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TIMES BUILDING

[*Regular Edition, August* 5, 1905.]

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and

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CONTENTS

DURING the last few years educators have been giving careful and anxious consideration to the possibility of effecting economies in the time that a man has to spend on his education before he can graduate from a technical or professional school, for, as many take a full professional schooling after a full collegiate course, it has been felt that a system that obliged a man to spend the first twenty-seven or twenty-eight years of his life in mere preparation for work was, considering the average life "expectancy," more than likely to be needlessly wasteful somewhere. By requiring more work in the preparatory schools and by readjusting the curricula followed in the colleges, it is now possible, at Harvard for instance, to get one's bachelor's degree in three years in place of four as formerly, and doubtless further economies can be made under the test of experience. One economy has long been practised by certain colleges and universities which are willing to accept a degree issued by one institution as entitling the holder to enter some of the classes of an institution of a higher grade, without requiring him to waste time in passing an entrance examination. The list of institutions willing to engage in this amiable practice has just been enlarged in a most interesting and unexpected manner, and, since international amity is involved, the matter of graciousness should not escape note. At the solicitation of Mr. Lloyd Warren, chairman of the Committee on Education of the Society of Beaux-Arts Architects, the Ministry of Fine Arts has consented to allow the Society's prize man—the prize is awarded annually, for two years—to compete in the *concours* of the First Class at the Ecole des Beaux-Arts without first having to go through at Paris the preliminary studies and examinations required from Second Class men. As such a privilege as this could only be granted on the submission of proof, the concession cannot but be gratifying to those members of the American society who have devoted themselves so unselfishly to the educational undertakings the Society fosters. Moreover, the act, by itself alone, gives the Society a standing as an educational institution which it might have been slow to claim for itself.

WITHOUT the illuminating aid of Professor Charles Eliot Norton, we doubt whether one man out of a hundred thousand, or more, would ever have divined that the real reason for the founding of the Archæological Institute of America was that it might be a rebuke or a barrier "to resist the flood of vulgarity and barbaric luxury brought in by the rapid and enormous increase of wealth then beginning to overwhelm the country." In furtherance of its most laudable ambition, the Institute, as soon as founded, began to seek for texts to enforce its precepts by digging up buried cities so that "the conditions of prehistoric barbarians" might be considered. The question inevitably suggested by this unexpected explanation is: Was the luxury of the "prehistoric barbarian" any less "barbaric" than that of our own over-opulent day? We fear that the founders of the Institute must now admit that their institution is a failure so far as original intention goes, but we trust that they may find consolation in the fact that they have contributed to the world's knowledge not a little very interesting and some quite valuable information.

ALTHOUGH the Archæological Institute of America finds it none too easy to procure funds for its own particular undertakings, and though Professor Norton would hardly go so far as to call the unfortunate inhabitants of Herculaneum "prehistoric barbarians"—although they did indulge in the lavish luxury he finds so vulgarizing nowadays—we do not question but that both will be glad to lend the aid of their approbation to the romantically attractive scheme for at length exhuming that long-buried city. Professor Charles Waldstein, once Director of the American School at Athens, and now holding the chair of the Slade Professor of Fine Arts at the University of Cambridge, England, is now in this country to raise money and complete the organization of a very powerful international body of archæologists, students and rich amateurs of art, with a committee of honorary presidents consisting of Kings, Presidents and Kaisers at the head, which shall at length excavate Herculaneum and bring its buried treasures to light. Professor Waldstein knows this world at least as well as he knows that of the ancients, and that just as the ordinary Englishman "dearly loves a lord," so the thoroughly democratic American dotes on royalty and can be counted well pleased to find his name in a subscription-list headed by Edward VII. and Victor Emmanuel II.

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PROFESSOR WALDSTEIN has gathered from geologists and others satisfactory proof that the material in which this city is buried is not a true melted lava, but rather a cementitious concrete of mud, ashes and refuse raped from the mountain side, and that, though this flood covered parts of the town to the depth of eighty feet, modern excavating machines can burrow their way into it without excessive waste of time and machinery. All that is needed, now that official permission has been obtained for the undertaking from the Italian Government, is money enough to pay for the needed plant and labor. The bill, will be large, of course, but, great as the cost may be, it is probably not too great to pay for the recovery of the interesting works of art that almost indubitably can be unearthed. The marble and bronze equestrian statues recovered from the Theatre and the smaller bronze statuettes, tools and utensils, and above all the papyri recovered from the House of Piso, bear testimony not only to the artistic quality and probable number of the objects of art there buried, but also prove that the flood of liquid mud was a far more kindly preservative than the thinner covering of hot ashes that sepultured Pompeii. Now that this quest seems likely to be prosecuted with energy, we cannot help believing that it will actually be carried to a successful issue without too many delays. The remarkable verifications of history and legend accomplished in various parts of the ancient world by public and private archæological expeditions will serve as a constant spur to flagging energies and afford perennial encouragement in the face of delay and obstacle.

THE Washington correspondent of the St. Louis *Globe-Democrat* throws an amusing sidelight on the promotion of art or the art of promotion, as you will, as practised in Government circles. The story runs that last year, in a fit of economy, Secretary Shaw forbade that the report of the Supervising Architect should contain any illustrations of buildings newly designed, and was so pleased with his device that he proposed to follow the same course this year. This did not suit the Supervising Architect or the wishes of Congressmen in whose districts new buildings were to be erected, and so representations were made to the Secretary of the Treasury that a report without the usual illustrations was quite valueless: in fact, could not be given away, the proof being that about half of the previous year's unillustrated report still lay in the vaults uncalled for and undesired by even the most impassioned book-collector. As Mr. Taylor's office turns out work too good to lose, it is fortunate that Secretary Shaw saw the point, and allowed the report to revert to its accustomed form. As we ourselves put in a bid for the printing of the document, we happen to know how beggarly an economy the Secretary was aiming to effect.

THE shyster lawyer is known to make his living sometimes by working up blackmailing cases, and there are nowadays so many curious suits involving building-lines that get into the courts that one is tempted to believe that there must be engineers of the same class, who spend their time in studying deeds and taking sights with the object of now and then establishing a case of trespass which they can work to a profit. The latest of these curious cases concerns a lot of land on William Street, New York, which is in use under a hundred years' lease that still has half a century to run. Upon the lot next this property, the Royal Baking Powder Company erected a building, the upper stories of which were allowed to oversail the party-line by eight inches. The trespass was at once noticed, and the trespasser was warned, but took no heed. Then an injunction was brought, but this was dissolved and finally suit was entered. Any one indulging in law-suits has to watch the court's docket, and recently Mr. Graham, the plaintiff, while examining the docket for the day was startled at reading the announcement that his case had been "settled" and withdrawn. With the aid of his lawyer, who knew of no settlement, he at length discovered that the owner of the fee, the Dutch Reformed Church, had sold to the trespasser a strip of land eight inches wide. As the land is still subject to the tenant's fifty years' easement, the sale can not really diminish his rights, but it obviously gives the Baking Powder Company a better fighting chance, and, having plenty of money, they evidently mean to fight.

THE fact that there are established in this country a large number of architects who were born and received their architectural training in foreign countries is once more brought to mind by learning that Mr. Gordon W. Lloyd dropped dead in a restaurant last week in San Francisco, where he happened to be, on his way to Australia. Mr. Lloyd, though born in England, came to this country in boyhood but was sent back to his early home to finish his education and study the profession he was to adopt. On his return to this country in 1858 he established himself in Detroit and to the time of his death carried on there a large and successful practice.

IT is rather a shock to one's sense of the eternal fitness of things to know that, even in a quiet way, there has been in official quarters a discussion going on as to the propriety of discontinuing the Villa Medicis or rather as to the advisability of continuing that cradle of the arts where so many art students have become full fledged artists —if we may be allowed a slight jumbling of metaphors. The discontinuance of the Villa Medicis would seem to involve the abolition of the several Prix de Rome, and the discontinuance of the Prix de Rome would be to the Ecole des Beaux-Arts very like putting the axe to the roots of a vigorous, however venerable, tree. The cause of the discussion, which had final outlet in the Chamber, was the difficulty of finding a satisfactory successor as director to M. Guillaume, who had so admirably filled the place for many years. The trouble is that the Government *subvention* is not as large as it might be, only a total of thirty-five hundred dollars being applicable to the director's salary. Owing to the important position he fills, the director has to entertain all sorts of notables and and has to do it largely at his own expense; consequently only a rich man can afford to accept the honor when offered. The selection of the painter Carolus Duran fortunately solved the problem, for that artist has won a large fortune with his brush and can afford to accept the honor. Aspirants for the Grand Prix are therefore likely still to enter *en loge* for further centuries as they have ever since the days of Louis XIV.

HEATING AND VENTILATION—I.

THE subjects heating and ventilation in their different branches are usually taken up independently of the buildings to which they are to be applied. In this, and the articles following, different classes of buildings will be treated separately, and the apparatus best adapted to each will be briefly discussed, together with the methods of proportioning and arranging the different parts for the best results, both as regards ease and economy of operation.

Buildings requiring the simplest systems of heating will be taken up first, and the various pieces of apparatus described can then be applied to more complex arrangements without further description.

In designing a heating system for any building the first step is to determine the heat loss which must be made good by artificial means. The loss of heat from a building is due to the following causes: First, conduction through walls and windows; second, leakage of warm air around doors and windows and through the walls themselves; third, heat required to warm the air for ventilation. The loss of heat through the walls of a building depends upon the material used, the thickness, the number of layers and the difference between the inside and outside temperatures. The exact amount of heat lost in this way is very difficult to determine theoretically, and so we depend principally upon the results of actual experiments.

The leakage of air from a room varies from one to two or more changes per hour, depending upon the construction, the frequency of the opening of doors, etc. It is common practice to allow for one change per hour in well constructed buildings where two walls of the room have an outside exposure. As the amount of leakage depends upon the extent of exposed wall and window surface, it may be provided for by increasing the allowance for loss due to conduction.

There are several tables in use that give the heat loss through walls of different materials and thicknesses under varying temperature conditions. The following, taken from Wolfe's chart, has given good results in practice, when properly corrected for exposure, etc. The factors given in this Table are sufficiently large to cover the losses by leakage.

Material.	Difference between inside and outside temperatures.									
	10°	20°	30°	40°	50°	60°	70°	80°	90°	100°
8″ brick wall	5	9	13	18	22	27	31	36	40	45
12″ " "	4	7	10	13	16	20	23	26	30	33
16″ " "	3	5	8	10	13	16	19	22	24	27
20″ " "	2.8	4.5	7	9	11	14	16	18	20	23
24″ " "	2.5	4	6	8	10	12	14	16	18	20
28″ " "	2	3.5	4.5	7	9	11	13	14	16	18
32″ " "	1.5	3	5	6	8	10	11	13	15	16
Single window	12	24	36	49	60	73	85	93	105	...
Double window	8	16	24	32	40	48	56	62	70	...
Single skylight	11	21	31	42	52	63	73	84	94	...
Double skylight	7	14	20	28	35	42	48	56	62	...
Concrete on brick arch	2	4	6.5	9	11	13	15	18	20	22
Wood floor on brick arch	1.5	3	4.5	6	7	9	10	12	13	15
Double wood floor	1	2	3	4	5	6	7	8	9	10
Ordinary wooden dwellings	3	5	8	10	13	16	19	22	24	27
1″ wooden door	4	8	12	16	20	24	28	32	36	40
2″ wooden door	3	5	8	10	13	16	19	22	24	27

For sandstone, increase the factors given for brick by 1.6, and for limestone by 1.75. The figures in the table give the loss per square foot of exposed surface per hour, in British thermal units (B. T. U.).

Where rooms have an attic above or an unwarmed basement beneath, the heat loss through walls and windows should be multiplied by 1.10. The figures given in the Table are for rooms having a southern exposure; for other exposures multiply by the following factors:

Exposure.	Factor.	Exposure.	Factor.	Exposure.	Factor.
N.	1.32	W.	1.20	S. E.	1.06
E.	1.12	N. E.	1.22	S. W.	1.10
S.	1.0	N. W.	1.26	N. E. S. W. (total exposure.)	1.16

The use of the Table may be more clearly shown by applying it to a practical case:

Example.—A room 15 ft. square and 10 ft. high has two exposed walls; one toward the north and the other toward the east. There are four windows, each 3 ft. by 6 ft. in size. The two in the north wall are double, and the others single. The walls are of brick, 20 in. thick, with an inside temperature of 70 degrees. What will be the heat loss per hour when it is 10 degrees below zero?

Total surface	15 x 10 x 2 = 300
Glass surface	3 x 6 x 4 = 72
Net wall-surface	228
Difference between inside and outside temperatures	80°
Factor for 20-inch brick wall	18
Factor for single window	93
Factor for double window	62

The heat losses are as follows:

Wall	228 x 18 = 4,104
Single windows	36 x 93 = 3,348
Double windows	36 x 62 = 2,232
	9,684

As one side is toward the north and the other toward the east, the actual exposure is northeast. The factor for this exposure is 1.22; therefore, the total heat loss is 9684 × 1.22 = 11814 B. T. U. per hour.

DWELLING HOUSES.

The systems of heating commonly used for dwelling houses include stoves, hot-air furnaces, direct and indirect steam, and direct and indirect hot-water.

Stoves.—The simplest and cheapest form of heating is the stove. The heat is diffused by radiation and convection directly to the objects and air in the room, and no special system of transmission is required. The stove is used largely in the country and is especially adapted to the warming of small dwelling houses and isolated rooms.

Furnace Heating.—Next in cost of installation and simplicity of operation is the hot-air furnace. By this method of heating, the air is drawn over heated surfaces and then transmitted through pipes, while at a high temperature, to the rooms where heat is required. Furnaces are more costly than stoves, but have certain advantages over that form of heating. Being placed in the basement, more space is available in the rooms, and the dirt and litter connected with the care of a stove is largely done away with. They require less care, as only a single fire is necessary to warm all of the rooms in a house of ordinary size. One great advantage in this method of warming comes from the constant supply of fresh air which is required to bring the heat into the rooms. While this is greatly to be desired from a sanitary standpoint, it causes the consumption of a larger amount of fuel than would otherwise be necessary, for heat is required to warm the fresh air from out of doors up to the temperature of the rooms, in addition to that lost by leakage and conduction through walls and windows.

A more even temperature may be maintained with a furnace than by the use of stoves, owing to the greater depth and size of the fire which allows it to be more easily controlled. When a building is placed in an exposed location there is often difficulty in warming rooms on the north and west sides or upon that side toward the prevailing winds. This may be overcome to some extent by a proper location of the furnace and by the use of large pipes for conveying the hot air to those rooms that need to be favored. Furnaces may be divided into two general types known as "direct-draught" and "indirect-draught." In the direct-draught furnace the gases pass from the top of the combustion-chamber into the smoke-pipe by way of passages more or less direct. In some of the cheaper forms the gases pass directly into the smoke-pipe, thus carrying away much heat which should be utilized.

In the ordinary form of indirect-draught furnace the gases pass downward through flues to a chamber, or radiator, located near the base, thence upward through another flue to the smoke-pipe. A direct-draught damper is provided to give a direct connection with the smoke-funnel; this is to be used when coal is first put on, for carrying off the increased amount of gas which is formed at that time.

The fire-pot is usually made of heavy cast-iron or of steel plates lined with fire-brick and varies from about 12 to 18 inches in depth. Cast-iron fire-pots are more effective as heating-surfaces than lined ones, and where the latter form is used it is necessary to increase the size of the radiator or dome to offset it. The body of the furnace above the fire-pot is commonly called the dome or combustion-chamber. It should be of sufficient size to permit the gases to become thoroughly mixed with the air passing up through the fire or entering through the feed-door. The dome should be made somewhat larger than the fire-pot.

The radiator is a chamber placed either at the top or bottom of the furnace and acts as a sort of reservoir in which the gases are kept in contact with the air passing over it. Radiators are built of cast-iron, of steel plates, or of a combination of the two. Their effectiveness depends upon their form, the amount of heating-surface they offer and the difference in temperature between the gases and the surrounding air. If the radiator is placed near the bottom of the furnace it is surrounded by the coldest air and is therefore more effective; but, on the other hand, the cold air has a tendency to condense the gases and the acids thus formed are likely to corrode the iron.

The heating-surfaces of a furnace are made up as follows: The fire-pot, the dome or combustion-chamber, flues and radiators, and extended surfaces, such as ribs or pins. The ratio of heating-surface to grate-area varies somewhat according to the size of the furnace; it may be taken as ranging from 2.5 in the smaller sizes to 1.5 in the larger.

One of the first points to be determined in estimating the heating-capacity of a furnace is its efficiency—that is, the proportion

of heat in the coal that can be utilized for warming. The efficiency depends chiefly upon the area of the heating-surface as compared with the grate, on its character and arrangement, and on the rate of combustion. In practice the efficiency uusally ranges from 50 to 70 per cent. The rate of combustion required to maintain an inside temperature of 70 degrees depends upon the outside weather conditions. In zero weather this should be from 4 to 5 pounds of coal per square foot of grate per hour. In estimating the required size of a first-class furnace with a good chimney-draught, we may safely count upon a maximum combustion of 5 pounds of coal per square foot of grate per hour, and may assume that 8000 B. T. U. will be utilized for warming purposes from each pound burned. This corresponds to an efficiency of 60 per cent., which is a fair average.

Having determined the heat loss from a building by the methods given, it is a simple matter to compute the size of grate necessary to burn a sufficient quantity of coal to furnish the amount of heat required for warming.

In computing the size of a furnace it is customary to consider the whole house as a single room with four outside walls and a cold attic. The heat losses through the walls and windows are then computed and increased 10 per cent. for the cold attic and 16 per cent. for total exposure.

For wooden dwellings of the usual construction, the following simple method may be used: Multiply the total exposed surface by 38, which will give the heat loss in B. T. U. per hour for an inside temperature of 70 degrees in zero weather. This factor is obtained in the fol owing manner: Assume the glass surface to be one-sixth of the total exposure, which is an average proportion. Then each square foot of exposed surface consists of one-sixth glass and five-sixths wall, and the heat loss for 70 degrees' difference in temperature would be as follows:

Wall	$\frac{5}{6}$ x 19	= 15.8
Glass	$\frac{1}{6}$ x 85	= 14.1
		29.9

Increasing this 10 per cent. for loss through ceilings and 16 per cent. for total exposure, we have $29.9 \times 1.10 \times 1.16 = 38.1$. The loss through floors is considered as being offset by including the kitchen walls, which are warmed by the range and would not otherwise be included, if computing the loss from each room separately.

If the heat loss is required for outside temperatures other than zero, corrections must be made as follows: Multiply by 50 for 20 degrees below zero, by 44 for 10 degrees below, and by 33 for 10 degrees above. This method is convenient for approximations in the case of dwelling houses, but the more exact method should be used for other types of buildings, and in all cases for computing the size of heat flues to separate rooms. When calculating the heat loss from isolated rooms, cold inside walls as well as the outside must be considered. The loss through a wall next to a cold attic, or other unwarmed space, may in general be taken as about two-thirds of that through an outside wall.

In calculating the size of a furnace we may consider the heat delivered to the rooms as being made up of two parts: first, that required to warm the outside air up to 70 degrees (the temperature of the rooms), and, second, the quantity which must be added to this to offset the loss by conduction through walls and windows. Air is usually delivered through the registers at a temperature of about 140 degrees with zero conditions outside, and leaves the rooms by leakage at a temperature of 70 degrees (the normal inside temperature), having lost one-half its heat by conduction, so that the heat given to the entering air must be twice that which has been computed for the loss through walls and windows by conduction.

Example.—Let us illustrate by the use of a practical example. The total heat loss from a building, as computed by the methods given, is 80000 B. T. U. per hour in zero weather. What size of furnace will be required to maintain an inside temperature of 70 degrees?

From the above we have a total amount of heat required equal to $80000 \times 2 = 160000$ B. T. U per hour. If we assume that 8000 B. T. U. are utilized per pound of coal, then $160000 \div 8000 = 20$ pounds of coal will be required per hour. If 5 pounds of coal can be burned on each square foot of grate per hour, then $20 \div 5 = 4$ square feet will be required. A fire-pot 28 inches in diameter has an area of 4.27 square feet and is the size we should use. When the outside temperature is 10 degrees below zero, multiply the computed heat loss by 2.14 instead of 2, and multiply by 2.28 for 20 degrees below and by 2.42 for 30 degrees below.

A furnace should be so placed that the warm-air pipes will be of nearly the same length. The air travels most rapidly toward the sheltered side of the house and to the upper rooms, so that the pipes leading to the north and west rooms on the first floor should be favored in regard to length and size. The furnace should, therefore, be placed somewhat to the north or west of the center of the house, or toward the points of compass from which the prevailing winds blow when the house is in an exposed location. The smoke-pipe should be carried to the chimney as directly as possible. The top of the pipe should not be less than 10 inches from unprotected beams nor less than 8 inches from beams protected by asbestos or plaster with a metal shield beneath. Town and city requirements vary somewhat in regard to this matter. A collar to make tight connection with the chimney should be riveted to the pipe about 5 inches from the end to prevent its being pushed too far into the flue. The chimney-flue should be made not less than one-seventh the grate-area of the furnace. A square flue cannot be reckoned at its full area as the corners are of little value. A clean-out door should be placed at the bottom of the flue for removing ashes and soot.

The cold-air box should be large enough to supply a volume of air sufficient to fill all the hot-air pipes at the same time. If the supply of cold air is too small, the distribution is sure to be unequal and the cellar will become overheated from lack of air to carry away the heat generated. It is common practice to make the area of the cold-air box three-fourths that of the combined area of the hot-air pipes. The inlet should be placed where the prevailing cold winds will blow into it; this is commonly the north or west side of the house.

Whatever the location of the entrance to the cold-air box, changes in the direction of the wind may take place which will bring the inlet on the wrong side. To prevent the possibility of such changes affecting the action of the furnace, the cold-air box is sometimes extended through the house and left open at both ends, with check-dampers arranged to prevent the air from blowing through. The inlets should be covered with wire netting of about ⅜-inch mesh. Adjustable shut-off dampers or slides should be placed in the inlets for throttling down the air-supply in case of high winds. A door to admit air from the cellar to the cold-air box is usually provided, but should not be used except when the house is temporarily unoccupied or during high winds. A return register placed in the front hall and connected with the cold-air box is often advisable for use in extremely cold weather, as it may be arranged to catch the cold air which rushes in when the door is opened, and also that which leaks in around it while closed. Check-valves or flaps of light gossamer or cloth should be placed between the cold-air box and the register to prevent back drafts of cold air.

The required size of the hot-air pipe to any given room depends upon the heat loss from the room and the volume of warm air required to offset this loss.

Each cubic foot of air warmed from zero to 140 degrees brings into a room 2.2 B. T. U. We have already seen that in zero weather, with the air entering the registers at 140 degrees, only one-half of the heat contained in the air is available for warming purposes, so that only 1.1 B. T. U. in each cubic foot of entering air can be utilized for this purpose. Therefore, if we divide the computed heat loss in B. T. U. by 1.1, it will give the cubic feet of air at 140 degrees necessary to warm the room in zero weather. As the outside temperature becomes colder, the quantity of heat brought in per cubic foot of air increases, but the proportion available for warming purposes becomes less at nearly the same rate, so that for all practical purposes we may use the figure 1.1 for all usual conditions. In calculating the size of pipe required, we may assume maximum velocities of 280 and 400 feet per minute for rooms on the first and second floors, respectively.

Knowing the number of cubic feet of air per minute to be supplied, we can divide it by the assumed velocity, which will give us the required area of the pipe in square feet.

Round pipes of heavy tin or galvanized-iron are used for this purpose.

The following Table will be found useful in determining the required diameters of pipe in inches:

Diameter of pipe, in inches.	Area, in square feet.	Diameter of pipe, in inches.	Area, in square feet.	Diameter of pipe, in inches.	Area, in square feet.
6	.196	10	.545	14	1.07
7	.267	11	.660	15	1.23
8	.349	12	.785	16	1.40
9	.442	13	.922		

Example.—The heat loss from a room on the second floor is 22000 B. T. U. per hour. What diameter of hot-air pipe will be required?

$22000 \div 1.1 = 20000$ = cubic feet of air required per hour; $20000 \div 60 = 333$ per minute. Assuming a velocity of 400 feet per minute, we have $333 \div 400 = .832$ square foot, which is the area of the pipe required. Referring to the table of areas, we

find this comes between a 12 and 13-inch pipe, and the larger size would probably be chosen. Since long horizontal runs of pipe increase the resistance and loss of heat, they should not, in general, be over 15 feet in length. Pipes of excessive length should be increased in size for the additional resistance.

A damper should be put in each pipe near the furnace for regulating the flow of air to the different rooms and for shutting them off entirely when desired.

While round-pipe risers give the best results, it is not always possible to provide a sufficient space for them, and flat or oval pipes are then substituted. When vertical pipes must be placed in single partitions, much better results will be obtained if the studding can be made 5 or 6 inches deep instead of 4, as is usually done. Flues should never, in any case, be made less than 3½ inches in depth. Each room should be heated by a separate pipe unless it be two unimportant rooms on an upper floor. A clear space of at least ½ inch should be left between the risers and the studs, and the latter should be carefully tinned, and the space between them on both sides covered with tin, asbestos or wire-lath. The following Table shows the capacity of oval pipes. A 6-inch pipe ovaled to 5 means that a 6-inch round pipe has been flattened out to a thickness of 5 inches, and column two gives the resulting area:

Dimension of pipe.	Area, in sq. inches.	Dimension of pipe.	Area, in sq. inches.
6 ovaled to 5	27	9 ovaled to 6	57
7 " " 3½	29	11 " " 4	58
7 " " 4	31	10 " " 6	67
7 " " 6	38	11 " " 5	67
8 " " 5	43	15 " " 3½	73
9 " " 4	45	12 " " 5	75
10 " " 3½	46	14 " " 4	76
9 " " 5	51	19 " " 4	96
12 " " 3½	55	20 " " 3½	100

Having determined the size of round pipe required, an equivalent oval pipe can be selected from the table to suit the space available for running it.

The registers which control the supply of warm air to the rooms generally have a net area equal to two-thirds of their gross area. The net area should be from 10 to 20 per cent. greater than the area of the pipe connected with it. It is common practice to use registers having the short dimension equal to, and the long dimension about one-half greater than, the diameter of the pipe. This gives the following standard sizes for different diameters of pipe:

Diameter of pipe.	Size of register.	Diameter of pipe.	Size of register.
6	6 x 10	12	12 x 17
7	7 x 10	13	14 x 20
8	8 x 12	14	14 x 22
9	9 x 14	15	15 x 22
10	10 x 15	16	16 x 24
11	11 x 16		

CHARLES L. HUBBARD.

(To be continued.)

LOSSES IN UNDERGROUND MUNICIPAL STRUCTURES.*

THE author has recently completed the uncovering of some miles of water and gas pipe and replacing the pavement, and while doing so was again forcibly impressed by the enormous loss and inconvenience caused by ordinary municipal and corporate methods of constructing and managing street surface and sub-surface structures. While this is a matter of more or less common knowledge, it is one of the most serious unsolved problems confronting municipal engineers and boards of public works, and it is probably only the apparent hopelessness of remedying present conditions which causes them to be tolerated as they are. The sources of loss are herein considered separately, but possible remedies are considered for all of them taken collectively, for the reason that it seems probable that no remedy can be found for one or two only which will be effective even for these. In fact, the attempt to treat each by itself is probably the chief reason why no acceptable results have yet been obtained by water, sewer or street boards or commissioners in preventing these wastes, and one of the objects of this paper is to call to the attention of the overseers of each class of improvement the interdependence of them all in this matter, with the hope that by co-operation a common, satisfactory solution may be found to all of the difficulties in a considerable number of cases.

Most of the losses to be referred to can be classed under four heads: 1. The destruction of street paving by constant digging up of the streets. 2. The cost of the digging itself and replacing the paving whenever the substructures must be got at. 3. The losses due to leakage of gas. 4. The loss of water by leakage. There are incidentally minor losses and inconveniences, such as the thawing of water mains and service pipes; the interference with traffic caused by excavations; difficulty of access to and ignorance of the exact location of service connections and other appurtenances; the great confusion of pipes so intricately placed beneath the streets of large cities, etc.

1. *Pavements.*—Secretary Tillson, in his work on "Street Pavement and Paving Materials," says, "It is almost impossible to repair any opening in a pavement so that it will be as good as before disturbance," and we know this to be a fact. It is not that it is not done, but that it is not practicable. The remedy does not lie entirely in being more strict with those disturbing the pavements. No pavement is now in use which can be patched without causing humps or depressions which will diminish the serviceability and hasten wear, and weak spots in the foundation, causing after settlements, are apt to be numerous. This undoubtedly results in a financial loss both in the pavement and to traffic, the former of which can best be expressed, perhaps, in terms of the shortening of the life of the pavement, but which it is difficult if not impossible to determine definitely. I believe most authorities would admit a reduction of at least 15 per cent. to 25 per cent. in the serviceable life of each section patched. The loss to vehicles might be expressed as a negative gain from the improved paving; that is, if the pavement which has been torn up and replaced is but three-fourths as much an improvement on previous conditions as if it had been left intact, then one-fourth the cost of that improvement has been lost. If the pavement were found to last four-fifths as long as if undisturbed, and meantime to have but three-fourths its full value as an improvement, then the disturbing of that pavement has caused a loss of 40 per cent. of its construction cost. The loss to vehicles may not extend over the entire surface when but one or two trenches are dug longitudinally, but the shortening of life does, since the pavement must be renewed as a whole and not by patches. (Asphalt can be patched with better success than other pavements, but ,on the other hand, the patching generally costs more.) I believe 30 per cent. of the cost of city pavements would be a conservative estimate of the loss due to disturbing them—50 to 75 cents a square yard, or, say $2 to $4 a lineal foot. If this loss be distributed over the life of the pavement, and this be assumed at sixteen years (on the basis of twenty years of life if undisturbed) we have 12.5 to 25 cents per year per foot as this loss.

As to the amount of such disturbance. In New York, in 1896, one mile in four was torn up for construction purposes, and one opening requiring repairs for every 40 feet of paved street. In Brooklyn, during the same year, one opening was made for every 75 feet of paved street. In Boston, in 1897, in about 500 miles of paved streets there were 14,017 separate openings, about one to every 185 feet, with a total length of openings of 2,134 miles. In Chicago, in 1902, 20,200 permits were granted to tear up pavements, resulting in about 200,000 square yards of disturbance, or one opening to each 340 feet of street. Records of smaller cities are difficult to obtain, but with the spread of wire conduits and steam heating to small cities and towns (which already have sewers, waterworks and gas), all agree the destruction of pavements is increasing rather than decreasing.

2. *Cost of Digging.*—This, of course, depends largely upon the size of hole necessary, but probably no opening costs less than $3 to $5 plus the cost of replacing the paving. This last will cost, if properly done, about as much as the original paving, even when most of the material can be used again—say, at least $1.50 per square yard for all pavements on a concrete base and 50 cents for macadam. In Washington, D. C., the cost of taking up and replacing the paving for street openings during one year on about 125 miles of streets (110 of which were asphalt and ten asphalt-block) was $47,594.83, or $380 per mile, or 7.25 cents per foot.

Assuming one opening, costing $4 for excavating and back-filling for each 100 feet of street, gives 4 cents per foot for this. Probably 8 to 15 cents a lineal foot of the entire street surface would not be an excessive estimate of the cost of excavating where the pavement is properly returned.

3. *Gas Mains.*—It has been estimated that "in good practice the normal leakage of gas mains is 225,000 cubic feet per mile per annum for an average diameter of 6 inches. It is frequently twice that amount; in some instances it is three or four times greater. In American practice leakage ranges from 10 to 30 per cent. of the output." (Jas. C. Bayles, League of American Municipalities, 1902.) In 1898, 353 plants reported to the United States Commissioner of Labor a leakage of 7.3 per cent. to 14.7 per cent., 163 of these more than 14 per cent. and all but 26 more

*A paper read before the American Society of Municipal Improvements by Prof. A. Prescott Folwell.

than 11 per cent. If we assume that gas costs an average of 40 cents in the mains, and a leakage of 200,000 cubic feet per mile per year, this gives a loss of $80 per year per mile of main, or 1.5 cents per foot. Unfortunately the greatest loss due to leakage of gas does not always fall upon the gas company, but is found in the destruction of asphalt pavements above such leaks; in many fires of "unknown origin," but attributed by insurance companies to gas leaking into cellars and basements from the ground (the freest outlet when street surfaces are sealed with concrete); in explosions and asphyxiation of workmen in sewers, a large part of the "sewer gas" to which this is attributed being generally illuminating gas; and in the illness of individuals and shade trees.

4. *Water Mains.*—Much has been written about waste of water by consumers; not so much about loss from the underground mains and service connections. Mr. Dexter Brackett reported to the Metropolitan Water Board (Boston and vicinity) in 1904 that "the tests which have been made in the several municipalities of the metropolitan district tend to show that the leakage from the street mains and services is very large, and that from 10,000 to 15,000 gallons per mile of street main escape each day into the ground or into some underground channel." In one town of this district 24,000 gallons per day was found to leak from 1,000 feet of main—a rate of 130,000 gallons per mile. Different authorities consider that an average of from 500 to 3,000 gallons of water leak from each mile of well-laid main daily. Taking the average of poorly laid and well laid, probably 5,000 gallons is well under the actual amount in the average plant. At 5 cents per 1,000 gallons at the average cost of putting water into the mains, this means a loss of $91 per year per mile of pipe, or 1.7 cents per foot.

For the sake of brevity few data have been introduced to substantiate the above statements and assumptions, but they are all based upon reliable reports and investigations, and probably any member of this Society could find in his own city indications, if not proofs, that they are conservative.

These four losses, as estimated above, total 22.5 to 45 cents per lineal foot of street per year. This is, of course, a general average, and some cities may be so fortunate as to suffer much less loss. But the author believes there are more in which these figures are exceeded in the business sections. There are the additional considerations of the annoyance from tearing up of streets and from odors of gas, and objections to water waste other than financial ones and others previously mentioned.

The correction of each of these objectionable conditions without a radical change of the entire system of underground structures has probably progressed nearly as far as is practicable; but with more care joints of sewer, water and gas pipes and the house services of each (in which much if not most of the leakage frequently is found) can be improved upon. For instance, a small box might be placed over every corporation cock and goosenecks always used; tarred pipe could be rigidly excluded from gas mains (the author has seen a great many tarred specials used in these). Also service connections could be run to the curb opposite every building lot from sewer, gas, water and heat mains just previous to repaving and at no other time. But there would still remain the tearing up of streets for laying new mains, for repairing leaks, thawing frozen pipes, etc.

The most serious loss, that in connection with the paving, can be somewhat lessened by having all tearing up, back-filling and repaving done by the city at a fixed price which the corporations desiring the excavation should pay. It would not then be necessary to bring pressure upon and await the delays of the corporations responsible for remedying the faulty relaying of a pavement, but all paving and repairs would be under the immediate supervision of and attended to directly by one city department. This is probably the best solution of an undesirable state of affairs, and has been adopted by several cities. But even this does not give perfect repaving, since such is practically impossible, nor do away with the annoyance and cost.

The only solution which can be adopted as satisfactory will be one in which the paving will never need to be torn up until worn out, in which all pipes, wires, etc., can be laid without interfering with the paving and be readily inspected at any time, this being true of service pipes and wires as well as mains. The paving can be preserved by not permitting either private corporations or city departments to lay any mains under the streets, but compel them to purchase right-of-way along private property, or else reserve strips of public property—such as alleys or strips between the sidewalk and the street (the latter of which would be interfered with by shade trees)—under which all such would be laid. But the other disadvantages are not remedied in this way. To meet them all a general conduit seems to be the only solution, with small branch conduits for the service lines. It seems probable that the model city of the future will have such conduits throughout its business section at least, where pavements are most expensive and such structures most numerous. In them would be placed the small sewers of the separate system, water, gas and steam-heating mains, while in the walls of hollow tile could be run the telegraph, telephone and other wires. St. Paul already has something similar to this in its sandstone sewer tunnels, as has Paris in its sewers. Nottingham and St. Helens, England, comparatively small cities, have had such conduits for several years. In Chicago 60 miles of tunnels for wires have been built, the trunk tunnels 12 2-3 by 14 feet, the branches 6.5 by 7 feet. If a private company can do this for its own wires only, it would seem to be still more practicable financially when all the above can be provided for. The advantage of such a conduit is not confined to the annual savings if the structures it contains can be originally laid in it, thus saving the excavating and repaving which would otherwise be necessary. This would amount to not less than 75 cents a foot for each structure, or $3 a foot for four—as sewer, water, gas and steam. (In the centers of the larger cities the number of various pipes, etc., would be several times this.) An electrical conduit in a business section costs $2 to $4 a foot or more (26 cents per duct foot on an average). Therefore, even in a city of small size—say 25,000 to 60,000—the saving of $5 to $10 on construction would be effected. The loss of 22.5 to 45 cents per foot capitalized at 4 per cent. would give $5.56 to $11.25 per foot, or a total of say $10.50 to $21 per foot. The conduit offers other advantages besides these financial ones, such as facility of inspection of all pipes, etc., and exact knowledge of the location and condition of each service connection. Also freedom from freezing of water mains and ease of thawing if frozen.

The weak point in this argument, and probably one of the principal reasons why more cities have not built these conduits, is that before they are really necessary several of the pipes have already been laid in different parts of the street, and instead of saving much of the cost of laying, the use of the conduit requires the relaying of all of them, or of all but one, around which one the conduit may be built. But in spite of this it would seem as though some such a contrivance is a necessity if we are to construct and maintain good paving, and that the time is coming when any city can afford a brick, asphalt or modern wood-block pavement must afford to first place under it a conduit which will preserve it from premature disfigurement, deterioration and renewal.

THE SORBONNE.

FIRST of all, the Sorbonne is a building, one of the most successful—and most unsuccessful—attempts of modern architecture to supply the demands of a great modern university. It is one of the many buildings of the present University of Paris, and it is the seat of the most important organism of the centralizing, State-monopolizing, all-embracing University of France. By the way, it occupies the site and wears the name of an historic building which was the center of the old University of Paris from the thirteenth century to the Revolution; and the old seventeenth-century church remains built into the modern structure and still contains the tomb of Richelieu, second founder of the Sorbonne.

The new building is a construction of the republic. The Empress Eugénie indeed laid a corner-stone in 1855; but nothing was done, the plan was abandoned, even the corner-stone was lost. So everything had to be begun over again; and the first operation was a great competition of plans for the choice of an architect. M. Nénot, a "Grand Prix de Rome," came out ahead, a young man of twenty-nine. This was in 1882, and for twenty-two years he has been realizing his plans in stone, carved architecturally without and painted murally within, with arched vestibules and a giant stairway and cloistered passages round interior courts, giving hundreds of lecture-rooms, which are sometimes well fitted to their purpose, and too many dark corners reserved for laboratories. But the show rooms, the great halls of pomp and parade, are beyond all praise.

The front of the building, on the side of its official entrance, extends 274 feet along the Rue des Ecoles, one of the broad avenues cut ruthlessly by Baron Haussmann through the century-old grime of the crowded, tumble-down Latin Quarter. Then, in an irregular oblong of from 700 to more than 800 feet, the build-

ing climbs the hill along the Rue Saint-Jacques, which was a Roman road on one side and old streets with modern names on the other. There it is on a level with the transmogrified Collège Sainte-Barbe, which in the mediæval university had Ignatius of Loyola and John Calvin for its students, the present flourishing Law Faculty, and beyond with the Panthéon. Across the Rue Saint-Jacques, lower down, is the Collège de France, the venerable seat of a higher university extension imagined by Francis the First. Below is the Musée de Cluny—an abbot's house built around Roman baths where Emperor Julian was sweated, even if he was not crowned there, as legend has it. And on every side university buildings dot this genuine Latin Quarter—where Latin is talked or thought, and which is not to be confounded, as Americans in and out of Paris do, with the art students' Bohemia. Altogether, the surroundings are all that could be desired for an historic Studium Generale, which is here and now a beehive humming with young thought and old doctrine.

Tourists commonly visit the Sorbonne to see the mural paintings—at the head of the great stairway, the Fasti of Paris Letters by Flameng and of Science by Chartran; in the amphitheatre, the long hemicycle of Puvis de Chavannes, "Sacred Wood." But if the janitress is properly tipped and there is nothing going on, you may be introduced into vast halls glorious and golden in decoration; the Salle du Conseil Académique, with its panels painted by Benjamin-Constant; the great reception-hall, decorated by Cazin; the rector's dining-room, by Raphael Collin, the rector's own reception-room, by Olivier Merson, and other salons and halls for university committees and doctors' parade disputations, by other contemporary French artists, proud to do their best work for one of the chief monuments of new Paris. The taste for sculpture is not so commonly found among visiting tourists, but here and there and everywhere are planted decoratively statues of university glories, as far back as Homer for letters and Archimedes for science (by Falguière).

This one building, now fairly complete, except in details, serves first for the two faculties of letters and sciences of the University of Paris. It includes none of the professional scientific schools; but it furnishes a place for the Ecole Pratique des Hautes Etudes —a special school for the supraliminal highest courses of all—and for the celebrated Ecole Nationale des Chartes, where archivists, librarians and archæologues who have to do with documents may learn to read and weigh the parchments of a thousand years equally with the browning papers of the Revolutionary tribunals and the sources of contemporary French history.—S. D. in *New York Evening Post.*

BOOKS AND PAPERS

MR. McGOODWIN'S book* is handsome and attractive, conspicuously so, and is a credit alike to writer and publishers. But it has nevertheless a modest purpose. It does not propose to go any farther in illuminating the obscurities of *Shades and Shadows* than is necessary to make clear the processes commonly employed in the solution of some common problems. In pursuit of this eminently practical end the plates are numerous, some of the earlier ones are quite simple, and all of them, instead of being mere geometrical diagrams, mechanically engraved, are *fac-similes* of actual drawings made with pencil, pen and brush. The book thus teaches by example as well as by precept. The accompanying text is brief and is pertinent to the special cases in hand, and it contains, incidentally, much useful information and good advice in regard to the use of brush, pen and pencil, thus enforcing example by precept.

Besides these plates, which are seventy in number, there is, for a frontispiece, an interesting and instructive one showing a line-drawing, a rendered drawing, and a photograph, all of the same building. In this, by an unlucky slip, Mr. Hunt is named after his son. There are also, at the end of the book, half a score of plates of the Orders, with their shades and shadows, photographed from plaster casts, a unique and admirable feature.

The technical terms are few, simple and well chosen, and the notation consistent and not difficult to master. Still, the book is not easy reading, and only experience over the drawing-board and in the class-room can show whether, as may be feared, some of the examples given are a little complicated for the purpose, and the explanations a little concise. The processes would probably be easier to follow if the construction-lines had been *dotted in*, as is usual in text-books. But then the plates would have been less like real work. They would also have been more attractive, as well as more informing, if the portion of the surfaces which is in shade had been discriminated from that in shadow by a lighter tint, a distinction which, especially in drawings made to a small scale, as most rendered drawings are, adds greatly to their luminousness and to the transparency of the shadows. But there is, throughout the book, but little recognition of the phenomena of reflected light, either in the drawings or in the photographs.

Another thing which makes the drawings difficult to follow is the frequent use of a side elevation, instead of a plan, to give the third dimension, and the adoption of the draughtsman's device of economizing space and labor by drawing the plan, or side elevation, directly upon the main elevation, instead of below, or alongside. In fact the methods that are best for the draughtsman do not seem to be in all respects best suited to the needs of the teacher or of the student.

An admirable feature in this book is the repetition of a plate whenever the text which relates to it overruns the page opposite to it. Future writers please copy.

Carefully constructed shadows are, as Mr. McGoodwin justly says, an essential element in accurate draughtsmanship; if judiciously rendered they add greatly to the attractiveness of a drawing; and in geometrical elevations, which give only height and width, they are of practical service, as indicating the third dimension. But he goes on to claim that shadows are an important element not only in the composition of the picture, but in the architectural composition of the building itself, and that an architect, like a painter, should, in studying his design, directly aim at effects of chiaroscuro. This seems to us somewhat dangerous counsel, especially in view of the inevitable tendency, in drawing-board designing, to consider the rendered drawing as a final result of one's endeavors, instead of looking ahead to the actual conditions of the actual structure. Shadows are indeed a main element in the pictorial aspect of buildings, and this is necessarily the way of regarding them which is fostered by drawings and photographs. But this aspect varies, of course, greatly, according to the weather and the time of day. It can be commanded by the draughtsman in his sketches and renderings, and by the patient painter of landscape in search of the picturesque. But it is not to be counted on for the man in the street, in daily life, out of doors. Architecture, like sculpture, is a matter of solid forms. It exists in the round. It has to do with the real relations of real things, not with contrasts of lights and shades, blacks and whites, and the special charm which buildings and statues take on, when seen under special conditions of favorable illumination, has only an accidental and adventitious merit—like that given by searchlights to the Niagara whirlpool, or by the setting sun to the Cathedral front at Orvieto. We conceive that a building is best apprehended, in truth and soberness, on a gray day, and that its purely architectural qualities are then best manifested.

If this is so, it is a fair question whether the pictorial effects which make rendered drawings so attractive are not actually misleading, as well as quite irrelevant to the practical business in hand. One is here reminded of the sage remark of the eminent practitioner who said he could never trust his designs until the office-boy's copies of them looked well. It would seem, at any rate, as if the employment of shade without shadow, as in drawings made by diffused light, a treatment to which Mr. McGoodwin naturally does not refer, had some advantages over the accepted method. Though such drawings are less attractive they are not less veracious; they give the third dimension nearly as well, and for small objects much better; and they are free from the geometrical pitfalls which, even with Mr. McGoodwin's careful guidance, must always be a terror to the architectural draughtsman.

**Architectural Shades and Shadows*, by Henry McGoodwin, instructor in architecture in the University of Pennsylvania. Published by the Bates & Guild Company, Boston, Mass. Price, $3.

ILLUSTRATIONS

ELEVATIONS OF OFFICE BUILDING FOR THE BUSH COMPANY, LIMITED, BRIDGE, PEARL AND BROAD STREETS, NEW YORK, N. Y.
MESSRS. KIRBY, PETIT & GREEN, ARCHITECTS, NEW YORK, N. Y.

In these times when no architect seems to feel he is "doing" anything unless he has the fortune, good or bad, to have entrusted

to his skill the erection of a modern steel-skeleton "high building," it is distinctly refreshing to come upon some one who is willing to devote skill and study to the creation of so successful a low building as this. We do not know whether to congratulate the more sincerely the architects who were brought into contact with so amenable a client, or the client for having entrusted his fate to designers of such proved competence.

PLANS AND SECTIONS OF THE SAME.

GENERAL EXTERIOR DETAILS OF THE SAME.

HOUSE OF IRVING T. BUSH, ESQ., 28 EAST 64TH STREET, NEW YORK, N. Y. MESSRS. KIRBY, PETIT & GREEN, ARCHITECTS, NEW YORK, N. Y.

Additional Illustrations in the International Edition.

CENTRAL DOORWAY: CHURCH OF ST. BARTHOLOMEW, MADISON AVENUE AND 44TH STREET, NEW YORK, N. Y. MESSRS. MCKIM, MEAD & WHITE, ARCHITECTS, AND MESSRS. DANIEL C. FRENCH AND ANDREW O'CONNOR, SCULPTORS, NEW YORK, N. Y.

One of the pieces of decorated architecture in New York best worthy of attentive study is the frontispiece, as it were, which has been plastered across the lower story of St. Bartholomew's Church, which was built, a number of years ago, after the designs, of Messrs. Renwick, Aspinwall & Russell. The new and elaborate treatment of the doorways, which forms a memorial to the late Cornelius Vanderbilt, provided by members of his family, accords none too well with the treatment and material of the original structure, which is Lombardic in style and variegated in color; but it is so important in itself, so self-contained and so satisfying, that it can easily be, and always will be, considered as an entity, without reference to the building of which it now forms so all-important an adjunct.

DETAILS OF THE NORTH DOORWAY OF THE SAME CHURCH. MR. PHILIP MARTINY, SCULPTOR.

It should be noted that the large frieze at the left was modeled by Mr. Andrew O'Connor.

"BLITHEWOOD": HOUSE OF CAPTAIN A. C. ZABRISKIE, BARRYTOWN, N. Y. MESSRS. HOPPIN & KOEN, ARCHITECTS, NEW YORK, N. Y.

EXTERIOR DETAILS: HOUSE OF IRVING T. BUSH, ESQ., 28 EAST 64TH STREET, NEW YORK, N. Y. MESSRS. KIRBY, PETIT & GREEN, ARCHITECTS, NEW YORK, N. Y.

NOTES AND CLIPPINGS

THE BERLIN HEIGHT-LIMIT UNALTERED.—Another attempt to get permission to build skyscrapers in Berlin has failed. The law permits no building to exceed twenty-two metres in height.—*Exchange.*

THE CHATEAU DE BAGATELLE, PARIS.—The little château of Bagatelle, adjoining the Bois de Boulogne outside of Paris, which was built in 1779 by the Comte d'Artois, and was used during the Revolution as a restaurant, has been bought by the city of Paris for $1,300,000, and will be made part of the Bois de Boulogne park. It was owned by an Englishman, Sir Murray Scott, who was offered a much larger sum by speculators wishing to cut the property up into building-lots.—*New York Evening Post.*

HOW LOS ANGELES PROMOTES MUNICIPAL IMPROVEMENTS.—The city of Los Angeles, California, has just adopted a unique method of handling the telegraph-pole nuisance in the residence section. The business portion of that city having been pretty well cleaned up, it was decided after much discussion that two miles of street should be brought into conduit each year in the residence district. As Los Angeles has no alleys, and as there are two telephone companies supplying one instrument to every six inhabitants, the largest ratio of any city in the Union, the pest of poles and wires had become almost unbearable. The City Council, however, refused to agree to the two-mile per year conduit addition, unless it were embodied in a plan whereby the selection of the area could be made on some basis that would not be open to the charge of favoritism. To select some particular two miles of street for this advantage, when the whole city was clamoring for it, would involve difficulties the authorities were not willing to face. The arrangement finally effected provides for the filing of petitions by improvement associations representing the various streets contending for the favor, in which they set forth what improvements they are willing to make if the conduit privilege is granted; and the streets or regions with the best showing win. Two of the best resident streets of the city have entered the contest, offering to carry out a whole series of improvements, which would make them over into handsome boulevards, if their poles and wires are removed. This plan has been passed upon by many of the best civic authorities in the country and declared to be doubly effective; for it not only disposes of a nuisance but turns it to actual advantage in bringing about improvements.—*Municipal Journal and Engineer.*

AXEL HAIG'S ETCHINGS.—When Whistler was shown by the writer some of Mr. Haig's illustrations in *The Architect* he expressed surprise that so able a draughtsman did not produce etchings instead of lithographs. Mr. Haig took up etching, and with what success all lovers of art must know. A more remarkable exhibition of architectural views [recently opened in the Fine Art Society's rooms in Bond street] has never been seen in London. No plates or drawings are better adapted to popularize the art than Mr. Haig's. His etchings will hold their own for effect beside plates of another kind by various masters. It has been objected to them that they are over-elaborated. If etching is to be taken as the expression of a momentary emotion before a building, then of course detail is out of place. What different people observe when they look upon a cathedral probably varies according to the sensitiveness of the individuals. All who have a genuine achitectural spirit which qualifies them to become artists are struck by the irresistible power of the impression which such a building makes. When Mr. Bodley said that York Minster filled him with awe as a child, and that "it seemed like a great cliff wrought over with beauty and stamped with dignity," he was recording the experience of many another architect. To eyes like Mr. Haig's, which have been trained by practice of the severest kind—for he long worked for architects—much more is visible even at the first glance than is likely to appear to an ordinary observer. In Gothic buildings there is not only mass but detail, and Mr. Haig would belittle his architectural practice if he ignored those characteristics and represented a cathedral as if it were a simple structure which could be adequately suggested by a few lines. Those who are satisfied with simple studies will find in the pencil drawings exhibited evidence that Mr. Haig can be also expressive while employing only a very limited number of lines. Whatever he does is adapted to its purpose, and students of architecture will find a study of the drawings and etchings profitable to them.—*The Architect.*

KING LEOPOLD'S COLLECTION OF PAGODAS.—Among the many queer idiosyncrasies of King Leopold there is none that is more peculiar than his hobby for pagodas, which amounts almost to a mania. In fact, I believe that if he had his way he would live in a pagoda. Pagodas figure largely among the bric-à-brac of his palaces at Laeken and at Brussels, especially in his private apartments. There are pagodas of porcelain, ivory, ebony, of silver, and indeed of every conceivable material, while some years ago I recalled his keeping people employed for several months in hunting through all the curio shops of Paris and of other European capitals to find for him some Oriental bronzes in the shape of pagodas perched on the backs of elephants, and upon which he had set his heart. They were ultimately found with great difficulty in a second-hand shop in Paris. But the King was delighted, and they figure among his treasured possessions. If I mention this it is because he has just completed, at a cost of close upon $500,000, the construction of a species of pagoda in the grounds of his suburban palace at Laeken. It stands in the park near Jean de Bologna's fountain of Neptune, and rises to the height of nearly one hundred and fifty feet above the pedestal. There are about eight or ten stories to the pagoda, all the windows are of stained glass, and when at night it is lighted up by thousands of small electric globes the effect is most fairylike. The interior is decorated on a scale of extraordinary magnificence. Both China and Japan have been ransacked for the costly wooden carvings and superb lacquer panels, while the furniture is of carved ebony, inlaid with ivory, mother-of-pearl and silver. Close by is a Chinese restaurant, from which all the meals are served to the King when he is resting in his pagoda. But since it has been completed no visitors or strangers, not even court officials or members of the royal family, have been admitted, sentinels and gendarmes having been stationed all around, with the most peremptory orders from the King to prevent any one having access to the pagoda without his permission in writing.—*Marquise de Fontenoy in New York Tribune.*

[*For* SOCIETY NOTES *see pp. VI.-VII., and for* BUILDING NEWS *see p. IX.*]

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DURING the audience granted on New Year's Day to Ambassador Tower, the German Kaiser is said to have expressed the aspiration that the time might come when the professors at German and American Universities might profitably temporarily exchange chairs, as it were, and spread abroad over another land the theories and principles they were inculcating at home. The idea is a liberal and enlightened one, one worthy of its sensible though often erratic originator and quite worth while carrying out. It might have a secondary and unintended value in suggesting to American youth that other languages than English actually are spoken and by stimulating a zeal for modern languages, might do something to counteract the limitations in respect of linguistic accomplishment that the detached position of our nation fosters. The idea is quite in line with one we have often thought of propounding, because of its bearings on architectural education as now conducted, and because we see in it the germ of that School of Fine Arts which we all hope to see come into being at some not too-distant day. This idea simply calls for the application of a modified exchange system to the architectural schools now in existence—of which by the way there are already too many. If we admit that the teaching staff of the four or five most satisfactory of these schools, the ones whose comparative standing in worth it is hard to determine, is as good as can be obtained, we must none the less admit that because of the tedium of routine administrative work and classroom drill most of the members are doing work below their real efficiency, and that they could do better and more valuable work under a greater and fresher stimulus. This needed spur could be found in the establishment of a regular system of exchanges by which the best of the lecturers in their appointed fields could prepare a special short course of lectures to be delivered in rotation before the classes of one school after another, to the advantage of the hearers, and the enlivening of their own faculties.

CARRY the idea one step farther. If the schools should contribute of their own means and, further, solicit contributions from the moneyed friends of the several institutions, a considerable fund could be raised with which to pay remunerative honorariums that would induce the very élite of the artistic and scientific world, outside the classroom, to prepare and deliver short series of their peripatetic lectures before the established schools of architecture and interested outsiders. Not Americans only would be glad to aid in such a matter, but English, French, German, Italian and Spanish adepts would hold it an honor to receive an invitation. A traveling Sorbonne, as it were, might be established in this way which by itself could do a world of good. But further than this, it would seem that out of the undertaking might come into being finally a real School of Fine Arts, with not only high aims and ideals, but with a competent and really select body of teachers and lecturers whose fitness for the task had already been tested.

AT the Pittsburgh convention, half a dozen years ago, Professor Ware, speaking of the desirability of a real School of Fine Arts, said that he hoped the time would soon come when one of the present architectural schools—and he hoped it might be Columbia's, because of its metropolitan position and the advantages that would grow out of that single fact—might find itself willing to close its doors, so far as beginners were concerned, and open them only to those who could bring a diploma from some of the remaining architectural schools, or could pass an entrance examination that would establish their right to enter a post-graduate school for a two or three years' course in the higher branches of design. The desirability of such a school was easy to see, and it was equally plain to perceive that there would be a reasonable number of pupils, but it was not quite so readily discovered where were to be found just the right men to form its working and teaching staff. It is our notion, however, that after the traveling Sorbonne we have suggested had been on the circuit for three or four years, it would be not a difficult task to select the right men for the governance of the new institution.

THE New York Real Estate Board of Brokers is to appoint a legislative committee to watch all bills affecting real-estate interests that may be introduced before the Legislature of the State, opposing those that are pernicious and fostering those that are beneficial. Doubtless this new committee will prove as useful as the similar

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body that has had existence in Boston for several years, and has just published a report of its operations during the session of the late Legislature. This report lists by their titles some two or three hundred measures, and states whether the Real Estate Exchange opposed or favored each of them, and whether each was enacted, failed to pass, had leave to withdraw or was referred to the next General Court. In a general way the legislative committee of the Real Estate Exchange has worked in harmony with the very efficient and wide-awake legislative committee of the Boston Society of Architects, which also jealously watches over proposed legislation. But there have been times when the two organizations have been in opposition, and we believe we are right in saying that on those occasions the architects' representatives have proved themselves the better guardians of the rights of the general public. The committee of the Boston Society of Architects has so proved the value of its services to the public and the profession, that each Chapter of the Institute ought to have a similar legislative committee, which should arrange with the Sergeant-at-Arms, or other proper functionary, to be served regularly with copies of every bill that is introduced during a legislative session. What is everybody's business no one attends to, and because of this many a bad law gets upon the statute books when a little timely effort could have prevented its enacting.

FOREIGN-BORN architects do not come only to the United States to settle and make name and fame, as is shown by the history of Don Isidoro Garcia, who has just died in the City of Mexico in the sixtieth year of his age. He was born at Puente Genil, near Cordova, Spain, and came to this western world less than a score of years ago, but during this short time he did much important work in the neighboring republic, among which was the restoration and redecoration of the Cathedral at Monterey.

AT a hearing in Chambers, this week, Justice Fitzgerald ruled against the pleadings as prepared in the case of the Sculptor Biondi in his suit against the trustees of the Metropolitan Museum of Fine Arts, for the non-exhibition of his group the "Saturnalia." The case will now have to come to full trial before a jury.

EVERYONE will regret to learn of the revival, in a more alarming form than before, of the rumor that many important buildings in London are being deformed and brought into perilous static condition through the continued settling of their foundations. It had been hoped that the trouble, which undoubtedly exists and is caused by the general lowering of the ground water level due to the running of new underground railways and sewers in the vicinity of the affected buildings, and the necessary pumping which this work entails, would at once reach its limit, and that thereafter permanent restorations could be made. But the evil is now proved to be a progressive one and so the reports as to the stability of the east end of St. Paul's, for instance, are really more alarming than those which were recently issued about St. Mark's in and about whose foundations nothing has occurred in long years to affect their supporting powers. Just what has happened in London and what is the rate of the progressive movement is very hard to determine as is shown by the fact that Mr. Frederick Hovenden, Secretary of the London Institution—a body whose functions are quite unknown to us—had to wait two years before he could find in the neighborhood a building sufficiently unaffected by the movement to give the permanent perpendicular to establish the necessary datum for determining the rate of the progressive deformation.

IT is reported from Paris that the selection of an architect for the Peace Palace at The Hague may be made by an international competition, each of the governments interested delegating two architects from its country to represent it as competitors. If this form of competition is decided upon it will be as unique in character as the idea of the Peace Palace was unique in conception. The interest of the various governments might be stimulated by such a competition, but whether architects at large would think well of the idea remains to be seen. In Europe opposition to such a limited competition is already expressed by architects, and in this country many will without doubt feel that a competition open to a larger number would obtain better results.

POLITICAL opponents of Mayor McClellan, of New York, seek to belittle two excellent appointments he has made recently, by pointing out that no salary attaches to the places and so, only really public-spirited citizens could be found to take the places on the Municipal Art Commission left vacant by the retirement of Messrs. John Dewitt Warner and Henry Rutgers Marshall. The point is valid enough, but there are plenty of public-spirited citizens who would be quite willing to serve and yet would be wholly incapable of filling the places satisfactorily. The Mayor has shown once more his own intelligent conception of duty by selecting Mr. Robert W. de Forest of the Tenement-house Commission and Mr. Walter Cook. Mr. de Forest has already had experience in municipal matters of importance, while Mr. Cook, as his intimates know, is endowed with mental faculties of a high judicial order, while architects everywhere know they are glad to find themselves in safe hands whenever he has been selected to serve on a competition jury or as one of the hanging-committee at an exhibition. It is just such men as these that should always be found on this particular public commission, for it is already proved that the commission's function is of very real importance to the city even in times of natural progress and development, while no one can foresee its real worth and value if ever a comprehensive scheme of improvement and beautification, such as is now being discussed, should really be entered on.

THE ARTISTIC FIREPLACES OF ITALY.

A FIREPLACE is par excellence the best domestic means of warming that we possess; but as to its origin we have no documents. It is admitted that the ancients, more hardy than we are, were better suited than we moderns to resist the extremes of cold. But it cannot be denied that they did warm themselves, and it must be admitted that in the northern countries, where people erected buildings of a certain importance, the fireplace should be found. At any rate, hypothesis here takes the place of proved fact, and whatever took place before the Middle Ages is for us involved in absolute obscurity. My essay, nevertheless, will not be obscured by these obstacles, because I intend merely to draw attention to a series of remarkable fireplaces in Italy, my remarks concerning models which exist, and in no way those which are known to us only through drawings. Italy does not possess a great quantity of fireplaces of the kind which is found in France, where the Gothic art of the Middle Ages became better acclimated than with us. Yet, those who know the castles of Piedmont are not ignorant that here are to be found Gothic fireplaces of a fashion influenced by French taste, for the French-Italian style throughout the fifteenth century dominated the Piedmontese region of our peninsula. Sometimes simple, sometimes of exaggerated interest, these Gothic fireplaces were of considerable size, almost always having dimensions which, in these days, would not be allowed by our houses, for the halls in which these fireplaces are have proportions which quite exceed the scale of our present customs. According to our historians, it appears that these great Gothic chimneypieces were fed by enormous trunks of wood or spreading branches—a statement which is confirmed by the size of the fire-dogs which our museums contain. Those who do not know anything about Piedmontese castles, and would like to have an idea of Gothic fireplaces, may be able to visit the Castello at Turin, a modern restoration after the ancient original drawings, which was brought into being in 1884 at the time of the memorable General Italian Exposition of that year; for, in the great hall of the men-at-arms, in the ante-room and in the baronial chamber there is that which will satisfy their curiosity. And since fire-dogs are always associated with fireplaces, I will add that, in the Castello at Turin there are models of wrought-iron andirons recalling the originals more or less faithfully. So, in the Castello are to be found not only andirons crudely worked according to the style of the fireplaces in the great hall of the men-at-arms, but also very elegant andirons for the ante-room in the upper story, for the baronial chamber and even for other fireplaces as well.

A very evident characteristic of the Gothic fireplace is its extreme height. Why, these fireplaces are veritable monuments. Above the shelf, supported by an architrave of considerable dimensions, so that a man can easily stand upright below it, the chimney proper, or its flue, appears in pyramidal form, and is decorated with bas-reliefs, arcadings, heraldic crests, or a dozen other motives delicately sculptured, sometimes painted and often touched up with gilding. The sides, very often of great projection, received benches for the accommodation of several persons, just like so many settees in our ante-chambers. Here the men-at-arms and the poetry-loving dames chatted during the long winter evenings, and rudeness was thus brought into contact with gentleness in the daily life and the contrast between death and love was expressed as an eternal refrain.

The country houses of Italy still preserve fireplaces of large dimensions and the settles associated with them, but these are not Gothic fireplaces. On the contrary, the fireplaces in our farmhouses are modern, but our yeomanry have perpetuated the form of the ancient Italian fireplace and the custom of chatting by the light of the open fire in the country wherever the villagers are not in the habit of going to warm themselves in the sheep-pen, a custom which dates back to the time of the Deluge.

I will ask special attention to the pyramidal form of the partially concealed flue characteristic of Gothic fireplaces, for the sake of adding that sometimes this feature is not decorated and sometimes it is almost wholly concealed by decorations in the character of some small edicule, a miniature reproduction of some monumental ensemble, or an arcade enriched with statues or heraldic devices or inscriptions. To this latter type belongs a fireplace which I had a chance to see in the Ducal Palace at Dijon, and if for a moment I leave Italy, it is because I have not been able to find in the Peninsula any fireplace that corresponds to that at Dijon.

Divided into two stories—the lower quite refined—is the base of an edicule, very rich in treatment, which rises to the top of the room, where it merges into the wood-work of the ceiling. This edicule has the form of a Gothic window in several divisions, whose mullions interlace in the upper part, taking the form of very complicated curves; two pinacles rise at each side and statues fill up the voids. I should not overlook the roses which, as in a church façade, make a portion of this fireplace, which I cite to you as one of the most pretentious models that exist. My words must become more modest in presenting to you the Gothic fireplace which we find at Florence, in the Museo Nazionale, yet if I should write that the extreme richness of the model at Dijon had made me overlook the simple beauty of the once in Florence, I should say something quite apart from the truth. The fireplace at Florence was sculptured by Lorenzo d'Andrea Guardiani, in 1478, a little known artist, yet this date already brings us some distance this side of the Gothic period, which, in Florence, had less extension than in other regions of Italy. For this reason, a work such as this Florentine fireplace, sculptured, in 1478, in the very home of the Renaissance, in Florence, where Brunelleschi, Alberti and Michelozzi had created their chefs-d'oeuvre of Classic taste, is, from the point of view of style, an expression quite out of rule, a singular circumstance which, far from representing an epoch, represents merely an artist, in this case a master firmly devoted to the past. This, consequently, gives an importance to this particular fireplace of Lorenzo d'Andrea Guardiani's which leads us down to the Renaissance.

The spirit of Classicism fertilized in an extraordinary way the plant Italian art; consequently, Italy possesses an incomparable artistic patrimony relating to the fifteenth and sixteenth centuries, of which we have proof to-day while interesting ourselves with fireplaces. The illustrations of this article, in great degree, date back to the Renaissance. This does not happen because of any personal preference of mine, for I have none. The fact is, simply, that the monuments of the fifteenth and sixteenth centuries with us impose themselves on every investigator, for the historic climate of the Peninsula is absolutely Classic. If certain regions have been less inclined to Classicism, it is because of exceptional circumstances which I cannot discuss here.

It is to be remarked that during the Renaissance in Italy there were legions of artists, sculptors and architects executing monuments of decorative architecture, such as fireplaces, altars, tombs, pulpits, fonts and fountains, which afford an endless supply of information as to the worth of the several Italian masters known by works of a more sober character, such as palaces, villas, etc.; so the same names often belong to masters who have sculptured a fireplace and designed a monumental palace.

One of our artistic cities which received with a relative tardiness the impulse of Classicism is Venice. The city on the lagoons, with its Gothic architecture colored in Oriental fashion, with its art as expressed in the Ducal Palace, the Ca'd'Oro and the Palazzo Foscari, at first adopted without enthusiasm the Renaissance style, settling on a transitional style of Gothic which at the beginning was a Classic translation of the ancient Pointed motive. The examples which prove my point are numerous, for they exist in many of the Venetian palaces of the Renaissance which reproduce, letter for letter, in the Classic taste, the ancient Gothic forms of the Ca'd'Oro and the Palazzo Foscari.

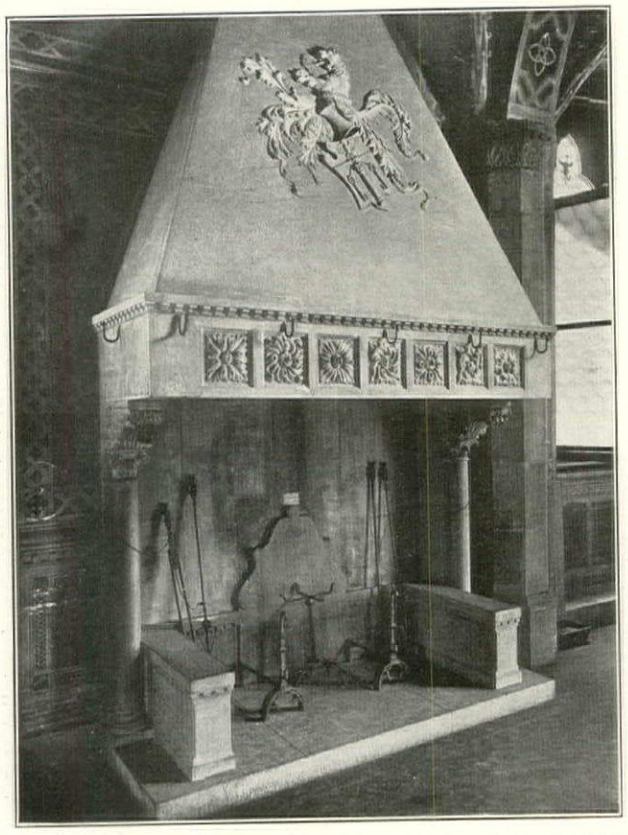
Not to leave my point, here is the celebrated fireplace in the Ducal Palace, which shows, in a certain fashion, Gothic and Classic feeling allied. Thus this Venetian fireplace somewhat resembles the one in the Museo Nazionale, at Florence. On the same canvas are here embroidered two different motives, yet the general motive of the two fireplaces differs only in the projection. The fireplace in the Ducal Palace owes to its very pronounced projection its character of beauty, which involves the details as well as the ensemble, following out a line of exquisite delicacy. The masters of the Cinquecento who executed this work are Antonio and Tullio Lombardo, or Solari, two famous artists who belong to a dynasty of architects and sculptors originating at Corona, on the Lake of Lugano, to whom Venice and Venetia owe a large portion of their architectural and sculptured patrimony of the Renaissance period.

Just as I have not been able to deny myself the introduction of the general view of the chimneypiece in the Ducal Palace, no more can I refrain from giving, also, a bit of its detail, and then turn to another chimneypiece in the same Ducal Palace, not less famous than the first, of which we reproduce the ensemble. Addressing myself to artists, I have no need to point out the merits of the consoles which project above the colonettes for some distance; just as there is no need of bearing upon the lightness of the style and elegance of the monumental sculpture which so happily expresses itself, so there is no more need of dilating on

the frieze of one of these fireplaces which illustrates this study.

Nevertheless, although these Venetian fireplaces bring us down to the sixteenth century, they do not give the true expression of the Italian fireplace of the Renaissance epoch, but, as I have already remarked, we are here in the midst of the transitional period. The line of the Italian chimneypiece in the fifteenth and sixteenth centuries is more modest; the fireplaces of the Renaissance are backed up against walls, and generally offer only a framework of marble or stone, more or less richly carved, and surmounted by panels enriched with mirrors or painted canvas. The consoles are numerous but very discreet in their projections, which gives to their ensemble an expression of monumentality less pronounced.

The really Classic Italian mantelpiece is shown here in several examples, and first by three models which are found in the Ducal Palace at Urbino. The reader, of course, is not ignorant of the artistic glory of this palace which does the greatest honor to a Dalmatian architect and painter, who has not now any very great popularity, although in our Quattrocento he occupies a place in the first rank. I mean Luciano Dellaurana, an exquisite master



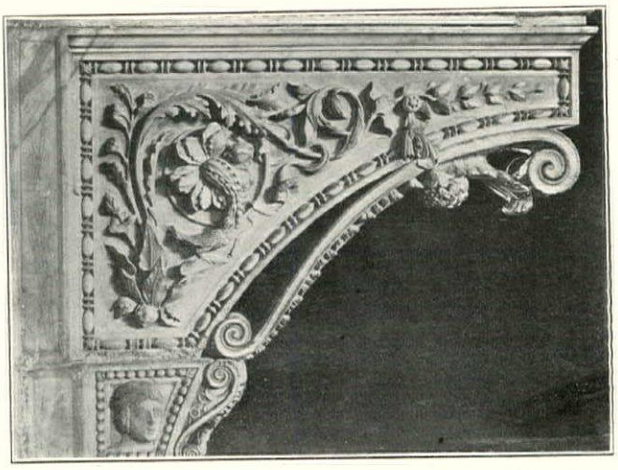
FIREPLACE IN THE "HALL OF THE DUKE OF ATHENS," MUSEO NAZIONALE, FLORENCE.

who won the praises of Giovanni Santi, the father of Raphael, the esteem of Federigo da Montefeltro and the consideration of the great Bramante.

You will notice, of course, the consoles of two of the fireplaces at Urbino, but the form of the console here is very different from that of the Venetian fireplaces. It here has the form of a true Classic console, decorated at each extremity with volutes recurving upon themselves in a contrary sense. Of these two console fireplaces, the one in the Throne-hall is the most successful, while, although very renowned, the one in the Hall of the Angels, with the frieze ornamented with dancing *putti*, does not accord with the laws of proportion which one always likes to see observed in works of architecture; yet, this fireplace, with its dancing *putti* (a motive which recalls Donatello), is one of the purest works in the style.

Singularly naïve is the third fireplace in the Ducal Palace at Urbino, with its two friezes which might well overload the caryatides below, although one of them is a Hercules. The style of the workmanship verges on naïveté, as well as the composition of the whole.

As to the master-sculptors whose work these are, I can give no definite information, for none exists. A monograph of the Ducal Palace is on the point of appearing at this very moment, but I do not know whether the author, Signor Cornelio Budinich, will give us any information about these fireplaces. We do know that an eminent master-ornamentist worked in the Palace at the time when it was undergoing embellishment, the sculptor, Ambrogio da Milano; but the Lombard master was at the head of a



DETAIL FROM FIREPLACE IN THE DOGE'S BEDROOM, DUCAL PALACE, VENICE.

legion of sculptors, and this makes the question of the actual paternity of the different portions of the Palace difficult to determine.

Generally speaking, the Renaissance fireplace never got away from the console motive, and for this reason our subject becomes somewhat monotonous, and the matter of beauty therefore reverts to the proportions and the good taste of the details.

There are three other fireplaces with consoles differing somewhat from one another, although the three, or, at least, two of the three, follow the same general treatment. The fireplace at

DETAIL FROM FIREPLACE IN THE DUCAL PALACE, NOW IN THE MUSEO ARCHEOLOGICO, VENICE. P. Lombardo, Sculptor.

Pienza in the Palazzo Piccolomini is the work of an eminent sculptor and architect, Bernardo Rossellino (1409-1464), so it is only natural to find a very remarkable elegance and grace in this fireplace, which are not equaled in the fireplace at Citerna, in the Casa Prosperi, whose unknown author has not triumphed in this

composition, since the entablature is rather heavy, the frieze paltry, while the mouldings should have received sculptures of foliage, eggs-and-darts, etc., if he intended to give an harmonious air to his work.

Finally, no one will object if I present a third of these console

DETAIL FROM FIREPLACE IN THE DOGE'S BEDROOM, DUCAL PALACE, VENICE.

fireplaces, that at Arezzo, in the Casa Chianini, as the finest and most delicate composition which I am at present able to offer the reader. A simplicity of the highest quality has created this fireplace at Arezzo, and I do not know a work of the kind which, in the same degree, could properly typify the early Renaissance in Italy.

The consoles take on a new character in two other Italian fireplaces, one at Cortona, in the Casa Sernini, and one at Citta di Castello, in the Palazzo Vitelli à Porta S. Egidio. These two fireplaces correspond in their general scheme, but the author of the one at Cortona appears more serious than the other; this author might have been Cristoforo Fanelli, to whom an inscription attributes the palace which the fireplace adorns and to which our praises are directed. Although we cannot praise the fireplace at Citta di Castello, it, nevertheless, has a certain amount of charm. It is not necessary to point out, that the heraldic bearing, flanked by the consoles in some degree destroys the charm. The twpes of these fireplaces should, nevertheless, be remembered, as they are real types of Italian Renaissance work.

We have already considered a fair number of Italian fireplaces, and have discussed their principal motives, yet there remain to be noted models which no one would like to have forgotten in any attempt to study the artistic fireplaces of Italy.

Here, then, are two celebrated ones in this class, the fireplace in the Palazzo Gondi at Florence, and the one in the Museo Nazionale, in the same city, carved by Benedetto da Rovezzano, a master-ornamentist who, born at Pistoia, might be called, as I have shown before, Benedetto da Pistoia. In these two Florentine fireplaces, the fantastic decoration in flowers and foliage is allied with figure-sculpture in the friezes, which are double in the fireplace designed by Benedetto da Pistoia.

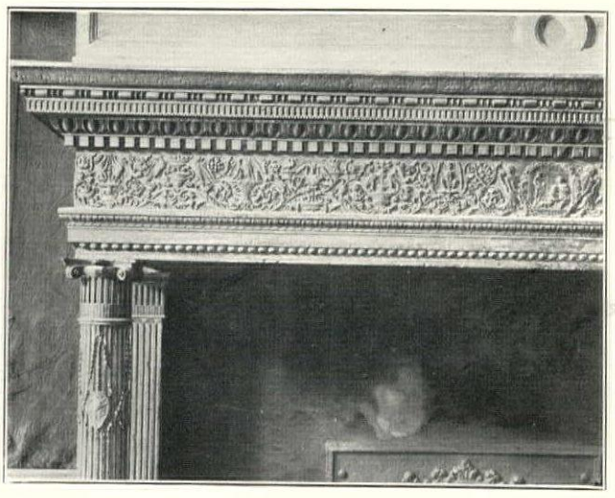
In the first place, let us consider the architectural character. There is novel here, relatively to what we already know, colonnettes, without the eternal consoles. In one we have real columns, and in the other case columns fashioned like balusters whose surfaces are covered with carving. The most remarkable peculiarity in the fireplace in the Palazzo Gondi is the high frieze, wherein is emphasized an antique motive, the triumph of Neptune. There is nothing remarkable in this, for the artists of the Italian Renaissance were famous for exhuming decorative themes which belonged formerly to Greek or Roman cults. The question is, is this a paraphrase or a copy? I cannot tell you. I can only say that the sculpture is without emphasis or energy. The celebrated architect, Giuliano da San Gallo (1445-1516), is the author of this fire place, a work whose beauty lies especially in the fineness of the vegetation, birds and insects which cover the balusters.

Interesting in a very different way is the fireplace by Benedetto da Pistoia; and this magnificent work which shines in our Italian Cluny, although it may be adorned by masters like Michael Angelo, Donatello, Verrocchio—this work ought to occupy a place all by itself in this study. Sculptured at the command of Pier Francesco Borgherini, for the palace later called Rosselli del Turco, this fireplace of Benedetto da Pistoia's was acquired by the Museum, at the very remarkable figure of 60,000 francs. Turn your attention to the columns of this fireplace: the sculptured decoration has all the fineness of goldsmith's work, and the figured frieze expresses beauty in its vigor and movement. The fact is Benedetto was one of the poets of our ornamental sculpture, and his name recalls the names of the sculptor-ornamentists whose work was most expressive of the period: Benedetto da Maiano, Desiderio da Settignano, Bernardo and Antonio Rossellino and Matteo Civitali, who are veritable masters of sculptured arabesque work.

Now let us leave Tuscany, that land so fecund in eminent artists, to halt a moment in Lombardy, a territory also famous for its sculptors, where there awaits us, at Cremona, a fireplace which is a very tour de force in the way of artistic arabesque work, namely, the fireplace in the Palazzo Comunale of that city. Lightly resting on two isolated colonettes, it is carved with richness, without giving the impression of exaggerated display; so, from the proper point of view, this mantelpiece at Cremona enjoys a satisfactory reputation among students. This designer does not bear one of those celebrated names which recall to mind an incredible series of artistic successes; he is a certain Giovanni Gaspare Pedoni, almost an unknown artist and Lombard sculptor, who signed his work in an extraordinary fashion: Ioes Gaspar Eeupedon Fecit I H I I; this is the inscription on the fireplace whereof the date is a subject of discussion, for no one knows what the figures signify, whether 1502 or 1511. It is enough for us to signify the fact and hasten to add that the fireplace used to be found in the palace of the Cremonese architect, Eliseo Raimondi, and that in 1750 the city of Cremona bought it; hence, the fireplace is adorned with the armorial bearings of Raimondi. There is a copy of it in existence, but I do not know whether the copy has been figured in the *"Broccatello de Verona,"* as the original which represents the tour de force that I have mentioned, because of the very hard material in which Pedoni executed his delicate carving.

The richness of this work is not like that which was introduced in the Baroque and Rococo periods, which might rather be said of the following fireplaces in the Villa Giacomelli at Maser (Treviso) attributed to Alessandro Vittoria (1608), an industrious artist who worked especially at Venice. Nevertheless, Vittoria, and the close of the Cinquecento, might have given us a composition much more significant from the point of view of Baroque work.

We must, for lack of time, accept without discussion the beauties of the seventeenth and eighteenth centuries; Italy produced in these times chefs-d'oeuvre and possesses also its special genius, Gian Lorenzo Bernini, who was the Michael Angelo of his day. In those days the fireplaces were ornamented with flowers, busts, heraldic bearings, cartouches, color, and we could easily make a collection which would not fail to retain the in-



DETAIL FROM FIREPLACE IN THE PALAZZO COMUNALE, CREMONA. Gaspore Pedoni, Sculptor.

terest of the reader. It would often include brilliant improvisations, colossal and ingenious compositions which were far removed from all ideas of decadence, but, on the contrary, many times impose themselves on the imagination of artists. This is the case especially of the Baroque fireplaces, while in the case of

those of the Rococo period the style changes somewhat and becomes less pompous and more feminine. Italy possesses more fireplaces of the seventeenth century than of the following one, while, on the contrary, France is especially rich in all kinds of examples of architecture and sculpture of that date.

After the abounding exuberance of the Baroque period, art sought its revenge, and a new school founded its being on the classic calm which detested the preceding epochs of the Baroque and the Rococo; the triumph of the new style showed itself even in productions of decorative architecture. To-day, however, modern æsthetic feeling aims at a liberty which leads to emancipation from the antique, and the modern school cannot endure copies. The improvements in the modern art of heating seem likely to turn attention from the artistic treatment of fireplaces; for my own part, I shall greatly regret the abandonment of this feature, for I think that the beauty of flames and the poetical associations connected with wood crackling in the fireplace cannot be replaced by the prose of the inartistic steam-pipes.

ALFREDO MELANI.

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ALUMNI FELLOWSHIP IN ARCHITECTURE OF THE UNIVERSITY OF PENNSYLVANIA.

THIRD COMPETITION—1905.

The Trustees of the University of Pennsylvania announce the third competition for the Alumni Fellowship in Architecture. This Fellowship, of the value of one thousand dollars, was established in 1903 for annual award during a term of five years in recognition of the action of the General Architectural Alumni Society in securing by general subscription among its members, for the needs of the School of Architecture, a fund of five thousand dollars.

All persons under thirty years of age who have taken at the University of Pennsylvania either the degree of B. S. or M. S. in Architecture or the certificate of the two-year special course in architecture are eligible to the competition, save only such as may have already secured opportunities for foreign travel and study equivalent to those conferred by this Fellowship.

The holder of the Fellowship is expected to sail for Europe not later than September 1, 1905, where he will be required to spend not less than one year in travel and study under a programme prepared in consultation with the Professor of Architecture and approved by the Provost of the University. He is further required to make reports of his work at appointed periods and, upon his return, to exhibit at the School of Architecture the work he shall have completed, from which the School may reserve as envois the drawings of not more than four of his subjects of study.

Form of Competition.—The required work may be done (*a*) at the University, (*b*) in any recognized atelier, or (*c*) under the supervision of an architect designated by the candidate and ap-

proved by the University. It will be identical in subject and date with that of the first period of the Beaux Arts Society's calendar for 1905 in order that those alumni may take part who are now engaged upon the work required in competition for the Society's Scholarship and the Cresson Scholarships of the Academy of the Fine Arts.

The Alumni Fellowship competition will therefore begin on Saturday, January 7, 1905, with the sketch *en loge*. The sketches of Fellowship candidates are to be sent direct to the University, where the best five will be designated, their authors then standing as the final competitors for the Fellowship. All sketches will thereupon be forwarded to the committee in charge of the Beaux Arts competition, to whom also the final drawings of the Fellowship competition are to be shipped by their authors, as required for all Beaux Arts competitors.

Method of Award.—This procedure will permit compliance with the regulations of the other competitions by candidates for the Fellowship, but the judgment of their work will be conducted independently.

The preliminary jury of selection will be composed of two practicing architects and a member of the University staff of instruction in Architecture. Judgment on the final drawings will be rendered by a jury composed of not less than five persons, one of whom will be instructor of the University as above, another a member of the Alumni Society designated by its Board of Directors, and the remainder practicing architects with whom none of the competitors shall have been professionally associated since January 1, 1904. Upon the recommendations of this jury, the Trustees will take action in awarding the Fellowship.

General Requirements.—Programmes will be sent out and special arrangements as to supervision of work will be made as desired where timely request is received by the undersigned. Preliminary sketches are to be accompanied by a sealed envelope, marked with a *nom-de-plume* (not a symbol), which is also to be employed on final drawings, and enclosing a card bearing the author's name. Fellowship competitors will be governed by the regulations of the Beaux Arts Society, save as to the first destination of preliminary sketches, and by the following:

a. No competitor shall submit more than one design.

b. This shall be his own both in conception and detail, and a statement to this effect, signed by him, is to be enclosed with the final drawings to insure their admission to competition.

c. A memoir is not advised, but if presented should not exceed two hundred words, signed with the author's *nom-de-plume*.

d. Instead of the usual lettering upon the final drawings, the printed label furnished to competitors is to be mounted on each sheet with blanks filled in as indicated in its attached memorandum. Rendering may, if desired, be carried over this label.

WARREN P. LAIRD, Professor of Architecture.

University of Pennsylvania, December 29, 1904.

RECORD.

The first award of the Alumni Fellowship was made in 1903 to Midgley Walter Hill (Sp. Cert. 1902), with equal Honorable Mention to Alexander James Harper (B. S. in Arch. 1901), and Lester Kintzing (B. S. in Arch. 1900). Preliminary Jury: Messrs. Paul A. Davis, 3d, Edgar V. Seeler and (for the University) Warren P. Laird. Jury of Award: Messrs. William A Boring, John M. Carrere, Walter Cook and Whitney Warren; for the Alumni, Paul A. Davis, 3d, and for the University, Warren P. Laird.

The second award, in 1904, was received by Luther Morris Leisenring (Sp. Cert. 1898), no Mentions being assigned. Preliminary Jury: Messrs. Arthur H. Brockie, Thomas M. Kellogg and (for the University) Paul P. Cret. Jury of Award: Messrs. Thomas Hastings, Henry Hornbostel, Charles F. McKim and Lloyd Warren; for the Alumni, Walter D. Blair, and (for the University) Paul P. Cret.

THE ARCHITECTURAL LEAGUE OF NEW YORK'S MEDAL OF HONOR.

December 30, 1904.

The Editor of THE AMERICAN ARCHITECT.

Dear Sir: I send you herewith a copy of a resolution passed by the New York Chapter of the American Institute of Architects recently, instituting a Medal of Honor, which is to be awarded through the Annual Exhibition of the Architectural League of New York. I thought probably you would consider the matter of interest to your readers.

I enclose also the circular of information which is being sent out by the League with reference to the next Exhibition.

Very truly yours, D. E. WAID,.

Chairman Sub-committee on Architecture.

Resolved, That the New York Chapter of the American Institute of Architects shall establish a medal of honor for award to designers of buildings represented in the annual exhibitions of the Architectural League of New York and that the conditions accompanying the proposed award shall be as follows:

First—That any architectural work in the United States, or Territory belonging to the United States, if completed within five years previous to the date of exhibit may be offered for consideration.

Second—The architect or architects who designed such a work, in order to be eligible to the award, must present for exhibition one or more photographs of executed work, also one or more drawings, including a small scale plan, and shall submit to the jury such working drawings of the structure as they may desire to examine.

Third—That an architect or firm of architects to whom this medal may be awarded once shall be ineligible for a future award.

Fourth—That the medal shall be bronze with the following inscription:

(Obverse)
Bas-relief
(Reverse)
AWARDED BY
THE NEW YORK CHAPTER OF THE AMERICAN INSTITUTE
OF ARCHITECTS TO
(name)
for
(name of building)
AS A DISTINGUISHED WORK OF ARCHITECTURE REPRESENTED
AT THE ANNUAL EXHIBITION
OF THE ARCHITECTURAL LEAGUE OF NEW YORK
IN THE YEAR (1905).

Fifth—That the medal shall be accompanied with a certificate setting forth the name of the completed structure which formed the basis of the award, together with the considerations which, in the opinion of the jury, characterized the structure as one worthy of the award.

Sixth—That the jury shall consist of seven architects, one the President of the League, one the President of the Chapter and five appointed by the Chapter.

Seventh—That one medal only shall be awarded each year and four members of the jury voting for the author or authors of the same work shall be necessary to an award, and that no award shall be made if, in the opinion of the jury, no work presented is sufficiently meritorious.

Eighth—In case the award is made to two or more joint authors of a work a copy of the medal shall be struck for each.

ILLUSTRATIONS

ITALIAN FIREPLACES: SIX PLATES.

For description see article, "The Artistic Fireplaces of Italy," elsewhere in this issue.

THE SCHOFIELD BUILDING, EUCLID AVENUE AND ERIE STREET, CLEVELAND, O. MESSRS. L. T. SCOFIELD & SONS, ARCHITECTS, CLEVELAND, O.

The Schofield building is fourteen stories in height, rising 210 feet to the top of the tower. It contains 429 offices in thirteen stories. The first story and basement are devoted to banking premises and stores. The basement also contains the machinery hall, boilers, coal depot, etc. It is lighted with Nernst lamps and has a refrigerating plant for storage rooms and ice-water. The cost, exclusive of the land, was about $600,000.

The building on the left of the picture is of the new Cleveland Trust Co.'s bank, by Geo. B. Post. The next building is the Rose building, by Geo. H. Smith. The one next to the right of the Schofield building is the Citizens' building, Hubbel & Bener, architects, and to the right of that the Permanent building, by Sidney R. Badgely.

The discrepancy in the spelling of the names of the owner and building is accounted for because of the convenience in leaving out the "h" in ordinary affairs, while in permanent matters, such as buildings, monuments, tombstones, deeds, etc., the original spelling is adhered to for accuracy.

TURN-HALL, ARZBERG, UPPER FRANCONIA, GERMANY. HERR CARL BRANTIGAM, ARCHITECT.

Additional Illustrations in the International Edition.

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The American Architect and Building News

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CONTENTS

THE annual convention of the American Institute of Architects turned out to be, in spite of, or maybe because of, the late date and postponement, an exceptionally interesting affair. This was due mainly to the "banquet," which its projectors desired to have the tone and the air of the long-famous Academy Dinner in London, and every one present or absent will willingly concede that the effort won more than a measurable success. The one thing that might have added to the éclat and intellectual high quality of the occasion could have been gained only by enabling the distinguished body of guests to select, with equal justice and discrimination, a similarly distinguished body of hosts. This, of course, was impossible, but the fact that most of the architects at the banquet were also present as elected delegates to the convention made the body of entertainers no unworthy hosts for such guests. The function was more than entertaining, it was in a broad sense informing, since in a popular, perhaps a slightly "yellow" way, it gave notice to the American public that the American Institute of Architects through its reformed and newer growth had become one of the great professional bodies in the country, one with whose members the really distinguished men in other walks of life were glad to mingle familiarly. The publication of the Convention *Proceedings,* in which the speeches at the banquet will be given in full, will be read with interest when it appears. But before that rather remote event takes place, we shall have a chance to lay before our readers a selection or two.

BECAUSE of the unusual character to be given to the annual banquet the several Chapters sent practically full delegations and, as a consequence, the business sessions were attended by a greater number of individuals than usual, a fact that had its inspiriting effect on speakers and the readers of stated papers, but produced almost no result in ameliorating that curious condition of dumbness which seems to obsess architects when they attend these annual gatherings. One would think that one of the chief ends of these meetings was the opportunity for debate and *viva voce* discussion, yet it is amongst the rarities when the reading of a paper, or papers, when the arguments for and against are presented, is followed by even the semblance of a discussion. It does not seem to be so at gatherings of architects in other countries, and there seems to be no good reason why it should be so in this, unless the truth is that American architects, besides being as "practical" as they are supposed to be, are also extremely self-centered and selfish. About the only time when anything like a discussion arises is when the matter of a change of by-laws is on the programme. In the days before the Convention became a delegate body, changes of by-laws were discussed with animation at every meeting and the meetings consequently were often very amusing because of the revelations of character they afforded. This year one of the sessions was quite like one in the old style, for a change of by-laws had to be effected if the further growth of the Institute were not to be absolutely prevented by the astounding audacity of a few members of the Brooklyn Chapter, who had taken upon themselves the seemingly merely malicious office of blackballing every architect who was proposed for membership in the Institute. After a lively discussion the desired change was effected, and once more the Institute is free to profit by a normal expansion.

THERE are so many known facts and so many probably reliable rumors in circulation amongst architects that most of them will be quite ready to believe that, in withdrawing from the Building Trades Employers' Association, the Thompson-Starrett Co. had real justification on which to ground their action. The defection of so important a member of the organization was too serious a rebuke to be passed over in silence, and the Association has felt constrained to make a public and formal denial of the allegations that Mr. Starrett makes, which closes with these words: "Every statement, therefore, which is made by any one to the effect that the Building Trades Employers' Association is a party to a conspiracy, either with labor unions or with any one else, for the purpose of increasing the cost of building is absolutely false." This denial is explicit and categorical and deserves the same credence that is usually accorded to similar denials "given out" to the press by societies, organizations and political parties, but no more than the usual credence, and that is not much; people are too accustomed to seeing associa-

Entered at the Post Office at New York as second-class matter.

tions of seemingly upright men doing and saying things that no individual member could do or say without becoming permanently ostracized. As worded the denial may stand. The charge, however, is not that the Association is "conspiring. . . for the purpose of increasing the cost of building." As we understand it, the point of the charge is that the Association is conspiring, whether with the labor unions or within its own membership merely, to thwart, crush and eliminate by unfair methods everything in the way of that genuine competition which must inevitably tend to the lowering of the cost of building. A denial covering this charge would have been much more to the point.

JUST at this time the people of Indiana are much exercised over the matter of having or not having a State Architect, as urged by the Governor in his inaugural address, and as a good deal depends on what they want him to do, and we do not know just what that is, we cannot offer a definite opinion on the matter. Not so many years ago, it was rather the custom for large municipalities to feel that they must have a "city architect," but after trial a good many cities now get along, and, they think, better, without such a functionary. Curiously enough, as the city architect goes out the State Architect comes in, for several States are now paying salaries to such functionaries. We are free to confess that there need be no parallelism between the two functionaries, and that a State Architect may be a most useful official if his duties are limited as we think they should be. Just as a Surgeon General is not expected to go about prescribing for individual invalids or even presiding over a single hospital, so a State Architect should neither be expected nor allowed to spend his time, talent and energies in designing the buildings which the State desires to erect. Such an official is usually appointed under the conception that he can furnish architectural service to the State at cut rates, as it were, and save to the public treasury that five per cent. payable to the private practitioner, which treasury watch-dogs are always so unwilling to pay out. If that is what Indiana wants its State Architect to do, we hope it may get him and that he will turn out just the sort of work such a constituency deserves. But we believe a State Architect should be merely the expert adviser to whom the Governor and higher officials can turn for expert opinion when a matter of public building is under consideration, a man who can study the conditions intelligently, formulate properly a programme for competition, act as one of the expert jury and be always ready to investigate and report on public undertakings going on under the charge of private practitioners. He should be one of the leading practitioners in the State in active practice, so that his capacities may be always in working order, and should be called from that practice only as occasion may require, and as he must be debarred from competing for public work during his term of office his pay should recognize an element of self-sacrifice. In this way a sovereign State could avail of the best talent and would get better service than by giving a meagre salary to a third-class drudge who, if he be honest, would aim mainly to turn out work that would show a margin saved from that awesome "five per cent.," or, if he be dishonest, would be ever on the alert to secure from contractors enough of a "rake off" to make good what he lost in official income.

THE case of Mr. F. C. Long against Jersey City, to which we have referred more than once, seems likely to prove an important one and may finally become a leading case, as the issues are very clearly drawn and cover a very common matter of misunderstanding and dispute. Mr. Long sues for full proportionate commission on one set of plans for a city hospital, prepared under duly authorized instructions, based on the pavilion system, and also for full proportionate commission for a second design for a hospital built on the block system, which was authorized after it had been discovered that the estimates for the pavilion scheme greatly exceeded the amount appropriated. Various complications that arose through conflicts between the mayor and more or less members of the Hospital Board seem, fortunately, to have been swept aside and an agreed statement of facts had been arrived at between the contending lawyers that seemed to promise a fair decision—every one has a very real respect for the New Jersey Courts—on a condition of things which often finds its parallel in ordinary practice. Unfortunately, Mr. Long has just been nonsuited in his case as laid; but the fairness of the New Jersey judicial mind is shown by his being given leave to amend his plea and come into court again, basing his claim next time under a certain Act of 1903, and not as before under an Act of 1902, which the later one made non-effective.

A FATAL kind of mistake seems to have been made by our State Department, many educated people will think, in sending to Venice the gentleman who at present fills the office of United States Consul there. In a recent Consular Report he rails in a rather petulant way against certain American manufacturers of motor-boats who had declined, unless they received cash in full in advance, to furnish a sample of their boats to the Venetian tradesman whom he had induced to send for a "sample," with a view to introducing them, to the displacement of the gondola. The United States Consul at Venice seems to be a very good example of matter out of place and therefore useless. He should either be suppressed and recalled or made to understand that the people who leave behind them the money on which Venice thrives do not visit that wonder-city to jiggle over the canals at twenty knots an hour, but go there especially for the delight of floating rhythmically along in the most comfortable craft man has yet devised, the gondola. The sensitive traveller can forget and forgive the few steam launches that ply on the Grand Canal, because they keep the Cook tourists out of his sight and way, but he objects to the odor of naphtha all about his own gondola.

IT is pleasure to learn that rather more than the usual number of concurrents competed towards the end of last year for the Prix de Reconnaissance des Architectes Américaines at the Ecole des Beaux-Arts. The programme called for a design for a "Cercle [club-house] artistique franco-américain," and the prize was awarded to M. Boileau, pupil of M. Redon.

THE PRESIDENT OF THE UNITED STATES TO THE ARCHITECTS OF THE UNITED STATES.

PRESIDENT ROOSEVELT'S other engagements did not allow him to fill the place of the most welcome as well as most distinguished guest at the banquet of the American Institute of Architects at Washington, on January 11, throughout the evening, and this, perhaps, is unfortunate, as he might have been tempted by what later speakers said to say something supplementary to the felicitous little address delivered by him before he left the hall quite early in the evening.

The President found time, however, to express himself as follows:

"It is a great pleasure to have the chance of coming here this evening and saying a word of greeting to a body of men who are engaged in doing work for this republic which is to count not merely in the present generation, but during the lifetimes of many generations to come. We hear a great deal said about true Americanism. Now the real American, the American whom it is worth while to call such, is the man whose belief in and work for America are not merely for the America of to-day, but for the America of the future.

"It is a comparatively easy thing to do work when the reward is to come in the present; but every great nation that has ever existed on this globe has been great because its sons had in them the capacity to work for the well-being of generations yet unborn. Such a spirit is peculiarly necessary when the work that we desire to have done is essentially work of a non-remunerative type, non-remunerative in more than one way; non-remunerative in money, and it may be in fame. We do not know the names of the architects and builders of the great cathedrals whose magnificent bodies are an heirloom to civilization. We do not know the names of the builders of the great majority of the works to which every man with any aspiration after beauty naturally turns when he thinks of the past. We owe that beauty, we owe the elevation of thought, of mind and soul that come with association and belief in it to the fact that there were a sufficient number of men who worked in the spirit that Ruskin prayed in—the spirit of doing work not for the sake of the fame, but for the sake of the work itself.

"There are things in a nation's life more important than beauty, but beauty is very important. And in this nation of ours, while there is very much in which we have succeeded marvelously, I do not think that, if we looked dispassionately, we will say that beauty has been exactly the strong point. It rests largely with gatherings such as this, with the note that is set by such men as those I am addressing to-night, to determine whether or not this shall be true of the future.

"A very large percentage of the durable work, the work which is lasting, must be done by the Government. Great buildings and beautiful buildings will be erected by private subscription; but many of the grandest buildings must necessarily be erected by the Government, national, State or municipal.

"Those in control of any branch of that government necessariiy have but an ephemeral lease of power. Administration succeeds administration; Congress succeeds Congress; Legislature succeeds Legislature, and even if all of the administrations, all of the Congresses, are actuated (a not necessarily probable supposition) by an artistic spirit, it would still remain true that there could not be a coherence of their work if they had to rely on themselves alone. The best thing that any administration, that any executive department of the Government, can do and—if I may venture to make any suggestion to a co-ordinate branch, Senator Cockrell—I would say that the best thing that any elective legislative body could do is in these matters to surrender itself within reasonable limits to the guidance of those who really do know what they are talking about.

"The only way in which we can hope to have worthy artistic work done for the nation or for a State or for a municipality is by having such a growth of popular sentiment as will render it incumbent upon successive administrations, successive legislative bodies, to carry out steadily a plan chosen for them, worked out for them by such a body of men as that gathered here this evening. What I have said does not mean that we shall go here in Washington, for instance, into immediate and extravagant expenditures on public buildings. All that it means is that, whenever hereafter a public building is provided for and erected, it should be erected in accordance with a carefully thought out plan adopted long before, and that it should be not only beautiful in itself, but fitting in its relations to the whole scheme of the public buildings, the parks, the drives of the District.

"Working through municipal commissions very great progress has already been made in rendering more beautiful our cities from New York to San Francisco. An incredible amount remains to be done. But a beginning has been made, and now I most earnestly hope that in the National Capital a better beginning will be made than anywhere else, and that can be made only by utilizing to the fullest degree the thought and the disinterested effort of the architects, the artists, the men of art, who stand foremost in their professions here in the United States, and who ask no other reward save the reward of feeling that they have done their full part to make as beautiful as it should be the Capital City of the great republic."

SOME LESSONS FROM THEATRE FIRES.*

ON March 23, 1881, the Municipal Theatre of Nice burned down completely, with a loss of about 100 persons, and in the same year, on the 8th of December, the world was stirred by the news of a far more terrible catastrophe, the burning of the Ring Theatre, in Vienna, in which, within a few minutes, 450 persons found a horrible death.

Only a few years before, in 1878, Herr August Foelsch had published his classical work, entitled *"Theatre Fires and Their Prevention,"* in which he had pointed out the prevailing defects in the construction and management of such structures, and shown the dangers to which theatre-goers at that time were exposed in nearly all theatres. His prophetic warning, based upon carefully collected and ponderous documents, had remained almost unnoticed, notwithstanding its impressiveness, until his statements became most emphatically confirmed by the two fatal events cited following so closely one upon the other.

Through the court proceedings following the Ring Theatre fire the public learned, much to its surprise and horror, of the conditions which had existed in that unfortunate theatre located in the midst of the splendid capital of the Austrian Empire. It also learned to what incomprehensible degree all rules of technical science, of common sense and of the simplest performance of duties had been violated. Indeed, the conditions which were brought to light by this sad incident defied all description and necessarily appeared as a mockery upon the advice given by Herr Foelsch, because it was in Vienna where, at a meeting of the Architectural and Engineering Society, he had uttered the same for the first time, and where they aroused the highest and most universal interest.

The terrible sacrifice was not, however, made in vain. With compelling force it called the attention of the public, as well as of the authorities in Vienna and throughout the whole civilized world, to the conditions described by Herr Foelsch and thereby gave the first impulse toward the powerful movement which was necessarily destined to cause decisive changes in the entire technique of the stage and which soon provided sweeping changes in everything pertaining to the planning and construction, as well as in the equipment, watching, inspection and management of such buildings. Instead of the hitherto prevailing carelessness came an almost feverish anxiety. From all sides was heard the cry for reforms of the recognized defects and for a better protection of persons in the theatre. This cry became more and more urgent, until municipal authorities took up the matter with a praiseworthy eagerness. Everywhere theatre commissions were created who examined critically the existing theatre buildings, particularly in reference to the safety of the audience. In many cases, particularly of older buildings, the results of these inspections were indeed alarming. One had to admit that it had really been merely good fortune which had saved the majority of these theatres from similar calamities, and that the public, as well as persons employed on the stage, were about as safe in them as if sitting on an open keg of gun-powder.

Previous to this time, the experience, the practical knowledge, the conscientiousness and the artistic feeling of the architect, the stage-manager and the stage-engineer had been the only guiding factors in the erection and construction of theatres. A new period in the development of theatre building began with the tremendous revolution due to the occurrences mentioned. With the collaboration of experts in the different branches the larger cities in various countries drew up very exact and carefully detailed building-ordinances relating to theatres, many of which are still in

*The above article was written for a German magazine, *Bühne und Welt*, by Herr Baurath Manfred Semper, the son of the illustrious architect, Gottfried Semper, and himself the designer of several large theatres. Mr. Semper is also the author of the volume on theatres in the German, *"Handbuch der Architektur,"* published in 1903.—W. P. Gerhard.

force at the present time and form the basis for better planning, construction and equipment of theatre buildings. Many of these rules and regulations are the result of searching considerations of all conditions pertaining to the subject. Existing theatre buildings, which did not conform with these requirements, had, in many cases, to be altered at great expense and were adapted under the supervision of the authorities to the new rules as well as the circumstances permitted, though not always in a quite satisfactory way.

It would be out of place in this paper to mention all the rules, pertaining to the construction and equipment of theatres, which were formulated in different cities, nor is it possible here to compare the different theatre laws and to point out their sometimes quite important differences. It must suffice to draw attention to the latest rules, which are of particular importance for Germany and German theatres, namely, those published in the year 1889 in Berlin under the title "Police Ordinances relating to the Construction and Interior Equipment of Theatres, Circus Buildings and Public Halls of Assembly." A supplement to these ordinances appeared in March, 1891.

The rules mentioned limited the power of architects in many respects, particularly as regards the planning of the staircases. They created a special type of building and caused a certain monotony in the development of the theatre plan, yet, notwithstanding these objections, the disadvantages mentioned were more than offset by the increased safety of the buildings due to the strict regulations and the restoration of the peace of mind which the public can now enjoy. Inasmuch as no theatre calamities at all comparable in magnitude to those mentioned in the beginning of this paper occurred thereafter, the impressions which the public had received had almost been forgotten, although on the part of the authorities, entrusted with the supervision of theatres, no relaxing in the requirements for the construction or the management took place.

The news of the terrible calamity which occurred in Chicago on December 30, 1903—a calamity which exceeded all previous occurrences of this kind in the number of victims, brought again a feeling insecurity and nervousness to theatre-goers, a feeling not unlike the one which, after the fire of the Vienna Ring Theatre, caused such feverish excitement. Once more the question was asked, whether theatres, notwithstanding the new rules and notwithstanding all care and watchfulness, could really offer to the public and to the stage personnel safety beyond doubt?

It is of importance that the theatre fire in Chicago, from all we have learned about it, shows a remarkable similarity to the one at the Ring Theatre in Vienna, both in its origin and in its fatal ending. It may be truly said that in both cases an unusual amount of carelessness and neglect of duty was the cause. It may also be said that this latest accident should be considered so abnormal that it would not be right to draw conclusions from it regarding the safety of theatres in general, and in particular of those of our country [meaning Germany].

The front of the house or the auditorium, with the spaces surrounding the same, has been the starting-point of a theatre fire in only very few cases and hardly ever during a performance, so that in this respect it may be safely disregarded. The dangerous portions of a theatre building are, as is well known, the stage proper and the stage house. In olden times the stage was much more dangerous than the modern stage is, but, notwithstanding all improvements relating to measures of protection, to fire-extinguishing appliances, and to the strictness of the supervision and watching, the fatal attribute of "dangerous" attaches to the stage to such an extent that the greatest attention should ever be paid to this part of the building.

Let us imagine that through some unfortunate accident, notwithstanding all supervision, during a performance an incipient fire starts on the stage. In such an event, unless one succeeds in putting the fire out before any one in the auditorium has noticed it, the first care should be to cut off the sight of the fight with the flames from the public; and this for the reason that it takes but a moment to start in an audience its worst enemy, namely, a panic. The iron stage curtain is intended to accomplish this at the right moment. The lowering of the curtain in the midst of an act will, it is true, leave no doubt in the minds of the public that danger exists and doubtless many people in the audience will suffer from sudden fright on noticing the safety-curtain being lowered; yet it cannot be denied that to others the slowly descending curtain will give a feeling of protection and security, and much is thereby gained, for the public will find time to leave the building quietly and in an orderly manner and not in the fatal manner so often experienced during a panic, which is inevitably caused by the sight of the fire and flames on the stage.

Recognizing that at such a critical moment the first and most important care should be to quiet the minds of the public, the instructions for the fire brigade of the Royal Theatre at Dresden [see Scholle, *"Ueber Theaterbraende"*] require that in such cases, as soon as the curtain is lowered, a fireman *in full uniform* (and this, too, is of importance) should post himself in front of the curtain. From this position he is instructed to request the public in a calm voice to remain seated or else to leave the place quietly. He is instructed to remain at his post, to keep his eye turned toward the public, to exhibit the most cool-headed calmness, and to advise and direct the public. He is not permitted to leave his post—although he may be aware of the fact that only a few feet behind him "hell is loose"—until the last person in the audience has left the house or until he is regularly relieved. Such a regulation is certainly of the greatest importance, but it requires a fire-brigade of absolute reliability and it presupposes an almost heroic devotion. The rule is worthless where a fire-brigade of such lofty character cannot be obtained.

While the front of the house is being emptied in a more or less quiet manner, the fight with the fire is taken up behind the fireproof curtain. Unless the fire can be subdued very quickly, the fight must, in the majority of cases, be considered as lost, the fate of the stage is sealed and nothing remains but to leave the same to the flames. But if the fire reaches this point, a new and formidable enemy arises in the poisonous superheated fire-gases, which, if they find the way open, at once escape into the auditorium where, in conjunction with the loss of common sense and the fear of death, they will attack the public and cause a most frightful destruction of life.

The damage and destruction caused directly by the flames is often much overestimated, and in all modern theatre fires, the details of which have become known, it has been shown that very few victims found their death by fire. On the contrary, the flames, when they had reached the front of the house, as a rule, found the destruction already accomplished, for the smoke, the terrible heat and the fire-gases had caused the death of many unfortunates. This destructive enemy does not pay much regard to the question whether the building is constructed of inflammable or of fire-resisting materials; it follows those which try to escape through open doors into the corridors and the staircase halls; it seeks in the densely crowded mass of humanity its victims, stops the flight of the panic-stricken people, and, in the desperate confusion of human beings finds an easy and a rich harvest.

To protect theatre-goers from smoke and fire-gases is, therefore, the next important problem and to solve this there is only one way: we must prevent these gases from entering the auditorium. This can be accomplished only by closing the large proscenium-opening by means of a strong and well-resisting fire-curtain. Where no safety-curtain exists, these gases are drawn from the stage toward the house by the exhaustive power of the ventilating flues. We must, therefore, in addition to providing a fire-curtain, find another way of escape for the gases and smoke. This is accomplished by means of suitable openings in the roof of the stage, which during a conflagration open up automatically and are designed of sufficient area to afford the smoke and gases a natural and quick escape upward. With such stage-ventilators open a stage might be compared to a large furnace, in which the fire is confined by the fireproof walls and by the fireproof curtain. Without the fireproof curtain the openings in the stage roof could not operate efficiently, and, while they would doubtless remove some smoke, a portion of the latter and of the fire-gases would necessarily enter the house.

Even where the emptying of the auditorium is accomplished in a quiet manner there will be more or less pushing and crowding. With due regard to this fact other safety measures must be provided in the fullest possible manner to aid in the orderly exit of the theatre-goers. It is not necessary to consider criminal carelessness, such as that reported about the Iroquois Theatre, where some safety stairs had been left unfinished and not carried to the street level. It is, doubtless, true that, even assuming the very best arrangement for the exits, the crowding and the jamming will, in the event of a fire, always be frightful and enormous, particularly if the public can see the quick spreading of the flames. For this reason the safety-curtain, which is intended to prevent this, must be placed in the list of safety measures ahead of all means for the better emptying of the house, such as suitable arrangement of stairs, corridors and exits. The safety-curtain exerts not only a moral effect upon the public, but it affords a really substantial means of protection, and for this reason

it must be characterized as the most important of all the interior equipments of a modern theatre, and one upon whose reliability and certainty in action the safety of the theatre-goers almost entirely depends.

It is, without question, true of both catastrophes to which this article refers that the calamity could in neither case have assumed such terrible proportions if the safety-curtain had been in working order. I may be permitted at this point to draw the attention of the reader once more to the curious parallelism which exists between the two theatre fires under discussion as regards their origin as well as their ending. In both cases the fire caught quickly a highly inflammable part of the scenic decorations owing to the careless and negligent operation of the lights. In the Ring Theatre at Vienna the electric lighting of some flies refused to work and a sponge, soaked in alcohol and attached to a long pole, was made use of, and, while this was being brought, the man in charge forgot to close the gas-cock supplying the fly; he also neglected to lower the fly to the stage level, as required by the rules. When the sponge was applied to the gas-jets the gas, which during the interval had escaped, exploded and a gauze drapery nearby caught fire. In this way the disaster originated. The fire in Chicago appears to have had a similar origin, though it was not due in this case to gas, but to the use of so-called "spot" or "flood" light—a very dangerous means of illumination, which was also placed in the immediate vicinity of a highly inflammable piece of scenery. This spot-light was operated by hand regulation and it was handled with criminal carelessness, a spark from it coming in contact with the scenery, and the result was the same as in the Vienna fire.

When the flames started on the stage, no attempt was made, either in Vienna or in Chicago, to put them out and to ward off thereby the dreadful danger. Every one, including the firemen on the stage, thought only of bringing their own persons into safety and, in Vienna, at least, they succeeded in doing so.

In Vienna the proscenium-opening was closed by a wire curtain, and it is difficult to state how much this might have protected the audience, if it had been properly lowered. But in Vienna nobody thought of lowering this curtain. In Chicago it appears that the asbestos curtain was poorly constructed, and, although it was partly lowered, it appears to have stuck in its grooves before it had been lowered to one-half of its rise.* It should be taken into account that in both cases the flames on the stage remained visible to the public and naturally caused terror: also that the fire-gases and the smoke had a free sweep to the throng of people who were jostling and trampling each other in insane fear and panic. The analogies between the fires go even farther, for in Vienna, as well as in Chicago, the rear stage-doors were thrown open and thus a strong draught was created, which fanned the flames and drove the deadly gases of combustion into the auditorium.

We finally find that in both unfortunate theatres all means for auxiliary lighting were lacking, so that the corridors and stairs were left in utter darkness after the gas had been turned off in the Vienna Theatre, or after the gas-meter exploded, as has been reported from Chicago.† The auditorium itself was illuminated in a gruesome manner by the flames of the fire, but too late for the unfortunate victims who had long before found their death in the theatre through smoke and gas.

And again, just as if the Chicago Theatre were trying to rival the Ring Theatre in Vienna as regards careless management, it was found in the hour of danger in both cases that the so-called emergency-exits were locked. Those persons whose fate had ordained that they should remember the position of these exit-doors had to perish when they reached them. It is to be devoutly hoped that at least one lesson from the last fire will be heeded in the future, namely, that the provision of so-called emergency-exits is a direct crime so long as they are simply kept for special occasions instead of being opened every night, the same as all other doors of the building, for the constant use of the public.

It appears almost incredible that conditions which twenty years ago led to such direful results, which throughout the whole civilized world became known and discussed in all their horrible details, and gave the impetus for many wholesome measures of reform, should have been retained in almost their identical form in a country which leads the world in so many branches of the technical sciences.

It may be stated without conceit that in the modern German theatres conditions will not be found which could cause such calamities. This is to be explained by the strict inspection by the authorities, by the conscientiousness, reliability and interest of the theatre employés, in particular of the theatre fire-brigade, and also by the efficiency of the organization and management of theatres. A fire arising on the stage may possibly cause the entire destruction of the building, but it cannot cause a fatal catastrophe such as happened in Chicago. It would be wicked to claim that because of the excellent safety measures and the splendid organization of the theatre fire-brigades, the possibility of a fire happening on the stage is entirely excluded. It must be admitted that human beings, crowded together, will at the moment of approaching danger always remain the same, whether it happens on a ship, on a landing-pier, on a lawn on which a festival is being held [referring to the panic at the crowning of Czar Nicholas II. of Russia on May 30, 1896, at Moscow, in which 1,000 or more people perished], or else in a theatre. At such moments the beast in man is apt to awake, to whatever station in life he may belong. For is it not a fact that at the fire and panic of the Paris Charity Bazaar young gentlemen, belonging to the highest society of Paris, hit ladies of their own class with their canes in order to gain escape for themselves?

One must always consider the possibility of a stage fire during a performance and a panic in the audience. In view of these two possibilities the safety measure, described in detail, which is intended to avert psychical danger and at the same time offer a safe physical protection, appears to be the most important. This safety measure consists of a well constructed, positively working iron safety-curtain, which must be attended to by reliable men from the fire-brigade. The public of the German theatres may look with confidence upon these two watchmen for their safety, and from such confidence it will derive the quiet and presence of mind which may be considered as additional important conditions for the avoidance of great calamities.

The space at my disposal does not permit of my discussing in detail other questions of prominence. I have, therefore, restricted myself to mentioning only the most important matters, and even these I have had to discuss rather briefly. I may, perhaps, be permitted to refer those interested in the subject to my larger work on *"Theatres,"* forming a volume of the *Hand Book of Architecture,* in which work I have discussed the entire subject in a fuller manner.—*Translated from the German by W. P. G.*

*The official report gives a different cause for the failure of the curtain to act, namely that it became obstructed by a board belonging to the proscenium light, which was hinged to the wall, and had been swung out under the curtain.—W. P. G.

†This is an error.

THE LATE EDWARD T. POTTER.

IN a letter to the New York *Tribune,* Mr. A. J. Bloor expresses with much feeling and unaccustomed felicity his appreciation of the most significant portion of Mr. Potter's life work as follows:

"As I stood, yesterday morning, among those who listened at his funeral to the solemn burial rite of the Anglican Communion, I wondered if more than the veriest few there thought of him as anything more than a man of charming personality, of ingratiating manners, accomplished in many directions, especially in tonal and plastic art—indeed, a 'retired architect,' and a composer of carols and other music which had afforded them pleasure and amusement—if even those of his own profession (supposing such present) realized that they were assisting at the obsequies of a great inventor, who had devoted most of his adult years not to securing commissions giving him opportunities to gratify his taste and talent for the production of fine architecture, ecclesiastical, domestic or (and best paying) the financial sky-scraping variety, but for the solution of the momentous problem of how to render feasible the providing of proper homes for the vast majority of all communities, those not rich, the poor, the very poor—homes, whether urban, suburban or rural, by which everything possible, under the unavoidable restrictions of expenditure, local ordinance, site, environment, etc., for the supply of sunlight, thorough draught, heating, cooling and ventilating of quarters, with the privacy and convenience of their occupants, has been thoroughly thought out and planned.

"This the oft recurrent 'Tenement House Committee' has tried to do, but with only scant success, largely because vested material interests and low class politics, together with the dense ignorance and lack of appreciation of the very classes most to be benefited, have interfered, but mainly because the problem has been handled, in a more or less perfunctory way, by parties qualified in some measure, it is true, by public spirit and beneficent intent, but handicapped by necessary attention to their private affairs, and not at all well panoplied in the general technical knowledge and prolonged specialistic study and research which our friend brought to the subject.

"Later on his rare inventiveness devised a system of what may almost be called instantaneous building by indefinite multiples of units of manufactured building materials. The very simplicity of this thoroughly original project has so far prevented its feasibility from being recognized by the average theorist or practitioner trained in the ruts of building and engineering operations. The scheme concerns itself not with the æsthetics, but simply with the constructional elements of the building art, and it is the present writer's conviction that the programme of the processes involved in the inventor's presentation, though temporarily submerged by his long illness, and now by his death, will yet be taken up as a practical issue by some one, or some group, gifted with adequate imagination and foresight, as well as capital.

"This was the view taken by our model citizen, Andrew H. Green, to whom, as he was already greatly interested in Mr. Potter's designs for the relief of house tenants in congested districts, I submitted his new conception for rapid building of structural units. He was unable to do so himself, the early stage of his finally fatal illness being merely coincident with his closing labors thereon. The Father of Greater New York was so impressed with my explanations and with the potentialities of the project that he wrote a letter indorsing it, which appeared in print, and had it not been for his tragical and wretchedly incongruous taking off, not long after, by an insane man's miserable mistake, he would doubtless have included the scheme among those selected in his later days for encouragement and promotion, as of special significance and inherent beneficence for mankind.

"When the system is developed in practice, the world will witness a new era in the provision springing up in the night, like Aladdin's palace, for the health and comfort of the multitudes who do its pioneering and colonizing work; for the frontiersman, who blazes his way through the primeval forest; for the irrigator, who turns the burning barren sands of the world's ancient deserts into toil for countless new gardens of Eden; for the miner, who wrests from the earth's depths the precious metals needed by the housewife, the farmer, the manufacturer, the seaman, the jeweler, and by every purchaser and seller on the globe —and, since red-handed war still harries the earth, for the soldier, who, till the greater era of universal international arbitration dawns on the stricken earth, must needs be led to slaughter, rapine and the destruction of all the blessings wrought by peace.

"In trying to keep this great inventor's beneficent projects from being laid out of sight with himself, I discharge a promise made long ago to him. But I made him yet another, and that was, if I should survive him and opportunity should offer, to give his widow equal credit with himself for their development, if not for their inception. He recognized with myself that many a man, ambitious to advance his own or others' good, has really been mainly 'made' by his wife—and has received the world's rewards and applause, unshared by her, for a record unattainable except through her unfaltering sympathy, her intelligence, her accomplishments, her competent criticism and advice and her steady co-operation, so far as her general culture qualified her in his current labors on his specialistic plane. His own pecuniary means exhausted, hers supports him and insures continuance of the leisure required for research and elaboration. Nor, as the writer knows by experience, does the normal woman always confine her generosity to her kith and kin. Sometimes she does not wait for wedlock and maternity, its ordinary outlet, to exercise the function assigned by the Creator to her sex as the primal cherisher of life.

"Mr. Potter's mental endowment was, indeed, sufficiently robust and self-poised for him to have outlined his various benevolent schemes without assistance from any second party, but his competence to project them in shape for presentation to those qualified to realize them 'pro bono publico' he felt he owed in chief measure to his helpmeet. And his nature was too grateful not to make his deep appreciation thereof apparent, and too just for him to be otherwise than anxious that the facts should form part of his record."

THE PRESENT CONDITION OF ST. MARK'S.

THE committee appointed to watch over the condition of St. Mark's and to take measures for the preservation of the great Basilica met recently to consider the report drawn up by Prof. Manfredo Manfredi, the eminent architect, and Signor Luigi Marangoni, the engineer, who were charged with the task of making a thorough technical examination of the building and carrying out such repairs as they might find urgent. The committee approved a proposal contained in the report for a thorough study of the foundations.

Professor Manfredi and Signor Marangoni stated that they had already had some important alterations effected with a view to strengthening the edifice.

The assertion that the fall of the Campanile of St. Mark's two years ago was a blessing in disguise, as it called attention to the condition of the Venetian antique monuments of art, is now confirmed. It was after that catastrophe that the Fabbriceria (administration of the Basilica) was dissolved, and the Technical Bureau charged with the care of it was reformed. At its head were placed the architect, Prof. Manfredo Manfredi, and the engineer, Signor Luigi Marangoni. During the past two years they have studied the conditions of the Basilica in its most minute details, as they show in their report, which submits a concrete plan of restoration. This report further shows that there has been no continuity in the methods of repair made in the Basilica, the most important being those of the celebrated mathematician, engineer and architect, Bernardino Zendrini, in the eighteenth century.

The document states that the dangers to St. Mark's are many, but the greatest weakness is in the foundations, which, on account of their construction and the nature of the land on which they rest, have been constantly giving way in diverse directions and in different proportions, in the various parts of the building, thus producing the settling noted in the Basilica. All the walls show such cracking and weakening that it would lead to the conclusion that under the magnificent dress of marble and mosaic is concealed the most alarming decrepitude. The report calls attention especially to the vaults of Paradise and Apocalypse, which are in a dangerous condition through the bulging of the walls and the sinking of the foundations.

The internal walls of the sacristy and those above it support too heavy a weight, and the case is the same with the walls of the apse, which show a considerable leaning outward. Both the dome of the choir and the great dome claim the most immediate and radical measures. Both are out of place and show fissures. The dome toward the Piazza is in a less grave condition, but is so indissolubly bound up with the great dome and with the vaults of Paradise and Apocalypse as to render the repairing of it most necessary. The side domes are fortunately in a better condition. The report then goes on to examine very closely all the many decorative parts, both external and internal, noting the damage caused by the cracking of the walls, the sinking of the foundations, the leaning of the whole building and the infiltration of water, and by the too frequent use of iron, introduced in former times for partial restorations. It is proposed to remove all the iron, and to repair all the damage with the most scrupulous care and the finest sense of art in the work of restoration. The report also suggests the restoration to their original condition of all the decorative parts of the corner of San Alipio, and also the restoration of the bronze Byzantine doors, which have been left totally uncared for. With regard to the pavement the necessity is affirmed of leveling it as much as possible, of adding the missing pieces, maintaining its ancient aspect, using the material which exists, and having the new material prepared by hand, in the manner of the ancient workers of St. Mark's.

In the whole plan of restoration special note is to be taken of the passage, in which it is said that it is a miracle that the vaults of the Apocalypse and Paradise maintain their equilibrium, and the proposal is made that, in order to face this urgent danger, the Technical Bureau should be provided with a complete scaffolding to support the two vaults, which may be applied even in a few hours if a telluric movement should upset that equilibrium, or the breaking of one of the wedges, put to indicate any movement, should show that the equilibrium is about to be overthrown. After this operation it is proposed to raise the whole roof, now weighing on the vaults, and gradually to rebuild them. The complete restoration of the large internal piers is also proposed, as well as the strengthening of the pillars which support them, to prevent any danger of the walls falling.

Restoration of more or less importance must be undertaken almost everywhere to preserve intact the characteristic and antique value of the walls and decorations.

The report estimates that all these restorations and reparations, not including the foundations and their rebuilding, which will come later, will involve an expense of £6,060, part of which is already in the hands of the administrators of the Basilica, who have not always spent the £2,000 provided annually by the Government for keeping up St. Mark's.—*Venice Correspondence London Times.*

HIGH STEEL-FRAMED BUILDINGS IN BERLIN.

UNDER date of November 30, Frank H. Mason, United States Consul General at Berlin, makes the following report to the Department of Commerce and Labor:

Some weeks ago the Central Association of German Industrials addressed to the ministry of the interior a respectful and exceedingly well written memorial urging that the present building laws, which do not permit the construction in Berlin of dwellings or business buildings with a greater height from pavement to cornice than 22 meters (72.18 feet), be so far relaxed as to allow steel-framed buildings of higher altitude to be erected, if not generally, at least in exceptional cases when good reason for such variation could be adduced.

The reasons for the proposed innovation, as set forth in the memorial, were that the rapid growth of Berlin in population and business interests required more room to be provided, particularly in the central districts, without increase of cost to tenants; that the restriction to a limit of four stories compelled excessive lateral expansion that had already spread the city over an immense area, and thus lengthened the distance between the homes of many people and their work; and that experience in other countries had shown high steel-framed buildings, when properly constructed, to be safe, comfortable, uniformly better lighted and ventilated, and therefore more sanitary for dwellers and working people than those of ordinary height. Furthermore, it was urged that such a relaxation of building regulations would bring into use great quantities of structural steel and iron which are now largely produced in Germany, and for which an increased market would be highly appreciated by the steel and iron masters, who are making such a brave fight for a share in the world's trade.

Thus plausibly stated, the appeal of the industrial association was submitted during the summer vacation to the ministers of commerce, the interior and public works, who, after due consideration, made a joint reply, dated September 20, in which the petition was flatly refused, for reasons which were stated at length, but may be condensed as follows:

(1) The ministries are opposed to any system of building which will lead to an increase in the number of "renting barracks" (Miethscaserne), large buildings divided into a great number of small apartments or tenements, which are leased to families of working people, with the result that a great number of persons of both sexes and all ages are huddled together under conditions which are necessarily subversive of normal family life and prejudicial to public morals.

(2) Buildings so high as to be beyond the level of the present water supply could not be made clean and sanitary.

(3) Any important increase in height beyond the present limit would put the upper stories of the buildings beyond the protection of the fire department, as at present equipped and organized. Whatever might be the material interests involved, the ministries held themselves bound to consider and protect not only the architectural unity and beauty of the city, but the health and the moral and physical safety of the people, all of which would, in their opinion, be compromised by the proposed innovation.

With this result the authors of the petition are by no means satisfied, and have replied that they had not proposed to carry buildings in Berlin to the excessive heights which are common in the United States, and that had the desired permission been granted, it would have been provided by careful and competent engineering that all the requirements of fire protection, water supply, and every sanitary necessity should be carefully and completely met. Moreover, in regard to resistance to conflagration, at Baltimore high steel-framed buildings, which offer least food for a fire, fully vindicated their superior safety and were left standing like monuments amid the wide waste of the ruins of four and five-story blocks built of stone and brick in the ordinary way.

Thus the discussion stands at present, and it does not appear likely that the ministries, fortified as they are by considerations of municipal beauty and public health and safety, will recede from their present position. It is difficult to persuade German conservatism, in so important a matter as the architectural construction of cities, with arguments drawn from experience in a country which, like our own, has paid during the past twenty-five years an average annual tribute of $125,000,000 to the scourge of fire, and which for the losses of the current year 1904 must pay nearly or quite double that sum. However little of our annual holocaust the "skyscraper" may be responsible for, the fact that it is a distinctively American type of construction will not recommend it to European municipalities.

THE TEMPLES OF ZIMBABWE.

A LECTURE to the members of the Dudley Literary Society on "The Ancient Temples of the Great Zimbabwe," was delivered by Mr. R. N. Hall, F.R.G.S., late of Dudley, who has recently completed two years' exploration work at Great Zimbabwe on behalf of the Rhodesian Government. During his explorations, he said, large portions of the ancient temples of the Great Zimbabwe were cleared to a considerable depth, and the original floors, as well as ancient walls and other structures, were disclosed; while prehistoric relics, overwhelmingly proving the extensive practice of Phallic worship of an exceedngly old cult, were found. The Phallic character of these temples was discovered in 1891 by Mr. Theodore Bent, who only saw the ruins in their buried condition. Recent explorations not only fully bore out Mr. Bent's conjectures, but yielded abundant evidence in this direction. Mr. Hall devoted eight years to the unraveling of the mystery which had always been attached to the ancient monuments of Rhodesia, which contained the most ancient and most extensive gold mines known to the world, and from which it was believed, on a conservative estimate, that some £75,000,000 of gold, sterling, had been extracted by ancients of a period covering the Ophir period of the Scriptures. During these eight years he had not discussed the question of the origin of the ancient gold seekers of Rhodesia, holding that further investigation of the ruins was necessary before any definite conclusions could be arrived at. After eight years' investigation it was his confirmed conviction that the older portions of the Zimbabwe ruins represented the monuments of a colony of the ancient empire of Saba, or Sheba, in South Africa. This conviction was founded on careful researches in the ruins generally and at Great Zimbabwe in particular, and supported by the opinion of leading archæologists in Europe with whom he had been in close correspondence while at Zimbabwe and since his return to England. Saba could now be shown by Assyrian and Egyptian documents, by ancient historians and the Scriptures, to have been a world-power long previously to, contemporaneously with, and subsequently to the time of King Solomon. It was believed to have succeeded the still older kingdom of Minæus. Saba rivaled Egypt in power and influence, arts, culture and literature and civilization, providing the Phœnician alphabet, which was the mother of all our European systems. It enjoyed the monopoly of the trade and commerce of the Indian Ocean and its coast. According to Scripture and ancient Roman and Grecian historians it was the gold-purveyor for the whole of the then known world, and possessed nearly the whole of the east of Africa, a possession maintained at any rate till A. D. 35, the "Periplus" stating that the Sabæan king, Kharabit, was at that time in the possession of the East Coast of Africa to an indefinite extent. The lecturer showed the identities in architecture and worship of Baal, and most probably Ashtaroth, existing between Zimbabwe temples and the temples of South Arabia, Mesopotamia and Syria, and also pointed out the affinities of Phallic worship, shown by the conical towers, the Phalli and the sacred birds of Zimbabwe, and those of other Semitic nations, alluding to the Penuel tower of the Midianites which Gideon destroyed, and similar Baal towers of Syria, Arabia and Phœnicia, and the Bel towers of Babylon. He also drew attention to the influence of the Phœnicians and Indumean Jews, whose port was Erzion Geber on the Red Sea, on the shores of Southeast Africa, including Mozambique, Sofala and Madagascar.

ILLUSTRATIONS

DETAIL OF THE GUTENBURGHAUS, COR. JERUSALEM AND SCHUETZENSTRASSE, BERLIN, PRUSSIA. HERREN CREMER & WOLFFENSTEIN, ARCHITECTS.

This plate is copied from *Blätter fuer Architektur*, but a view of the entire building, which appeared in our issue for November 12, 1904, was copied from the Russian periodical *Stroitel*.

HIGH SCHOOL, MARLIN, TEX. MR. GLENN ALLEN, ARCHITECT, WACO, TEX.

ENTRANCE TO THE SAME.

LIVING-ROOM; HOUSE OF PAUL TUCKERMAN, ESQ., 115 EAST 69TH STREET, NEW YORK, N. Y. MESSRS. HOPPIN & KOEN, ARCHITECTS, NEW YORK, N. Y.

LOWER GATEWAY; "CASTLE GOULD," ESTATE OF HOWARD GOULD, ESQ., FORT WASHINGTON, L. I.

This gateway was designed by Mr. M. J. Moroney and executed by the J. L. Mott Iron Works.

DETAIL OF UPPER GATEWAY TO SAME ESTATE.

HOUSE AT ROGOJENY, SOUTH RUSSIA. MR. H. INIGO TRIGGS, ARCHITECT.

This plate was copied from *The Builder.*

PROPOSED CLOCK-TOWER, SURBITON, ENGLAND. MR. ARTHUR J. GALE, ARCHITECT.

This plate, copied from *The Architect,* illustrates how willingly a designer, with his mind fixed merely in seeking the effect he aims at, disregards the cold rules of formal perspective drawing.

LAMP BRACKETS AT THE ENTRANCE TO THE BOSTON PUBLIC LIBRARY, BOSTON, MASS. MESSRS. MCKIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.

COMMUNICATIONS.

A CORRECTION.

TO THE EDITORS OF THE AMERICAN ARCHITECT.

Dear Sirs: My attention has been attracted to a little paragraph in the editorials of your issue of January 7, 1905, relative to the report of this office, in which the Honorable Secretary of the Treasury is placed in a rather undignified, if not false light, before your readers, and I beg that you correct the inaccurate statements made therein. The omission of illustrations from the annual reports of this office was not because of an order of Secretary Shaw at all, but in accordance with a general Executive order, applicable to Government reports in general in all the departments. Neither was it a question of suiting the Supervising Architect, that they were authorized this year, but simply because it was found wise to make an exception in this instance.

Kindly note this correction and oblige, yours respectfully,

J. K. TAYLOR,
Supervising Architect.

NOTES AND CLIPPINGS.

RECOVERY OF TIN FROM SCRAP.—The treatment of new tin scrap, known as "detinning," has become of considerable importance in the United States, and at least ten companies were actively engaged in this special branch of the industry during the year 1903. The average yield from tin scrap is approximately 2 per cent. of metallic tin. In addition, a large number of small concerns in the principal cities recover the tin from old tin cans and similar material by a smelting treatment in a furnace, the tin being obtained in the form of solder, which is either used as a basis for making new solder or is treated chemically to yield metallic tin or tin salts. The residue of scrap iron is generally utilized in the manufacture of sash-weights and other castings of inferior quality of iron.—*Journal of the Franklin Institute.*

A POETICAL DEFINITION OF SEWAGE.—"Not long since," says Mr. G. Everett Hill, "I visited a town to inspect a sewage disposal plant of great interest. I was a stranger without a guide, but I followed the valleys of natural drainage, and these led me unerringly to the works I sought. As I stood on the road at the foot of the town, I saw in the valley below me a long roof which looked as though it might cover the sewage tank. Leaning on a gate nearby stood an old farmer, evidently a Scotchman, whose shrewd but kindly face betokened an interest in my movements. To make sure before descending that I was on the right track, I asked him if he could tell me for what purpose that long, low building was used. He sized me up for a moment before replying, and then said slowly: 'It's full of unborn grass and flowers and fruit for God's garden.' It was the best definition of sewage I had ever heard."

NEW ACCESSORIES FOR FIRE-ENGINES.—A novel fire-engine has recently been constructed for the fire-department of Manchester, England, which contains, in addition to the usual features of an ordinary steam fire-engine, a number of additions designed to facilitate the operations of the firemen and to provide increased safety. The first of these is an air-pump, connected by gearing with the crank shaft of the engine, which furnishes air through a flexible metallic hose to firemen working in dense smoke, or placed where they are subject to gas, or fumes of acids or other chemicals. This flexible hose is connected with a protective helmet worn by the fireman, which is made of heavy leather, extending down over the shoulders and supplied with an opening for the eyes and upper part of the face. The air enters at the back of the helmet and flows around the face, passing out of this opening, keeping the eyes and nose free from smoke. The helmet contains a telephone receiver and transmitter, whereby communication can be maintained with the officer at the fire-engine, and by means of a switchboard, if necessary, with a chief official. The engine has a small dynamo, located over the front wheels, and connected with the fly-wheel by means of a belt. This furnishes a current for eight 32-candle-power incandescent lamps through a flexible cable, so that, provided with a hand lamp, a fireman can penetrate dark and smoky apartments, where it is necessary often to cut off gas or oil supply. The entire equipment, including the protective helmets for the firemen, is stowed in the forward part of the fire-engine, which is of the usual English pattern, and adds comparatively little to its weight.—*Harper's Weekly.*

CHICAGO'S FREIGHT SUBWAY.—While the New York Subway takes passengers and pedestrians from congested streets, the Chicago tunnel system purposes to do away with the teaming and heavy hauling on the thoroughfares, making it possible for a million people to use with comfort the downtown streets, in pleasure vehicles or street-cars, unimpeded by the delivery carts, drays and coal-wagons that have rendered the highways almost impassable at times. The street situation in Chicago may be better understood when it is recalled that the early builders of the city, for financial and physical reasons, centered the railway terminals, freight depots, wholesale establishments, retail stores, and more than 70 per cent. of the manufacturing plants within or on the edge of an area one and one-half miles square. The teaming necessary to the transfer of goods in this district has grown to such proportions as to be unequaled in any city of the world for a similar space. On thirty-two miles of streets the daily movement of merchandise has averaged 112,000 tons. During the busy hours as many as 1,000 teams have been counted passing a street corner in an hour. Within a section one and one-half miles square 70,000 vehicles have been employed at a yearly cost of $50,000,000, while 750,000 clerks, laboring people and business man have been confined to the same territory, together with thousands of shoppers visiting the retail stores. In view of these conditions it is easy to see what the subterranean freighting system means to Chicago. The basement of every business house in the congested area now has direct access to the Subway tracks leading to the terminal railway freight-yards and to the depots of the twenty-five railway trunk lines and their thirteen branches entering the city.—*William E. Danforth, in Harper's Weekly.*

CAROLUS DURAN'S EARLY LIFE.—One of the salient events in the art world of Paris has been the appointment of M. Carolus Dural to the directorship of the Villa Medici, at Rome. Apropos of this, the London *Daily Telegraph* prints the following interesting note: The well known painter, on taking over his duties, will enter the French Government's Academy of Arts in the Eternal City for the first time. He never was a pupil in the school of which he will be master henceforth, for he is almost alone among modern French artists of like reputation in not being a former "*Prix de Rome.*" Leisure to go up for the trying ordeals of the competitions for a berth in the Villa Medici and the accompanying scholarships supposes some private means, especially as hardly one example is recorded of a candidate succeeding at his first attempt, and Carolus Duran, in his early years, or, rather, plain Charles Durand, as he was then, had little leisure and less means. If he has been one of the most successful artists of his day, no one ever knew harder times at the start than he. M. Jules Claretie relates how, having lost heart, the young artist had booked his passage as an emigrant to Algeria, giving his name and profession as "Durand, mason," when a friend met him just as he was preparing to walk to Marseilles, not having money enough to take the train, and prevented his leaving, lending him the wherewithal to rent a tiny studio for two quarters in advance in Paris. There Carolus Duran worked away furiously on nothing a year. A penny roll frequently constituted his midday meal, and he often went without dinner five times in a week, as he recalls nowadays not without a touch of pride. He, too, however, went to Rome, though not to the Villa Medici, and dates from his stay there his start in life. He won, in his native Lille, a scholarship endowed by an artist named Wicar, a contemporary of David, for the purpose of sending young artists to Rome, where they received for four years the sum of £7 a month. Carolus Duran, one of the most brilliant examples of a self-made man, will be able to point to himself whenever his young men of the Villa Medici grumble, and to bid them thank Providence their lot is laid in easier lines than his was.

The American Architect and Building News

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CONTENTS

IT is a long time since anything more surprising has happened in the world of art than the announcement, early this week, that a new Director for the Metropolitan Museum of Fine Arts had been found in the successor to Sir Philip Cunliffe-Owen, the first Art Director of the great South Kensington Museum. It seemed, and still seems, a rather curious and audacious act of transplantation, one which could hardly have been effected by unaided argument. It is true that, here in New York, there was a crying need to be satisfied and that, presumptively, if the right man could be found, it would be possible to provide sufficient means to advance the Metropolitan Museum to a really leading place among the world's institutions of its class, and while so doing satisfy every reasonable ambition for personal reputation that the managing director could entertain. But did it offer a better chance of securing lasting fame than could have been had, assuredly, by remaining in charge of the further development of the, at present, far greater institution at South Kensington? If the answer to this is that Sir Caspar Purdon Clarke had carried his work at South Kensington to as advanced a condition as was within his power, then it would seem to be desirable to discover whether the standard and quality of performance at South Kensington is just what is desirable to have set up in New York before a distinctly different people, amid a somewhat different civilization, so far as it finds expression in social and intellectual life. If the appointment should happen to mean that the New York institution was to be developed on the side of industrial art rather than the fine arts, we think it would be regrettable, but we have not the slightest ground for assuming that such is to be the case.

WHAT was needed by the Museum was a man of real administrative power, well grounded in all the arts and art industries, but the slave of no one of them, and he would be all the more desirable if he had already had some museum experience. Sir Purdon Clarke has all these qualifications in a high degree, and it is rather interesting to find an architect selected for the place, for, of all the artistic brotherhood, architects are the most practical, the least touchily sensitive, and the least likely to be hag-ridden by some hobby. Sir Purdon Clarke, a man of fifty-eight, is a Fellow of the Royal Institute of British Architects, who has done a good deal in the way of official building for exhibitions and so on, and a reasonable amount of private work. But his career has been rather in the field of museum work than in the regular walks of ordinary architectural practice. As early as 1870 he was occupied in overseeing the production of Italian casts for the South Kensington Museum, and between that time and 1891, when he became Assistant Art Director, he was largely occupied with exhibition work and traveling through the East as architect of sundry legation buildings officially designed by himself. On the death of Sir Philip Cunliffe-Owen he succeeded to his position as Art Director and was shortly after made a knight. The selection is assuredly a good and safe one; we hope it may prove to be an ideal one.

OBVIOUSLY, the beginning of a new development is close at hand, since rarely has an institution been favored with such a concentration of propitious influences—abundant income, a broad-minded and liberal President, a thoroughly trained and practical Director—any one of these factors is by itself almost enough to give the Museum a distinct new upward movement, but here we have all three factors becoming operative at almost the same time, and the result of their co-operation should be all the more marked. Further than this, the public authorities seem likely to do their share also, as a bill has just been introduced in the State Senate providing for an issue of a million and a quarter in corporate stock so that a new wing may be added to the Fifth Avenue front of the building. If, with conditions so favoring, it should be found in a few years that the Museum was being developed unduly on South Kensington lines, and was not seeking companionship with the Louvre, the Luxembourg, the National Gallery and the great galleries at Madrid, Vienna, Berlin and St. Petersburg, we cannot but feel that people would have ground for dissatisfaction. The needs of industrial art are worthy of consideration, and the world would feel the loss of South Kensington or the Musée des Arts decoratifs very keenly, but we feel that for the moment the industrial arts can be left to the care of the very intelligent and artistic body of "window-dressers" who make our shop-fronts quite as interesting and instructive in their way as many of the show-cases at

Entered at the Post Office at New York as second-class matter.

South Kensington or the Hôtel de Cluny. Temporarily, and during the formative stages, classification and separation cannot be, with wisdom, rigidly applied, but we hope that the ultimate aim will be to effect a physical separation between the major and the minor arts as well defined by character and space as that between, say, the National Gallery and the British Museum.

CHARLES W. ELIOT, President of Harvard University, may safely be counted on to say, and say in the right way, things that deserve thinking over, and he made no exception in the brief note in which he expressed his regret that he could not be present at the annual banquet of the American Institute of Architects. "When," said President Eliot, "a country gets rich and strong industrially and commercially, the first way in which its wealth should be visibly expressed is in its architectures. . . . A republic should not remain behind monarchies and empires in this artistic development. On the contrary, it should gain much from the fact that the great mass of the people feels a strong sense of ownership in all the republic's constructions." For the moment, we can forget that the presence of the janitor is a perpetual reminder that the ordinary individual's vested interest in a public building is of the very slightest, and only realize how true, in the abstract, the statement is; and how good an argument it is when we are seeking to bring about costly public improvements—this fact that "the great mass of the people has a strong sense of ownership" in public improvements. It seems as if here we might find one of the explanations for the unquestionably rapid advance in the arts of construction made in this republic—the people, the workmen, respond to their opportunities because they have a "strong sense of ownership" not only in the public buildings into which they can actually penetrate, but also in the beauties of the street architecture which private owners so generously contribute to public pleasure.

THE real pleasure "the mass of tne people" takes in its ownership of the "Republic's constructions" can be measured by watching the crowd that boards the newest battleship and comparing it with that other crowd that climbs the stairway to the Library of Congress. It takes more than one kind of man to make a world, but we fancy that one visit to the ship will serve for all time, while many a visit will be made to the Library, or other similar building, by those who find it within easy reach. It is not possible to believe that this sense of ownership in great public buildings did not do as much as anything to make possible the construction of a large part of the world's famous buildings. The great cathedrals were built and paid for, not because they were for the benefit of monk and priest, nor wholly because they were erected to the honor of the Almighty; it was possible to build them because the workmen felt a sense of ownership in the finished building, and knew they could enter freely in. It was probably the same feeling that in part facilitated the building of the mediæval guild-halls, as the membership was sufficiently large to represent an appreciable part of the local public; and so, if we would have more and finer public buildings, we should foster this sense of ownership, make the people realize it better—to their own artistic betterment—encourage them to enter in and look about them without being driven out by policemen or bullying janitor. The buildings are theirs and if their feet wear out the pavement, or their hands soil the walls, have they not in their collective pockets the money to replace them over and over?

THE incidents of the Russo-Japanese war are so varied and exciting that but little thought is being given to the ultimate consequences. Whatever may be the political or commercial changes that devolve on Japan, whether victorious or defeated, it seems to us that the loss to it as an artistic people must be very grievous. Quite aside from the fact that amongst the thousands upon thousands of volunteers and conscripts that will fall in battle or be maimed past usefulness there must, in the case of so artistic a people, be a very large percentage of the whole who have the right to be considered artists and artist-craftsmen of high rank whose loss to Japanese art is immediate and total, there is another important consideration: if the present rate of slaughter goes on, the remaining population, particularly if defeated and with no war indemnity to relieve the situation, will find itself so occupied in earning its own living, and in caring for the widows and orphans left on its hands, that little time can be given to the arts and to maintaining the subtile traditions of the ancestral crafts. This would be unfortunate enough at any time, but is likely to be all the more grievous in view of the willingness of the modern Japanese to be influenced by the artistic propaganda of the Western world. With the native art movement brought to a standstill, and being crowded by the oncoming of the wave of Western ideas, it looks as if one of the unfortunate results of the war might be the closing of the long history of native art development and, after an interval, the beginning of another and quite distinct and presumptively bastard art movement.

IT might be argued that, although the French were an artistic people, no such interruption in her art history followed the Franco-Prussian war, but then the loss, grievous enough, fell mainly on the pocket; there was no such slaughter of human beings as has been going on in Manchuria. On the other hand something very like the situation we apprehend did follow the Napoleonic wars and, but for the enlightened action of Bonaparte himself, the consequences might have been very serious. The real difference is, however, that the European wars were mere struggles between essentially similar civilizations, while here the artistic power of the Orient may be pushed back by the, in many ways, less artistic influences of the Occident. Still, whether we are right or wrong in our conjectures, we fancy that a golden time is dawning for the Occidental collector of Oriental treasures, for many an impoverished Japanese family will shortly be willing to exchange its cherished ancestral lares for furniture made in Grand Rapids or jewelry designed in Attleboro, accompanied with enough currency of the realm to make the barter commercially profitable.

SOME SPEECHES AT THE ANNUAL BANQUET, A. I. A.

CARDINAL JAMES GIBBONS:

I SUPPOSE, ladies and gentlemen, that I received an invitation to this banquet of most distinguished men simply because I represent the ancient Church which has always been the patroness of architecture and the nursing foster-mother of the arts and sciences. I must, however, on my part, frankly confess that my knowledge of architecture and sculpture and painting is exceedingly rude and superficial. I can admire a splendid painting, a noble work of art, a fine specimen of sculpture or architecture without at the same time being able, perhaps, to define the intrinsic perfections of this work, just as a rude and uncultivated man might be swayed by the eloquence of the Secretary of War that was [Mr. Root] without being able to point out the special excellencies of the oration he had been listening to.

Architecture and sculpture are among the most enduring creations of human genius; they survive their distinguished authors by years, by centuries, aye, by cycles of ages. We all are filled with admiration when we contemplate those great monuments of Egypt, the Pyramids, that have now stood for upward of 5,000 years upon the sands of Egypt, and they are destined to stand there as long as flows the turbid Nile. But who was the great architect that conceived the plan of the great works? We know not. The most searching investigations of archæologists and historians leave us in more or less doubt and conjecture as to who were the architects that designed those imperishable monuments, or who were the kings to whom they were dedicated.

Religion and architecture have always been inseparably united. They have always been linked together and they have gone down the ages hand in hand, inseparable. And this is true not only of Christian, but even of the pagan architecture: the most noble works of architecture that have come to us from pagan times are consecrated to religion; but, as I have said, the monuments exist and are perpetuated, whereas their authors passed away. We gaze in admiration upon the great monuments of religion in France, and I would appeal to the distinguished French Ambassador here for confirmation of the truth of what I say. We cannot but admire that magnificent cathedral at Rouen, and also, I would say to you as architects, that if you go to Rouen do not forget to see that noble little church of St. Ouen, the most graceful and beautiful work of art, perhaps, in existence. The Church of Saint Ouen bears the same relation to the Cathedral that a graceful bride does to a mature matron. We ought to admire the beautiful Cathedral of Notre Dame in Paris, the Cathedrals of Rheims and Chartres and all the other cities of France. We admire the Cathedrals of Canterbury and York and Durham and Salisbury, but, gentlemen, who were the authors of those great monuments that have passed down to us? Who was the author of that great Cathedral of Cologne, in my judgment the grandest specimen of architecture in the world? I prefer it to the Cathedral of Milan, because its outlines are more sharply and clearly drawn. It has stood for 600 years, and five and twenty years ago when I was in Cologne that cathedral was in course of completion. Now, gentlemen, those architects were pious men, they were men of God. They drew their inspiration from the Great Architect who has conceived and executed the great dome of nature. Theirs was a higher inspiration than human fame. Their ambition was to have their names inscribed in the Book of Life. While I earnestly hope that the members of this distinguished gathering will share in the bliss of their prototypes, I trust also that some incense of human fame will be added, and that the wave of oblivion will not pass over you, that your memories and your good deeds may be recorded in the hearts and affections of the American people.

Sixty years ago the city of Washington was the very modest capital of an aspiring republic; to-day the city of Washington is the fair capital of a great republic; sixty years from now, through your instrumentality, the city of Washington will be the most ornate and the most beautiful capital of the greatest and the most powerful nation of the world. Already, gentlemen, you have done much to make the city of Washington most attractive, and to draw illustrious strangers to the capital. There are public buildings and private edifices to-day in Washington of which any city might be proud. Perhaps there is one exception, to which I would refer in a faltering fashion. There is one building that has been very severely criticised—I believe it is the Pension Office. I know not whether the animadversions have been due to the material of which it is composed, or to the style of the architecture. The story is told that the late General Sheridan was brought over to inspect it carefully, and he said: "That building has only one defect." He was asked what that was, and he said that it was fireproof.

In speaking of architects and artists, I deem it my duty to associate with them another class of benefactors to society; I mean their patrons, some of whom are here to-night. I may mention Mr. Morgan and Mr. Cassatt. Many a mighty genius would have perished from the earth and his name would have been obliterated to-day were it not for the patronage of their munificent patrons. The works of Virgil and of Horace might have perished from the earth and the memories of them never have come to us, were it not for the munificent patronage of a Mæcenas; and the name of Michael Angelo, who designed the grandest cathedral that ever was erected to Almighty God, would have perhaps been lost to fame were it not for the family of the Medici. I would, therefore, close by paraphrasing a well known sentence of Webster when I say: "The Architect and his Patron, one and inseparable, now and forever."

THE FRENCH AMBASSADOR, M. JULES JUSSERAND:

Mr. President, Mr. Chairman, and Gentlemen:—I think it may be stated with truth that this banquet is emblematic of two of the most ancient and keenest desires and wants of man—bread and art. Most ancient both, the more ancient of the two being art. We know it is in France, for there we, too, have cave-dwellers. Recent excavations have brought to light the remains, and found among them are evidences of what was the art of primitive man and what was his food. We found that the art was remarkable, that these men could draw from life animals, elks, mammoths, etc., so as to excite the wonder and admiration of even the world's famous sculptors present at this place on this day. And we found what their food was. They could not rise to the height of bread, much less reach the then inaccessible clam, so they had to be satisfied with the snail. Mounds of snail shells were found in the cave; of bread there was as yet no question; of art there was quite a school, and an admirable one. Those traditions have been preserved in France.—I do not speak of the snail, although it continues to be eaten in my country, but of the artistic tradition. I do not think there has been a moment in the life of France which has not been associated with art. In the midst of turmoil and wars it continued alive and it has survived every storm. It has grown and bloomed, decking, from century to century, our land with those magnificent buildings to which his eminence made an allusion a minute ago, such buildings as that at Mont Saint Michel and that at Chartres, to which a splendid volume full of thought and literary recollections was recently devoted by one of the most eminent of Washingtonians. [Mr. Henry Adams.]

Throughout the ages, to the Renaissance, to the reign of Louis XIV, to the present day, French art survived unimpaired. Each time I go back to Paris I find changes and new signs of its vitality. It may be said, I think, of French art that it has all the qualities which the famous mare of Roland had, and one besides—it is alive. It is alive in all its branches, architecture, painting, sculpture, engraving medals, tapestry, pottery. One of the last times I went to Paris was in 1900, the year of the Exposition, and there I saw what an architect could do. When I had seen Paris, before a gloomy building called Palais de L'Industrie obscured the Champs Elysées; when I came again the magic wand of one of you had been applied there, the blot had disappeared and a splendid way had taken its place and a magnificent bridge spanned the Seine, and in the distance was seen the golden dome under which one who proved a friend to America, one who said: "France wanted America to be free as now she wants her to be great"—Napoleon, sleeps.

Why is French art so vital and alive in all its branches? Because it is alive in all the nation. The thing which is most important and which, I am sure, you feel and understand as well as I do, is that the artists are not enough, you must have the nation with you. Your efforts would be of no avail, if you were not understood by the common people. The common people in France, either by instinct or by tuition or inheritance, are able to be usefully associated with the highest manifestations of all the branches of our arts. The French people of the poorer class are asked what they think. No great change is introduced in our architectural arrangements without giving the people an opportunity to see it and express their feelings. When there was a question of changing the Arc de l'Etoile by placing a group of statuary on its summit, a model was made at great expense and placed in position for several months in order that the people

could see the effect of the proposed alteration; they decided it was better to remove the statues, and they were removed. For this cause all our museums, the finest, the most important, the ones where a mishap would be most deplorable, are thrown open to all comers. All are welcome, on all days, in all seasons; the poorest, if they choose, may come to warm themselves; let them come, perhaps they will look too. The same with our competitions. The exhibition of the competitive work for the Prix de Rome is open to all comers; the award is rendered by the highest authorities, Members of the Institute, but the people's opinion is of importance. I have often visited museums on holidays, when they are most crowded, and have noticed in a way that was most touching how even the poorest people could understand the value of a beautiful thing. I visited Versailles one Sunday last summer and I remained there until the gates were shut, and then went away with the crowd of Parisians who had spent the day there. When I was at the doors I found an humble couple and they were saying to the keeper: "What a pity the hour has come to go; it was so very beautiful!"

But is there, one may be tempted to ask, any practical use and advantage in such a state of affairs? Certainly. Art gives wholesome pleasure, and no effort should be spared to increase the number of wholesome enjoyments accessible to the poorest as well as to the richest. this is equality of the highest order. Art is a great consoler, and what does consolation of this sort mean? A diminution of weakness, an increase of strength.

Another thing I shall say of French art, and I am sure you will agree with me; it is hospitable. All nations are welcome to our schools, and when I received the invitation to be present at this grand and charming meeting I took the liberty of writing to the secretary of the school [M. Jouin], a most excellent secretary. I wrote him that I had to address an audience of Americans, and I asked him, as he had seen so many in the school, to say frankly what he thought of them. He sent me a letter in which he expresses with perfect freedom his opinion, and I shall take the liberty of reading to you the judgment of this gentleman about the several generations of Americans whom he has known at the Ecole des Beaux-Arts in his day. He writes:

"Of all foreigners who come to France to practice the arts of design, the American is the one who penetrates most easily and most deeply the genius of our nation. Neither do" * * * Comparisons being odious, I shall name no name, so I shall pass a few lines.

"Most American artists known in Europe have studied in Paris and have made long stays in France. Many have settled in France and consider our land as a second motherland for them. There is an affiinity between the two nations, because, I suppose, the groundwork of character in the American, as in the Frenchman, is made up of the same aspiration toward liberty, individual expansion and the hatred of ready-made formulas. I include a list of American artists now alive who have won recompenses at the Paris Expositions, where their works are judged by Frenchmen and in accordance with our tastes and ideas. My list includes:

Painters	260
Sculptors	50
Architects	37
Engravers	9
Total	356

My correspondent adds: "This number needs no comment." He reverts then to what America has done for the school. America has endowed our School of Fine Arts with the Prix de la Reconnaissance, "the prize of Gratitude," which was founded by you architects, former members of this school, and contributes to keep alive your souvenir in France.

I shall add only one word, artistic connections between France and America began long ago, under the happiest auspices. Immediately after the War of Independence, in 1784, the State of Virginia wanted to have the best possible statue of the Father of his Country, George Washington. After correspondence with Jefferson, it was decided that the greatest sculptor of the day, Houdon, should come to see Washington and make his statue from life. Houdon came, led by Franklin. He remained some time at Mount Vernon, a guest of the great man, and made that statue, that real masterpiece, which is now to be seen in Richmond.

My wish is that those connections, so happily begun, may be continued forever in the same spirit, and that artistic relations between France and America may remain a bond of sympathy and a tie of love and friendship between those two great republics of free men.

Mr. John La Farge:

Mr. Chairman and Gentlemen, the fate which overtakes me is a frequent one. I was to have spoken earlier, but the gentlemen who have spoken before me have said almost all that I could have wished to say, therefore I shall take up the affiliation, if I may so say, of what the ambassador from France has hinted at and has said. My own affiliations, my own training, with those of many of us, have been French. I feel that when allusion is made to the French artist who scraped on the bones of the cave-bear he was distinctly my ancestor. Through all these thousands and thousands of years I go back and feel that, after all, the only one who has drawn as distinctly and as well, with that firmness of touch, that far down feeling of nature is perhaps derived from such an ancestry but happens to have been born on the fierce wave-beaten coast of New England, and the only man who has ever drawn exactly upon the lines of the dwellers with the cave-bear is a great American painter, as great as any in the world, Winslow Homer.

The artist, away back, the painter, hardly existed except in such a form; he was useless then and to a certain extent he is useless now. That is his great advantage, and that is his great honor. The architect represents in the arts a useful side; his art is that of utility, and all the more honor to him when he blends with that utility the uselessness of the last and the most indefinite of the arts, the one I am called upon to represent, the art of painting, which could be of no use in the far back, except, perhaps, to disguise some man in ambush, who painted his face so as to surprise some one else, or to decorate the dress of some savage lady.

The art of painting comes after all the others; it is based, as we know it, upon the use of the outside world; it is the representation of an idea by an image of the outside world and consequently it has no end. It has had these vague beginnings, but it has grown with the entire human race. Every acquisition of knowledge, of learning has gone on with it, and the very last studies of science are used by the painter. The other arts are fine arts, and indeed that is their glory that they keep a more fixed condition. The architect, therefore, when he calls for help to the painter, has less use for him than he would for almost any other form of art. It is merely to recall the fact that there is such a thing as useless beauty, that there is something to elevate you outside of the ideas of utility that the painter comes in. He has but few things in common with the architect. It is true that he has always had them. He has the ideas and the representations of space, and of line, and of light and dark and what we call color, and that is all. The rest is entirely outside, and therefore we know that the architect has employed the painter very late, he has so little need of him. On that account whenever the painter feels that the fundamental art, the great art of usefulness, can employ him, can help him to say what he has to say, he feels at length that the end of civilization has come, and that he represents at length, finally, what civilization, what culture means, the cultivation of the useless, the thing that the Greeks called the noblest use of the mind, the thing that the great Saint Thomas called "the place of pure innocence," the thing which takes us away from the usefulness of ordinary life. Therefore, when the time has come that the architects, representing the earliest and the foundation art, need for the adornment of their work the painter's work, the time has come to say that the orbit of things has revolved, and that a new departure, a new birth is now impending. We have not, perhaps, the right to say that we are beginning an unprecedented era; that in a country where naturally, I should say, every man was from his original tendencies an architect, a constructor of buildings, a manager, something more than that is needed. What we have done in the lines of art has been going on now for over a century, and we have come to a place where we need fear the challenge of no one. We have just been assured of what importance the American has abroad. We are now at this very moment going to add to our aspirations, to the promise in the future, to the glory of the future, to the future charm of life for the artists of all kinds, a connection with Europe which has been wanting, the placing of the names of our young men in the great city of the past. We are going to be established in Rome, which is apart from all useful matters, upon which I do not care to speak. This is in itself a statement that we, too, are rivals of all that has been done and intend to rival all that shall be done, and we can then feel that the old cycle is closed, and that a new one has begun.

The Institute of Architects represents all this; it is to be the guardian and the helper of the more ornamental side of the arts. It must be connected with what I have spoken of, the beauty of this American ambition, this American hope in the very center of Europe, and we artists feel that with the architects of the United States we are now bound and inseparable.

HON. JOSEPH T. MCCLEARY, M. C. FOR MINNESOTA:

On this festive occasion I am called upon to respond to the toast "The House of Representatives." Though the call has come practically without warning, I feel that a man who has spent weeks trying to convince a patient constituency that the salvation of this Nation depended upon returning him again to Congress ought to have at least something to say about the United States House of Representatives.

You would think little of the man who did not understand that behind the material that you architects use, within the structure which you plan, is an idea. The first question of Napoleon when he returned from Elba to his faithful friend on shore was, "Have the people caught the idea?" Ideas rule the world.

There were architects some hundred-odd years ago who constructed the grandest edifice on this earth, the Republic of the United States. Like your creations, that structure contains a central idea. That idea is Representation. It is the greatest idea in all this earth. It is the idea that one man can be trusted to stand for the interest and the welfare of others. That idea was unknown to the world when Imperial Rome sat on her seven hills and ruled the world. Citizens of Rome there were in Gaul and in Germany, but they had no hand in guiding the affairs of the Empire. Only those could vote who went in person to the Imperial City itself. In the forest of Germany was born the idea which has made possible this nation of ours, the idea of Representation, the idea of acting through others, whom we trust with life itself, with our fortunes, for the men sitting on yonder hill can embroil this nation in war and compel you to lay down even life itself and every dollar that you have. That is the central idea embodied in the structure reared by the fathers. What is the significance of that idea? What reach has it? What may be the outcome of it?

On the fourth day of July, 1863, in the city of Paris, France, Americans were assembled at a banquet in honor of the natal day of their country. Toasts were proposed, and one of them was "The United States." The gentleman proposing it said: "Here's to the United States, bounded on the north by Canada and on the south by the Gulf of Mexico, on the east by the Atlantic and on the west by the Pacific." How much that meant, gentlemen, on the fourth day of July, 1863,—how much faith it meant—to say that the United States was still bounded on the south by the Gulf of Mexico! To that toast they drank. That man was from New England, and historically correct in all his allegations.

A man from farther west said: "Here's to the United States, but when we toast it let us see it in its full magnitude. Here's to the United States, bounded on the north by the North Pole, on the south by the South Pole, on the east by the rising sun, and on the west by the setting thereof."

Another man from the farther West, perhaps from the breezy prairies of Southern Minnesota, said: "Gentlemen, when indulging in prophecy, why not see with the eye of a prophet? Here's to the United States, bounded on the north by the Aurora Borealis, on the south by the precession of the equinoxes, on the east by primæval chaos, and on the west by the Day of Judgment."

I have reminded you of that toast for this reason, that although it was given in playful spirit it yet contains a mighty thought; for in my judgment "the United States" is to extend from pole to pole, and from the rising to the setting of the sun. What is the spectacle which the United States of America presents to the world to-day? What is the real significance of the United States to-day? Wherein does it differ from all other countries? It is that we have here, on the choicest land that the world possesses, forty-five little nations living side by side in peace, each one absolutely self-governing in everything pertaining to itself alone; no fortresses on their frontiers, no standing armies within their borders.

That spectacle was never seen before it was exhibited by this country of ours. It never could have been seen but for the idea that the United States House of Representatives stands for the idea, the doctrine, the principle of representation.

How do we settle our disputes on matters that are interstate? Not by going to war. We turn it over to gentlemen sent to a central meeting place, this city of ours, with authority to deal with all such things. That is the model upon which is to be constructed the United States of the World.

The Dominion of Canada has caught the idea. In Australia they have caught the idea. Germany, though still monarchic, has caught the federative idea.

How few things has the United States to deal with, the things near and dear to us! The doings of things of importance to us—the education of our children, and such things—we control within our States. Comparatively few things we give to be controlled by the larger government, the Nation. And so, very few things indeed would be handled by that Congress of *all* the nations.

Gradually from the United States of America there will come into being the United States of Europe. They must put down their fortresses and disband their armies. In the great commercial battle now on the nations of Europe must free themselves from such handicaps and so, by gradual evolution, will come the result foreseen by prophets and sung by poets—the Parliament of war, the federation of the world, each nation retaining its identity and the entire management of its own peculiar offices, just as the States of our Union do to-day. And occasionally, once a year, or once in five years, as the occasion arises, we shall have a central congress of all the nations.

There will come the United States of the World, extending from pole to pole, from the setting to the rising of the sun, and thus through the central idea of this union of States will be realized what He came, 1900 years ago, to bring, "Peace on earth and good will toward men."

HON. JOSEPH G. CANNON, SPEAKER OF THE HOUSE:

Mr. Toastmaster and President:—As I did not hear the toast I am to respond to, I suppose that for a very brief space I may do as we did out West when I was a boy, and went out hunting for squirrels. We carried a gun full of shot which scattered. We sometimes captured an indolent squirrel. I hardly know what to say to architects. I suppose, Mr. Toastmaster, that when you called upon me to supply the place of Senator Wetmore you must have felt a little bit as prohibition orators feel who, when they were preaching prohibition in the Middle West, in the villages and other little cities, never were fully equipped unless they had a bad example. What I don't know about art and architecture, Mr. Morgan, would make a library larger than all your wealth could buy. And yet I was born in the United States, am a citizen of the United States, and my life has been spent in trying to earn an honest living. In Illinois, and later on, by the good will of a confiding constituency, in giving my vote for legislation, and it has fallen to my lot for twenty years and over to have given my time, sometimes with a little information as to the details of the public service, and sometimes with very little information touching the division of the "dough" among the governmental chickens. And, after all, I dare say that I have had about the experience that the average American citizen has had. I don't know that I have had an eye for the beautiful, and yet there are certain things, certain buildings, certain paintings, certain frescos here and there about Washington and about our considerable cities that I stop and look at as I pass along. In Washington, as my eyes have gazed upon the Monument, it has grown upon me. I don't know whether it is a great monument or not, but it has gradually grown upon me. The Capitol of the United States seems to be a great building to me, and some of the great frescos on the inside, although they do not appeal to me from the standpoint of utility, yet sometimes as I pass by them my eye catches what must have been the fancy of the artist, and I see in them objects which are beautiful to me, though perhaps they would not appeal to you as artists. To show you how little or how much of an artist I am, there is one fresco—I believe it is a fresco—on the western wall as you ascend the staircase where you land above, ready to go into the House gallery. I never went up there in my life without turning and looking at that fresco, "Westward the Star of Empire Takes Its Way." I forget the artist, but to me it is the greatest work my eyes ever beheld. To you it may not be anything, but to me it typifies the development of the republic, the development of the country in the Middle West, and in the Far West, as I look upon it with its steer and mule yoked together, with the broken wagon wheel, the immigrant with his rifle and the faithful dog, and the mother with the child in her arms, and, by the side, the little grave of the child that fell in the immigration. I never looked at that picture that the tears didn't come to my eyes, because I felt that I was part and parcel of that picture, and so perhaps something else might strike the eye of some other individual.

I am proud of what you have accomplished. Sometimes I have said things that many of you didn't approve. I have not said half as bad things of architects as the late Secretary of War has said about many of them to-night. I have learned to know that there are architects and architects, as there are doctors and doctors, and lawyers and lawyers. All of them are not perfect, and yet progress has been made all along the line. I am not an artist, and am too old to ever learn to be an artist, and while I have seen but little of the "other side" I don't know much about the excellence of those architects in the Middle Ages. Possibly they are ahead of the people; possibly those castles and cathedrals ought not to have been built, considering the income of the municipalities; possibly there ought to have been a little more of expenditure for the individual good, and a little less on the splendid and magnificent structures. But they are there, and I have no doubt I shall later gaze on them with interest and admiration. If we have gone slowly in this country, yet it has been our growth, from the lean-to on the Wabash within my recollection, and then the cabin with one room and two rooms—and when the logs were hewed the man was a plutocrat and an aristocrat. Gradually we have grown, with our 200,000 miles of railway, with our splendid material, with our common-school systems and our colleges and universities, with our great accumulation of wealth, until to-day we stand equal to Germany and Great Britain in wealth, and I say it respectfully, because those are great countries and represent great civilization. But we still grow and I am not quite sure but what the artist and the architect are keeping step fairly well with the progress of this country. Since I came here this evening, I have received new assurances that you will more than keep step. I was more than gratified, because in the busy life of my own little circulation I had not noticed it—I was more than gratified to know that $200,000 had been subscribed for the creation of an endowment fund for the American School in Rome. It had been brought to my attention for several years that the Government ought to contribute to such a school and should maintain it; but I said, nay, nay. From my standpoint it was not proper to make the grant from the treasury to found a school across the waters. It seemed to me not, and it seems so to me now. But, sir, I want to say to you that I trust eight other gentlemen will be found—and I do not doubt but what we have a dozen Americans here to-night with whom we might do as we used to do in Illinois when we dedicated a church. If the church cost $10,000 they raised about half enough to build it and then, before it was dedicated, they got everybody in the neighborhood to come, and they got their best ministers to preach a sermon and they began to take subscriptions and the names of those who were willing to subscribe. I recollect on one occasion, thirty-five years ago, they dedicated a church in the then little town where I lived. It had an old style Methodist preacher, and he was only paid $25 at a time. He got one to say $25 and then he looked appealingly my way and said: "I see a white-headed young lawyer, Mr. Cannon, will you not *see* him." I replied that I would and raise him $25.

I shall not talk about the Washington public buildings. We have them, splendid and magnificent. The Library of Congress is the best one that I know of. I am proud of it. My constituents are proud of it; they go and look at it and they are benefited by it, and while it is true that by exact calculation it requires $1.60 cents, as I am told, to pay for every book that is lifted down from its shelves, it is a great show building. It is our library and worth the money.

It is wonderful how this country grows; it is almost impossible to keep up with it. Capitalists, building for investment, get along well because they receive a return from the investment; so we make progress there, but in public buildings it is almost impossible to provide for the necessities of the Government. The maintenance of an army and the building up of a great navy, to strengthen our diplomacy and to defend our seacoast, necessarily require large expenditures, so that it is difficult to build the buildings as fast as they are required. It seems to me that sometimes a compromise might be made, that in certain parts of the City of Washington, here and there, and you gentlemen could locate them better than I could, when a public building is built that it should be a building having utility, and at the same time beauty. Take the National Museum, for instance. I think that will combine utility and beauty, and so will the two office-buildings on the Hill. By and by there will be a building for the State Department, and by and by for the Department of Justice, but I don't think that every building that is erected for practical purposes need necessarily be as ornamental as the Library of Congress. Some one has said, and there are always these objectionable people saying things, that it cost $10,000 to house one $1,200 clerk in a certain building in Washington. It is a matter of beauty, that building is. But in proper locations, it seems to me, we want some buildings constructed for office purposes as you, Mr. Morgan, construct them, or as anybody else would construct them here and there, and then you could house a good many clerks for $10,000. I think in proper locations, here and there, that such buildings could be constructed without being eyesores. It is up to you, gentlemen, because you have to lead. I may preach, but when you come and criticise and talk about skyline, somehow or another you get the people with you. I am gratified to have the honor of your invitation to meet the gentlemen assembled here. I bid you god-speed in your specialty. It is a great specialty, whereas others of us from necessity run to our specialty, and in the end each man grows in his specialty until he becomes more perfect. We will have a republic of your sons and daughters which will strive for excellence. I have faith to believe we will present to the world the strongest and the best nationality, a people the farthest advanced in civilization on earth.

STREET ARCHITECTURE.*

ONE principle which ought to govern street architecture is, surely, that consideration should be had for neighboring buildings, because street architecture is social architecture, and it ought to conform to those rules of convention by which men in society are governed. Buildings in a town street cannot indulge in the freedom that is permissible to a house in the country any more than the owner can live in town with the same easy disregard of appearances that he enjoys when he is away. In town, living under the eyes of his neighbors, he must submit to many social restraints of habit and costume in order to conform to the ways of the society in which he moves, or he will be thought an ill-bred person; and in the same way architecture, when she takes up her abode in the streets, must conform to social conditions, and show respect to the company in which she finds herself, provided, of course, that it be respectable. Architecture may be guilty of social offences quite as much as the architect. Violent interruptions, startling contrasts of demeanor, disregard of the conventions of society, efforts to shout down and overpower his company, which would put a man outside the pale in the civilized world, find a very close analogy in the pretentious buildings that one often finds thrust into the streets and squares of London without the least regard for the style of the work they interrupt or the scale of the buildings they overshadow. . . .

The first principle, therefore, that I would lay down for town architecture is that there should be a consistency, a regard for the surroundings, an absence of vulgar rivalry in display, corresponding to that consideration for others which is the essence of good manners among individual men and women; that ordinary houses should subordinate themselves to buildings which, from their public uses or their architectural importance may fairly claim precedence; that, in fact, there should be a "comity" of conduct in architecture as well as in society; any violation of which should be condemned by public opinion as in bad taste, inartistic and intolerable. How far we are from general acceptance of this standard of criticism, we can all judge by sad experience.

Another consideration that arises out of this, especially when there is a question of cutting through old towns and forming new thoroughfares, is that when the alterations approach or touch beautiful buildings, whether old or new, they should be designed so as to fit them, and bring out their beauties and enhance their architectural effect. This is a principle that has been much more attended to abroad than with us. The Louvre must have gained enormously by the construction of the Rue de Rivoli, and the old Tuileries by the formation of the gardens and the Place de la Concorde. With us, hitherto, this principle seems rarely if ever to have been thought of, new streets and roads having been planned solely for convenience, easy gradients and economy, with very little thought of artistic effect. What splendid opportunities have been missed, for instance, when the alterations were made at Hyde Park corner, which, though they have facilitated traffic to some extent, have destroyed the little there was of orderly arrangement, when Decimus Burton's arch and screen stood in some sort of relation to one another. Now we have a shapeless expanse, a wilderness of irregular roads, dangerous to cross, in the midst of which float three island-refuges of various shapes, with a statue that seems to have lost its way. A still worse failure is that at the site of the old circus, where Regent street joins

*Extracts from a lecture by Mr. T. G. Jackson, R.A., before the Society of Arts, and published in the *Journal* of the Society.

Piccadilly. This has destroyed Nash's fine plan, and given us an amorphous space, with the relics of the old circus on one side and nothing definite elsewhere, a mere accidental clearing in the middle of houses, where Mr. Gilbert's fountain seems to float in space without any relation to its situation. Imagine what a fine thing might have been made of this if Nash's scheme had been respected, his circus enlarged into a larger circus, or developed into a square with the fountain in the center; or, better still, prolonged into a rectangle like the Piazza Navona at Rome, in which, besides the fountain, room might have been found on its axial line for Cleopatra's Needle, now so absurdly perched on the parapet of the Embankment, quite, as one might say, accidentally, without any relation to the architecture behind it, and certainly none to the river in front. It is not so that the obelisks have been treated at Rome and Paris, where they are made the focus or pivot of "place" or piazza. I could not help being struck, when walking from the Panthéon down the Rue Soufflot, with the fact that the Eiffel Tower, in the dim distance, faced me exactly on the central line of the street. The Eiffel Tower is not perhaps the most beautiful thing in the world, but so placed it had from that point of view a meaning—it acquired a certain value by its relation to circumstances and conformity to place, which it would not have had otherwise. I can hardly suppose this effect to be accidental; I would rather think it designed; but I am sure that no such conception would ever have entered the minds of our street engineers in London. . . .

I think, then, that another principle to be observed in altering or improving an old town should be that the general lines of the main streets ought to be respected whenever it is possible, and the general conformation of the plan as little altered as is consistent with public convenience. Above all, this is desirable in the case of a city that is not only old, but has been the scene of great events in the history of a nation; one whose streets possess associations that would lose much of their force if our eyes no longer rested on the stage where these events were performed. In the Paris of to-day, remodeled under the Second Empire, the want of historical character must often have disappointed those who visit it with memories of the past. One would willingly spare a good deal of modern splendor if one could have something of the Paris of the Valois, or even be able to trace out better the scenes of the Great Revolution. London, which has better preserved her connection with the past up to the present, having been spared the blessing of a Napoleon or a Haussmann, is now in danger of losing it rapidly. It will be a great pity if such improvements as the enormous traffic of the day demands are carried out without due regard to historical associations on the one hand, and, on the other, to the preservation of interesting or beautiful buildings that lie dangerously near the line of alteration.

Considerations of convenience on the one hand and beauty or sentiment on the other are seldom wholly irreconcilable; their claims may generally be met by a compromise such as that which has saved the church of St. Mary-le-Strand. To shut our eyes to any considerations but those of bare utility is to hand our cities over to the Philistines. Easy locomotion from point to point is not everything. Streets are not, or should not be mere mechanical contrivances for getting to our destination as speedily as possible; they have never been so regarded at any age but our own; one might almost say they are not so regarded now in any country but this. They should be beautiful and interesting, and so disposed as to show off their buildings to advantage, and to preserve faithfully their historical traditions; and Londoners ought to be able to take the same pride, and find the same enjoyment in the streets of their great city, that the burghers of Florence or Venice, Nüremburg or Ghent, did and can still do in theirs.

One very awkward result, moreover, would be avoided if the lines of old thoroughfares were taken in laying out new ones. Everybody must have noticed the sharp triangles to which corner houses come in most of the new streets that have been driven through crowded districts of London. They are caused by the fact that the general trend of the old streets lay obliquely to the line chosen for the new ones. In the new Kingsway, now under construction, toward the Holborn end the line is fairly square with the streets it passes through, but as it comes south the streets bear off obliquely, and this unsightly result will have the usual bad effect, unless the adjoining streets are altered also for some way outward.

But bad as these sharp-ended sites are for architectural effect, and inconvenient as they must be for internal plan—for anybody can imagine that a room shaped like an equilateral triangle cannot be a pleasant one to live in—they are not so bad as the rounded ends and corners which have been the fashion in new streets. Rounded angles are seldom agreeable in architecture, and are best avoided. They deprive one of the firm outline and positive drawing which the eye demands in builder's work, and substitute for it a certain weak indefiniteness which is destructive of true form, and confuses the elements of proportion. Whether in large or small buildings this rounding of the mass is equally injurious. Small buildings, perhaps, need sharp square forms and positive outlines even more than large ones, and yet nothing can be less satisfactory to the eye than these rounded fronts on a great scale, as, for instance, the Grand Hotel at the corner of Trafalgar square, a huge pudding of a building without a single firm line to define its shape or proportions.

These rounded angles are, I think, a matter of paper architecture, by which I mean that they look well in a drawing, and have a show of convenience which is not based on practical experience. Those long easy curves, which look well on paper, are not, I believe, found to save the horses, for they mean a long bearing on one rein, which is more wearing than turning a sharp corner and having done with it. Some of us, who have been oarsmen, will remember how much worse it was to have the rudder against one round a long curve than round a shorter one, and may form from that some idea of the views a horse might be imagined to entertain on the matter. If it is ever absolutely necessary to take off an angle for the sake of foot passengers, and I quite admit that this need may occur when there are no areas between house and street, let the corner be canted off with a flat front, which will give two bounding lines at the angles. Foot passengers, however, do not run very much against one another and need never do so if everybody observed the rule of the footway. A few more direction labels—"Keep to the Right"—put up on lampposts and elsewhere in our crowded thoroughfares, and some insistence on the rule by the police, who I have observed always walk on the wrong side themselves, would enable us to build our corner houses with that squareness and definite outline which is one of the first conditions of tolerable architecture.

In the original plans for the new "Kingsway" all the corners were shown to be rounded off to such an extent that some parts of the street would have resembled a row of huge band-boxes rather than a street with parallel sides. We may thank the architect of the Council, Mr. Riley, for having persuaded them to modify these extravagant curves, and substitute canted angles of more reasonable dimensions.

In the case of a street that is entirely new from end to end, such as the Kingsway, it is plain that many difficulties are absent which present themselves when it is a question of altering an old one, where there are buildings that must be respected. This is particularly so in the matter of scale. The buildings that are to line Kingsway may be as large as they please; there is nothing to compare with them, nothing that they would injure by overpowering it. They will only be judged by one another, and there is nothing to confine them to any established proportion. In the case of the Strand this is not so. The proper scale there is given by the two churches and Somerset House. These are public buildings, and in every view of the street they have always predominated very happily, as they are entitled to do, over the private houses around them. Here is a scale to which on artistic grounds the new buildings must conform if they are not to spoil the picture. Unfortunately this is not likely to be a consideration with either the London County Council or the lessees and purchasers of the new sites, if one may judge by the beginning that has been made. The new Gaiety Theatre is far enough from St. Mary's to do it no particular harm, but an enormous building has been run up to a still greater height next to it which overtops both theatre and church. If this is to give the scale of the other houses that are to follow on eastward the churches will be reduced by comparison to the size of toys; their architectural importance will be ruined, and the street view will suffer. I sincerely trust it is not too late to put some limit to this overbuilding and to induce the Council to fix a height for the Strand front which will be properly proportioned to the scale of the old buildings which give the Strand its particular charm—a charm, however, which may easily be broken by injudicious and disproportionate surroundings. Let the houses in Aldwych and Kingsway adopt a scale of their own, but let the Strand front be restricted to the scale given already by the fine buildings which will remain the greatest ornament of the street if it is judiciously laid out. There is a serious danger lurking behind the words of the report by the improvements committee, that "it will be possible to secure under the Council's scheme an imposing effect for the buildings to be erected on the northern side of the Strand." We do not want an imposing effect on the north side of the Strand. We want

houses, lofty perhaps, but of a reasonable loftiness that will not crush the public buildings into insignificance, nor contrast too violently with the buildings on the other side of the way. Let the imposing effects be reserved for Aldwych and Kingsway, where they can have the field all to themselves and injure no one.

And yet even there I think we may express a hope that that megalomania, which is one of the vices of the age, will not be allowed to run riot. The skyscraping architecture of New York is fortunately illegal in this country, but, without breaking the law, we can and do get nearer the sky than is agreeable to those who walk on the earth. In hot countries where the sun is an enemy to be shut out, narrow streets between lofty houses are reasonable. But in England the sun is a visitor who never, or very rarely, outstays his welcome, and we want as much of him in our streets as we can get. The houses of Regent street and Oxford street, and of the untouched parts of the Strand, have always seemed to me of the ideal height for our dim, murky London climate. Those streets always look bright and cheerful, while, for sombre melancholy and awful gloom, I know nothing to approach Victoria street, Westminster, with its monster mansions on either side.

As things are, however, at present, it seems that those who build along the new frontages will be allowed to do much as they please in the matter of height and style. The only condition is that they shall submit their designs to the London County Council, who, it is supposed, will form a committee of taste to pass or reject what is shown them. This suggests another question as

(To be continued.)

ILLUSTRATIONS

TRINITY BUILDING, NO. 111 BROADWAY, NEW YORK, N. Y. MR. FRANCIS H. KIMBALL, ARCHITECT, NEW YORK, N. Y.

A COTTAGE AT BROOKLINE, MASS.

DESIGN FOR THE CHURCH OF ST. ANDREW, MANITOU, COLO. MR. T. MAC LAREN, ARCHITECT, COLORADO SPRINGS, COLO.

This design provides for a church to seat 200 and chapel to seat 40, and provided for possible future extension to add 70 sittings to church. The material proposed was local sandstone and the estimated cost $9,000.

CHRIST CHURCH, CANON CITY, COLO. MR. T. MAC LAREN, ARCHITECT, COLORADO SPRINGS, COLO.

The accommodations include the church, seating 300, the chapel or Sunday school, seating 120, and a sacristy. The walls are of local sandstone, and roof shingled. The woodwork of interior is finished with dark stain, and the roofs over church and chapel are open timber. The building cost $17,000.

FOUNTAIN ON THE ESTATE OF CORD MEYER, ESQ., ELMHURST, LONG ISLAND, N. Y.

THE RATHAUS, POSEN, PRUSSIA. GIOVANNI BATTISTA DI QUADRO, ARCHITECT.

This building dates from 1550-5, although the great tower was not built until 1783.

THE LOGGIAS OF THE RATHAUS AT POSEN.

This plate, like the preceding one, is copied from *Blätter fuer Architektur.*

Additional Illustrations in the International Edition.

VIEW IN MEMORIAL HALL: MASSACHUSETTS STATE HOUSE, BOSTON, MASS. MR. CHARLES BRIGHAM, ARCHITECT, BOSTON, MASS.

The decorative painting shown in this view is "The Discovery of Land," by Mr. Henry Oliver Walker.

VIEW IN VESTIBULE TO THE SAME HALL.

The decorative paintings, here very imperfectly shown, are the work of Mr. Robert Reid.

NOTES AND CLIPPINGS.

THE UNRECIPROCATING AMERICAN ART-COLLECTOR.—The Whistler memorial exhibition in the New Gallery will be another remarkable one-man show. Over 250 separate etchings will be shown, with many duplicates. The King, without public knowledge, has been a collector of Whistler's etchings for a long period and will lend 149 examples, including the Spithead series, which the artist presented to Queen Victoria after the great naval review. These will be shown as the Royal Gallery etchings. Over 100 paintings have already been promised, and there will be another hundred. The Luxembourg Gallery, Paris, through the intervention of the Foreign Office and the British Ambassador, has made the first exception to its established rule and granted permission for the exhibition of the portait of the painter's mother in London. The Glasgow Gallery will lend the portrait of Carlyle, and the owners of private collections are equally obliging. The only refusals to lend come from a dozen American owners of paintings. The Carnegie Institute, the Boston Museum, the Chicago Museum and the Pittsburg Gallery have all behaved handsomely, but A. A. Pope, of Cleveland, is almost the only private collector who has consented to send works to this Whistler show. Loud complaints are made here of the lack of reciprocity between the art collectors of the two countries. British collectors have contributed freely to the World's Fair shows at St. Louis, Chicago and Philadelphia, but American collectors are not willing to take the trouble to send art treasures across the ocean when wanted here.—*New York Tribune London Correspondence.*

A FATAL AFTERMATH.—A week after the recent great fire which gutted the Boutelle & Peck buildings at Minneapolis, Minn., and their skeletons had cooled off, one of the side walls of the Peck establishment was particularly examined by the city's building inspector, all the more carefully, because it overlooked the Crocker hotel, a low-sized structure completely dominated by its taller neighbor. It was pronounced perfectly safe, and on the strength of this judgment on the part of Inspector Houghton the wall was allowed to stand, and the Crocker hotel guests went back to live in it without any hesitation or fear. A fierce wind storm, however, arose during the night of December 21, and so shook the side wall of the Peck building that it crashed down upon the hotel and caused the death of six persons, and very serious injury to two more. The three floors of the hotel were carried clean down into the cellar, burying the unfortunate victims of the crash under a heap of débris. It must not be forgotten that those who were in the hotel left it, and had been warned that there was danger, but had returned when they found that the Peck wall had been pronounced safe by competent authorities, with the exception of a small portion of the rear wall, which was to have been torn down at daylight. The catastrophe was the outcome of an error of judgment. The walls of the burned building should not have been left standing. Hot though they were, they should have been pulled down, as soon as their condition would have admitted of that being done. High winds are always to be expected in winter, and the danger arising from such a source should have been guarded against by the removal of its possible cause.—*Fire and Water Engineering.*

THE ST. LAWRENCE BRIDGE AT QUEBEC.—There is now under construction across the St. Lawrence at Quebec a cantilever bridge which when completed will contain the longest span of any bridge yet erected, not even excluding the great cantilevers of the Forth Bridge in Scotland. The structure is of the cantilever type, and consists of two approach spans of 210 feet each, two shore arms, each 500 feet in length, and a great central span, 1,800 feet in length. The total length of the bridge is 4,220 feet, and, although in extreme dimensions, it does not compare with the Firth of Forth Bridge, which is about one mile in total length, it has the distinction of having the longest span in the world by 90 feet, the two cantilevers of the Forth Bridge being each 1,710 feet in length. The total width of the floor is 80 feet, and provision is made for a double-tracking railway, two roadways for vehicles and two sidewalks. In a cantilever of this magnitude the individual members are necessarily of huge proportions, the main posts, for instance, being 325 feet in length, and each weighing 750 tons. —*Scientific American.*

A MONUMENT IN UNDRESS.—One of the most unique monuments in the world will be erected shortly at the little town of Lagos, a suburb of the city of Guadalajara, to the memory of General Pedro Moreno, a hero of the War of Mexican Independence. It will represent General Moreno in his night clothes directing an attack. The plans of the sculptor have been made in accordance with history, as General Moreno took part in the most noted battle of his career, dressed only in his underclothing. His forces were surprised by the Spaniards at night, while he was asleep, and he had not time to put on his uniform. The battle resulted in a great victory for the Mexican troops, one of the decisive engagements of the struggle for independence.—*Stone Trades Journal.*

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CONTENTS

OWING to pressure of other business, a very interesting case involving the architect's right to control, under the provision of the uniform contract, was not laid before the Washington convention for discussion. Mr. W. Albert Swasey, architect, of St. Louis, awarded a contract for the building of a theatre in that city, one of whose provisions was that the contractors should keep a competent foreman in charge of the work. At various times and in sundry ways the foreman selected by these contractors so manifested his incompetence that the architect thrice demanded his discharge and replacement by a competent man, demands which the contractors by one device or another succeeded in evading. At length a time came when, the date of completion of the theatre being already two months overpassed, the lessees announced that, if the building were not delivered to them complete in some three weeks, they would at once enter suit for heavy damages. On this the architect telegraphed and wrote peremptorily to the contractors demanding the instant discharge of the incompetent man, the removal of certain rejected work, and its proper replacement. Feeling that the way was at length cleared, the architect visited the job next day only to be confronted by the foreman armed with a telegram from his employers instructing him to go on with the work and finish it as he pleased. The architect thereupon personally discharged the man, and ordered him to keep off the premises. Loyal at least to his employers, the foreman appeared on the job next day, controlling operations at his pleasure as before. The architect, having meanwhile been advised that the man was unquestionably a trespasser, at once had the foreman arrested, but the precinct captain would not hold him, declaring that the proper method of procedure was through an injunction, under bonds, from the Circuit Court. Before the architect could take any further action the foreman brought suit against him in the sum of twenty-five thousand dollars for false arrest and imprisonment. On Mr. Swasey's statement of the case, he seems to have been quite within his rights, and the contractors, if they are substantial men, have placed themselves in a very precarious position in relation to the rights of the owners, the lessees and the architect, though we question whether the latter could collect from them the costs of defending the action for damages brought by the recalcitrant foreman.

THE familiar adjuration to beware of Greeks and others bearing gifts would seem to be one that museum trustees should perpetually keep in mind, there is so often a taint of posthumous selfishness to be feared in the case of bequests of collections—with "a string" attached, as the saying goes. It is rumored that the very valuable collection of prints and paintings that the Smithsonian Institution has just accepted from Mr. Charles L. Freer, of Detroit, was once intended to go to the Boston Museum of Fine Arts. It is not necessary to imagine that the gift was tentatively offered to Boston and declined because the collection must be kept as the Freer collection and intact and, moreover, housed in a special building; the greater amount and more shining degree of fame to be derived from a Washington than from a Boston habitat is quite enough to justify making the nation's capital the collector's first choice. But if the Smithsonian Institution, or the National Museum, is going to be forced by the precedent to go on accepting collections, which we will assume to be, as in this case, of indisputable worth, each to be housed in its own building—little or big as the whim or purse of the testator may determine—what is going to become of the "plan for the Improvement of Washington?" Will not the margins of the Mall become a little bit crowded?

MORE than thirty years ago it was our good fortune to pass an evening with R. Phené Spiers and his charming sisters, thus being one of the earliest in a long line of young American architectural students who have enjoyed the hospitality of that artistic little family group. After tea our host, to pass away the time, brought out portfolio after portfolio filled with sketches and water-color drawings, the product of recent trips through France, Spain and Egypt or Syria. The scale of the drawings, the accuracy of the perspective and the multiplicity of the detail seemed to us simply marvelous, and we felt properly abashed at being in the companionship of such a past-master of draughtsmanship. But after enjoying for a while our modest expressions of admira-

Entered at the Post Office at New York as second-class matter.

tion, Mr. Spiers honestly brushed them all away and poohpoohed them with a "Why, my good fellow, any one can do those things. I always use a camera lucida." The way our self-esteem once more hopped onto its accustomed pedestal would have amused Mr. Spiers if he could have known. At once we decided to invest in a *chambre claire* and go and do likewise, but forgot all about it until, long afterwards, just before leaving Paris, we saw the instrument in a shop-window and purchased it. A little practice, however, soon made it plain that it did not do its own drawing, so to speak, and that Mr. Spiers needlessly belittled the personal equation when disavowing his right to applause.

RICHARD PHENE SPIERS, who was elected an Honorary Member of the American Institute of Architects at the Washington Convention this month, has been kind and helpful not only to a relatively small number of Americans, but to a vastly larger number of Englishmen since, for many years, he has been at the head of the Architectural School of the Royal Academy which, for a long time, was the only institution in Great Britain that provided anything in the way of stated architectural instruction, the normal way of studying the art being by paying fees as an articled pupil to some practising architect or, latterly, by joining the classes of the Architectural Association. The consequence is that Mr. Spiers has among the younger men of both countries a large number of devoted friends and these have decided to hold in London, this month, in his honor, a formal testimonial banquet. Learning that this function was to take place, at which he is to be presented with a medallion portrait executed by Professor Lantéri, the *anciens élèves* of the atelier Blouet-Gilbert-Questel-Pascal have joined in the subscription to their former fellow-pupil. Further than this the Société Centrale des Architectes Français has added its name to the list and sends to Mr. Spiers, in his quality as Corresponding Member, a silver-gilt medal. This truly international function cannot but be enjoyable and deeply appreciated by the man it honors.

IN a paper read this month before the Society of Heating and Ventilating Engineers' attention was called to a point of practice, which one would be inclined to think would be rather a piece of supererogation before such a body, and yet, as the writer of the paper, a Danish heating engineer, is the inventor of a certain known system of hot-water heating, it is fair to assume he knew that the oversight he pointed to was one commonly occurring in practice. In brief, he found that the radiators he had provided for the top rooms in a certain large building did not do their work, but had to be replaced by more powerful ones. The mistake was made through the erroneous description of the building which led him to understand that there was above the highest story to be heated an unfinished attic story. This led him to give the radiators in the top story only one-third more radiating-surface than the radiators on the second or normal floor of the building. As this top story actually had between it and the underside of the roof-boards only an air-space the depth of the rafters and a lath-and-plaster ceiling the conditions were very different from those assumed, and to produce the needed temperature the radiating-surface on that floor had to be increased to sixty-six per cent. more than the surface required by a normal floor where the heat absorption is confined to three exposed surfaces at the most. Mr. Reck says that his rule for heating such upper rooms as actually existed in the case in question, is to give the radiators therein "one 'nominal' square foot more of radiating-surface for every nine square feet of exposed ceiling" than would be given radiators on a second floor, and explains that a "nominal square foot" is one that emits one hundred and sixty British thermal units per hour. Perhaps he is wrong in thinking that American heating engineers need waking up on this point, but it is a good point for architects to bear in mind when revising specifications.

A DOZEN years or so ago our humanitarian instincts were outraged because of the suffering and wrong visited on whole communities in Wales through the operating of the McKinley high-tariff act that put a prohibitive duty on tin-plate, at that time made almost exclusively in Wales, by antiquated and time-honored but wasteful and time-consuming methods. A great industry was practically struck dead by a signature made three thousand miles away; men starved, while women and children sickened and died. Finally large numbers of Welsh tin-workers emigrated to this country and presumably have now become satisfied with their lot. Labor is mobile, but invested capital is a fixture and in this case invested capital was hit harder even than was labor, and the McKinley bill threatened it with total extinction. Fortunately invested capital is usually in close alliance with active mentality, and the Welsh tin-plate makers realized that if they would save themselves they must adopt new and improved methods and devise new economies. So successful have they been that although the exports—not to this country, although a part came here—for the past year do not form a "record" they were higher than for any of the previous nine years, while the promise for this year is more than excellent, and the general condition of the industry was never more promising than it is at present.

IT is said that the Council of the Royal Institute of British Architects is seeking means of checking what is said to be an undesirable practice that is steadily gaining ground in Great Britain, and prejudicially affects the honorable standing of the profession. This practice, of which there is, we believe, no exact counterpart in this country, consists in the ceremonial presentation to an architect, or to his wife, at the time of the laying of a corner-stone of some gift of considerable value—money or plate. Objection is not made to the presentation of a decorated trowel or key, which have constructively a merely emblematical value, but to gifts of a more negotiable character, which coming from contractor or material-men suggest unpleasant wonderings as to the "consideration," while coming from the owner they seem to establish an equally unprofessional relation as existing between obliger and obligee.

ANNUAL ADDRESS OF THE PRESIDENT OF THE AMERICAN INSTITUTE OF ARCHITECTS.

I HAVE divided my address into several headings for the purpose of more clearly following the idea, because the subjects change rapidly in any address reporting to the members of the Institute the official action of its officers. I first refer to the objects of the Institute. On February, 23, 1857, in the office of Richard Upjohn, in the City of New York, a notable gathering of the most eminent architects of that time was held for the purpose of considering the propriety of organizing a society of architects. That was in 1857. Among those present might be mentioned: Richard Upjohn, Leopold Eidlitz, Richard M. Hunt, John W. Rich, Frederick C. Withers, Thomas U. Walter, Edward C. Cabot, James Renwick, Jr., E. G. Hatfield, Arthur Gilman and others of perhaps equal eminence.

This meeting resulted in the organization of an artistic and scientific society, which was duly incorporated under the laws of the State of New York, as the American Institute of Architects. The cardinal principles and objects of this organization are clearly and completely expressed in the very first section of the constitution adopted at the time of incorporation, and in no other articles or section of this Constitution is there any allusion as to a different intent or sense, nor has there been any change in the language of this section since its adoption at that meeting.

There has been a change from "the Architects of America" to "the Architects of the United States of America."

With your indulgent permission the section referred to is quoted as follows. I read this because I think it is important for us not to lose sight of the original purpose of the foundation of this Institute, and the section referred to seems to have been drafted with remarkable sagacity.

"*Sec.* 1. The objects of this Institute are to organize in a limited fellowship the architects of the United States of America, and to combine their efforts so as to promote the artistic, scientific and practical efficiency of the profession."

I wish to direct your attention to the fact that the purpose was to organize a united fellowship of the architects of the United States of America, and to combine their efforts so as to promote the artistic, scientific and practical efficiency of the profession. That is all there is in that section.

The purpose of bringing to your notice and renewing your acquaintance with the original and explicit intention of the founders of this organization is to recall to your minds the singleness of intent which actuated these eminent men in effecting this organization.

Many years have passed, during which the growth of the Institute has been such as to apparently justify the hopes of this group of pioneers, and the profession is to be congratulated upon sustaining and carrying into effect their original aims. I think it might safely be said that the original founders of the Institute will not be ashamed of our present condition.

Considering, however, the extraordinary growth of the country and rapid increase of cities and large centers of commerce and population, it is but natural that its original scope has been overshadowed by local and personal interests, and we are justified in recalling our obligations in preserving and applying to our present time and needs the far-sighted and prescient judgment of our able predecessors.

In some directions this divergence from the original aims has been so great as to establish it in the minds of some of our best practitioners that the principal object of the Institute is to provide employment for its members in both private and public work. That was never the intention.

I now refer to the Tarsney Act. Numerous letters from members of the Institute have reached its officers requiring of them an explanation and a reason as to why their authors had not been awarded important professional work.

It is practically only within the last ten years that work of large importance has become necessary or possible in the United States, partly by the necessities of our commercial growth and partly by the necessity of supplying suitable and dignified edifices for our various branches of government.

At the risk of saying to you what may already be well known, it might be stated that the work of the United States Government, apart from that intrusted to the Supervising Architect of the Treasury Department and that done by the Engineering Corps, is conducted in one of two ways, either of which places the Federal work in the charge of architects in private practice—one being the selection and appointment of architects directly by the head of a Department, and the other by invited competition under the Tarsney Act, through the agency of the Treasury Department.

A number of commissions have been placed directly. Employment has been offered directly from the head of a Department to an architect in private practice. There are several instances of that sort. The only other work given to private practitioners has been through compliance with the Tarsney Act by invited competition.

Until Lyman J. Gage, Secretary of the Treasury, concluded to put into effect the Tarsney Act, all of the work authorized by the Treasury Department had been done in the office of the Supervising Architect, and the Tarsney Act merely authorized the Secretary at his discretion to distribute the architecutral designing of Federal buildings among private practitioners, invited as he might elect, and of such eminence as in his opinion would promise results of unquestionable artistic merit, comparable to the best examples in Washington erected between the years 1800 and 1850. Among these might be mentioned the White House, the National Capitol, the Patent Office and the Treasury Department, all of which stand to-day as accepted examples of scholarly art, and which have lost nothing in the subsequent long series of desperate effort to surpass them in beauty of design or scholarly arrangement of plan.

I think we might concede, as a profession, the fact that those buildings have not suffered by any efforts that we have made on our own behalf in the past fifty years.

The designs for these buildings were executed by Thornton, Latrobe, Bulfinch, Mills and Walter, all architects of distinctive ability, each the best of his time, and each selected by Presidents Washington, Jefferson, Madison, Adams and, after a long interval, by Fillmore, whose sole purpose was to secure the services of the most able men of the profession.

I call attention to the direct interest taken by the Presidents in these appointments and selections, because to-day the wisdom of that policy seems to have been lost sight of on the part of many of our Members of Congress. And it is to be hoped that our President to-day, and his successors, may take as active and lively an interest in the selection of the architects and in the execution of public works in Washington as was done by their predecessors.

In passing this feature of our current professional practice, it would be well for us to bear in mind that in execution of public works intrusted to any of the members of the Institute, we must not lose sight of our deep obligation to the Government and to the people, to supply them with our best services and talent, in order that we may leave the stamp of conscientious scholarship upon the work executed by us in our generation.

I now refer to "the Octagon," the home of the Institute. The Octagon daily grows to be an object of deep solicitude to all of our members who become familiar with its rare fitness as our official headquarters, and it is to be regretted that the indebtedness to be paid in order to complete its actual and entire possession has not as yet been fully liquidated. It is to be hoped that the report of the Committee on the Octagon will not only show material progress toward its complete purchase and payment, but suggest practicable and feasible means that will insure its final possession before the date of our next convention.

I think we have every reason to expect that that will be accomplished.

I now refer to education. The Institute owes a duty to the cause of education—that of fostering our schools of architecture by personal and combined effort whenever opportunity offers, and even our busiest men should be willing to assist in the capacity of lecturers in supplementing the earnest and serious work of the professors of architecture in these institutions.

The Institute must not be forgetful of the fact that it is the parent of an institution of the highest class and of the most laudable purposes in the direction of higher or post-graduate education in the art of architecture—referring to the American Academy in Rome established in 1894, and inspired largely by the artists who co-operated in the creation of the World's Fair buildings at the Columbian Exposition in Chicago.

As some of the members may not understand the details of this institution it might be proper to state that its object is to afford unusual advantages for higher training in architecture, painting and sculpture, by enabling such beneficiaries of the United States as shall be selected by competition from among those who have passed with honor through some of the leading technical schools, or have been equally well qualified by private instruction or study, to develop their powers and complete

their training under the most favorable conditions of direction and environment.

The selection of Rome as the location for this Academy of course was obviously suggested by fifty years of precedent and following, perhaps, in the footsteps of European nations.

This school is located in Rome, and corresponds with the French Academy in its scope and purposes; and its incorporators, numbering one hundred or more, comprise the names of the most eminent architects, painters and sculptors, men of letters, presidents of universities, financiers and public-spirited Americans who have a direct and active influence in the development of American art.

The information has already been conveyed to you that a bill is pending before Congress for the incorporation of the American Academy in Rome, and asking for the protection of the United States Government. This bill passed the Senate and was favorably reported to the House, but failed to pass the latter body, owing to the crowded condition of national affairs at the close of the Fifty-seventh Congress. The bill has already been pledged the earnest support of Congress, and will doubtless become a law before the close of the present session.

I have next a heading, Congress and Government Architecture.

The important work of the officers of the Institute during the past year on the lines of the largest professional good to its members and to the cause of art, consisted in exerting sufficient influence in Congress to secure a hearing before the Committee on Public Buildings and Grounds, to prevent the erection of the new Agricultural Building in such a manner as to intrude upon the Mall, an enterprise which if carried into execution would have rendered impossible a return to the original plans as prepared by President George Washington and the eminent engineer L'Enfant. The Committee of the Senate, though at first hostile to our attitude in these premises, finally reported favorably upon our recommendations, and with the support of the more public-spirited Senators and Members of Congress, together with the personal interest in the subject manifested by President Roosevelt, this irretrievable error was avoided.

On another occasion a bill providing for large public works, when referred to its proper committee in the Senate, was altered in such a manner as to reduce the compensation offered for architectural services to two per cent. The officers of the Institute were again granted a hearing, and succeeded in having the bill reported without this restriction, thus avoiding a disastrous attitude of the Government toward the profession. We were not able to accomplish all we undertook on that occasion, but we at least avoided the stamp of public action as to the proper commissions to be paid an architect for Government work. It should be a matter of congratulation to us that there is a general and rapidly growing understanding of the artistic as well as the business aspect of our profession on the part of Members of Congress and men in public places—governors of States, mayors of municipalities, and those acting as trustees of edifices of a semi-public character. The attitude of Congress toward the profession is one fast assuming a mutually dependent relation that is both natural and necessary for the production of Government buildings worthy of our commercial power and pride.

The Park Commission.—It would seem impossible to refrain from mentioning our increased conviction that it is a matter of national necessity that no effort be spared, so far as the Institute is concerned, in the endeavor to have adopted the plans of the Park Commission for the improvement of the city of Washington. The Institute is already on record as to the national responsibility involved in adherence to this plan.

Seventh International Congress.—In the month of April, 1904, it was my good fortune to be a delegate to the International Congress of Architects held at Madrid, Spain, whereat marked official respect for our profession was manifested by the Spanish Government. The next Congress will be in London, and cordial overtures have been made, looking to the co-operation of our organization with the Royal Institute of British Architects toward making this occasion, conducted by English-speaking nations, even more successful than the six congresses previously held on the Continent. I ask your serious consideration of this suggestion, and recommend the appointment of delegates to fittingly represent the American Institute of Architects on the occasion of this the Seventh Congress, to be held in London.

Institute Details.—It is gratifying to state that the membership of the Institute has grown rapidly since the delegate system has been adopted and put into operation. The details of this feature of representation, and many other matters of vital importance to the Institute, will be fully covered in the recommendations contained in the report of the Board of Directors, and your closest consideration of the importance of the details of this report is earnestly solicited. I have purposely avoided touching upon the matters contained in the report of the board of directors. They are the real essence of our business, and I certainly hope that the committee reporting upon the report of the Board of Directors will perform their work successfully and thoroughly.

It would be useless for me to attempt to express to you my sense of the honor conferred by the Institute in electing me to the presidency—an honor to which I should never have dared to aspire. Whatever measure of success may have attended the period of my administration is chiefly, if not wholly, due to the prompt and earnest support afforded at critical moments by some of our most self-sacrificing and busy members. The service has been of great value in teaching me the force of united effort on the part of every member toward the accomplishment of the best good for all.

REPORT OF THE BOARD OF DIRECTORS TO THE THIRTY-EIGHTH ANNUAL CONVENTION, A. I. A., 1905.

MEMBERSHIP.—The total membership is 746 at the present time, consisting of 353 Fellows, 393 Associates. Two Associates have been advanced from the Associate to the Fellowship grade, and six Associates have been elected during the past year.

Mr. Walter J. Paine and Mrs. Louise Bethune have resigned; Mr. Julius W. Krouse, of California, and Mr. Silas Brower, of New Jersey, have been dropped from the roll. Twenty-one applications have been balloted upon for membership in the Institute since the last convention. After February 15, 1904, all applicants, fifteen in all, had cast against them six black-balls, thereby preventing their election. These applications came from all sections of the country, North, South, East and West. Many of the applications were from the most talented younger men of the profession, the most desirable class from which to draw recruits to the Institute. The Board of Directors, after a careful investigation of the subject, feel that there was no just reason for rejecting these applications. The appearances indicate that there was a concerted movement among certain members of the Institute to damage the national body by preventing increase in its membership. The Board of Directors having directed the Secretary to send out a ballot, determined to substitute a signed ballot for the secret ballot heretofore used for the purpose of requiring the signature of the voter. This ballot when returned had six adverse votes against all applicants. These six ballots were cast by members of the Brooklyn Chapter, who had them registered at the Madison Square Station, New York.

Although the Board regrets the necessity, they feel that it is a matter of sufficient gravity to present the matter to the delegates in the convention. The Board has no authority, under the Constitution, except to count the ballot as received, and to reject all applicants who receive more than five black-balls. The delegates to the convention should take some action that will in the future prevent measures so detrimental to our organization.

An amendment to the By-Laws will be offered, which the Board believe will remedy the difficulty.

The following Honorary and Corresponding Members nominated by the Board of Directors at the last convention, were elected at the last convention: Honorary—Joseph H. Choate, Aston Webb, Victor Laloux. Corresponding—Frederic Crowninshield, Owen Fleming, A. D. F. Hamlin. Mr. Theodore Cooper was transferred from Corresponding to Honorary membership in the Institute. The Board of Directors recommend advancing the following Associates to the Fellowship grade—Messrs. Henry F. Bigelow, of Boston; C. B. J. Snyder and Grosvenor Atterbury, of New York; Alfred B. Harlow, of Pittsburg, and Irving K. Pond, of Chicago.

Chapters.—No new Chapters have been organized during the past year.

Two Chapters still on the roll of the Institute, Indianapolis and Milwaukee, have not yet taken steps toward reorganization. The Board of Directors urge upon them the desirability of electing officers and entering again into active work.

The Chapters are the organic members of the national body, and exercise a large influence. It is, therefore, of the highest importance that they should faithfully perform the duties belonging to them.

The Board of Directors again wish to call attention to the

fact that such local organizations materially improve the welfare of the architects in the different sections where Chapters are organized. Chapter organization creates good fellowship and allows united action among the members of the profession and gives the strength obtained by united effort instead of the weakness inherent in individual action.

Washington City.—The development of Washington City is progressing in conformity with the Park Commission plan. Congress having authorized the National Museum, the Agricultural Building, the new Office Building for the House of Representatives, the Office Building for the United States Senate, the Municipal Building and the Pennsylvania station. An effort was made to locate the Agricultural Building near the center of the Mall, where it would have barred future development. The Board of Directors and members of the Institute after concerted and determined effort, were fortunately able to prevent this blot upon the future artistic improvement of the city.

This gratifying result was achieved through the full and frank discussion of the subject in Congress and in the public press. Distinguished members of the Senate and House of Representatives rendered notable services to the country and to our profession in placing before Congress the merits of our contention.

The President of the United States and the Secretary of War were found to be in sympathy with the views advocated by the Institute.

The memorandum of the Secretary of War, on the recommendation for reducing the width of the Mall from 890 feet, recommended by the Park Commission to 600 feet, especially deserves to be remembered for its breadth and common sense. He said in effect "that when a capable expert commission has carefully considered and reported upon a measure, I believe in following their recommendation.

"When I have submitted to me two schemes for constructions that are to last for centuries, I will always approve the larger scheme. I therefore beg leave to disapprove of the recommendations of the Commissioner of Public Buildings and Grounds, endorsed by the Chief of Engineers, and request that my endorsement be brought to the attention of the President of the United States."

American Academy.—The Board of Directors is happy to announce that the American Academy has purchased a villa in Rome, and the Board expresses a hope that a bill before Congress for its incorporation under the laws of the United States, giving it a national character, will pass at this session.

The foundation of the American Academy in Rome cannot be too highly recommended; it is from Rome that great artists of all the civilized world have drawn inspiration and we feel that it is from this source that the men of our country will draw permanent artistic benefit. Our country will gain in the future from the serious study obtainable at the Academy, and we may confidently hope that grander and more refined architecture, statuary and painting will result therefrom.

Funds.—The Board wishes the members of the Institute to keep constantly in mind the necessity for an endowment fund so that the work of the Academy may be broadened in character.

The *Proceedings* for the year 1903, together with the *Quarterly Bulletin* have been regularly published. Libraries and foreign societies are more and more anxious to receive complete files of both the *Proceedings* and the *Bulletin*, and seem to appreciate the index of architectural literature. The donations received last year will be given in the report of the House and Library Committee.

The Octagon.—The actual contribution for the purchase of The Octagon at the last convention amounted to $12,895. The chairman of the Octagon House Committee will give a report showing the amounts received and the disbursements since that date.

SPEECH OF HON. ELIHU ROOT AT THE ANNUAL BANQUET, A. I. A.

MR. CHAIRMAN, Your Excellency and Gentlemen of the Institute: The place in which we are met and its traditions are of happy augury for the future of American Architecture, which receives a new impulse to-night. Within a hundred feet of this room stands the Church of St. John, which perpetuates the beauty and the simplicity of Latrobe's design. From the windows of the adjoining room one may look through the trees and catch a glimpse of the white porch of the building relieved by our present President from the stilted title "Executive Mansion" and brought to its own familiar name, by which it is known among all the American people, "The White House;" that ideal expression of the time when the fathers of the Republic lived, that inheritance of America from the genius of Hoban, selected by Washington to erect, as the home of America's Chief Magistrate, the residence of an American gentleman upon the banks of the Potomac; that perpetual embodiment of the spirit of the life that gave to the Nation Washington, and Jefferson, and Madison, and Marshall, and Randolph, all American gentlemen on the banks of the Potomac. I thank Heaven it has happily been preserved, restored and protected against all discordant and overwhelming additions and constructions whatsoever, against all garish display and inconsistent treatment; preserved as a precious monument of America's past for America's future, by the fine and reverent sense of art of that brother of our own, upon whose shoulders fell the mantle of Richard Hunt as upon Hunt's shoulders fell the mantle of Richardson, Charles McKim.

At the foot of the slope, the brow of which we can see from this building, begins that stretch of land set apart by Washington and L'Enfant for the great avenue which was to stretch upon the axis of the Capitol on to the future monument on the shore of the river that Washington loved; that avenue as yet not realized, but to be realized as the reverence of the American people for the past of the Republic and the loyalty of the American people to the high ideals of art which Washington appreciated and strove for becomes true and effective in the future.

To-morrow's sun, which is so soon to rise, will cast over the avenue that leads to this place the shadow of the Capitol wrought out of the work of Thornton and Hallet and Bullfinch and Hadfield, the architects who gathered their inspiration not only from the classic works of art, but from the love of country and the serene natures of Washington and of Jefferson. The place is full of the associations and the traditions of the far distant day, a day back to which the people of our country are turning with ever more and more solicitous desire to gather the true inspiration of the earlier time. Those were great days when the colonies were made into a Nation, and they were the beginnings of great days for your art. From that period the State House in Boston, preserving the genius of Bullfinch, looks down to-day upon the Shaw Memorial. From that day survive the State Houses at Portsmouth and at Newport. From that day the City Hall of New York, embodying the fine and delicate art of the French Republic, looks up in its purity and its grace upon the Tweed Court House and the sky-scrapers of lower New York. From that day there comes to us a message in the Capitol at Richmond, in "Monticello," in the University of Virginia, in many a fine old dwelling in Charlestown, in many a colonial Revolutionary structure preserved in quiet corners in the North and in the South; and as our Nation looks back to gather renewed inspiration in politics, in social wisdom, in patriotism, it finds also that the fathers of the Republic had in their souls the conception of beauty. It finds that republicanism, that democracy, that the government of the people did not mean to them things unlovely, did not mean squalor, or ugliness, or meanness, but meant all that was noble and beautiful in art.

We turn in the midst of the wealth and luxury of the day to the simplicity of earlier times. "Jeffersonian simplicity" is much in our mouths in these latter years, but "Jeffersonian simplicity" was the simplicity of true art. Let me read to you from a letter of Jefferson to Madison. When the State House was to be built at Richmond, Jefferson was asked to secure a plan. Being in Paris he set about it, but before, through the slow communication of the times, the plan had reached Virginia, the impatient people of Richmond had begun the erection of their capitol; and Jefferson wrote to Madison a hundred and twenty years ago—in 1785.

Paris, September 20, 1785.

TO JAMES MADISON:

Dear Sir.—By Mr. Fitzhugh you will receive my letter of the 1st instant. He is still here, and gives me an opportunity of again addressing you, much sooner than I should have done but for the discovery of a great piece of inattention. In that letter I send you a detail of the cost of your books, and desire you to keep the amount in your hands, as if I had forgot that a part of it was in fact your own, as being a balance of what I had remained in your debt. I really did not attend to it in the moment of writing, and when it occurred to me I revised my memorandum book from the time of our being in Philadelphia together, and stated our account from the beginning, lest I should forget or mistake any part of it. I enclose you this statement. You will always be so good as to let me know, from time to time, your advances for me. Correct with freedom all my proceedings for

you, as, in what I do, I have no other desire than that of doing exactly what will be most pleasing to you.

I received this Summer a letter from Messrs. Buchanan and Hay, as directors of the public buildings, desiring I would have drawn for them plans of sundry buildings, and, in the first place, of a capitol. They fixed, for their receiving this plan, a day which was within about six weeks of that on which their letter came to my hand. I engaged an architect of capital abilities in this business. Much time was requisite, after the external form was agreed on, to make the internal distribution convenient for the three branches of government. This time was much lengthened by my avocations to other objects, which I had no right to neglect. The plan, however, was settled. The gentlemen had sent me one which they had thought of. The one agreed on here is more convenient, more beautiful, gives more room, and will not cost more than two-thirds of what that would. We took for our model what is called the Maison quarree of Nismes, one of the most beautiful, if not the most beautiful and precious morsel of architecture left us by antiquity. It was built by Caius and Lucius Caesar, and repaired by Louis XIV., and has the suffrage of all the judges of architecture who have seen it, as yielding to no one of the beautiful monuments of Greece, Rome, Palmyra, and Balbec, which late travelers have communicated to us. It is very simple, but it is noble beyond expression, and would have done honor to our country, as presenting to travelers a specimen of taste in our infancy, promising much for our maturer age. I have been much mortified with information which I received two days ago from Virginia, that the first brick of the capitol would be laid within a few days. But surely the delay of this piece of a Summer would have been repaired by the savings in the plan preparing here were we to value its other superiorities as nothing. But how is a taste in this beautiful art to be formed in our countrymen unless we avail ourselves of every occasion when public buildings are to be erected of presenting to them models for their study and imitation? Pray try if you can effect the stopping of this work. I have written also to E. R. on the subject. The loss will be only of the laying the bricks already laid, or a part of them. The bricks themselves will do again for the interior walls, and one side wall and one end wall may remain, as they will answer equally well for our plan. This loss is not to be weighed against the saving of money which will arise, against the comfort of laying out the public money for something honorable, the satisfaction of seeing an object and proof of national good taste, and the regret and mortification of erecting a monument of our barbarism which will be loaded with execrations as long as it shall endure. The plans are in good forwardness, and, I hope, will be ready within three or four weeks. They could not be stopped now, but on paying their whole price, which will be considerable. If the undertakers are afraid to undo what they have done, encourage them to it by a recommendation from the Assembly. You see, I am an enthusiast on the subject of the arts. But it is an enthusiasm of which I am not ashamed, as its object is to improve the taste of my countrymen, to increase their reputation, to reconcile to them the respect of the world, and procure them its praise.

I shall send off your books, in two trunks, to Havre, within two or three days, to the care of Mr. Limozin, American agent there. I will advise you, as soon as I know, by what vessel he forwards them. Adieu.

Yours affectionately.

That was the simplicity of the great exemplar of the Simple Life of America.

Since then we have passed through a dreadful period. The stern requirements of conquering a continent, the engrossment of hard-handed toil, withdrew our people from the consideration of the elegant and the beautiful in life which the Virginia planters were at liberty to cherish. In this period the first acquisition of wealth, bringing a longing for ornament, for something beyond the bare necessities of life, found the people untrained and ignorant of art. Basswood castles and sawed scroll-work were a first expression of a desire for the beautiful. A multitude of men calling themselves architects covered the face of the country with horrible objects of ingenious distortion, including a vast number of libels upon an excellent lady whose name has been given to the supposed style of Queen Anne. The American idea that any American can do anything prevailed in architecture. The simple dignity of the log-cabin, born of its conditions, wedded to its environment, gave place to the meretricious adornment of the confectioner. The perfectly appropriate and charming little white house with green blinds, with a persistent survival of classical details at the hand of the good, honest carpenter, gave way to wooden towers and arches and cheap false pretence. But a better day has dawned. The myriads of Americans who year after year swarm across the Atlantic and rush through Europe with the guide-book, seeing, for ever so short a time, fortress and castle, palace and cathedral, tower and arch, the great examples of art in the ancient and modern world, have come back with new standards. Gradually the standard of the people has changed. We have already done enough so that we can afford to be modest, we have already done enough so that we can afford to admit that every American cannot do everything.

It was reserved for the great city of the Middle West, by the example of that fair, white City by the Lake, which remains with us as a dream of Ionian Seas, to lead our people out of the wilderness of the commonplace to new ideas of architectural beauty and nobility. The lesson of the Chicago Exposition has gone into every city and town and hamlet of America. You now, for the first time, are beginning to have the Nation with you. The people of America are beginning to see that it is not necessary to be commonplace in order to have common-sense. The people of America are no longer content that the multi-millionaire in his palace, the great railroad corporation in its monumental station, the great banks or insurance companies, or trust companies, in their massive buildings, shall be the sole inheritors of the beauty and the art which our fathers loved. They wish for themselves in the public buildings of municipalities and State and Nation to have the best results of time and the best attainments of genius. What the people desire, their representativs in State Legislature, in municipal body and in the Congress of the United States desire for them. The art of our fathers, the art of our private citizens is to be the art of our people, and of our whole people.

I say a better day has dawned. The reign of Mullet is over already. For our great public buildings architects are consulted as Washington and Jefferson consulted Thornton and L'Enfant and Hoban for the Capitol and the White House. We have the inspiring spectacle in this city of the broad-minded management of the greatest of our railroad corporations, which is represented at this board to-night by Mr. Cassatt, voluntarily and cheerfully withdrawing from the public park of Washington the railway, station and the railway-terminal which stood in the way of the realization of the dream of Washington and L'Enfant, voluntarily sacrificing the material advantages of that position in the center of this great city, in order that art might have its perfect work and the plans of the fathers be wrought out to full fruition.

Already, besides securing the Villa Mirafiori in Rome for the American Academy, within the week, a firm foundation of endowment has been made sure by the munificent gift of $100,000 by Mr. Henry Walters, of Baltimore, and $100,000 by Mr. J. Pierpont Morgan, of New York. No one can estimate the value to France of the two centuries during which the citizens of France were taught in the French Academy in Rome. It was one of Jefferson's cherished ideas that young men of America might become saturated with the ideas of classical art by study in Rome; and now we are beginning the enterprise through which America will no longer be obliged to take her ideas of classic art at second hand, but will go directly to the fountain source at the home of art under the direct and cherishing care of an American institution maintained by American munificence.

My brothers of the American Institute of Architects, you are no longer to be as one crying in the wilderness. The people of America believe that they are building a State which shall endure for all time. They believe that they are building into its structure the best of politics, of social science, of patriotism and of humanity. They believe that the hopes of mankind for the rule of justice and liberty and peace rests largely upon the development of the American Republic. And they already know that as there is a simplicity and nobility in nature which lifts up the spirit of the poorest worshiper, there is a simplicity and a nobility in art which protects the richest of its votaries from the enervating and debasing influence of a purely material life of wealth. They would have every expression of American ideals, of the noblest and the best; and they would leave to the generations that come after them an expression of their patriotism, of their aspirations, of their faith in humanity and in divinity in structures as truly representative of the greatness and the nobility of the American Nation as the cathedrals of the Middle Ages were representative of the aspirations of their builders.

It is for you to answer to the demands of a great people with great ideals, and in answering to those demands you will have with you in the future the people whom you serve.

MEXICO TO EXPLORE AN ANCIENT OTOMITE CITY.

THE Government of Mexico is about to send an expedition of archæologists to explore some ancient ruins of what is believed to be the lost city of Teayo, which was, more than 300 years ago, the capital of the Otomite Kingdom in that country. According to the San Francisco *Call*, the ruins were found by a party of Americans who were investigating a report of the existence of coal deposits. When they reached the Otomite territory, they found an Otomite Indian whom they employed as guide. They found no coal where it was said to exist, and they resolved to continue their journey into the wilds for the purpose of seeing what they might discover. Guided by the Otomite Indian, they traveled over mountains and through dense jungles of tropical forests for fourteen days. They came upon a number of small settlements of Otomite Indians, and but for the fact that their guide interceded in their behalf they would have met with a hostile demonstration at the hands of these natives. They were the first white men to penetrate the region, and their appearance was a sensational event to the Indians, who have never submitted to or acknowledged the authority of the Mexican Government over them. The Otomites proudly boast that they are still unconquered.

On the fourteenth day the Americans came within sight of the city of Teayo. The sacrificial tower, which rises to a height of 65 feet, attracted their attention when some distance away from the city. The Otomite guide went forward and obtained permission from the inhabitants of the ruined city for the Americans to enter. They spent several days viewing the ruins of the ancient capital, which in the days of its glory had a population of not less than 500,000 people. They obtained a large number of good photographs of the different ruins and views of the city.

These photographs include hieroglyphics which exist in the city. It is believed that when these hieroglyphics are deciphered they will show that a discovery of great archæological value has been made. In an interview one of the members of the party of explorers gave the following discription of the ruined city:

"The sacrificial tower, which now rises 65 feet above ground, formerly had an altitude of more than 100 feet. It has been reduced in height by the erosion of the centuries. There are great quantities of stones detached from it scattered over the ground at its base. When the great age of this pyramid or tower is considered, it is the best preserved monument of Mexican antiquity known to exist. At the base of the tower, the north and south sides are 65 feet wide and the east and west sides are 75 feet wide. A stone stairway 30 feet wide runs up the tower on the east side. It is estimated that at least 40,000 tons of material were used in constructing this monument.

"Another interesting feature of the ancient city is the great central underground chamber. The Otomites constructed underground thoroughfares through all parts of the city, and many of these dark and gloomy passages and chambers are still in a good state of preservation. This system of underground thoroughfares radiated from the sacrificial tower. Many of them are walled with stone, upon which the beautiful work of the sculptor is still to be seen.

"I saw underground chambers which were filled with skeletons of men said to have been the victims of religious rites. The labyrinth of underground passages, chambers, and vaults will probably reveal a great store of information bearing on the past history of the Otomites when properly explored and investigated. One of these subterranean passages runs from the center of the city to a surface opening in the face of a cliff, seven miles distant. It is said that no one has entered this mysterious passage for many decades. It was used to provide the imperial family a means of exit from the capital in time of emergency.

"The ancient Otomites excelled the Aztecs in sculptural art, as is shown by the splendid expressions of the human face on stone wrought by the Otomites as compared with that of the Aztecs. The tomb of Tlachimoc, the last of the emperors of the Otomites, is one of the things of interest which we saw at Teayo. The tomb has a raised cover, upon which two sphinx-like figures stand like guards over the pagan ruler. A cross of mahogany, erected in recent years, surmounts the cover.

"At each corner of the paved area over the tomb stands a sculptured stone taken from some ancient lodging place to do honor to the memory of the dead Emperor. One of these stones is eight feet high and is covered with allegorical figures, inscriptions, and hieroglyphics; another of the stones represents a prince, a third a wise man, and the fourth a woman, who is minus her head.

"The Otomites sacrificed the lives of their victims by casting their bodies from the top of the tower through the hole which formed the center of the structure from top to bottom. The bodies fell into the subterranean passage under the tower. Otomite Indians are of light complexion. In the days of their power they were well advanced in civilization."

OLYMPIA.*

THE ruins of Olympia are a delightful place in which to do nothing Strolling among these splendid fragments in the deep grass, while the lizards are basking on the Heræon and the Byzantine church with a Philistine indifference, or perhaps a catholic breadth of sympathy, which would make a specialist shudder, one feels perhaps more than elsewhere the true atmosphere of ancient Greece. A few days amid these surroundings will teach the scholar more of old Hellenic life than the ten years which we so unprofitably spend in groping among the various readings and pedantic foot-notes of donnish editions. Here we have twelve centuries of Greek life within the compass of a morning's walk. Nero, the greatest art-collector who ever sat on a throne, is here cheek by jowl with Pindar, and Herodes Atticus, the type of the courtier-philosopher, jostles Phidias. From Pelops, the legendary winner of the first chariot-race, to Theodosios I., who prohibited the games, it seems here but a step across the Kladeos, where the frogs are croaking so loudly. Here Alcibiades, the Athenian Rosebery, gained political renown by his Olympic victory; here enemies met on neutral ground, as Boers and Britons have met on the cricket-field; here the whole Greek race, the Ἔθνος, as the modern Greeks would say, found a bond of union in sport, just as Great and Greater Britain are federated at Lord's or Henley. And from this spot the ancient Greeks derived their method of reckoning, just as the stableman dates events from Hermit's Derby or the sporting judge calculates years by the dead-heat in the boat race. At any rate, a merrier sort of calendar than the Byzantine method which superseded it of counting time by the year of taxation.

Olympia is blest, too, above other country places in Greece by the material comforts which it provides. Here alone, in the midst of profound quiet—for there is no village but only a few general shops and the hotels—it is possible for even the fastidious European, who must have his course dinner, to live at ease. But the warfare between the rival editors of Eatanswill was as nothing to the strife which rages between the two hotels. As far off as Pyrgos, or even Patras, the traveler is waylaid by emissaries of these opposing establishments, who extol the virtues of their own, and decry the arrangements of the other, in language which would, in England, involve an action for slander. "A place for pigs," says the Hermes of the one; "a place for Greeks, not for Europeans," rejoins the Ganymede of the other. "You will be half starved if you go to that place," impressively murmurs the first tout; "the hotel is quite unfurnished," retorts tout number two. But even when one has made one's bargain and is comfortably installed at hotel A., the determined rivalry of hotel B. does not quite give one up for lost. As I was walking about among the ruins a day or so after my arrival, the landlord of the opposition house boldly accosted me and offered to take me in for the same number of *drachmai* which he imagined (quite erroneously) that I was paying in francs at my own hotel. But even this daring attempt at poaching was exceeded by a subsequent manœuvre, when the rejected candidate for custom handed to one of my friends an envelope containing a *menu* of what his guests had had for lunch and a *menu* of what they were going to have for dinner, with a polite request that he would peruse the contents, and then hand the paper on to his landlord!

The excavation of Olympia has been justly described by a recent German biographer of the Emperor Frederick III. as one of that amiable prince's best memorials. To his inspiration when he was Crown Prince the great work was due, and up on the hill of Drouva were the headquarters of the excavators, one of whom lies buried near the church. What better spot than this could have been chosen for an archæologist's grave? How "Karl Kraus of Transylvania, overseer of the German excavations," died, we are not told in the German inscription, which ends with a Greek farewell, Κραὺς Χρηστὲ Χαίρετε. But here, in sight of his labors, this fallen soldier of archæology, which hath her victories no less than war, is happier than those twin captains of classical scholarship, Ottfried Müller and Charles Lenormant, whose tombs on the hill of Kolonos at Athens are now a mark for

*Extract from "A Tour in Peloponnesus," by W. Miller, in the *Westminster Review* for January.

every boy to shoot at, a slate on which every 'Arry can scribble his useless name. No student of Sophocles can visit Kolonos without a feeling akin to that with which we see an historical building sacrificed to stucco.

ILLUSTRATIONS

HOUSE OF GEORGE ABBOT JAMES, ESQ., 52 BEACON ST., BOSTON, MASS. MESSRS. STURGIS & BARTON, ARCHITECTS, BOSTON, MASS.

NO. 22 EAST 35TH ST., NEW YORK, N. Y. MESSRS. M'KIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.

FRONT VIEW: HOUSE OF E. J. BLISS, ESQ., NEAR CHESTNUT HILL RESERVOIR, MASS. MESSRS. CLOUGH & WARDNER, ARCHITECTS, BOSTON, MASS.

REAR VIEW OF THE SAME.

HARVARD COLLEGE GATEWAYS, CAMBRIDGE, MASS. MESSRS. M'KIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y. TWO PLATES.

NO. 21 EAST 33RD ST., NEW YORK, N. Y.

The reason for publishing this and the following plate in juxtaposition must be sufficiently obvious.

NOS. 9 AND 11 WEST 66TH ST., NEW YORK, N. Y.

Additional Illustrations in the International Edition.

THE GATE OF THE CLASS OF 1877: HARVARD COLLEGE, CAMBRIDGE, MASS. MESSRS. M'KIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.

THE "JOHNSTON GATE": MAIN ENTRANCE TO HARVARD COLLEGE YARD, CAMBRIDGE, MASS. MESSRS. M'KIM, MEAD & WHITE, ARCHITECTS.

THE REFECTORY: GENERAL THEOLOGICAL SEMINARY, CHELSEA SQUARE, NEW YORK, N. Y. MR. CHARLES C. HAIGHT, ARCHITECT, NEW YORK, N. Y.

Some of our readers may be able to recognize this as a subject which was supposed to be exhibited on a certain sheet of paper sent out with our issue for Jan. 14 last, which, but for a series of misunderstandings, certainly would not have been included among the illustrations in that issue, as it is not our intention to publish any gelatine plates of inferior quality. We have accordingly caused the plate to be reprinted and recommend that the earlier one be destroyed.

COMMUNICATIONS.

A CRITIC CRITICISED.

TO THE EDITORS OF THE AMERICAN ARCHITECT.

Dear Sirs:—The Englishman's house is proverbially his castle: and, although no longer fortified against intruders, it still maintains some seclusion and privacy. The house of the modern well-to-do American citizen appears now to be looked upon as common property (in an architectural sense, at least) as much as our public buildings, and to be subject to public criticism.

A certain monthly magazine (Chicago) is publishing a series of critical articles on "The Poor Taste of the Rich," showing or purporting to show "that the homes of many of our richest citizens are furnished in execrable taste."

The Bradley-Martin house was the first criticised in the December number, and now the current number contains a critical article on the Clarence H. Mackay house, illustrated by three photographs. And "a third article in this series, devoted to the home of a prominent Boston family, will appear in the February issue."

This magazine has had many excellent articles and illustrations heretofore, and I have been a subscriber and occasionally a contributor to it, but I cannot approve of this method of preaching what is good art and what is bad by showing up the interiors of the homes of private individuals. I believe good art enhances the commercial value of a house or any building, and we might reasonably suppose, say in the case of the Boston house, which is next to be attacked, that the showing up of its shortcomings as a piece of good architecture might depreciate the value of the house and damage the reputation of the architect and decorators concerned in its building and furnishing.

The articles in question are not signed by the writer, who I am inclined to think is of the "gentler" sex, for no one but a woman would attack the pillows so vigorously and notice the bed "millinery" as part of the interior decoration. The writer in speaking of the bedroom in the Mackay house, says: "The room has many incongruities, but the crowning absurdity is the bed. The modern pillows put to flout the festooned canopy, although the canopy is right and the pillows are all wrong. The graceful lines of the bedstead are quite effaced by these square aggressive pillows."

Housekeepers in "prominent Boston families" will please see that their pillows or pillow-shams are properly disposed.

ROBERT BROWN.

Boston, January 25, 1905.

NOTES AND CLIPPINGS.

BUILDING FROM CITY REFUSE.—A good example of the utilization of waste products is provided by the Fulham Borough Council, which has erected a building from the bricks made from waste products, and a dust-destroyer is to be built for the consumption of waste. This is the first building of the kind erected; in fact, the first example of the manufacture of bricks from refuse.—*London Chronicle.*

THE FIRE-SERVICE OF A FIRE-PROOF HOTEL.—*Fire and Water Engineering* gives the following account of the thorough manner in which real fire-proofing has been supplemented at the Hotel Astor, in New York, with an equally real fire-fighting service:

"As to the fire-alarm system: If a careless guest on leaving a room and locking the door after him, drops a lighted cigar or cigarette butt, and thereby sets fire to the curtains or any other drapery, a thermostat, with an attachment consisting of a small ammonia diaphragm, airtight and filled with ammonia. One is fixed in the ceiling of each room, and is connected by wires with an annunciator in the hotel office. As soon as the heat reaches 130° Fahr. the boiling ammonia expands the diaphragm and closes an electric current. An automatic alarm is instantly given and a red light in a small bulb in the annunciator shows the number of the room. An electric gong is also rung in an elevator in the engine-room, which summons the house fire-brigade; electric bells are set ringing in the hallways and in the servants' quarters on the floor on which the fire has broken out. All over the building are electric fire-gongs, each operated from the office. Red lights show the location of the stairways, and all are lit by both gas and electric lights. The building is equipped with three four-inch standpipes, with outlets on each floor, the cellar and the roof. At each outlet are 100 feet of linen hose, nozzles, hooks, and auxiliary fire-extinguishers. A header is fixed in a hanging ceiling on the roof, and into it the fire-lines are connected, the header itself being connected to the three roof-tanks, whose capacity is about 25,000 gallons. A gate and check-valve control each tank outlet of this supply, which is only an emergency supply until the fire-pumps can be operated. They are connected in the cellar to an underwriters' fire-pump, and cross-connected with the four house-pumps. In the cellar they are connected into a header, with four Siamese connections on the street for fire-engine connections. In accordance with the rules of the city fire-department, check-valves are so fitted that steamers on the street can pump direct into the fire without injuring the pumps or overflowing the roof-tanks. The hose at the outlets is looped from an iron bar in such a way that not a moment is lost in bringing it into service. The private house brigade consists of ten men specially drilled for fire-service. They are always in waiting, as is the special fire-elevator. The special brigade is drilled by itself twice a month, and besides these men all employes of the house, whether male or female, are drilled once a week, and in that way learn exactly what part each has to play in case of emergency. It may be added, also, that there is no fooling over these drills; they are carried on with as thorough exactness as they are on board an ocean liner or a battleship. Each member of the hotel staff has his or her own position to take and duty to do in case of emergency. The chambermaids, for instance, are instructed to stand near stairways and elevators, in case of an alarm, to inform the guests as to the quickest way out. The maids are taught more than this, and each of these young women knows how to handle a fire-extinguissher. There are other hotels in the city—all of the modern fire-proof type, whose construction is on the same lines and probably as nearly fire-proof as the Astor, but, on the whole, the latter may be looked upon as the most completely equipped for fire-fighting purposes."

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CONTENTS

THERE seems to be at length a fair chance that the vexed question of the ownership of architectural drawings may be brought to final determination. Incited by certain favorable aspects of a recent case, Gibbon *vs.* Pease, the Royal Institute of British Architects, the Society of Architects and the Surveyors' Institution have, each and severally, appropriated a considerable sum so that competent counsel may be employed to take up the case and carry it through all the courts and before the House of Lords, if needful, in the hope that, at last, the decision in the noted case Ebdy *vs.* McGowan may be overthrown, and the courts at length be made to see that ever since that decision was given in the Court of Exchequer, in 1870, they have been treating all such cases in altogether too cavalier a fashion. As Ebdy *vs.* McGowan is cited in American cases of the kind, it would be quite worth while for the American Institute of Architects to inquire whether the three bodies named above would not allow it, also, to contribute some of the sinews of war. But as the fight may be a long one and as litigation is costly for defendant and plaintiff alike, it seems just possible that the defendant may offer, and the court force the acceptance of, some compromise before the case reaches the highest court. In such case, perhaps, for the sake of obtaining definite adjudication, it might be well for American money to be used in replenishing the defendant's account.

IN more than one noted case, what has proved ultimately to be an important public improvement would, possibly, never have been carried out, if some one had not had the audacity to overstep the law. In this class historians are not unlikely to place the building of the Panama Canal under American auspices. Sometimes the audacious and strenuous promoter has to set out rapidly for parts unknown, as "Boss" Shepard did some years ago, although now his memory is held in honor at Washington as one of the citizens to whom the community owes much gratitude. At other times the law succeeds in interfering before flight becomes even possibly advisable, and this seems to be the situation in the case of the promoters of the Chicago subway system, the important piece of engineering of which our Chicago correspondent gives some interesting details elsewhere in this issue. The President of the Chicago Tunnel Company and four other persons who, five years ago, held some official position under the city government were last week indicted by the Grand Jury for forgery and perjury, in that they caused a certain report on the Chicago tunnel system to be printed as having been "approved" by the City Council, whereas those who have now procured the indictments allege it was only ordered to be "placed on file." As one of the indicted men was the City Printer, it is easy to understand how a forgery of the kind charged might have been carried out.

THE legal and what may be called the etymological history of the undertaking seems, if we apprehend the situation, to have been quite as devious and mole-like as the actual engineering operations themselves. In 1899, the promoters, in the guise of the Illinois Telephone and Tunnel Company, procured a charter and permit, which empowered them to build a "conduit system" for the stringing of telephone and other electric wires, and the conveyance of mail-matter and packages—presumably by pneumatic pressure. The expansion of a "conduit" system, such as the grantors probably had in mind, into a system of tunnels twelve feet wide and fourteen feet high, through which all the freight of the city should finally be hauled is a species of inflation that could hardly have taken place except in the windy city. Of course by strict interpretation and derivation a tunnel is a conduit, but the incident suggests that there might be fewer loosely worded laws passed if there were more dictionaries and fewer sheep-bound law books in legislative chambers.

IF Sir Caspar Purdon Clarke has the make-up of the average human being, he is probably rather pleased just now that his approaching departure from London has given him the chance of reading the many very pleasant things that the informed newspapers and periodicals have been saying about him and his administration of the South Kensington Museum. And, as these pleasant things seem to be said with obvious sincerity, it becomes all the more agreeably apparent that the Metropolitan Museum has been more than usually fortunate in securing as its new Director a man whose abandonment of a similar post in a greater institution is so genuinely re-

Entered at the Post Office at New York as second-class matter.

gretted. The general belief on the other side seems to be that, although Sir Caspar's new salary and retiring pension are understood to be at least double those which his place at South Kensington assured him, he nevertheless would never have deserted London but for the fact that he has not had at the Museum the free hand he felt he was entitled to. The fact is that South Kensington is under the control of the Science and Art Department, and the nominal head of the institution has been much thwarted and fettered by the red-tape bonds of his official, but unintelligent, superiors.

IT is not fair, perhaps, to say that of all classes of society the one least acceptable to architects as clients is made up of clergymen, but it may safely be said that there is no class which will so unblushingly do, through sheer unworldly ignorance of proper business fair-dealing, so many things that look like bits of sharp practice. It is probable, too, that a greater number of lawsuits grow out of the building of ecclesiastical structures of one kind or another than are generated by any other kind of building operation. The fact that this same belief, that the cloth may do what fustian may not do, seems to affect the princes of the Church as thoroughly as the lowliest dissenting parson is shown by a recent occurrence in Rome. It appears that it is the custom for the tomb of a deceased Pontiff to be erected at the expense of the cardinals created by him during his reign. Leo XIII had indicated his preference for being buried in St. John Lateran, so that his monument might balance at one side of the high-altar the monument he had erected to Pope Innocent III. A commission of cardinals was appointed, who finally vested the control and direction of the whole matter in the hands of Cardinal Satolli, well-known in this country, because he had special charge of the basilica. Thus empowered, Monsignor Satolli made arrangements with a sculptor, Professor Luzzi, to prepare the design. This was made, submitted to Pius X for approval and, the alterations suggested by him having been incorporated in it, a contract was entered into with the sculptor, who at once began the execution of his task. At this point Cardinal Satolli was called to America, and during his absence the commission of the College of Cardinals, finding that six thousand dollars could be saved if the work were to be placed in the hands of Professor Tadolini, accordingly abrogated the contract with the unfortunate Luzzi, who is now forced to sue the College of Cardinals for civil damages. These he will probably secure, for the Pope is said to be on his side; as well as the abstract equities of the case.

AS the work of Louis Ernest Barrias, who has just died in Paris, consisted largely of portrait statues and busts, it is not as well known to Americans as that of some others of his contemporaries. Probably, because of its position in the Garden of the Tuileries, his "Oath of Spartacus" is as well known as any composed work of his. But his "First Funeral—Adam and Eve carrying the body of Abel," shown in plaster at the Salon of 1878, is well known, as also are his "Song" and "Music" that adorn the grand staircase of the Hôtel de Ville, Paris; while it is not unlikely that his fame may come to rest largely on his fine figure of Joan of Arc, at Rouen, one of his later works. M. Barrias was born in 1841 and won the Prix de Rome when twenty-four years of age, having already won the Second Grand Prix four years earlier.

IT is unfortunate that on the verge of what promises to be a very active building season there should occur anything which tends to shake the confidence of investors in and improvers of real estate, either in the stability of prices and general conditions, the probity of contractors or the reliability of laborers. Much undesirable perturbation is being caused by the effort being made at Washington to bring about a regulation of railroad traffic rates, a regulation made for the temporary advantage of the shippers without much consideration for the permanent and vested interests of the owners of the railroads. It happens that the ownership of a vast amount of railroad securities is vested in savings-banks, insurance companies and national banks, institutions, that is, which are in the habit daily of making building-loans, to large total amounts; it is easy to infer, then, that legislation that affects prejudically the absolute value or the earning capacity of these securities, and by so doing diminishes the income of these institutions, cannot but compel them to be less ready, if still able, to make the building-loans on whose procurement almost all large building operations depend nowadays. Fortunately the great money-lending institutions are awake to the situation, and are lending their aid to the railroads in their contention against hasty and unwise legislation of too sweeping a character.

IT is a very common occurrence that, whenever there has been a fatal accident during building operations, the whole working-force should knock-off work for the remainder of the day—at whose expense, we do not just know. This action is partly due to an innate impulse of decency and partly to the promptings of superstition. The obscure psychic influences of superstitious belief are so generally felt and acknowledged that many can sympathize with the men at work on the building of the Columbus Savings and Trust Co., at Columbus, O., who, on the occurrence of the twenty-first accident, declared there was a "hoodoo" on the structure, and they would no longer work there. The most curious case of yielding to superstition occurred on the old wooden sailing frigate which carried the United States exhibits to the Vienna Exposition. Returning home light in ballast, heavy seas were encountered one day, and owing to the rolling and pitching a heavy ice-box on the deck broke adrift and threatened to do much damage as it careered about over the deck. As a portion of the watch was trying to secure the slippery mass, it caught one of the men between itself and the bulwarks and crushed him to a pulp. As soon as the watch understood that Death had boarded the ship every man Jack of them skulked below, even the man at the wheel disappearing, so that the officers themselves had to brace up the yards so as to prevent serious disaster. This impulsive yielding to superstition took place in spite of the discipline that prevails on an American man-of-war.

THE RELATION OF THE ENGINEER TO THE ARCHITECT.*

THE advent of the rolled beam has brought a new era in architecture. This era is contemporaneous with our own work, it is being evolved in our own times; and we have not yet adjusted ourselves to it, not even we here in America. This does not mean that there were no structural problems before our day, but rather that the use of steel has brought with it structural possibilities indefinitely greater than anything that preceded, so that it practically constitutes a new age in building construction. Many of the great designers of the Middle Ages must also have been great engineers. Their command of geometric functions may have been as great as ours. From a structural standpoint, their work will always remain notable—some of it remarkable—and the new era does not signify that we know more than they did, but that we now have a material for our buildings that admits of forms of construction of which those masters could not have dreamed.

The characteristic features of this new era are: the substitution of the steel frame for the heavy masonry walls of massive construction, great height of buildings, larger openings in walls, wider spans in rooms, magnified requirements for ventilation and sanitation, electric light and power, the modern elevator, and the great multiplicity of structural and mechanical problems which these things involve. These characteristics do not pertain directly to the utility of the buildings nor to its artistic treatment, but to structural conditions involving technical education and experience. This is true, though the increased height of buildings and the great openings in exterior walls may call for a modification in the artistic treatment, and though the problems of utility may have been almost immeasurably magnified.

This new era, with its new conditions, partially explains why the engineer has suddenly, as it were, become a distinct factor in the building problem. It is because of this enormous expansion of problems involving technical knowledge. The other reason is not far to find: it is because the methods of treating these problems have been elaborated during the last century, and particularly during the last thirty years, upon a basis which affords much more accurate and more definite results than anything, so far as we know, in use before the present time.

While some of the vaulted ceilings and domes of the old world make men wonder how the designers calculated so closely and did their work so well, it is undoubtedly true that a large part of even the best buildings constructed prior to the advent of steel, were dimensioned and fixed structurally upon the basis of experience and precedent. Every new building called for careful comparisons and the judgment of the most experienced persons. The actual calculation of stresses and strains was unknown. Now this is changed. The rule is the other way in every up-to-date architect's office. The dimensions and sizes of all details of construction, as well as the mechanical features of a modern building are calculated, accurate and definite results are sought, and we pay less and less heed to what the dimensions and sizes of the same details were, in comparison, in other buildings. We lean on our computations, and not on precedent. Judgment is not eliminated, but in a large measure it is transferred, and the experience required is the experience of the technical man rather than that of the observer.

To put it briefly, structural and mechanical problems in building work were comparatively few in number in all times preceding the advent of rolled beams, while accurate and definite methods of treating such problems, particularly those involving the strength of materials were at least relatively crude and unsatisfactory and electrical problems were entirely unknown. In these days such problems fairly burden every design, and they are susceptible of definite calculation and accurate determination. Unless we get this point of view, we shall scarcely be able to appreciate what an evolution is really going on at the present time in the relation of the architect to his work and in the operations of his office, or to realize that these changing processes are not yet completed. Attention is called to this, in the beginning, because we can not determine what relation the engineer can most profitably hold to the building problem and to the architect, unless we approach the question with the largest possible conception of these new conditions which the construction of modern buildings has wrought in architectural methods and requirements.

*A paper by Mr. C. T. Purdy read at the Thirty-eighth Annual Convention of the American Institute of Architects.

The engineering profession, as a profession, is comparatively a new thing. Compared with that of the architect, it is really in its infancy. The employment of architects, their work as designers, and their supervision of construction are fixed things the world over; their place in the business world, and even their standard rate of compensation is universally conceded. With an engineer it is entirely different; he has been struggling, particularly during the last generation, for an acknowledged place as a professional man, and for a like independence. This is really true in every department of engineering. The busines world in these latter years has finally come to recognize him as a man of some importance, but it still expects him to work on a salary, unless he is able by some means to maintain himself independently, and this seems to be as true of the man who builds a transcontinental railroad or tunnels a mountain as it is of the youngster that works over a draughting-board.

When it comes to the engineer working on architectural problems, the commentary is doubly true, for it is practically a new field for technical effort. The engineers taking up this work, and their number is constantly increasing, appreciate these conditions. We shall see during the next generation, however, that they are a strong body of men, also, that they are ambitious, and that they will unquestionably aspire to any authority or position which circumstances may open to them. It may, therefore, be confidently predicted that any practice by the architectural profession which fails to appreciate these men at their real worth, and the rapid development of the engineering profession as a whole, will, ultimately, come to naught. If a relation is ever established between the engineer and the architect, which will be conceded to be the proper one by both professions and by the public, we may fairly expect that relation to be one which will work for the advantage of all concerned—the architect, the engineer and the owner.

Ten years ago, when the writer moved his office to New York, he was told that there was no chance for an engineer in that city; that excepting a few who regularly employed engineers in their office-force, the architects depended upon one of three or four of the great iron manufacturers of New York for their steel designing, and that that arrangement was a fixed one in the architectural practice of the city. He was told that the custom was so thoroughly established that it could not be disturbed. His office was, nevertheless, started in the belief that such a custom would go to pieces of its own accord. In a very large degree this has already happened, and it is a fair illustration of what will eventually happen to every relation between men that is not reasonably considerate of all interests concerned.

The structural engineer ordinarily includes in his part of the work, the structural framework of the building, be it much or little, the foundations, and also the masonry whenever it becomes complicated or questions of strength are involved. This part of the designing of a building can be accomplished in several different ways:

1. The architect may do the work himself, without assistance.
2. The architect may have the work done by some manufacturer.
3. The architect may have the work done by the builder, or the owner, with his consent, may have it done in that way.
4. The architect may employ the engineer as a part of his own force.
5. The architect may associate the engineer with himself as a partner.
6. The architect may employ a consulting engineer, who has his own independent office and practice.
7. The architect may be associated with such an engineer, employed directly by the owner, without any personal arrangement with him in relation to the matter, or
8. The engineer may have control of all the work, with the architect more or less subordinated to him.

All of these methods of getting the work done are in vogue at the present time. Here is a wide divergence of practice and certainly a very undesirable condition of affairs. With engineers in other departments, particularly in electrical work and heating and ventilating, the practice is more uniform, but not sufficiently so.

The responsibility rests chiefly with the architect. Where the work has been done by men in the employ of the manufacturer or builder, in many cases it has been so because they wanted it, and when they have been employed by the owners, it has usually been because the owners required it; but outside of these influences, the architects have been in control of the

work. They have decided how it should be done, and the engineer could do nothing but acquiesce in their wishes.

This wide divergence of action has, first of all, grown out of the varying conditions among the architects themselves. Some have technical training, and their best work pertains to the structural part of their problems, while others, and among them some of the best designers, have little or no taste for construction. Some architects can afford to give their own time to structural details, when it would be folly for others to do so. Some architects have a business sufficiently large to warrant the expense of regularly employing competent men in their own offices, while others cannot afford such an expense. In some cases the cost of the best technical assistance is unhesitatingly met by owners, while other work is done under circumstances which makes the employment of engineers almost prohibitive.

To some extent, this difference in practice has grown out of a fear of trusting to outside help. Some architects have been willing to try it, while others have not. The fear has been twofold, that the work would not be done well, and that the building could not be designed to advantage unless the work was all kept together. Sometimes it has been the former, sometimes the latter, and occasionally it has been a dread in both directions.

The divergence of practice is also due to a failure to appreciate good work. The great structures of our cities vary in strength and stability, and in every other structural characteristic, from the wretchedly poor to the wastefully good. The engineer is not to blame, he does the best he can; but *he* is to blame who chooses an inexperienced or incompetent man for important work. It is a fact that young men not long out of school and men whose technical knowledge is very limited are employed in offices to do work for which they could not be considered qualified in any of the leading engineers' offices of the country. They fail to do the wise thing. They can't help it. Sometimes the result is lacking in some essential feature, and sometimes it involves only the lesser evil of extravagance; but whether it is the one or the other, ordinarily, both the architect and the owner fail to realize its imperfections. It is only now and then, when such structures come under some extraordinary test, that the weakness becomes apparent.

There remains, however, another explanation of this divergence, a more important one perhaps than all the others put together, and that is the cost. Undoubtedly, this is often the reason why inexperienced or incompetent men are employed. The question is asked too often: "How can we get the work done at the least expense?" and there are not a few extreme cases on record where the architect has tried to employ a consulting engineer by taking bids to see who would do the work for the least money! The results produced by such means are, to say the least, very unsatisfactory, and words can hardly tell how discouraging and humiliating it is to the competent engineer who is trying to do good work.

Some of the ways in which structural designing is now being done ought to be ruled out altogether, and this is particularly true of the one already referred to as the common practice in New York ten years ago. The day is coming when no architect who values his reputation will venture to receive assistance from a manufacturer or his employés, whether that assistance is paid for in a regular way or not. It might also be added that the day is coming when no engineer regularly employed by a manufacturer, or practising as such himself, will expect to be called on for such services. It is an old saying that "No man can serve two masters," and it is because this is true that this relation, sooner or later, is certain to disappear: in many cases it works to the owner's distinct disadvantage.

The steel frames in some of the most notable buildings, both of the East and the West, have been designed by the builder or under his immediate direction. This is particularly true of some of the first high buildings. The builder's confidence in the practicability of the new methods of construction, and his willingness to share in the responsibility of their introduction, made that way of doing the work acceptable and pardonable when these first buildings were erected. The same method, however, has been followed on other important buildings during later years. Its continuance is partially due to the existence of the precedent and partially to the influence of the realty element which has recently taken so large a hold of the building business of the country. It is, however, an undesirable relation from the architect's point of view, and that is sufficient to forbid its general adoption.

The employment of engineers by an architect as a part of his own force is also open to at least two serious objections, particularly when it is done in an office of moderate size. The character of the work which is ordinarily produced under such circumstances is not likely to be of a high order. The other objection comes from the other point of view. The subordinate and limited character of the service ordinarily required in such cases is certain to be distasteful and not acceptable to the most competent engineers. For these two reasons it is a method that probably will not be permanently maintained. The structural and mechanical problems in any office, be it large or small, are likely at any time to require the services of men whose training and ability will compare favorably with that of the architect himself; or, to put it another way, these problems may at any time become the most important problems connected with the architect's business. The day is already dawning when the owner is going to appreciate this fact and is going to require the same ability and the same experience in those departments that he expects to get from his architect in other ways. When that day fully comes, this method of handling these problems, in all, except possibly the very largest offices, must disappear. Indeed, as rapidly as architects come to appreciate the importance of good structural designing, they will themselves be dissatisfied unless they can have the very best, and it will be almost impossible for them to get the best from a salaried man without a greater expense than they can afford. Even in the largest offices it will eventually prove difficult to keep the service up to a high standard without occasionally varying the practice or making changes in the personnel of the department. This is possible, because no man working under a salary will maintain as high a standard of efficiency as he would maintain if he were working for himself. There are few exceptions. It is human nature. Moreover, all men are prone to work in ruts and to repeat their faults. If an architect is constantly dependent upon one or two men in his own office, there is no getting out of these ruts or escaping from these faults, unless it be by occasionally changing the method of having the work done, or by changing the employés themselves. One of the leading engineers of the country, in speaking of this matter, recently said: "The consulting engineer, in general practice, may be expected not only to have better and more adequate facilities, in the way of technical assistants, for doing a given piece of work, but he can also bring to bear upon this work a much greater amount of experience and knowledge derived from the greater number and variety of cases handled through his office." He added: "I have had occasion to note several times the limited scope of the knowledge and experience of the technical assistants employed on salary by architects and contractors."

The employment of the engineer by the owner as the associate of the architect or the one in general charge of the work, is also undesirable; as an associate it divides responsibility; in charge of the work, it subordinates all other considerations to the structural. Eventually it would be humiliating to the architect. It does not conduce to the best interests of either the owner or the architect. Both arrangements are mistakes and neither can attain a general acceptance, in or out of professional circles.

On the other hand, consideration of such a plan cannot be turned away lightly. If some solution of this difficulty is not found, if some systematic effort is not made to "standardize" this relation, if such an expression may be used, the engineer will strive to push himself forward in just such ways as these, and will meet with encouragement from the public. The opportunity to take the lead appeals to his ambition. He is also almost always a practical man of affairs. On these accounts, if the situation is allowed to drift, it may never be possible to arrive at an understanding between the two professions for a uniform practice and a division of authority which may in time become fixed by public usage. And this is not an abstract theory. A good illustration of both arrangements has come to the writer's attention while these words are being written. In one case, the owner of a fifteen-story building employed the engineer to design the steel construction of the building without reference to the architects. In the other case, a power-house was designed by the engineers and no architect was employed until the services of one became absolutely necessary, and then only to serve in a subordinate relation.

Objections are also repeatedly made to the employment of a consulting engineer. It is urged that the dividing of the work is a disadvantage to the architect, and that it obstructs and delays the men employed in the architect's office on other features of the design. The desire to keep the work under personal control

is usually due to this notion; but sometimes it is due to a feeling of satisfaction in doing everything one's self, and occasionally it is born of the wish to monopolize the credit of every achievement with which one has to do. These ideas and desires prevail not only in the larger offices, where the volume of business is sufficient to warrant their gratification but architects having smaller practices are governed by the same ideas.

A much greater difficulty, however, is the question of compensation, to which reference has already been made. The expenditure of so large a part of the architect's commission in one sum always seems a hard thing to accept.

These difficulties, and these only, seem to stand in the way of the employment of a consulting engineer. To all other relations there seems to be an objection which makes them impossible, an objection which will surely prevent their final acceptance by all concerned. It might, therefore, be well to inquire particularly into these difficulties which appear to stand in the way of the employment of the consulting engineer who has a practice of his own independent of the architect. Are the objections insurmountable? Has the relation advantages of sufficient importance to warrant changing other methods which we are using in order to secure its adoption? Let us see?

The dividing of the work in the architect's office and the likelihood of delay growing out of doing so seems tangible enough to those who have believed in it, and who have had little or no experience to disprove the notion. I remember one case in which the owner arranged for an outside engineer to do the work, but the architects were so sure that it was an impossible arrangement that they spent some hundreds of dollars duplicating the work of the engineer, before they were convinced that it was unnecessary. As a matter of fact, the very opposite is true. The dividing of the work is more likely to give point and snap to the work remaining to be done in the architect's office, than otherwise. It is hard to make the doubting believe, but more than one member of this Institute has borne testimony to such an experience.

No consulting engineer can preserve his independence in business, unless he can find a way of doing his work with little or no trouble to his client and, also, unless he can do it quickly, making every figure and every line count in the final result. He cannot afford to have the work drag in his office, nor to speculate with uncertain data. He wants to get things settled. So does the architect; but the architect can be put off. The engineer, however, objects to doing work until things are settled. So decisions are hastened, and both the architect and the engineer get the benefit. Many times, also, the touch of the two offices with one another is like an infusion of new blood to the slower one. Sometimes it is incited to keep ahead of the engineer, just as a matter of rivalry; and at other times, it is to keep him informed regarding the general construction. This particular difficulty, therefore, can always be overcome, if the work is rightly managed.

The cost of the work, as already stated, has been the hardest difficulty to satisfactorily adjust. It has prevented the employment of the engineer more than anything else. If the cost of his services could always be obtained from the owner without encroachment upon the architect's regular fees, it would undoubtedly do much to simplify the problem. But the general acceptance of such an arrangement in the immediate future can hardly be hoped for. From all reports, it is often difficult to obtain the regular commission, and any charges in excess in such cases are impossible. If any general effort should be made by the architects or by the engineers, or by both professions co-operating, to definitely establish this relation between the two professions, and it was predicated upon the willingness of the public to pay the extra commission, the movement would probably come to nothing. The public are educated slowly and, for a good while at least, their willingness to pay the additional commission would be the exception. In the meantime, other influences are gathering headway, and these in turn, would probably prevent the success of such an effort in the more distant future. The conditions are such, it seems to the writer, that such an undertaking should be made, if at all, upon some basis which can be put in operation in comparatively short time, a basis which does not require the co-operation of the public. This does not mean that an extra commission from the owner is undesirable. It is desirable, and every effort, both of the architect and the engineer, should be put forth to secure it. It is probably a fact that the amount of work required of the architect in these days, in proportion to his income, is greater than it used to be, and that this additional compensation, if it may be called such, would not make the architect much, if any, better off than he would have been with the same amount of work a few years ago. It is also true that some owners have already paid this additional compensation, and that some others can be easily induced to pay it; yet, notwithstanding these points to the contrary, it is important that the success of the movement should not be dependent upon the willingness of the public to pay the extra commission.

It seems to the writer that the following points should be made with reference to this question of the engineer's compensation:

1. It should be paid by the architect.
2. It should be adequate.
3. An extra commission on account of this expense should be obtained from the owner, if possible.
4. The compensation should be a commission.
5. If an extra commission can be obtained from the owner, the engineer should get the benefit of it.
6. If the extra compensation cannot be obtained from the owner, the engineer should be content with a smaller commission.
7. The commission should be the same for all kinds of engineering pertaining to building work, structural as well as mechanical, and
8. The commission should cover only the work included in the service.

The engineer's compensation should be paid by the architect, because that is most in keeping with the subordinate relation of the engineer. It puts into the architect's hand, without friction and without question, the power to retain his management of the business.

The compensation should be adequate, otherwise the whole idea of establishing a permanent and satisfactory relation between the two professions will fall to pieces. The engineer will more and more assert himself, and he will not agree to any fixed relation unless it provides for a full and adequate compensation for his services.

If an additional commission is paid by the owner, the engineer should give something for it, otherwise it will be difficult to persuade the owner that the additional compensation is necessary. It is suggested that the engineer should assume the full responsibility of the architect in reference to his part of the work when he receives the full commission; that is, the full compensation which he should receive when an additional commission is obtained from the owner; and on the contrary, that he should not be held any more responsible than an employé of the architect's office if this full compensation is not paid. This will be to the advantage of both the architect and the owner. It will tend to prevent the employment of incompetent men as consulting engineers; it will encourage the employment of better employés in the engineer's office, and will promote better work in every way.

The engineer will undoubtedly be more careful with his work if he faces the possibility of losing his commission when it is not promptly done. Mathematical computations will be more perfectly checked, plans and specifications will be more thoroughly studied, and the placing of the responsibility on the engineer in a definite way cannot fail to bring about a better service. This is really the same argument that we are now presenting to the owner when we tell him that he can have an engineer's services, if he pays for them; for, under present conditions, the architect is bound to furnish the owner something in the way of technical work, whether an extra compensation is paid or not.

And this compensation should be a commission, though a number of the leading engineers of the country undoubtedly prefer a fixed sum. Many of the architects are also accustomed to paying a fixed sum instead of a commission; but notwithstanding these preferences, it is the writer's opinion that in all ordinary cases it should be a commission. If any arrangement is made to establish a definite and fixed relation between the two professions, it must unquestionably cover the problem of compensation, and that can be stated in the terms of a commission definitely, equitably and generally, while it cannot be stated in any general terms on the basis of a fixed sum. Moreover, such a plan can be carried out, and the adequate compensation of the engineer can be maintained in that way with the least friction. It also enables the architect to compare the amount he pays out with that which he receives, which he cannot readily do if the engineer's compensation is fixed in any other way.

In any case, the architect ought not to be obliged to pay out all that he receives. It is right that the engineer should be adequately paid, but it is also right that there should be a fair division. If it is worth while to undertake to establish a fixed relation between the two professions, which can be maintained whether the public falls into line or not, and the architect is to employ the engineer, whether he receives the extra commission or not, the engineer should be expected to serve in any case and to receive a less compensation if necessary.

In order to give point to this suggestion with reference to compensation, the writer would suggest the following rule to cover all ordinary work: Charge the owner 7½ per cent. commission for all technical work for which engineers are required. If the 7½ per cent. is obtained from the owner, pay the engineer 5 per cent. when superintendence is included in his services, and 3½ per cent. when it is not. If only 5 per cent. commission is obtained from the owner, pay the engineer 3½ per cent. when superintendence is included in his services and 2½ per cent. when it is not. The cost of the engineer's services for extraordinary work, under this rule, would have to be adjusted in each individual case, and the question of whether work was ordinary or not would have to be determined before the work was begun. The rates named in the rule would not be sufficient to cover all cases. Often the actual cost of designing the structural steel work for a theatre, without superintendence, is 5 per cent., or more.

Let us turn now to the other query:

"Has the relation advantages of sufficient importance to warrant changing other methods we have been using in order to secure its adoption?" It seems to the writer that it has. There are perhaps twenty-five or more engineers of large experience in the several departments of building construction, now in independent practice in different parts of the United States, and the most eminent and the most capable men in the world in these departments of work are to be found in this number. The monied interests of the country are awakening to a greater conception of the importance of good structural and mechanical designing, and more and more, in the future, they are going to require technical services of a high order. They will eventually force the situation. Unless some arrangement is made for co-operation, most of these engineers will, sooner or later, be employed by the interests that now employ the architects, and the more this is done the more difficult it is going to be to standardize the relation of architect and engineer. In this same connection it should not be forgotten that the schools of our country are turning out well-trained young men in the engineering profession, several thousand of them each year, a considerable part of whom are going into building work. An evolution is in progress. Shall we drift with the current, or shall we control it? It would seem to be better to fashion events and not let them fashion us. It would seem to be better to yield a little here and a little there of our individual preferences, in order to secure the common good. It would seem to be better, possibly, to sacrifice something at the present time, if thereby a reasonable relation between the two professions may be fixed and maintained.

In this day of the centralization of power and responsibility, the best interests of the owner are unquestionably subserved by making one man responsible, and only one. I confidently believe that no practice can become uniformly acceptable; no relations between architects and engineers can ever give satisfaction, that is not founded upon this fundamental idea—the centralization of responsibility in one man. If this is true, engineers should not hesitate to accept a position of subordinate service, for it may reasonably be contended that the architect is the one man that should be in this position of supreme control. Not only is precedent in his favor, but the character of his work and the wide range of its requirements especially fits him for this larger responsibility. In this new dispensation, whatever else he is, he must be a man of affairs in the architectural world, and the engineer cannot take that place of responsibility, however well qualified he may be for doing so, without subordinating his technical work to the larger demands of such management.

On the other hand, the architects should not fail to appreciate the changing conditions. They should not hestitate to meet the engineer half way. They want only reasonable profits for their labor, an undivided responsibility in their own departments, and the credit which is due to them for really worthy achievement. Less than this, they will not be content with.

The architect in full control of the planning and execution of every great architectural undertaking, retaining structural and mechanical engineers who have their own independent practice, and sharing with them the emoluments and the honors of their achievements; the engineer laboring independently within his own province, without limitations, except by the financial and architectural conditions of his problems, receiving adequate compensation while he maintains the position of the architect: such is the ideal relationship of architect and engineer, and particularly so if both individuals are broad-minded and reasonable, and over all, there be mutual sympathy.

Let us summarize the points we have made in relation to it:

1. It is open to no insurmountable objections.
2. The details of its operation can be arranged in all cases so as to offer no serious disadvantage.
3. It can be made to afford the engineer a regular and adequate compensation.
4. It conserves the best interests of all concerned, by fixing the responsibility and the managing control for each undertaking on one man.
5. It provides that the architect shall be that one man, and would undoubtedly perpetuate that arrangement.
6. It insures the best results, making it possible for any architect to avail himself of the best technical service the country affords, and
7. It enables the architect to place a definite responsibility for the technical work upon those whom he calls to his assistance.

Only one thing more remains to be said: Certain things must be done, if we would undertake to establish such a relation:

1. It must be deliberately worked for. It will not "come drifting."
2. It must be a co-operative effort.
3. It must be a general effort.
4. It must be undertaken in a spirit of compromise and good-will.

If a committee were appointed by the American Institute of Architects to consider this matter and to confer with the engineers, the latter would undoubtedly find some acceptable way of meeting them. There is certainly a great deal of dissatisfaction with present conditions, and a number of the leading engineers have already expressed their wish that some action might be taken to put the relation of the architects and engineers upon a better basis. Any such effort will come to naught, however, unless it is undertaken in a spirit of compromise and good-will. There must be, on the part of the engineers, a willingness to take a subordinate part, and to support the architects in maintaining that relation, even though sometimes it may require an apparent sacrifice; and there must be, upon the part of the architects, a willingness to share in both their compensation and in the credit of their achievements.

THE RELATIONS OF SPECIALISTS TO ARCHITECTS.*

IN attempting to discuss the relations of specialists to architects, a difficulty at once presents itself in the varying factors of the professional equipment of the architect, the personal qualifications of both the architect and the specialist, as well as in the particular work which the specialist is called upon to do.

An architect of large and constant practice can afford to have complete or approximately complete provisions in his own office for every department of work covered by his practice. This is necessarily an expensive service to maintain, but the conditions are ideal for the execution of the best work. In such a case, the controlling head employs only such specialists as assistants as will do his bidding in their relatively subordinate places, or whose independent work can be relied upon to conform to the known traditions of the office. It is possible also that the designers in the more purely architectural departments be given a general oversight of the allied departments. Offices of this importance, however, are extremely few.

There is a second and larger class of offices, in which the conditions of American practice warrant the maintenance of a construction department, equal to handling the special as well as ordinary problems of steel-skeleton construction and heavy building, in addition to the necessary departments of design. The constructive engineer is generally capable of dealing with the mechanical problems of heating and ventilation, power-plants and electrical installations.

By far the largest class is obliged to have not only the problems

*A paper by Mr. Edgar V. Seeler, read at the Thirty-eighth Annual Convention of the American Institute of Architects.

of special construction and mechanical engineering solved by specialists employed temporarily, but, in common with the second class, also problems of sanitation, landscaping, interior decoration, models of ornament, and such other work as general practice implies. In this class, the smaller the practice, the greater is the difficulty of securing the assent of the client to the extra fee which the employment of the specialist necessitates, and, it may be added, the greater the difficulty of the architect in securing a satisfactory specialist.

With the growing importance of the specialist, the acknowledgment that he has come to be a necessity, emphasized by such statements as that in the "Schedule," which provides that his services are to be paid for "by the owner" in addition to the fee paid the architect, contains a germ of harm to the best interests of the architect, in so far as it encourages too great independence on the part of the specialist. For the prime requisite toward the ultimate success of any building is that the architect, either in person or by a responsible deputy, shall be in full control of every individual item which goes to make his building a complete whole.

It may be generally admitted that the engineering specialists are much more tractable as associates than those specialists whose work requires a more definite artistic sense. Capable engineers are numerous, and they have no sentiment of hurt pride in admitting that they know little of art.

It is also probably true, on the other hand, that the artist's distaste for engineering makes it easier for the engineer to accomplish his purpose, so that in designing, the architect is more willing to make concessions to the engineer, or to meet him half way, than if the engineer presumed beyond his true sphere. The architect comes to know after very little experience that heat-flues, steam-pipes, electric-conduits, plumbing lines, demand space for their proper operation, and he allows for them, even though vaguely.

Again, it must be remembered that the engineering expert, whatever his particular branch, is not always capable of determining just what is meant by plans, nor of seizing at once the particular object which the architect wishes to accomplish. If the engineer is lazy or set in his ways, he is prone not to devote any more time to such work than is actually necessary to accomplish his own results, irrespective of their artistic merits.

The architect, therefore (and it cannot be urged too strongly), must in self-defense exercise a close supervision over the work of the engineering expert. He will require tact and persistency, in order to get the most out of the ingenuity which the engineering expert frequently possesses. He must, in every case, have it definitely understood that no work in those departments is to be finally determined without reference to him for its ultimate effect in the sum total of his building.

The landscape architect, the interior decorator, the glass designer, being men in whom the artistic sense is indispensable, are perhaps the most difficult of all to control; the more so that their functions are in many ways as important as that of the architect himself. Fortunately, these experts are much less fractious now than they were ten years ago; but the lack in each is usually due to a misapprehension of the relation which his work should bear to the building of which it is an adjunct.

It is a pity to have to admit that many architects do not consider the setting of their buildings, or the treatment of interiors, as an integral part of their design. It is a greater pity that many architects are not qualified to determine such questions. For such architects little respect can be expected from the specialist. The architect is of no help to him, and is not sensitive enough to appreciate the work of the specialist. The incentive to the best effort is absent.

On the other hand, where an architect has mastered, if only in a general way, the principles of good design, where he has a clear conception of his completed work, he should have no difficulty in modestly but firmly impressing his convictions upon the specialist.

The term "landscape architect" is an anomaly. The chief service of the landscape artist—since it seems to be the only term available—is to apply his knowledge of planting, of the growth, form and color of vegetable life, to the details of the general scheme of grounds or setting which has been correlated to the building and developed in its architectural work by the architect himself. The landscape architect should not be called upon to determine whether gardens shall be sunken or raised; whether walls, balustrades, dials, and such accessories shall be of one mass and design or another, of one material or another; whether the formal garden shall be on this axis or that, or off axis altogether; to determine these things is the duty of the architect. The service of the landscape architect should mean advice in the choice of plants, in the relative value of trees, shrubbery and vines, in the planting of lawns and hedges, and in those items which are the result of special nature-study and intimate living with nature.

Regarding the interior decorator, there is no possible slaughter worse than that he can accomplish, and usually does accomplish, with an otherwise harmless if not entirely wholesome architectural interior. And with the interior decorator may almost be classed, in ruthless disregard of architectural principles, the artist of eminence to whom is entrusted the picture panels. Puvis de Chavannes is almost the only modern who has realized the dignity of his work, and it is an open question whether, in the one or two examples of his work which we have the good fortune to possess in America, he would not have changed his color scheme could he have seen its surroundings in advance.

Of designers in glass and mosaic, how many can be trusted undirected with a work of importance, without the risk of their introducing an irrelevant style or an inharmonious color note?

The only guaranty of the perfect working out of these various parts in the make-up of a building lies, first, in the education of the architect, whereby he himself is competent to conceive, to express and to execute, or to select from around him those who can do so; and, second, in the untiring supervision of his executants.

An interesting side of all this is that the intelligent specialist, whatever his work, is usually willing and desirous that general lines shall be laid down for him. He knows that his work gains in dignity, grows more interesting in variety, and helps more in the accomplishment of a unified result than would be possible under any other circumstanecs.

There is no reason in the world, other than deficiency of some sort on the part of the architect, why the architect and the specialist should not work side by side in entire harmony under the acknowledged leadership of the architect and the willing acquiescence of the specialist.

REPORT OF THE COMMITTEE ON EDUCATION, A. I. A.

THE Committee on Education submits the following brief statements of the architectural schools of the country, which continue to show increase in numbers.

The Department of Architecture of the Massachusetts Institute of Technology reports that the entering class is a third larger than last year, and that as many as fifteen graduates have remained for advanced work. An interesting feature is that the college graduate who enters the school is more desirous than hitherto of adding the Institute degree to the one he already possesses, or, if he prefer to rest as a "special," he does not limit himself, as he has commonly done heretofore, to the æsthetic side of his profession, but adds the necessary mathematics to his course in the interest of scientific construction.

It has been found that the courses at the Paris Ecole des Beaux-Arts are somewhat stiffer than at the Institute, if the student is to take his degree. This has had its good influence here, as shown by the above results. Another cause of the increased attention given to construction is undoubtedly the steadily increasing demand for engineering knowledge in all important work; but the fact remains that the association of construction and design has come to receive its proper recognition.

The Department of Architecture of the University of Illinois has in architecture, 62 students, and in architectural engineering, 31 students, making a total of 93. Usually, ten students graduate annually. The equipment of the department has been increased during the year by the addition of 1,500 lantern-slides, mostly of Italian subjects, making a total collection of about 6,000 slides; by the purchase of about 1,800 Italian photographs, including a large series on the Apulian monuments, and by the addition of architectural books costing several thousand dollars to the architectural library. Courses in design and practice of several art-industries have been added. The department has received a State appropriation of $7,500 for the extension of the equipment during the years 1903-5. Future prospects for the department and its graduates are very promising.

The Cornell University College of Architecture reports this year a gratifying increase in the number of students. It regrets to chronicle that Professor Van Pelt has retired, to follow Professor Trowbridge into architectural practice, but the College feels itself fortunate in being able at the same time to announce that Mr. Maurice Prevot has been elected to the Professorship in Design, while Professor Clarence A. Martin is advanced to the position of Professor in Charge. Professor Prevot, a graduate of the Paris Ecole des Beaux-Arts, is regarded as one of the

strongest of the later Beaux-Arts men, having won, among other distinctions, a silver medal at the Bordeaux Exposition and a First-Second prize in the Grand Prix de Rome. Professor Martin has been closely identified with the administrations of Professors Trowbridge and Van Pelt, and has worked thoroughly in sympathy with them in the building up of the new curriculum. It is expected, therefore, that the College of Architecture will continue along the lines already established.

The School of Architecture at Columbia University reports the number of students enrolled at the beginning of the year as 78, of whom 35 are regular undergraduates, 15 specials, 4 students from other parts of the University pursuing partial courses, and 4 are post-graduate students, candidates for higher degrees. This registration is somewhat below that of last year.

In reply to and by way of comment upon suggestions received from twelve New York architects upon the invitation of the trustees, and by them referred to the Acting Head and Staff of the School, a comprehensive report upon the reorganization of the curriculum and changes in the methods of the school was made to the trustees in March. This report is still under consideration by the Board, and until they take action upon it, probably in November, it will, of course, be impossible to give out the substance of the changes recommended. So far as could be done without the action of the Board, the courses and methods of the school have been already modified in the direction of greater emphasis upon freehand drawing and design, and upon the professional relations of the school. The division of the course into "years" or year-classes is being gradually done away with, together with the tradition that a student must graduate four years after entering, and is to be blamed or pitied if he fails to do so. The "Announcement" or Bulletin of the school states that the course is "of indeterminate length." A student graduates when he has done all the work required in a satisfactory way, without regard to the time consumed in doing it. The "summer work" has been made more practical and definite in character, each student being required to spend one month in an office or in equivalent draughting work, to work out one rendered design from a given programme, and to write an essay or make a series of measured drawings, as he may elect, subject to official approval.

The Columbia Fellowship was won by Herbert Van Wagenen, of the Class of 1899. Since the retirement of Professor Ware there have been no changes in the staff of the school.

The Department of Architecture of the University of Pennsylvania reports an enrollment numbering 106 students this year, showing a growth in recent years from an average of 55, prior to 1902-3, to 65, 85 and 106. It has enlarged quarters, now occupying the third floor of College Hall, the principal University building, a suite of fourteen rooms, and there is a movement, now well under way, to secure $500,000 for a new building, to be complete in its provision for the most advanced type of instruction in architecture.

There has been established, for local architects and "principal" draughtsmen in charge of designing, a plan for the study of design under the criticism of Professor Cret, with the full resources of the school at command. In order that the members of the atelier thus formed may secure its advantages without any feeling of constraint or loss of dignity, its work is conducted in quarters set aside for the purpose, criticism is rendered any weekday afternoon but Saturday, in the hour between four and five, and studies may be developed for criticism, either at the office of the member or at the University, where the library is available. A small fee is charged to cover incidental expenses. In the Summer School is offered the preparation necessary to college graduates wishing to take the Degree in Architecture by two years of work, and to draughtsmen who desire to study design at once without entering the special course. The following changes in the corps of instruction have taken place, viz: Professor Dana's resignation to the honorary Professorship of Art, after fourteen years of generous and highly valued service; Mr. McGoodwin's withdrawal to accept an instructorship in the Architectural Department of Washington University, his place being taken by Mr. Philip R. Whitney, a graduate of the Massachusetts Institute of Technology in 1902, and Mr. Thomas Nolan's promotion to an assistant-professorship. The first holder of the University Fellowship, Midgely Walter Hill, has completed, and the second, Luther Morris Leisenring, has begun, the required year of foreign travel and study.

The Department of Architecture at Harvard University has begun its work this year under favorable conditions. The total number of students in the department this year is 122, as against 117 last year. During the summer, important additions to the collections were set up in Robinson Hall, including a number of ancient fragments of great interest, secured in Rome, and a full-size model of one corner of the Temple of Niké Apteros, besides a number of unique Greek casts.

The most noteworthy event to be recorded is the establishment by Charles F. McKim, in honor of his wife, of the Julia Amory Appleton Fellowship in Architecture of the annual value of $1,000. Mr. L. P. Burham was appointed as the first holder of this fellowship, and will spend the winter at the American Academy in Rome. The Appleton Fellowship and the Robinson Fellowship will now be offered in alternate years, and will usually be held for two years.

At Syracuse University, the space assigned to the Department of Architecture has been somewhat enlarged; the Architectural Library has been added to and the Faculty of the course has been strengthened by the addition of a professor in water-color sketching and rendering. This professor has just returned from a year's study at Paris. There are thirty-four students registered in the course this year, an increase of two over last year. There were nine graduates last year.

Besides the professional schools at the Massachusetts Institute of Technology, Cornell University, the University of Illinois, Columbia University, the University of Pennsylvania, Harvard University, Syracuse University, Washington University, St. Louis, and the University of California (to name them in the order of their establishment). The Society of Beaux-Arts, Architects, in New York, has for some years, established competitions in design for draughtsmen, and maintained ateliers in New York. Opportunities for more elementary studies have also been offered in the Pratt Institute, in Brooklyn; the Drexel Institute, in Philadelphia; the Armour Institute, in Chicago, and by several schools of correspondence, especially by the International School, of Scranton, Pa., and the Armour School, at Chicago. The usefulness of the Brooklyn and Chicago schools is necessarily limited to these cities, but the competitions of the Beaux-Arts Society are open to draughtsmen in any part of the country. The number of students who take part in these competitions is much gerater than those of any single architectural school in the country, and the amount of work done by the students, although entirely night work, compares favorably in amount with that of other institutions. Up to September 1, last, 238 students had submitted work, of whom 113 were new recruits. Of these men 136 are residents of New York, and 102 are members of various ateliers in other cities; 184 of them have rendered finished drawings, 80 of these being new students, and 104 old students.

Besides the work in the city of New York, conducted by the ateliers of Henry Hornbostel, Donn Barber and Frank E. Perkins, there are ateliers in other cities, as follows: In Washington, D. C., atelier of Theodore Pietsh; in Philadelphia, the atelier conducted by Professor Cret, of the University of Pennsylvania; at Chicago, Ill., the atelier of B. E. Holden; at Baltimore, Md., the atelier of B. P. Tuzo; at Rochester, N. Y., the atelier of C. F. Bragdon, and at San Francisco, Cal., the atelier of C. P. Weeks. Besides these, designs are sent in from the Washington University, St. Louis, under the direction of Professor Mann; and from the Rhode Island School of Design, Providence, R. I., under the direction of Professor E. B. Homer.

The Beaux-Arts Society Scholarship, with a value of $2,000, has been awarded for the first time this year to George A. Licht, of the atelier Freedlander, New York.

It is obvious from the above that the Society of Beaux-Arts Architects is doing an important work in architectural education, especially for the very large class of young men who, from their circumstances, are unable to attend the regular schools. A similar class will be reached at an earlier stage of their career by the correspondence schools, which are planning to add better-organized courses in architecture to their curricula. Excellent text-books in the elementary studies of the orders have already been published by these institutions, and they ought to be able to assist in raising the standard of admission to the regular professional schools.

The American Academy in Rome, which was incorporated in June, 1897, under the laws of the State of New York, bids fair to become the culmination of architectural education in this country. Hitherto the policy of the Academy has confined its advantages mainly to the holders of its special scholarships, but Mr. Breck, of New York, the distinguished painter who has recently been appointed to the directorship, has been authorized to extend the advantages of the Academy as far as possible to properly accredited students, and the trustees hope that the

Academy may become the recognized center for holders of architectural fellowships from the principal architectural schools of the United States. This should add enormously to the usefulness and prestige of the institution.

The Academy at present still occupies the Villa del'Aurora, but the generosity of one of the trustees has enabled the Academy recently to purchase the Villa Miarfiori, which will therefore become its permanent home. The building is situated a short distance outside of the Porta Pia. The building is large and the grounds are spacious. There are at present five regular students at the Academy, with a certainty that this number will, within a short time, be increased to twelve. There are also a number of students not regular members who are allowed the privilege of the drawing-room, but do not reside at the villa. During the winter an exhibition will be held at the Metropolitan Museum of Art, in New York, of the work of students in the Academy. It is hoped that the American Academy may shortly secure national standing. In 1901 the Secretary of State of the United States authorized the American Ambassador at Rome to accept the position of Trustee *ex officio* of the Academy, and directed him to secure for it all the privileges and exemptions that are accorded by the Italian Government to like institutions in other countries. A bill to incorporate the American Academy in Rome, under the laws of the United States, has already passed the United States Senate, and it is confidently expected that the House of Representatives will shortly take favorable action thereupon.

Respectfully submitted,
For the Committee,
H. LANGFORD WARREN,
Chairman.

CHICAGO LETTER.

LAST YEAR'S WORK.—THE MARSHALL FIELD ADDITION.—THE FIRST NATIONAL BANK.—THEODORE THOMAS'S MUSIC HALL.—THE FREIGHT SUBWAY.—DIFFICULTIES IN THE WAY OF A PASSENGER SUBWAY.—SUGGESTED GROUPING OF ALL RAILWAY STATIONS.

THE closing of the year 1904 brings us to the point when retrospection is an interesting act, for in the year that has just passed we see one of unusual prosperity for Chicago. Few years have shown equal activity in building lines, and only twice in the history of the city have the totals exceeded those of the year which has just closed. The permits for building during the last twelve months have amounted to 7,131, with an outlay of $44,543,090, while in 1903 there were only 6,135 permits, with an expenditure of $33,645,025, showing an increase of nearly eleven millions spent in building over the amount spent in the year preceding. Reliable trade journals report unusual activity in manufactured building materials. The steel industry has not been in such a healthy condition for several years as it is to-day.

A curious little experience has recently shown how our home products are appreciated abroad. One of our hardware firms, that of Orr & Lockett, have recently sent a three thousand dollar order of builders' hardware to China, to be used in the palace of the viceroy.

Many large buildings in the down-town district are now in process of construction, notable among these being the Rector Building, Republic Building, Buck and Rayner Building, Chapin and Gore Building and the Heyworth Building. In all the big down-town structures it absolutely now seems that, to look at them from the standpoint of the architect, there was little to admire, in fact, little of his work to discover; but that to the engineer belonged all the consideration. Chicago's utilitarian instinct is painfully, perhaps wisely, noticeable when it comes to the matter of sky-scrapers.

Marshall Field is about to add a new "quarter" to his already huge structure. Prints of this new portion were published in one of the local papers a few days ago, showing the elevation to be very similar in character to the last part recently erected. This portion of the great emporium is most admirably arranged, and suited to its purpose, but on the exterior is without any marked architectural features, being chiefly a solid, honest wall pierced with windows. This fact was especially emphasized by the fact that the print of the prospective building was published in one of the local papers upside down, and probably not one person in a dozen noticed the mistake. Though similar in outward appearance, the new portion will differ in the interior from that most recently erected in several very practical and, for this part of the country, new features There will be three basements, in which will be situated salesroom, shipping-room, mechanical plant, receiving-rooms, etc. The subway floor will be on a level with the Chicago subway tracks. The foundations will extend sixty feet below this level, or one hundred feet below the sidewalk line. To make all this underground life possible, a most thorough system of ventilation will be installed, which will come nearer, it is said, to solving the ventilation problem than has yet been done. Combined with this will be an equally elaborate system of drainage. The shipping-room will have the best possible equipment for handling the thousands of packages which go out of this great place daily. There will be elevators for lifting the vans and horses or electric vans directly from the shipping-rooms. The first basement will be devoted to salesrooms, materially enlarging the present basement, which already is claimed to be the largest in the world. The work for this mammoth basement is to be begun while the old building still stands and is occupied; in fact, so much of the foundation will be laid under the present building that when that is torn down the actual work on the new building above ground can be commenced with but little delay. With such feats as this, it is no wonder that Chicago's enthusiasm for the engineer is great.

Mandel Brothers, not to be outdone by their rival, Field, will undertake extensive additions to their already large store early in the present year.

One of the finest and largest structures which has been completed this year is the First National Bank Building. This building has been erected in sections, in this way holding on to many of its tenants, who preferred to suffer some inconvenience rather than be subjected to the still greater one of hunting up a new abiding place. The bank proper is just now having the finishing touches put to it; the first portion finished is being cleaned to match the white portion just completed.

The exterior of the building is without any special architectural feature other than those which must of necessity be present in every building; but in the interior the bank itself is not without much dignity and elegance, and is, unquestionably, the finest banking-room in the West—some say in the United States. Entering from Dearborn street, through an entrance which has not yet been turned over to the public, a large central rotunda extending through several stories receives the visitor. This rotunda is entirely faced with white marble, treated in the most severe manner. Pilasters extend from the floor to the ceiling, the last story being arcaded, with marble balustrades between the pilasters. In this rotunda are located many of the desks of the Bank's corps, and the appointments and furnishings of these desks are kept most simple in treatment. A green marble shelf runs around under the openings at the desks. The mouldings are all very simple in character, as well as all the metal-work, which harmonizes with them in this particular. The bronze grilles, the electroliers, etc., are all of classic simplicity, and have much of dignity about them.

Two large niches or alcoves, faced with white marble like the rest of the rotunda, are at either side of the Dearborn street entrance-door, the exact use of them having not yet been shown to the public, as they are not entirely completed. Possibly they will hold large electroliers or some still more decorative feature. From this central portion access is given to two large side wings, one facing on Dearborn and the other on Monroe street. These wings are similarly treated in white, plaster being here substituted for marble. The ceiling is in classic caissons. A second entrance at the back of the Monroe street side affords ample accommodation for entrance and exit to the crowds during the rush hours. The white marble stairs for this entrance are within the bank precincts proper, and are made an architectural feature by the white marble seat which surrounds them in place of balustrades, their newel-post transforming itself into a portion of the arm at the end of the seat.

One well-designed feature is the mahogany standing-desks through the central rotunda. The ends of these, as well as the mahogany settles, being similar in design. With almost no marked decorative feature in the way of color scheme, the whole interior is dignified and impressive from its size and simplicity. The Monroe street entrance has a similar white marble treatment, but is cheapened by the cigar-stands, etc., which have been permitted in it, as well as by the very commonplace transparency, bearing the legend, "First National Bank," over the entrance to the marble stairs before alluded to.

All Chicago has been filled with sorrow over the death of Mr. Theodore Thomas, leader of the Chicago Orchestra. It has seemed especially sad, coming, as it did, when Mr. Thomas had realized his long-cherished wish of having a permanent home for his orchestra. He had only conducted one concert in Music Hall when his fatal illness occurred.

Music Hall is situated nearly opposite to the Art Institute, but a little to the south. It is a comparatively low building, the upper stories of brick being essentially Colonial in style, while the two lower ones, of stone, run into more French Renaissance lines. If it were not for the names of composers above the second story, one could easily imagine it was some down-town apartment-house. Passing through a small but pleasing vestibule, a very narrow foyer is reached, leading directly to the last row of seats in the parquette. Those holding these seats complain bitterly of the wintry draughts after their comfortable quarters in the old Auditorium. On entering the hall proper, the first impression is one of uncomfortable oppression, caused by the very low balcony, which extends over a third, possibly over a half of the space occupied by the parquette. This arrangement, which is most inartistic and unsatisfactory in every way, was evidently adopted to obtain greater seating space where space is so much needed.

In the memorial services held for Mr. Thomas, hundreds of subscribers to the building fund were unable to obtain admission to the building, and consequently the concert was repeated in the old, comfortable quarters at the Auditorium. Every available inch of room for seating purposes is used, the front seats being so near the platform, when the musicians are seated, that a sight of them is next to impossible. The pitch of the galleries is almost unpleasantly steep, but by this means the greatest amount of seating room is obtained.

The rent of the Auditorium has been a great burden on the orchestra organization, each year there being a deficit which public-spirited citizens had to make up. So it was decided that a special building should be erected for Mr. Thomas and his orchestra, and subscriptions were forthcoming from all quarters of Chicago—large ones from rich men and small ones from poor ones. And now we have a building so cramped in its proportions that it is hardly large enough to contain the holders of season-tickets, and those by no means always in comfortable places. The lover of music who can only afford to go occasionally, can only do so by securing his seat three weeks in advance, and then is only able, usually, to secure an undesirable one. It seemed a great pity, when Chicago subscribed so liberally to this building fund, that it should not have had an alternative opportunity to subscribe to a guaranty-fund to keep the orchestra in its old quarters, where there was room for everyone who cared to listen to these beautiful concerts.

It was said the acoustics of the Auditorium were not absolutely perfect, but where do we find many buildings that this could be said of? The musical critics, writing in the local papers, have found the new hall far from perfect, but whether Mr. Thomas himself was disappointed in this respect the public does not know, as he was seized with his last illness almost immediately after his first concert. The stage for the musicians looks especially cramped, after their generous quarters on the Auditorium stage, and though the background is certainly more artistic than that ugly old setting endeared to us by pleasant associations, still the arrangement here looks uncomfortable. Three tiers of seats, built like an amphitheatre of classic times line the back of the stage, the organ rising in turn behind them. In their old quarters, the musicians had no suitable retiring-rooms, which was a source of considerable discomfort to them, while in this building that trouble is obviated, as there are ample rooms for their accommodation at the rear of the stage.

In speaking of the Marshall Field plans, mention was made of one of the basements being on a level with the subway. Many people will hardly notice the small item, and do not at all realize that Chicago already has a subway twenty-four miles long, which has been in the process of construction for several years, and which, when completed, will have a length, thirty-one feet below the surface of the street, of over sixty miles. This subway is designed entirely for the transportation of freight, which, it has been estimated, after the road is completed, will amount to over fifty thousand tons daily. When in full running order, the road will have three thousand cars, all small affairs and hauled by one hundred and fifty engines of simple construction. Thirty-eight lines of railroad enter Chicago, and this subway will be operated between their freight and other depots. In this way everything, from coal delivered to ashes taken away, can be handled underground from the large downtown buildings, thus most materially lessening the congested condition of the streets. This will be an especial relief in the wholesale districts, where much of the receiving and shipping of goods has been immediately in front of the stores and directly across the sidewalks.

There are two sizes of tubes in the subway. The lines which extend beneath the principal streets are 11 feet in width and 12 feet 6 inches in height, while the cross-section lines are a trifle larger, and all are arched and laid up in concrete. The construction of this subway has caused consternation to owners and architects of high buildings in its immediate vicinity. Although the promoters have vigorously denied that they were the guilty parties, yet unexpected and inexplicable settlements and cracks, necessitating the use of jack-screws, have made owners more than suspicious that the effect of working below on treacherous soil has produced this result.

Chicago is desirous of also having a passenger subway, and Mr. August Belmont, thinking of our lack of rock and New York's superabundance of it, remarked that "compared with the task which confronted New York, Chicago's problem of constructing a passenger subway will be like boring a hole through cheese." However, this is hardly the case, and such a bore made under the downtown district is said to contain more problems for the engineer than work of any similar nature in the country. Chicago's foundation problem is a serious one always, owing to the peculiar physical composition of the soil. As is universally known, but often forgotten by the average citizen, under all of Chicago is a stratum of soft, oozy clay, which holds water like a sponge. On this clay the lighter business block, not the sky-scrapers, rest on wide pyramidal foundations. In excavating for a subway, which would have to be at least twenty-five feet below the surface, miles of this spongy, oozy soil would be opened up, and with the immense weight of the buildings upon it would result in squeezing out of it so much water as to materially lessen its bulk, on which the foundations rest. This could only result in dangerous settling of buildings. Mr. George W. Jackson, engineer of the construction work of the Illinois Tunnel Company, is reported as saying:

"To guard against the danger, an elaborate system of bulkheading would have to be used. It would be necessary before touching the work of excavation to construct along the route of the proposed bore, on both sides, a waterproof wall from grade level to a point several feet below the proposed lowest point of the subway.

"This wall would be what, in the engineering world, is known as sheet-piling, consisting of huge plates of steel attached to supporting piles driven into the ground in the same manner that ordinary wooden piles are driven for foundations. The plates would overlap and fit together in such a manner that little or no water could ooze between them. With this safe-guarding wall in place, the work of excavating would begin, and the piling would be held in place by braces until the masonry work was completed. The expense of this system of construction would be much greater than if the bore had to be blasted out of solid rock."

With all these possible and actual changes underground, there is much talk of a great change in the setting of one of Chicago's most prominent features—its railway service. Situated, as Chicago is, in the center of a vast country, the transfer of passengers, baggage and mail from eastern to western roads and vice versa from the different stations in various parts of the city is a decided problem. Chicago railway traffic is too great to permit of any Union Station. Mr. F. A. Delano, former general manager of the Chicago, Burlington & Quincy Railroad, has carefully worked out a scheme, which, though colossal, certainly appears practicable. In outline, Mr. Delano's plan contemplates the erection of five stations, each one block in width, between State street on the east and the river on the west. The idea is to erect these stations on Taylor or Twelfth street, the street selected for the site to be widened into a boulevard of generous width. In this way all the roads which enter Chicago would have their terminals side by side. If the site at Twelfth street were selected, the railroads would utilize the territory bounded by State street, Twelfth street, the river and Sixteenth street. The channel of the river could be straightened between Twelfth and Sixteenth streets, thus giving ample space for the five stations, which should extend west from State street, while space could be reserved west of the river for a sixth, when it should be required. Not only are the present six terminals most inconveniently situated as regards one another, but their surroundings are such as to give a most unpleasant impression to anyone entering Chicago.

One feels, if Chicago push were allowed full swing, that even a native-born, after a few months' sojourn away from the city, would hardly be able to recognize it. It has even been advocated that a change in the position of the mouth of the river might be a good thing, artificially carrying it a mile farther north. Much of this reminds one of the block village wiped off from the floor by a child's hand, and "now let's begin to build it all over again." In the meantime we have our same dirty old streets, our same dirty old atmosphere.

STREET ARCHITECTURE[1]—II.

THIS suggests another question as to the best way of laying out street architecture on a general scheme. Should it be treated as one whole—a single design to which every builder of a part must conform, or is the building line to be the only rule to which every one must work, all else—style, scale and architectural treatment—being left to the individual taste of the several builders? Is the architecture of the street to be individual or collective, accidental or regular? There is much, no doubt, to be said for either alternative. If we recall to memory the streets that have delighted us above all others in our travels, I fancy the picture that will rise in the mind's eye of most of us will be the street irregular, winding perhaps among the magpie black-and-white houses of Shrewsbury, or the carved and overhanging timber fronts of Hildesheim which seem almost too quaint to be off the stage of a theatre; or the High street of Oxford, with its stately series of colleges and churches set off by the more modest buildings that serve as a foil to their beauties; or the arcades of Bologna and many an old Italian city; or the shadowy eaves of Berne and Lucerne; or Lisieux with its slated house fronts; Caen and Rouen; or such streets as abound in the old cathedral and county towns of England, with fronts of mellow brick or hoary stone, and here and there a glimpse of a trim garden or masses of foliage from overhanging trees—these are the streets we love and of which we cherish the memories rather than the formal splendors of modern improvements. But these streets that we love are not to be had for the asking. They are the outcome not of design but of accident. They are the creation of individualism, of each man's desire to house himself according to his own taste, and so each house has in its degree an historical interest. The result is not so much architectural as picturesque. The Strand of three or four years ago was, and the western part of it still is, a street of this kind, eminently picturesque, deriving its interest from variety of color, sky-line and height, all combining when seen in perspective into a certain agreeable confusion and intricacy of detail that was pleasing, although when one came to examine the buildings severally, except the few that had survived from the seventeenth or eighteenth century, there was hardly a good one among them. Such a street cannot be designed, it must come of itself, and it requires time and weather to ripen it to perfection.

But the new Strand cannot wait for time and weather; the buildings along the new frontage have begun to rise and will continue to spring up with magic rapidity. The north side of the street will soon be lined with buildings of some kind or other, and the question is whether they should be drilled into regularity as was done in the case of Regent street and the terraces on Crown land facing the Mall and those in Regent Park, or else be left to the individual taste of the owners, subject only to their satisfying the taste of the County Council. The latter is the plan proposed at present, though perhaps it is not too late to revert to the other should it be thought desirable. I confess to regarding the unrestrained or practically unrestrained genius of the commercial architecture of to-day with misgiving. If we may judge by what is now going on in the Brompton-road the result will probably be a competition in which every house will try to outshine its neighbors by cramming on more ornament, overpowering it in splendor, and overtopping it in height. Better far than this the monotony of Gower street or the unloveliness of Wimpole street—but the days for sober building of that kind it is to be feared are gone forever. The tide of self-advertisement is rising; it has risen high enough to capture the last stronghold of journalism, and it has laid nine-tenths of our architecture at its feet. It is held that architecture to be good must be smart; art is supposed to consist in ornament, and ornament is valued in proportion to its quantity, not to its quality. Nothing has done more to help this principle into practice than the introduction of terra-cotta as a building material. After the first cost of the model, it is as cheap to cast ornamental work as plain, and as the ornamental work makes more show for the same money, there is no end to its abuse. To the fatal facility afforded by this dangerous material we owe the trimmings round door and window which have violated the respectability of Russell square, the unspeakable gorgeousness that disturbs the repose of the purlieus of Berkeley square, and the elaborate arcades and great dome that seem to ride insecurely on the edge of plate-glass windows in the Brompton-road. It is a great pity that terra-cotta should have been so misused. Properly employed as it was in many towns of North Italy, notably at Cremona and Pavia, and in the fine roundels at Hampton Court, or the tombs at Layer Marney, terra-cotta is a noble material, and when glazed it may rise to the dignity of Robbia ware. But cheap repetition of ornament vulgarizes it; when once used the moulds should be destroyed, except in case of simple mouldings, or such conventional embellishments as the egg-and-dart, or dentils, and such like simple ornaments which alone admit of repetition to any extent without awakening feelings of fatigue and disgust.

But the mention of plate-glass reminds me that I have scarcely time left to speak of what is perhaps the crucial difficulty of street architecture, namely, the shop-window. In this age of display and self-advertisement, when commercial modesty would seem to have fled like Astræa to the heavens, it is thought necessary to abolish the front wall of the ground floor, and substitute huge sheets of plate-glass behind which the wares can be exhibited in lavish profusion. There are a few exceptions, but very few. I suppose a tailor who broke out one of these large windows and displayed his wares instead of the usual wire blind would lose his customers; and now and then one finds a shop deliberately retaining the modest window and small panes of 50 years ago, and I think one always feels instinctively that the wares in that shop must be above the average. But the rule is the other way. These open shop fronts have come—as the slang phrase goes—"to stay," and architects will have to reckon with them just as the sculptor has to reckon with the modern trousers and frock coat, which cause him equal distress and perplexity. Accepting, then, the great plate-glass ground floor as inevitable, how are we to treat it architecturally so as to make it tolerable, of if possible more than tolerable, actually an element of beauty in the façade? For it ought to be possible to do this if it is one of the glories of architecture, as we believe, to accommodate itself to circumstance and necessity, and not only to construct suitably, but to satisfy the eye and give pleasure by expressing the conditions of the construction.

This, then, is the problem. The ground story must have no front and no partitions and no supports except against the party-wall on either side; but the upper stories must be enclosed for habitation and be divided by partitions into rooms. The whole mass of this upper part, sometimes of enormous height, has to rest on an iron girder at the ceiling level of the ground story, a girder which has no supports but an iron stanchion at each end. How are we to treat this on the orthodox principle of architecture should be the expression of the construction, when the real construction of such a building has so little with which to appeal to the eye? It may, of course, be argued that the old construction with piers and arches satisfied the artistic sense and pleased the eye because we knew from experience that it was sufficient for support, and that when we find from experience that two steel stanchions and a beam across them will do as well, our artistic sense will, or should, adapt itself to the new conditions, and rest equally satisfied in them. This is, no doubt, a hard saying, but yet there is truth behind it. To bring this construction within the domain of art it is only necessary that it should be visible. What support there is must be seen, for art only deals with what meets the eye. It will not satisfy the artistic sense to know that the support is there unless it can also be seen, and then the eye, appreciating the difference between the properties of iron and those of brick and stone, may learn to be satisfied, and admit the novel construction into the domain of art. There seems no reason why the stanchions and bressummers should not be shown and treated architecturally. But so far from this being done now, the practice is to hide them carefully as if there were something disgraceful in being obliged to prop the upper stories, and the necessary columns or stanchions are either concealed behind stone facings to give a fictitious appearance of stone construction, which, if real, would be wholly unequal to its apparent duty, or else they are encased in mirrors which prevent their being seen at all. So long as the building appears to be supported on the edge of its plate-glass shop-front its architectural redemption is past hoping for.

The same inconsistency prevails in the upper stories. The solid lower story is done away with to suit a novel requirement. But the builder puts above it just the same upper stories that would have been there if the lower part had been built in the old way. This cannot be right; so radical a change in the supports ought to affect the character of the whole elevation. We cling to the old traditions in one part though we abandon them in the other, and the result is ludicrous when it is not offensive. What can be more ridiculous than the oriel-window we often see insecurely balancing itself on the middle of a girder? These features belong

[1] Extracts from a lecture by Mr. T. G. Jacson, R.A., before the Society of Arts, and published in the Journal of the Society. Continued from page 32, No. 1518.

to the old way of building, and have no place in the new. Till we recognize this and make up our minds that if we accept the new mode of construction by iron we must break definitely with the traditions of brick and stone, there will be no hope for us.

The best solution I can suggest is that as the lower story must be of iron construction the upper stories should be so too, as far as is consistent with their purpose. To manage this we must start with a full recognition of the difference between the properties of iron or steel and those of stone or brick. The strength of masonry or brickwork, setting aside the cohesion of mortar, which should be regarded rather as an accessory, consists in its weight and its resistance to downward crushing loads. If exposed to lateral force its stability depends either on its *vis inertiæ*, or on the equilibrium of forces acting in opposite directions. It has no tensile strength and no elasticity, or very little, and the only lateral tie it has to depend on is that of the bonding or interlacing of the stones or bricks that compose it. Contrast this with the methods of carpentry. Timber construction has all the properties that are wanting in masonry or brickwork. It has tensile strength and elasticity, and it can be framed so as to tie the fabric securely together. Good carpentry hangs together by its joints and framing, and will submit to considerable distortion before it gives way. The half-timbered houses of England and France afford many instances of this; they are often out of the perpendicular, leaning forward, falling backward, or inclined sideways, and yet, so long as the timber is sound and the tenons hold, they remain secure.

This half-timber construction, be it observed further, is a reversion from arcuated construction—it is in the literal sense of the word a *trabeated* style—a style of posts and beams quite as much so in its own way as the Parthenon and the older buildings that preceded it, and reproduced in stone the elementary forms of wooden construction.

Now, in these half-timbered houses I think we may find a suggestion of what might be done in the way of construction with iron and steel. Iron construction, after all, is very like carpentry. It is a trabeated style. It has the tensile strength, the rigidity and the elasticity of timber, but in a superior degree, and it hangs together by its joints, cleats and bolts, much as carpentry does by its tenons and mortices. Just as the half-timbering forms the skeleton of a Surrey cottage or a Shropshire mansion, which is filled in with the flesh and skin of brick nogging or cob and plaster, so might a skeleton of iron framing contain a similar wall-veil or curtain to make the interior of the upper floors habitable.

Let us imagine, then, the street front of a row of shops below with several stories above. The supports of the great bressummer would be exposed to view, made preferably of cast-iron, and between them, not as now in front of them, would be the great plate-glass screen enclosing the shop. The bressummer itself would also be exposed to view, protected by some salient feature to throw off the wet, and thus the eye would be contented by the exhibition of the supports. The upper stories would be formed by a skeleton of iron or steel, filled in with brick or stone, but showing itself on the surface just like the half-timbering which was its precursor. The strength of the building would consist in this framing, and the filling-in might, therefore, be only so thick as was necessary to secure an even temperature in the rooms. Probably two four-and-a-half-inch walls with bonders and a hollow space between would suffice, the inner lining being contrived so as to cover the iron frame and prevent mischief from condensation. The interior partitions would, of course, be formed in the same way and the floor would naturally be constructed of iron and concrete. Following again the precedent of half-timbered houses, the upper floors might be made to overhang by projecting the joists of each story successively beyond the face of that below. In this way I can conceive an admirable effect being produced. The filling-in might be either plain or modeled with plaster in relief, or faced with glazed bricks or colored terra cotta, or decorated with sgraffito, or treated in a dozen different ways suitable to the embellishment of plain surfaces, for, let us hope, there will be no oriel-windows hanging in air, nor any fantastic freaks such as we are now suffering from.

M. Viollet-le-Duc in his lectures on architecture—lectures which, like the Verrine orations, were written but never delivered—has several sketches for construction with iron supports. Some of them are suggestive, but the majority seem to cling too closely to the Gothic art he loved, to be pleasing in combination with the new principles he is advocating. Gothic vaults of masonry, springing from stone capitals which have no columns below them, but are supported by inclined struts of iron projecting from a distant wall, do not impress one favorably, nor does there seem any object in retaining the Gothic vault at such a sacrifice. But he shows a street front constructed somewhat in the manner I have described, which commends itself at once as sensibly contrived.

Whether or no anything of the kind has ever been built I cannot say. It seems to me an experiment that would be most interesting and instructive to carry out.

Whether this iron construction will prove durable or not is another question. One has been told that the life of a girder exposed to changes of temperature is not more than that of a generation. It depends a good deal on the thin skin of paint that protects it. What will happen in the inside of box-girders that can never be painted remains to be seen. What will happen in case of a great fire is also a grave question. But, after all, these buildings are not intended for immortality; if they last for a generation it may be enough. The constant changes that London undergoes make doubtful the permanence of anything one does. A house I built in Dover Street some seven or eight years ago has been already pulled down to make way for a station on the Tube railway. The great mass of Walsingham House, just destroyed, and about to be replaced by a monster hotel, had only enjoyed a life of some twenty years. It fell to my lot to demolish an expensive marble staircase and entrance hall of one of the city Companies which had only been built thirty years. Thirty years hence the new marble staircase I made in another part of the building will perhaps follow its predecessor into oblivion, and the city Company itself may conceivably have ceased to exist. The changes in London are so incessant and of late so sweeping that he would be a bold man who would prophesy a long life to any building in it whether old or new. The number of Sir Christopher Wren's fine city churches is being diminished. One by one they are being pulled down and their sites covered by banks and offices. Huge piles of chambers cover what ten years ago or less were the pleasant retired gardens and courts of New Inn and Clement's Inn, and Clifford's Inn is doomed to a similar fate. If these monuments of architectural and historic interest are unable to save themselves why should we expect or wish for the ordinary shop front more than an ephemeral existence?

But though street architecture may be evanescent, the streets themselves—at least the more important of them—will probably continue to run on their present lines more or less, and if, as now happens, any great innovation has to take place it is important that the new lines should be properly laid down.

ILLUSTRATIONS

Hall of the National Geographical Society, Washington, D. C. Messrs. Francis R. Allen and Charles Collins, Architects, Boston, Mass.

The Danielson-Lincoln Memorial Library, Brimfield, Mass. Mr. Edwin J. Lewis, Jr., Architect, Boston, Mass.. Two Plates.

House of James H. Proctor, Esq., Ipswich, Mass. Mr. Ernest M. A. Machado, Architect, Boston, Mass.

House of Richard S. Russell, Esq., North Andover, Mass. Mr. Ernest M. A. Machado, Architect, Boston, Mass.

Chimneypiece in House of Paul Tuckerman, Esq., 115 East 69th St., New York, N. Y. Messrs. Hoppin, Koen & Huntington, Architects, New York, N. Y.

House of Daniel R. Craig, Esq., Wellesley, Mass. Mr. Willard D. Brown, Architect, Boston, Mass.

The Heinemann Picture Gallery, Munich, Bavaria. Herr Emanuel Seidl, Architect.

When we selected for republication from the last issue of *Blätter für Architektur* this interesting façade, we considered it a rather happy chance that we should be able to place before our readers one of the latest pieces of work of a man who was elected, last month, an Honorary Member of the American Institute of Architects. But, on consulting the record, we find that the new member is not Emanuel Seidl but Gabriel von Seidl. Fortunately the fact that of two Munich architects—brothers, we presume—one has been granted the nobiliary *von* does not at all detract from the architectural value of the design here shown.

Additional Illustrations in the International Edition.

Detail of Central Doorway: Church of St. Bartholomew, Madison Ave. and 44th St., New York, N. Y. Messrs. McKim, Mead & White, Architects.

Detail of Left-hand Doorway of Same Church, Showing Sculpture by Mr. Herbert Adams.

The American Architect and Building News

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CONTENTS

IT is interesting to note that Senator Fairbanks, who has always been credited with being a very shrewd politician, seems already to be getting into line for the next presidential election by making himself the champion, in the Senate, of the omnibus Public Buildings bill that has been prepared in the House. This bill, which appropriates nine and one-half million dollars, has been very cleverly designed for political, among other, purposes, since it provides separate appropriations for the largest possible number of the smaller class of public buildings, the work topographically so distributed as to do the most good. This sort of a measure we thoroughly believe in, and we hope it may pass both chambers, no matter whose political career may be benefited by such passage. Not only the people, as President Eliot lately said, do take an owner's interest in the public buildings, but, now that the artistic quality of the Government's architectural achievements is so much superior to what it was even fifteen years ago, it is of distinct educational and artistic benefit to a community to have set before it as a standard one of the smaller but well-studied buildings that are produced alike by the Supervising Architect and by private practitioners.

FEW official positions are beds of roses, and city building inspectors, however actually designated, are no more happy in their lot than other officials. The head of the New York Department of Buildings is just now in trouble because it has been discovered that a certain newspaper in which he has in some degree an owner's interest has been benefiting by money paid for city advertising. The paper is a small affair, and possibly may never have paid a dividend, so that Mr. Hopper might easily have forgotten he owned any of its stock. But, as facts seem to be, he is placed in a position where his resignation might easily be exacted. At the same time the head of the Boston Building Department is confronted by the renewed demands of Mr. Fitzpatrick, for a long time one of the inspectors in the Department, that the former's official conduct shall be carefully inquired into. We referred to the matter at the time the charges—very definite ones—were first brought, and now that they are, so long afterwards, once more pressed on public attention, we cannot but feel that Mr. Fitzpatrick and his allegations should be honored with a careful hearing. The Mayor of Boston is evidently of a different belief, because it is his implied refusal to take action on Mr. Fitzpatrick's first complaint which now induces the latter to place a second petition before the Board of Aldermen.

IT is pleasant to know that some of the Allegheny, Pa., County Commissioners take an enlightened view of the proposed defacement of Richardson's court-house by the suggested alterations. One of them, Mr. James A. Clark, advises the acquiring of the territory bounded by Diamond, Grant, Fourth Avenue and Ross Street and building thereon a new county court-house large enough for present and future needs, retaining the present building in temporary use for minor offices until the city of Pittsburg, which is in need of a city-hall, can be induced to purchase Richardson's building for such use. The present building could easily and inexpensively be rearranged internally for use as a city-hall and, as the suggestion is economically sound and would cause the preservation of Richardson's work, we hope the architects who are banded against the alteration of the present building may find reason for taking up and promoting Mr. Clark's scheme.

NEW YORK CITY, having at length accomplished some things of magnitude commensurate with its commercial and civic importance, seems to be affected just now by the same sort of exhilaration that, in the past, has enabled Chicago to develop in so wonderful a way. Having recently twice bridged the East River, having at the moment several tunnels in process of construction under the North River, and having a considerable section of the Subway in successful operation and new lines in process of development, steps are now seriously being considered that will provide for the removal of the surface tracks of the New York Central Railroad over which freight trains now pass along the length of Eleventh Avenue, from Sixtieth Street to the freight depot at St. John's Park. A bill is preparing that, in return for the railroad's present charter rights to two surface tracks on the avenue and the cost of constructing a subway, provides that it shall have a perpetual franchise for two out of the six tracks the tunnel is to contain, and shall pay an annual rental on the other four, over which it is to be allowed to haul both freight and passengers, instead of only freight as now. The railroad is said to be in favor of the measure; but in case it sees fit to object, within a year from the enactment of the law, the bill pro-

Entered at the Post Office at New York as second-class matter.

vides that the Railroad Commission may abrogate the present charter and the city take possession of the avenue under condemnation proceedings. This new undertaking would be not only an important but, since it would involve the question of passing over or under the Pennsylvania Railroad tunnel lines, an interesting piece of work. Moreover, it is impossible to believe that such an operation as this, which would reclaim an important avenue for general surface traffic, would not also redeem it architecturally from its disorderly and dishevelled air, and finally lead to the building and equipping of modern quais and bulkheads, furnished with as perfected appliances for loading, unloading and forwarding of freight as can now be found at Liverpool, Antwerp, Hamburg, Genoa or our own Great Lake ports.

THE plan of operations adopted by the London County Council in dealing with the last stage of the great street changes carrying out in the neighborhood of St. Mary-le-Strand has so specious an air of generosity and of intending to promote the "City Beautiful" at any cost, that it may form an attractive but none the less dangerous precedent. After betterments had been charged against the estates benefited by the changes, it was found that the owners, to get a fair income from their property, must put up higher buildings than was fair to their famous neighbors, Somerset House and the two churches in the Strand. Moreover, the County Council could not tolerate the idea that a good architectural opportunity should be marred by inartistic design. They therefore adopted a novel device in the case of the first building to be erected on the new frontage, the Gaiety Theatre. The owners were told that the design for their building must be approved by the County Council, who, of course, assumed that the theatre people, in consulting their own business interests, would spend as much money as they could afford on making the building noticeable and noteworthy. But as there was, even then, no guaranty that the theatrical war-chest would contain enough to secure to the building that degree of architectural excellence the County Council aimed at, it was agreed that if, after being satisfied that the theatre owners had done all they could afford, the County Council was still dissatisfied with the result, they should then require the design, or the materials in which it was to be carried out, to be revised to their taste and the added cost of these alterations paid for out of the public funds.

THIS experimental case called for improvements to be defrayed at public cost in the amount of twenty-eight thousand pounds, as claimed in a bill of extras; but the sum actually to be paid, as fixed by arbitration proceedings, amounts to nearly ten thousand pounds less—a conclusion not likely to be relished by the theatre owners, particularly if they have to pay taxes permanently on the enforced extra cost of the building. Moreover, there is a certain part of the public disposed to question the advisability, if not the lawfulness, of spending public funds in just this way. Supposing, however, that all parties concerned in this case, including the public, confessed themselves satisfied, some people might feel that here had been discovered and perfected a very ingenious way of bringing about desirable public improvements. But that would be a very mistaken view to take, for we believe this experiment to be a mischievous one if for no other reason than that there is no standard of performance predetermined and, consequently, the owner, whether honest or not, must prepare his design in an undesirable state of uncertainty, since he knows it must be subject to the control of official whim and caprice; further there would always be an equal uncertainty as to the architectural worth of the officially approved design since London, with the performance of Mr. Ayrtoun and Sir Horace Jones before the eye, has abundant evidence as to the uncertain quality of official taste. The situation has in it elements that suggest the notorious Westminster Chamber case in Boston. Suppose the County Council chose to suppress two or three stories of a building upon the rental from which the owner had been counting, would they, year after year, pay him from the rates an amount equal to the rental of which he had been deprived?

THE burning of the Casino Theatre in New York last week is likely to emphasize the demand for the addition of a salt-water fire supply system in that section of the city, since at the fire in question the pressure in the mains was said to be inadequate. Fortunately the fire occurred at mid-day and, though there was a large number of actors in the building rehearsing for the matinée performance, every one escaped without injury. As the building made no pretense at being fireproof, even as the word is used nowadays, having been built a score of years ago under the old and very imperfect ordinances and inspection, there might have been a large loss of life in so rapid a fire, but for the lucky chance that it broke out in the dressing-rooms, and not as is too often the case under or on the stage. Theatre-goers are to be congratulated that one more fire-trap has been put beyond the support of their patronage.

THE sudden demand for State Architects is rather interesting and deserves the attention of the interested Chapters of the American Institute of Architects, to the end that the duties of such officials, if created, may be properly described and limited. A bill creating such an office and providing a five years' term, with an annual salary of five thousand dollars, has just been introduced in the New Jersey Legislature.

THE answer made by the Minister of Instruction to certain interrogations in the Italian Chamber of Deputies does not seem to make the undertaking of the excavation of Herculaneum any more of an uncertainty than people who took the trouble to consider Professor Waldstein's suggestions must have understood to be the case. The Minister essentially admits that Professor Waldstein had justification for his propaganda, but says that, of course, the national dignity will not allow any excavations to be undertaken except under the control of existing Italian law, and by Italian authorities. That surely was to be understood. It would be, of course, a case of treasure trove where the rights of the lord of the manor, in this case the Italian government, are paramount.

HEATING AND VENTILATION*—II.

DIRECT STEAM HEATING.

DIRECT steam is largely used for the warming of dwelling-houses, both by itself and in combination with indirect heating. The first cost of installation is greater than for a furnace, but the amount of fuel required is less, as no outside air supply is necessary.

This gain, however, is made at the sacrifice of the fresh-air supply furnished by the furnace. One of the principal advantages of direct steam is the ability to heat all rooms alike, regardless of their location or the action of winds. On the other hand, the sizes of the radiators must be proportioned for warming the rooms in the coldest weather, and, unfortunately, there is no way of regulating the amount of heat in mild weather, except by shutting off or turning on steam in the radiators at more or less frequent intervals as may be required. In large rooms this may be overcome to some extent by dividing the heating-surface between two or more radiators, in equal or different proportion. In this way different combinations may be obtained by means of which the desired amount of heat may be had under nearly all conditions of outside temperature. [There are several appliances upon the market at the present time for regulating the amount of heat given off by a steam radiator, but the length of time they have been in use has not yet fully demonstrated their value and durability under practical working conditions.]

A system of direct steam heating consists of a furnace and boiler for the combustion of fuel and the generation of steam; a system of pipes for conveying the steam to the radiators and for returning the water-of-condensation to the boiler; and radiators or coils placed in the rooms for diffusing the heat.

The boilers used for house heating are usually made of cast-iron. They are made in many different forms, the smaller sizes usually having a round fire-pot like a furnace with an extended heating-surface, made up of flues, above. A water-leg surrounds the furnace, thus adding valuable heating-surface. The larger sizes are usually made up of sections, the number being varied to produce the required size. The sections are commonly of such form that they add to the length of the boiler, although in some makes they are placed side by side, thus increasing the width. In selecting boilers of the first type care should be taken that the grate is not made too long and narrow while providing the required area.

The grate of a house-heating boiler should not, in general, be over 4 feet in length, as it is difficult to properly clean and care for the fire at the rear if the fire-box is made longer. When the sections are placed side by side the length of the grate remains the same, and as the width increases extra fire-doors can be added. The sections are connected together either by internal nipples or bushings, or by outside drums having nipples connecting one section with another. Figures 1 and 2 show boilers of these two patterns. In boilers of the form shown in Figure 1 the steam space is formed by the upper part of the sections which are connected near the top by large nipples. Steam is taken off from the top of one or more of the sections, depending upon the length of the boiler. If boilers of this type are forced too hard, the steam rushing through these openings toward the outlet is apt to carry considerable spray with it unless the openings are of large size. If the boiler is properly proportioned to its work and the steam outlets are not too far apart, this type should give satisfactory results.

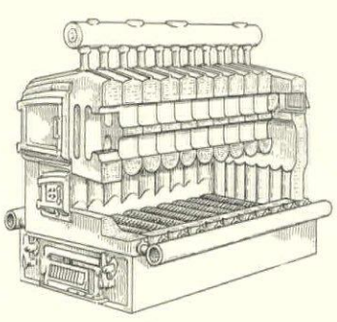


FIG. 1.

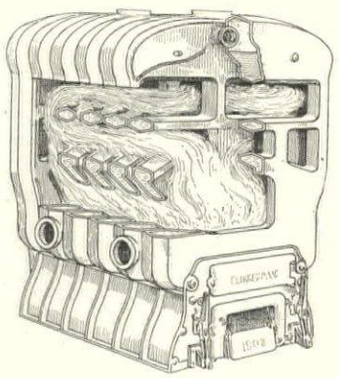


FIG. 2.

In selecting a boiler, always choose one with a generous steam space and large connecting nipples. In Figure 2 the top header acts as a steam-drum and the lower ones as mud-drums; they also receive the condensation from the radiators. Boilers of this form are well adapted for connecting in batteries of two or more, as the drums serve to equalize the pressure and maintain an even water-line in all of the boilers. In both forms the gases from the fire pass backward and forward through flues and are finally taken off at the rear. The ratio of heating to grate surface in boilers of this type ranges from 15 to 25 in the best makes. They are provided with various attachments, such as pressure-gauge, water-glass, gauge-cocks and safety-valve; a low-pressure damper regulator is furnished for operating the draught doors, thus keeping the steam pressure practically constant. A pressure of from 1 to 3 pounds is carried upon boilers of this type in dwelling-house work. The usual setting consists simply of a suitable foundation of brick or concrete and a covering of some non-conducting material, such as plastic magnesia or asbestos. Makers of different boilers publish ratings in their catalogues which are generally much in excess of their economical capacity, and it is better to compute the size of boiler required rather than depend upon published ratings. In order to do this accurately, it is necessary to know the ratio of heating to grate surface. This is given in some catalogues and can usually be obtained from any reliable maker.

In computing the required size, we may proceed in the same manner as for a furnace. For the best makes we may assume a combustion of 5 pounds of coal per square foot of grate per hour and an average efficiency of 60 per cent., which corresponds to 8,000 B. T. U. per pound of coal, available for useful work. In the case of direct steam heating we have only to supply heat to offset that lost by conduction through walls and windows, so the grate-area may be found at once by dividing the computed heat-loss by 8,000, which gives the number of pounds of coal per hour, and this in turn divided by 5 will give the area of grate required. The rate of combustion, 5, may be assumed where the ratio of heating-surface to grate-surface is not known. If this ratio is known for the boiler to be used, we may find the most *efficient* rate of combustion as follows: It has been found by experiment that a combustion of about one-quarter of a pound of coal per hour for each square foot of heating-surface seems to give the best results; so, knowing the ratio of heating to grate-surface, we may easily find the most efficient rate of combustion, and from it determine the necessary grate-area.

Example.—The heat loss from a building is 480,000 B. T. U. per hour; we wish to use a boiler in which the ratio of heating-surface to grate-surface is 24. What will be the most efficient rate of combustion, and what will be the required grate-area?

$480{,}000 \div 8{,}000 = 60$ pounds of coal per hour, and $24 \div 4 = 6$, which is the most efficient rate of combustion to employ; therefore, $60 \div 6 = 10$, the square feet of grate-surface required.

It is often desired to have the boiler so proportioned that fresh coal need only be fired twice or three times a day.

In this case it is necessary to make the grate of such size that the required amount of coal can be burned with a combustion of only 3 or 4 pounds per square foot per hour. Another method of determining the size of boiler is first to compute the amount of radiating-surface and proportion the boiler accordingly. The way to do this will be taken up a little later. In any case, it is always well to state to the makers the conditions under which the boiler is to operate, and obtain from them a guaranty that it will do its intended work in an economical and satisfactory manner. Smoke-pipes and chimney-flues may be made about one-seventh the grate-area if round, and about one-sixth if rectangular.

The radiation used in direct steam heating is made up of cast iron radiators, pipe radiators and circulation coils. Cast-iron radiators are made in a great variety of forms, varying in height and width to suit all conditions. They are made up in sections, the number depending upon the amount of heating-surface required. The sections are formed of loops connected at the bottom by special nipples, so that steam entering at the end fills the bottom of the radiator, and being lighter than air rises through the loops and forces the air down and toward the farther end, where it is discharged through an air valve placed about midway of the last section. The pipe radiator is an older form and not much used at the present time. For a given surface it is more efficient than the average cast-iron sectional radiator.

A low and moderately shallow radiator with ample space for the circulation of air between the sections is more efficient than a deep radiator with the sections closely packed together. "Two-column" radiators, so called, are preferable to three and four-column, where there is sufficient space to use them. The stand-

*Continued from No. 1515, page 5.

ard height of a radiator is 38 inches, and it is better not to exceed this if possible. For small radiators it is better practice to use lower sections and increase the length; this makes the radiator slightly more efficient and gives a much better appearance.

Wall radiators of various sizes are now quite extensively used for bath-rooms, hallways, etc., where it is desired to keep the floor free and occupy as little space as possible. The regular sizes project only 3 or 4 inches from the wall when in place. Patterns having cross-bars should be placed, if possible, with the bars in a vertical position, as their efficiency is impaired when placed horizontally.

Return-bend circulation coils are sometimes used in place of wall radiators in bath-rooms and hallways where the appearance is not of much importance. They are usually made of one-inch pipe supported on hook-plates attached to the wall.

The efficiency of a radiator—that is, the B. T. U. which it gives off per square foot of surface per hour, depends upon the difference in temperature between the steam in the radiator and the surrounding air, the velocity of the air over the radiator, and the character of the surface, whether smooth or rough.

In ordinary low-pressure heating the first condition is practically constant, but the second varies somewhat with the pattern of the radiator. In a large number of tests of cast-iron radiators, working under usual conditions, the heat given off per square foot of surface per hour, for each degree's difference in temperature between the steam and surrounding air was found to vary from about 1.3 to 1.7 B. T. U. The temperature of steam at 3 pounds pressure is 220 degrees, and $220 - 70 = 150$ degrees, which may be taken as the average difference between the temperature of the steam and the air of the room, in ordinary low-pressure work. If we take the mean of the above results—that is, 1.5, we shall have $150 \times 1.5 = 225$ B. T. U., as the efficiency of an average cast-iron radiator. A circulation coil made up of pipes from 1 to 2 inches in diameter will easily give off 300 B. T. U. under the same conditions, and a shallow pipe radiator of standard height may be safely counted upon to give 260. These efficiencies are lower than are given by some engineers, but if the sizes of radiators are taken from trade-catalogues it is not safe to go much above these figures.

If the radiator is to be used for warming rooms which are to be kept at a temperature above or below 70 degrees, its efficiency will vary directly as the difference in temperature between the steam and surrounding air. For example, if a room is to be kept at a temperature of 60 degrees, the efficiency of the radiator becomes $\frac{150}{140} \times 225 = 241$. It is not customary to consider this unless the steam pressure is raised to 15 or 20 pounds, or the temperature of the rooms varies from 15 degrees to 20 degrees from the normal. From the above it is a simple matter to determine the size of radiator for any given room. First compute the heat loss per hour by conduction through walls and windows, in the coldest weather; then divide the result by 225 for cast-iron radiators, 260 for pipe radiators and 300 for pipe coils. The result will be the square feet of radiating-surface required. It is customary to make the radiators of such size that they will warm the rooms in the coldest weather. This varies a good deal in different localities, even in the same State, and the lowest temperature for which we wish to provide must be settled upon before any calculations are made. In New England and through the Middle and Western States it is customary to figure on warming a building to 70 degrees when the outside temperature is from zero to 10 degrees below, and in some localities a temperature of 20 degrees below must be provided for.

The makers of radiators publish in their catalogues tables giving the square feet of heating-surface for different designs and heights, and these can be used for determining the number of sections required for all special cases. If pipe coils are to be used it becomes necessary to reduce square feet of heating-surface to linear feet of pipe. This can be done by multiplying by 3 for one-inch pipe and by 2.3 for 1¼-inch.

Radiators should be placed in the coldest part of the room, if possible, as under windows or near outside doors. In living-rooms it is often desirable to keep the windows free, in which case the radiator may be placed at one side. Sometimes the position of a radiator is decided by the necessary location of the pipe riser, so that one's judgment must be used in many cases rather than attempt to follow any fixed rule. This is also true to a certain extent in determining the size as well as location of radiators. For example, the radiator for an entrance-hall should nearly always be longer than computed. The outside wall-surface is usually small compared with the cubic contents, and there is always a large amount of inleakage of cold air around the outside door. The heat from a lower hall always passes to the upper, so that in practice the hall radiator should generally be made about twice the size called for by computation. It is often desirable to warm bath-rooms, sewing-rooms, etc., somewhat above 70 degrees, in which case the computed sizes may be increased from 10 to 20 per cent.

The size of boiler may be computed from the radiating-surface by multiplying its amount in square feet by its efficiency, and dividing the result by 8,000 times the assumed rate of combustion. This gives the square feet of grate-area required.

When this method is used it is customary to increase the result from 15 to 20 per cent. to provide for the heat lost from the pipe mains and risers.

There are three systems of piping commonly used for direct steam, known as the two-pipe system, the one-pipe relief system and the one-pipe circuit system, with various modifications and combinations of each.

The arrangement of piping and radiators in the two-pipe system is shown in Figure 3. The steam main leads from the top

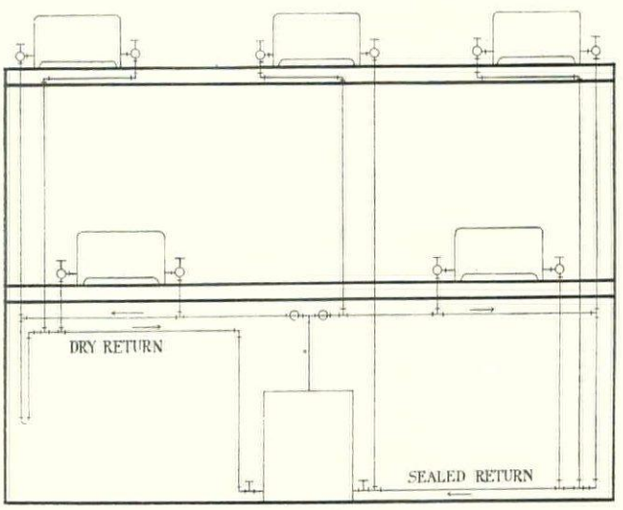


FIG. 3.

of the boiler, and branches are carried along near the basement ceiling; risers are taken off from the supply branches and carried up to the radiators on the different floors. The returns are brought down to the return mains, which should, if possible, be run near the basement floor below the water-line of the boiler.

A system in which the main horizontal returns are below the water-line of the boiler is said to have a "wet" or "sealed" return. If the returns are overhead and above the water-line, it is called a "dry" return.

A system having a wet return is, in general, more free from "water-hammer" or snapping in the pipes than one having a dry return. As the return from each radiator is sealed against the entrance of steam there is no chance for air to become caught or pocketed in the middle sections of the radiator; this often happens with a dry return, when the return valve is opened before the radiator is entirely filled with steam. When it is necessary to use dry returns on account of the pipes crossing doorways, etc., they should be made of large size and given a pitch of at least 1 inch in 10 feet toward the boiler. The ends of all steam mains and branches should be dripped into the returns, and all pockets for the accumulation of condensation should be avoided. If the returns are sealed, the drip may be directly connected, but if they are dry it is better to drip them through a siphon loop 3 or 4 feet in length. The loop becomes filled with water and prevents the steam from flowing directly into the return and causing water-hammer.

In the one-pipe relief system the radiators have but a single connection, the steam flowing in and the condensation draining out through the same pipe. Figure 4 shows the method of running the pipes for this system. The steam main, as before, leads from the top of the boiler and is carried to as high a point as the basement ceiling will allow; it then slopes downward with a grade of about 1 inch in 10 feet, making a circuit of the building or a portion of it. Risers are taken off from the top and carried to the radiators above, the same as in the two-pipe system, but in this case the condensation flows back through the same pipe and drains into the return main through drip connections made at frequent intervals.

If the radiators are large and at a considerable distance from the next riser, it is better to make a drip connection from each; small radiators may drip back into the supply main. When the main return is overhead, the risers should be dripped through siphon loops, but the ends of the branches should make direct connection with the returns, which is the reverse of the arrangement in the two-pipe system.

There is but little difference in the cost of the two systems, as larger pipes are required for the single-pipe method. With radiators of medium size and properly proportioned connections the single-pipe system is preferable, there being but one valve to operate and only half as many pipes passing through the first-floor rooms.

In case of the one-pipe circuit system the steam main rises to the highest point in the basement as before, and then with a good pitch makes an entire circuit of the building and again connects with the boiler below the water-line. (See Figure 5.) Single

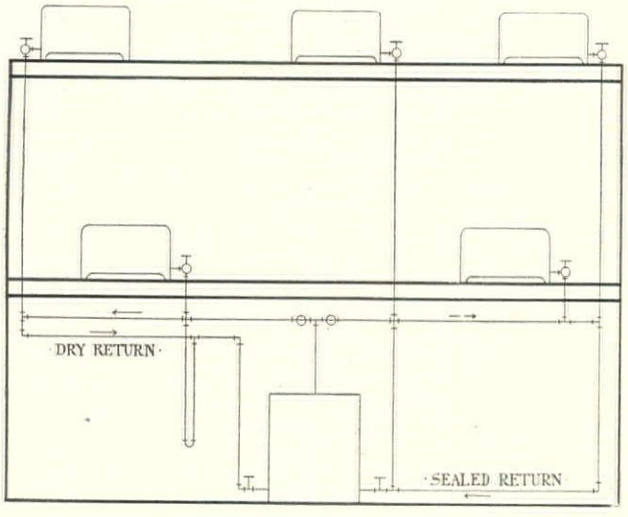


FIG. 4.

risers are taken from the top and the condensation drains back through the same pipes and is carried along with the flow of steam to the extreme end of the main, where it is returned to the boiler. The main is made large and of the same size throughout its entire length; it must be given a good pitch to insure satisfactory results. In all cases a valve is placed in the steam main near the boiler and a corresponding valve in the return. A check-valve should be placed in the return just outside of the shut-off valve to prevent the water from flowing out of the boiler in case of a vacuum being suddenly formed in the pipes. A feed-pipe should be connected with the boiler for supplying water under pressure, and a blow-off for draining the boiler and returns. The

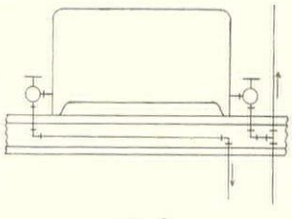


FIG. 6.

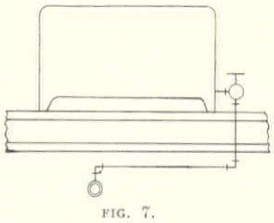


FIG. 7.

feed-pipe should be provided with globe and check valves and the blow-off with a valve and plug cock. Small boilers have simply a cock for drawing off the water into a pail or for connecting a hose.

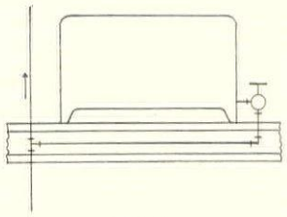


FIG. 8.

Figures 6, 7 and 8 show common ways of making the connections between the risers and radiators. The first shows the usual form of connection for a two-pipe radiator; the second, a single-pipe connection with a riser which supplies a radiator upon an upper floor also, and the third, a connection with a first floor radiator draining back into the supply main, as in the case of the one-pipe circuit system. The horizontal portion between the radiator and riser should be short and have a good pitch toward the riser. There are various ways of making these connections especially suited to different conditions, but the examples given serve to show the general principle to be followed.

Cold steam pipes expand approximately 1 inch in each 100 feet in length when low-pressure steam is turned into them, so that in laying out a system of piping it is necessary to arrange it in such a manner as to give sufficient "spring" or "give" to the pipes to prevent injurious strains. This is done by means of suitable offsets and bends. Where pipes pass through floors and partitions, the woodwork should be protected by galvanized-iron sleeves having a diameter from ¾ to 1 inch greater than the pipe. These should be fastened in place by flanging the top and nailing to the floor lining or to cleats attached to the lathing. Ceiling and floor plates should be placed around the risers after they are in position and the plastering and floors finished. The ceiling plates should always be fastened to the sleeves or lathing, and never

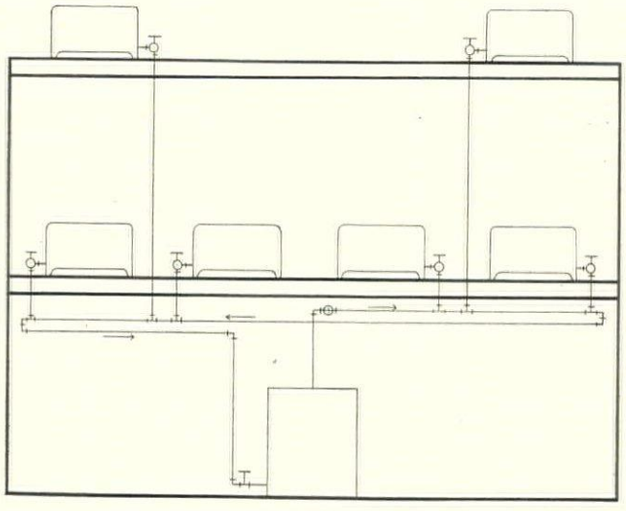


FIG. 5.

to the risers, as the expansion and contraction of the latter will cause the plates to work away from the plastering.

The valves commonly used for radiator connections are known as "angle," "offset" and "corner" valves. The first is used when the radiator is at the top of a riser or placed as shown in Figures 6, 7 and 8. The second, when the connection between the riser and radiator is above the floor, and the third, when the radiator is to be set close in the corner of a room and there is not space for the usual connection. Union valves are preferable for this work, as they allow the radiator to be easily removed for repairs or other purposes without disturbing the piping. Globe valves should never be used in horizontal pipes unless they can be placed on the side; otherwise a pocket will be formed, causing the pipe to remain half filled with water, which is likely to produce snapping and water-hammer.

Air-valves of various kinds are used for freeing the radiators of air when steam is turned on. These are usually automatic in action, being operated by an expansion piece, which closes the opening as soon as steam strikes it. When the steam pressure drops, the expansion piece contracts and opens the valve, allowing air to fill the radiator. When steam again enters the air is forced out and the valve closes as soon as steam strikes it. The expansion-piece is of various forms, being made sometimes of two strips of metal brazed together, but more frequently of vulcanite.

Automatic air-valves require frequent attention to keep them in working order, as the constant expansion and contraction of the vulcanite throws them out of adjustment. The air-valve should be in the last section of a cast-iron radiator, from one-third to one-half way up from the bottom; in a circulation coil it should be placed in the return, just inside the shut-off valve.

The proportioning of the steam-pipe sizes in a heating-plant is of much importance and should be carefully worked out by methods which experience has proved to be correct. There are several ways of doing this, but for the ordinary conditions found in house-heating the following Tables have given excellent results in practice. The sizes were computed by D'Arcy's formula, with suitable corrections for adapting it to the conditions of actual work. In this Table it is assumed that each square foot of radiating-surface will condense one-third of a pound of steam per hour,

causing a drop of pressure in the pipe of one-fourth of a pound per 100-foot length, if run. This covers all ordinary conditions of house-heating and can be used with confidence.

Size of pipe.	Square feet of radiation which it will supply.	Size of pipe.	Square feet of radiation which it will supply.	Size of pipe.	Square feet of radiation which it will supply.
1	80	2½	950	5	5,800
1¼	145	3	1,550	6	9,320
1½	190	3½	2,320	7	13,800
2	525	4	3,250		

This Table can be used for mains and branches and for the supply risers in the two-pipe system. In the single-pipe system the risers must be increased in size as the steam and water are flowing in opposite directions and must have plenty of room to pass each other. It is customary in this case to base the computation on the velocity of the steam in the pipes rather than on the drop in pressure. Assuming, as before, a condensation of one-third of a pound of steam per hour per square foot of radiation, the following Table has been prepared for a velocity of 10 feet per second.

Size of pipe.	Square feet of radiation which it will supply.	Size of pipe.	Square feet of radiation which it will supply.	Size of pipe.	Square feet of radiation which it will supply.
1	30	1½	80	2½	190
1¼	60	2	130	3	290

The size of the return pipes is usually a matter of custom and judgment rather than one of computation. It is a common rule among steamfitters to make the returns one size smaller than the corresponding steam pipes. This is a good rule for the smaller sizes, but gives a larger return than is necessary for the larger sizes of pipe. The following Table gives different sizes of steam pipes, with the corresponding diameters for dry and sealed returns:

Size of steam pipe.	Size of dry return.	Size of wet return.
1	1	¾
1¼	1	1
1½	1¼	1
2	1½	1¼
2½	2	1½
3	2½	2
3½	2½	2
4	3	2½
5	3	2½
6	3½	3
7	3½	3

Radiators are usually tapped for pipe connections as follows:

	Steam.	Return.
TWO-PIPE CONNECTION.		
Square feet or radiation.		
10 to 30	¾	¾
30 " 48	1	¾
48 " 96	1¼	1
96 " 150	1½	1¼
SINGLE-PIPE CONNECTION.		
10 to 24	1	
24 " 60	1¼	
60 " 80	1½	
80 " 130	2	

This Table gives slightly larger sizes for the two-pipe steam risers than the Table previously given. As the radiators come tapped for these sizes, unless otherwise ordered, this Table may be used for the risers and the preceding one for the horizontal mains and branches.

CHARLES L. HUBBARD.

(To be continued.)

FINANCING BUILDING OPERATIONS*.

THE methods of financing building operations vary in different places. In New York many schemes have been adopted for a while, to give place at length to other methods.

For example, when apartment-houses were first introduced they became very popular. Then what was known as the Co-operative Apartment-house scheme was invented. The promoters would get the refusal of a piece of land, have plans drawn and organize a company of people who wanted homes. The plan was to give the owner of a certain amount of stock a perpetual lease of an apartment (very similar to the custom in Venice of different floors in a building belonging to different owners). A great many large apartment houses were built on this scheme, but after one notable instance, in which the mortgage was foreclosed and the stockholders wiped out, this method was abandoned.

Formerly, much of New York City was built on leasehold property, and many of the finest stores are on leased land, such as those of A. T. Stewart (now John Wanamaker's); Tiffany & Co., Union Square; W. & J. Sloane and others. But at the present time very little is loaned on leasehold, and it is almost impossible to finance a large proposition in New York, if the fee of the land is not included.

This is not the case in Chicago, where many very large and high buildings are on leased ground.

Most of the dwellings in the large cities of the world have been built by operators building rows of similar houses and selling them separately. This form of operation appeals to a large number. Men of small capital can start in a small way, and by investing their profits in more houses, often build whole neighborhoods. They are usually successful during rising markets. Of course, houses reproduced a number of times can be built more cheaply than separate houses. The plan of finance is, often, to employ an "architect" to make the plans of one house, a building-loan is then procured, and the different sub-contractors are induced to wait for their final payments until some of the houses are sold.

But there are many builders who build very good houses to sell, in New York, and a large number of fire-proof residences have been built and sold, and not a few have brought between one hundred thousand and two hundred thousand dollars each, in the last few years. There are very few private residences built at present on Manhattan Island, apartment-houses being the vogue.

In the financing of a building operation, the promoter has usually to provide the difference between the amount of money that can be borrowed on the enterprise and the cost of it. The permanent loan is usually made by a financial institution on a conservative basis, loaning only 50 or 60 per cent. of the value of the enterprise at a low rate of interest. If the conservative institutions decide for certain reasons not to loan money, there is very little promoting done until they again wish to loan. Of course, there is a great deal of money loaned by private individuals, but such loans are generally of smaller amounts.

There are institutions which make a business of loaning and selling the mortgages to private individuals. Thus the financial institutions have the first claim on most enterprises. They decide whether there will be an active business or not. If they are desirous of loaning, there are always operators who are anxious to promote enterprises.

As the size of operations in this country has increased to such enormous proportions, so have construction companies, promoting companies and realty companies been formed with very large capital. Some of these have increased their scope until now they will underwrite the mortgage, assist in financing the whole operation and build the building. This class of operation is almost exclusively confined to central and staple property.

A popular mode of procedure, far a man who wishes to operate in real estate, is to form a company, usually called a realty company, and for each particular building operation a subsidiary company is formed by the parent company, which method, under the laws of the State of New York, eliminates the element of personal liability of the stockholders.

There is a large field for these realty companies, managed on conservative lines, and they are of great advantage to people who are forced to improve their property. It may be that their buildings are too poor to compete with new neighbors or too old, or that they have been destroyed by fire, etc., or for other reasons. For example, a man has a piece of property in a business center which he is forced to sell or improve, and which is appraised at, say, $1,000,000; it does not carry itself, and there is not a ready sale for it at that price. A realty company might make the following proposition, viz.: To erect on it a building costing, say, $1,000,000; to pay him for his land $600,000 in cash and $400,000 in second-mortgage bonds of the company. The realty company would borrow from a financial institution, say, $600,000 on the land, and, say, $500,000 on the building as it progresses. After paying the owner $600,000, they would have $500,000 in cash for the building, and the stockholders would have to put in the balance, $500,000, and own the equity. In some instances the company issues no second-mortgage bonds but only stock.

There are many men who are forced to sell or improve their property, and while they have not the means to improve it themselves, they would prefer to keep an interest in it to selling it altogether, and they also feel that the experts in the realty company know better than they what the nature of the improvement should be. Perhaps the owners are not in this country, or perhaps they are not in a position to wish to take much trouble in posting themselves as to the requirements.

Some propositions like the above, in which they retain stock, naturally appeal to them. Of course, if the realty company puts in very little cash, it may prove a poor operation for the owner of the land, as he is taking most of the risk, and had better get most of the profits.

The financing of large building operations has been tried on very much the same lines as railroads are financed; that is, issuing

* A paper, by Mr. W. H. Russell, read at the Thirty-eighth Annual Convention of the American Institute of Architects.

bonds and stock in shares of, say, $100 each. Also large operations have been put through in Boston, I am told, by selling only stock in small shares, without the property being bonded, and again other large operations have been successfully carried out by selling first-mortgage bonds in small amounts. The stock in such an instance represents no payment in cash, but professes to represent the earning power over expenses.

These plans have not been popular in New York.

Real estate has increased so much in value in large cities that it would not be possible for most men to invest in it, if it were not through these companies. While formerly only the rich were able to participate in large enterprises, now, through the large corporations, the people can be interested in all the great enterprises of the country.

Building-loan corporations in great numbers have been started for persons who wished to build homes. Under their plan, the tenant gets the property upon the payment of a very small equity. He then, in lieu of rent, may pay off each month a small portion of the mortgage, in addition to the carrying charges.

The questions, How much will a building cost? and When will it be finished? are of the greatest importance to the financier. These questions depend largely on the labor conditions, on which subject the architect and his client, the owner, are not usually given a chance to be heard, although the owner is the greatest sufferer from strikes and lockouts. His interest account is going on all the while, and he has very much more at stake than the builder.

A company that could give a good guaranty to finish a building at a certain time for a certain amount of money, would, indeed, greatly facilitate any building operation. Let us hope that this may soon be the case.

It is not the province of the architect to formulate the financial scheme or to place the securities of the project. He may be called upon to design a new building, introducing features which will make it superior to its competitors. He is usually expected to prepare preliminary plans, specifications and to give an estimate cost of building, carrying charges and operating expenses in the shortest possible time. He should be familiar with all requirements of the building he is called upon to design. He should theoretically not put anything in that is not of use. He should at the same time make his building pleasing to the public, without adding unnecessarily to the cost.

Assume, for instance, that it is proposed to finance the construction of a high office-building in some great center. To ensure a good income, the requirements, above the first or second story, would probably oblige the building to have as many windows as possible—not too large to be easily operated, and yet as large as practicable. Each window should be separated from each other window, preferably by masonry, as it is advisable to have as little steel as possible exposed to the elements, but steel thoroughly covered with cement masonry is supposed not to deteriorate. Projections over adjoining property should be dispensed with, to avoid legal complications. Many title-guaranty companies discriminate against such encroachments. A large cornice is a disadvantage to windows under it. Therefore the requirement which confronts the architect is a flat wall pierced with windows at equal intervals, like a waffle-iron, and not even relieved by a large projection.

Although this is a difficult proposition, it is certainly a very interesting one.

The high building is essentially American. It is a new proposition, and requires more originality to solve than a problem where some historic example from the Old World may be taken as a prototype.

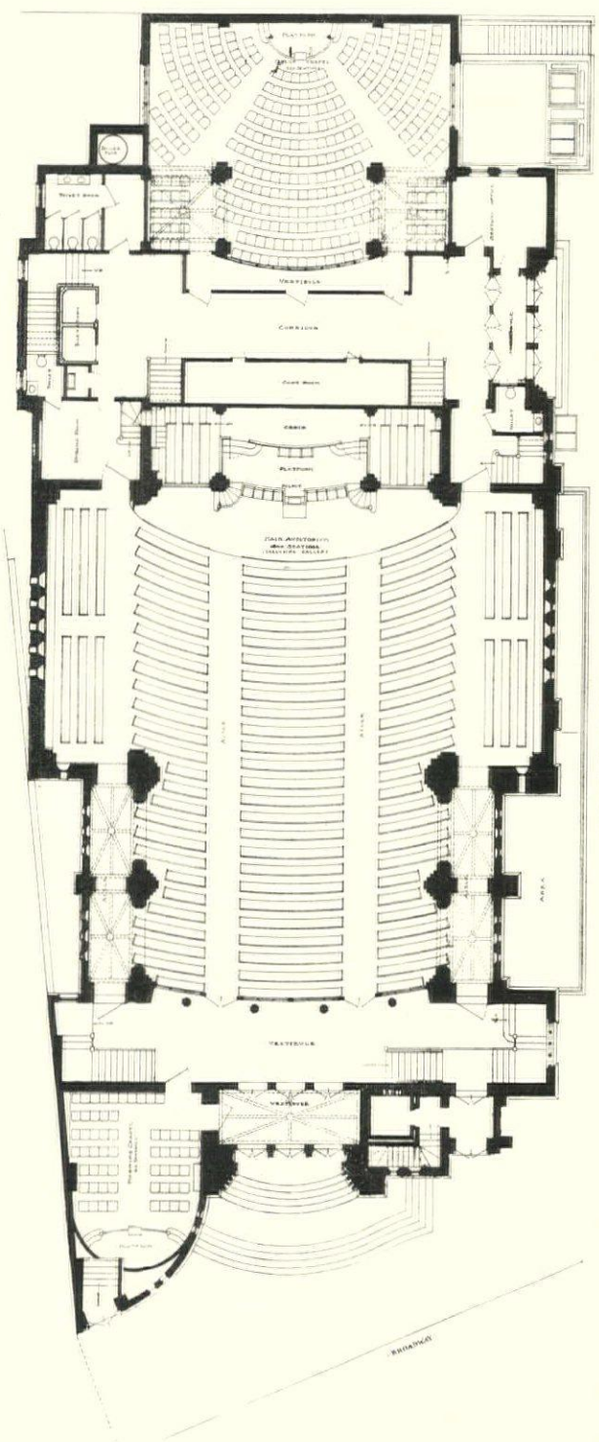
Would it not seem as if these requirements might best be met by the clever application of color? If some one could use bright-colored terra-cotta, for example, omitting large projections but with a handsome sky-line, and so make a beautiful building, he would, indeed, deserve the thanks of the community. For the skyscraper has come to stay, and the business centers of our large cities will be rebuilt.

The Egyptian, Greek, Roman, Romanesque and Gothic architects all felt the want of color and used it, and although color had perhaps better not be suggested by an architect until he is quite sure that he will be employed, it seems to be a subject for serious consideration.

It is of the greatest importance to have the description of a proposition as brief as possible, but covering all the points. A resumé of the specification is of great benefit.

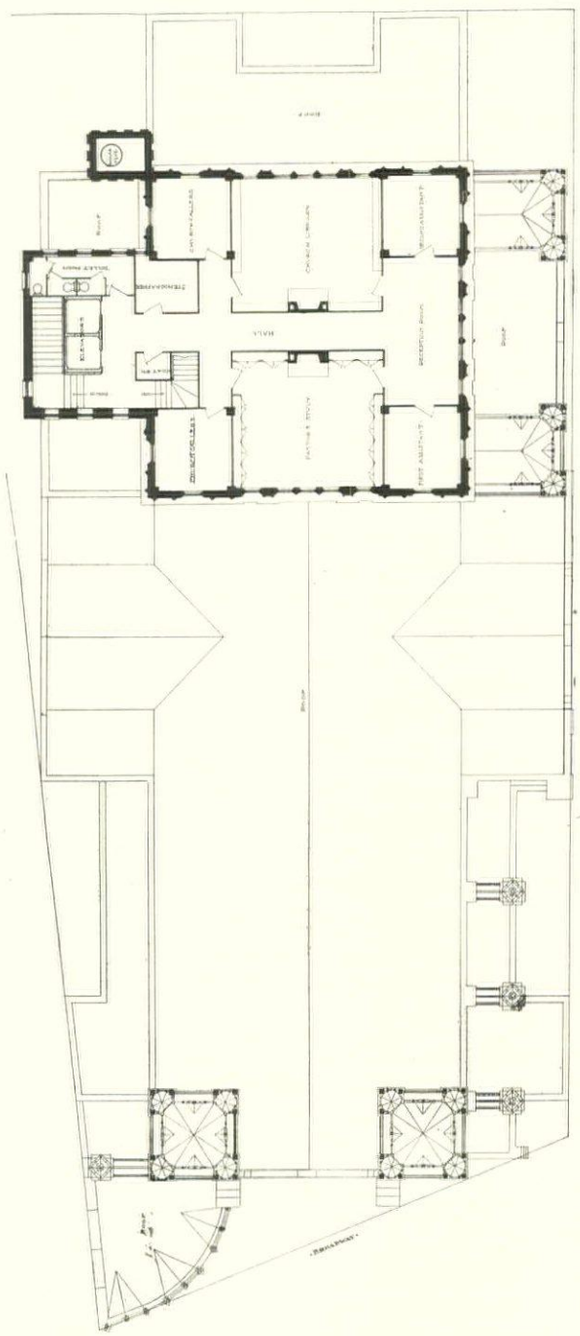
THE BROADWAY TABERNACLE, BROADWAY AND FIFTY-SIXTH STREET, NEW YORK, N. Y. MESSRS. BARNEY & CHAPMAN, ARCHITECTS, NEW YORK, N. Y.

THE new edifice whose completion the Broadway Tabernacle Church, New York, has been awaiting with a patience which unlooked-for delays have sorely tested, is in many respects a new departure in ecclesiastical architecture. Standing on one of the most conspicuous sites in Manhattan, at the northeast corner of Broadway and Fifty-sixth Street, it has attracted wide attention, as it has gradually taken on its final form and comeliness, in spite of lock-outs, strikes, dynamite plots and other interferences. It is deserving of the interest it has aroused, because it embodies a consistent and thoroughgoing attempt to solve a new problem under new conditions; and because the architects have succeeded in producing, under the very exacting conditions and requirements imposed upon them, a building remarkable at once for the way in which it meets these requirements and for the richness, beauty and originality of its exterior.



MAIN AUDITORIUM FLOOR: BROADWAY TABERNACLE.

The programme laid down by the pastor and building-committee required, first, an auditorium large enough to seat 1,500 worshippers and yet not too large for perfect seeing and hearing, with provision for an organ of great power and for a large chorus-choir. Secondly, a smaller auditorium for conventions, lectures and entertainments. Thirdly, a large chapel for prayer-meetings, and a small chapel for weddings, funerals and baptisms. Fourthly, accommodation for a large and up-to-date Bible-school, with class-rooms, library, etc. Finally, a large Parish-house, with a multitude of offices for pastor, assistants and sexton; of club-



PLAN OF MINISTER'S FLOOR: BROADWAY TABERNACLE.

rooms, parlors, reception-rooms and an apartment for the sexton. All this was to be provided on an irregular lot containing hardly 16,000 square feet, and at a cost which prohibited cut stone and elaborate decoration.

The resulting edifice is a marvel of careful and ingenious planning and sound construction. The Taylor Chapel for prayer-meetings, seating 300; the Bible-school and the Parish-house are provided for in a massive and imposing tower-like structure at the rear or east end of the lot, where it is the widest, so as to allow space for the necessary light-courts. For these courts ample area was allowed, as the adjoining territory is sure to be covered with lofty buildings. The hall of worship occupies the front portion of the site, its rear end joining the Parish-house, which forms a mass suggesting a transept with a huge tower rising from the intersection. This tower with its broad, spire-like roof and its elaborate gables and pinnacles, rises to a height of 160 feet, and is visible from a great distance. By contrast, the church proper looks low, but its lack of loftiness is justified by acoustic considerations. In front of the northwest corner the ornate little Thompson Chapel—named for Dr. J. P. Thompson, a former pastor—projects toward Broadway, filling up part of the triangle formed by the angular direction of that thoroughfare. The lecture-hall, seating 600, is under the hall of worship, but abundantly lighted by spacious and deep areas. Every requirement of the programme has been provided for, but the high cost of the building made it impossible to complete the interior finish of all parts of the edifice for the sum available after setting aside the endowment fixed upon by the trustees. The Thompson Chapel, lecture-hall and the upper floors of the Parish-house have been left unfinished internally to await the special gifts, which it is hoped will be made before many months or years have passed.

The whole structure is, externally, of cream-white brick with terra-cotta finishings of the color of Indiana limestone, and the entire interior construction is of fireproof materials—steel and concrete predominating. The style is a rather free version of late French Gothic, with mouldings, traceries and sculptural details of great elegance, beautifully executed in terra-cotta. The front presents a noble triple entrance under a richly ornamented surbased arch, with a tympanum sculptured with an admirable group representing the Sermon on the Mount. Two low towers flank the west front. The south flank is noticeable for the great wheel-window in the auditorium transept, and for the fine portal, windows and pinnacles of the Parish-house, which forms a kind of major transept. The south portal admits to a corridor, from which one enters the church on the left, and the Taylor Chapel—a fine, lofty, cruciform room, with oaken ceiling—on the right. At the farther end are the elevators and stairs. Above the Taylor Chapel is the Bible-school room, two stories high, perhaps the most elaborate arrangement for the purpose in Manhattan, with its fine central hall and twelve spacious class-rooms. The club-rooms and offices above this are for the present left unfinished. Every convenience of plumbing, heating and ventilation has been provided.

The hall of worship, covering over 7,000 square feet, with its immense west gallery and two transept galleries, is a noble room, although at present lacking the rich color decoration and memorial windows which, it is hoped, may be provided later. The pews, pulpit, choir seats and gallery fronts are of dark oak, and the organ (the front of which only is as yet in place) forms an imposing decoration behind the pulpit. The ceiling is a handsome groined vault in plaster, on steel framing, purposely arched with a flattened elliptical curve. Every architectural detail has been carefully studied and every inch of space utilized to the utmost. There is here a splendid equipment for the carrying on of that enlarged and aggressive Christian work toward which, under Dr. Jefferson's inspiring lead, the officers and members of this historic church have resolutely set their faces, in confident expectation of the Divine favor and blessing.

Rev. JAMES H. ROSS.

ILLUSTRATIONS

THE BROADWAY FRONT: BROADWAY TABERNACLE, NEW YORK, N. Y.
FIFTY-SIXTH STREET FRONT: BROADWAY TABERNACLE, NEW YORK, N. Y.

THE CENTRAL ORGAN CASE: BROADWAY TABERNACLE, NEW YORK, N. Y.

WAREHOUSE OF A. WERTHEIM, BERLIN, PRUSSIA. HERR A. MESSEL, ARCHITECT. TWO PLATES.

These plates, showing a German conception of architecture as treated under the inspiration of l'Art Nouveau, are copied from a recent issue of *Blätter für Architektur*.

Additional Illustrations in the International Edition.

SOUTHEAST VIEW: ST. PAUL'S METHODIST EPISCOPAL CHURCH, WEST END AVENUE AND WEST 86TH STREET, NEW YORK, N. Y.
MR. R. H. ROBERTSON, ARCHITECT, NEW YORK, N. Y.

Other views of this building may be found in the *American Architect* for June 24, 1899.

The American Architect and Building News

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CONTENTS

THE founders of the government were mistaken in no one thing more than in believing that the important official positions under it would always be filled by men belonging to the educated and moneyed upper classes who, feeling the demands of good citizenship, had the leisure and opportunity to yield to them, in the same way that Washington, Jefferson and the others yielded. Nowadays, it is so distasteful to such men to be brought into touch with the pushing selfishness of the professional politician, that each year fewer and fewer of our best and most efficient citizens are willing to accept public office of any kind. This makes the case of Colonel Henry S. Russell, who died last week in Boston, all the more noteworthy. Had Colonel Russell been called upon to reorganize the Building Department of that city—and it is a great pity that he was not urged to undertake that task—he would have set about the work as simply, as promptly and as efficiently as he entered on and carried out, at different times, first the reorganization of the Police Department of that city and later of the Fire Department. His connection with the Police Department was comparatively brief, some two years only, but that Department has since been carried on on the lines laid down at that time; but over the Fire Department he ruled single-handed for ten years, ruled with an iron hand, though it was covered with a velvet glove. Many men, the enrolled firemen among them, at first believed that the new commissioner was a mere martinet, but they soon found that he was, though a rigid disciplinarian, absolutely impartial and fair-minded, and the men under him soon learned not only to have confidence in but to love him; the consequence was that, as the material was good, Boston before long had one of the most efficient fire-fighting forces in the country, so far as personnel went; and, as the department was at length being carried on in strictly economical and business lines, it now has an equipment of equally good quality. Although a man accustomed to handling large commercial transactions, a man of means and having many social calls upon him, Colonel Russell, though having no interest in a political career, accepted his task purely in the spirit of good citizenship, doing the work because he felt he could do it as it should be done, without heed to its effect on his future career, doing it so thoroughly that throughout all his years of service he hardly took the fortnight's rest that falls to the lot of every clerk. To die in harness, in service as a good citizen, is a fitting end for a member of that group of young Harvard students whose part in the civil war will be remembered as long as Harvard, Beacon Street and Boston endure.

IT is unquestionably one of the attractions that Paris has for the traveler that here and there, in important sites not more than in odd nooks and out-of-the-way places, he comes upon work of the French statuary, sometimes of yesterday, but more often of to-day. The occupying of all available sites has been going on for so many years that it is nowadays really a difficult task to find a suitable site for a new statue, and there are at the moment several statues of notabilities, of a kind, all ready to be set up and unveiled, if any one could decide where to put them. Fortunately, in the Garde Meuble, the Parisians have a cure for their difficulty for, by extension of its original function of serving as storehouse for the discarded furnishings of royal or imperial palaces when a change of "mode" dictated a spell of refitting and redecorating, nowadays the rooms and courts on the Quai d'Orsay are to a considerable degree encumbered with statues and monuments, which have been removed from public places, for political reasons sometimes, and at others because the sculpture was too indifferent a piece of art to be tolerated longer in plain sight. But the Garde Meuble has its limits and has long been unduly crowded. The relief which it needs promises to be easily secured, if the example of the city of Riom proves catching. Before L. J. Duc built his portion of the Palais de Justice, there used to stand in the Place Dauphine a monumental fountain, having Egyptian characteristics, designed by Percier and Fontaine in honor of the Napoleonic general Desaix. Forced out of its original site by Duc's operations, the Desaix fountain was tried in one site after another, but finally brought up, as has many a less good piece of work, at the Garde Meuble. Recently Riom, near which town the famous general was born, has successfully petitioned the government for leave to acquire the monument and set it up and in action for the delighting of its citizens. The act is quite in line with the ordinary governmental practice of sending to the Provincial museum of art some of the paintings or sculptures bought each year at the annual salons.

NEW YORK has no garde meuble, though, if it had, the ground floor at least would have to be fairly large to accommodate the works of art that many of us

Entered at the Post Office at New York as second-class matter.

would like to have banished from public sight. But, if it has no garde meuble, it has many storage warehouses and safety-vaults which, a recent incident leads one to think, may contain a considerable amount of works of art more than half forgotten by their owners. From one of these warehouses, where it has lain *perdu* for twelve years, there was taken last week and set up for exhibition in the gallery of the National Arts Club a statue of Venus, cut from Parian marble, it is gravely alleged, by the hand of Praxiteles. The marble belongs to Mr. Frederick Linton, who has been a collector of art for some thirty years, and, if this Venus is a fair sample of the material he is hoarding in fireproof warehouses, he should be publicly entreated to put on view all of his treasures. Mr. Linton is, on the plea that the revelation might produce "international complications," unwilling to explain how he was so fortunate as to come into possession of the statue or in what locality he found it, and he seems to be equally vague as to the matter of its actual provenance, for the vendors were apparently unable to furnish a satisfactory pedigree. Fortunately, for all but archæological purposes, these things are not very material, for, unless the statue is to be gaped at merely as an antiquity, as are the bones of the great dinosaur at the Natural History Museum, its worth must rest upon the evidence its composition and modelling furnish: so far as use and enjoyment go, it does not matter whether the statue is a real antique, an antique replica or variant, or a clever modern forgery. The statue has undeniable charms of its own and ascribing it to Praxiteles will neither add to nor diminish these in the eyes of those who value a work of art for what it expresses.

EVEN without this incident to prove the fact, it was so commonly understood that many works of art, and some collections, were temporarily housed in storage warehouses, that it was rather startling to learn that an architect, of all persons, had allowed a very valuable collection of art to be burned up in a combustible building, a week or two ago. Although every one will sympathize with Mr. Stanford White over the loss of a collection of great individuality and much value, it is impossible not to look at the incident as a curious confirmation of the truth that lies in the old saw that familiarity breeds contempt. It was quite recently that Mr. White had moved his collection from a fireproof into a combustible building where there was more room for its proper display, and the fact that no insurance had yet been placed upon it was possibly one of the things a very busy man might easily overlook during the ardor of installation and rearrangement.

AT a recent dinner of the "Anciens élèves de l'Ecole" in Paris, M. Moyaux, who presided, took occasion to remind his hearers that two years ago, when he filled the same post, he had spoken somewhat jeeringly of the new proposal to admit young women to the architectural courses of the Ecoles des Beaux-Arts. He now confesses he had seen some young women who "handled the T-square and triangle as deftly as needle or crochet-hook and knew how to mix a batch of concrete with as full an understanding as if it were a matter of the domestic *pot-au-feu*." He added that although "the affluence of diploma-bearing women is not at present very redoubtable, it may become so since *la femme architecte aura pres du client des moyens persuasion autrement séduisants que ceux dont le sex fort peut disposer*." That is the true Frenchman's way of looking at the matter; but, in this country, we know that women, as a rule, enter upon a professional career with real ardor for the work and with the same spirit of simplicity and forgetfulness of sex that has won for Miss Frances E. Willard—not that she was an architect—a place in Statuary Hall in the Capitol, at Washington, where, last week, her statue was placed by the State of Illinois. As to Miss Willard's claim upon that honor, we have no desire to cavil, but we wonder whether, if the "crinoline" of the sixties had been her habitual wear, the same choice would have been made. This, the only female statue, adds but another curiosity to what was once a fairly dignified, but is now a very motley, gathering of distinguished favorite sons—and a daughter.

M. MOYAUX also drew attention to the new attempt to establish "écoles régionales" as feeders to the Ecole des Beaux-Arts itself and regretted that, as yet, such schools had been opened only at Toulouse and Rouen, while Marseilles and Lyons seemed likely to establish them, thus providing four out of the eight that are desirable. We are wrong in speaking of these provincial schools as "feeders" to the Paris school, for the new movement aims to bring about a decentralization of art, and hence, for a time at least, the new schools must draw their nourishment from the great institution on the Rue Bonaparte. The situation, then, in France is just the reverse of that which obtains in this country; there, there is a great central school which seeks to widen its influence by establishing these "écoles régionales," while here, in our many scattered architectural schools, we already have the feeders and now need, and should have, the greater central institution, and, as we have said before, the real School of Fine Arts should be here in New York. Columbia University has at this moment a committee which is studying the situation with a view to determining whether it may not be advisable for the University to establish a "faculty of fine arts," which, if recommended, would only mean, for the moment, the collocation of sundry classes, studies and professorships which now are attached to several unallied departments. But, with such a faculty established, a normal growth might, in course of time, bring into being the high grade central School of Fine Arts of which the best of art students of various kinds actually have long felt the need.

A VERY small percentage of the people who daily use the British Museum can have stopped to admire the little seated lions which Alfred Stevens modelled as the decorative feature of the iron railing before that much frequented building. These little gems of modelling—as impressive at their scale as Barye's more famous beasts as they sit, gazing on the Seine, beside one of the entrances to the Louvre—are likely to receive more attention hereafter, as some of them, now that the fence is to be removed from before the Museum, are to be used to decorate the railing that is to be placed about the Duke of Wellington's monument in St. Paul's Cathedral.

THE UNDERWRITERS' VIEW OF SOME FAILURES OF CONSTRUCTION.[1]

IN presenting to you the problem of this evening's talk I shall not try to touch upon every point in which construction may be said to have failed and the point-of-view is perhaps more correctly described as that of the insurance-engineer than that of underwriter. I should have chosen the term "insurance-engineer" rather than "underwriter" were it not for the fact that the insurance-engineer as a factor in our improved knowledge of construction is comparatively new, and that to most people, the term fire-underwriter expresses more definitely the idea I am here to represent.

Of the types of construction which have been most prominent of late in the minds of the public there are two which probably are to-day better known than others. These are "mill" construction—so-called because it was supposed at least to be patterned on the standard of the best types of construction for manufacturing-plants—and the so-called "fireproof" construction.

Both of these types have been presented to the public as panaceas for the enormous fire-loss of this country (a destruction of property which is as truly a loss as if the money value represented by it had been thrown into the sea), and both of them have, in some forms of their development, failed entirely to prevent this loss.

The reasons for these failures are matters of careful study by active-minded men, trained for the purpose, and once understood will be as surely overcome as other engineering problems have been.

In the case of the so-called "mill" construction the error seems to have been two-fold: First, in the application of this construction to work for which it was not intended; and secondly, in a failure to carry out fully and properly the principles upon which this form of construction was based.

This type of building was originally designed to cover in and protect from the weather large manufacturing establishments in which strength and not beauty was the leading requisite. It was designed to remedy certain defects which had appeared in the earlier type of building used for manufacturing purposes, such as concealed hollows in walls and floors, unduly combustible roofs and passages for fire, but not for firemen, from one part of the building to another; and it did overcome such difficulties to a very reasonable extent. It also improved the lighting, heating and ventilation of buildings for such work, and, in combination with the probable contents and the very excellent fire-fighting apparatus which was provided, succeeded largely in furnishing a satisfactory substitute (*for mill building*) for the "combustible architecture" which had preceeded it. It must, however, be kept in mind that compared to the city building to be used for the "storage and sale of merchandise" the mill, even the cotton-mill, contains but little combustible contents and that the mill though often containing large unbroken floor-areas is of comparatively slight height.

When, therefore, the success of this construction (which was really the first work of the insurance-engineer) in reducing the fire-loss in mills brought it to public notice, and the attempt was made to adapt it for use in stores and warehouses, no adequate provision was made for the changed conditions. The requirements of trade called for offices and counting-rooms; they were partitioned off with hard-pine sheathing. The shape and size of city lots made it difficult to put the stairways and elevator-shafts in separate brick towers, as they are in the best built mills, so the stairways and elevators were put inside the main walls of the building and were left unenclosed or only partially cut off. The desire to have attractive salesrooms led to the use of varnish in place of plain wood, or better still, well whitewashed surfaces. The necessary crowding together of buildings in cities makes thorough protection of outside openings most important. But shutters interfere with light, and require attention which, without mill discipline, was not easily secured, so shutters were neglected or often omitted.

The use of such buildings to house several tenants under one roof made the mill discipline impossible and increased materially the danger of fire from rubbish, from careless use of matches, from many other well-known causes. The lack of skilled mechanics as a part of the working force of such a building was no doubt a reason that proper fire-fighting facilities, as a part of the equipment of the building, were not more commonly provided. In short, there was an attempt to use "mill" construction for warehouses and stores without keeping in mind its essential features, which briefly are: No "vertical openings," no "concealed spaces," the minimum of "combustible finish," with ample facilities for extinguishing fire at its discovery, and ample protection from outside exposure. Under these circumstances it is not surprising that "mill" construction did not for city warehouses fulfil all expectations. Yet I do not feel that the construction was to blame, but the use made of it. Railroad semaphores are a necessary part of railroad equipment, and especially so in these days of fast trains, yet I once heard a first-class engine-driver say that "they got in the way like thunder when you wanted to make time," and I fear that this is the feeling of many merchants and owners of buildings as to the essentials of mill construction.

In the case of "fireproof" construction, difficulty seems to have come from a different cause. As in many other matters, the American tendency to go to extremes has resulted in undertaking the construction of enormous buildings, limited only by the strength of materials as to height and by the ground available as to area. In constructing such vast buildings, it has been assumed that because a material would not, under ordinary conditions burn, it was therefore "fireproof" or at least reasonably "fire-resisting." The enormous expense required by such construction has led to economies which have proved dangerous and to methods which fire has tried and found wanting. No one who saw the U. S. Government Warehouse, at Baltimore, soon after the awful conflagration of last year, can have any doubt that it is possible to build a warehouse of reasonable size which would, even under the terrible strain of such a fire as that, be a protection to the merchandise within its walls. If it had not been for the alteration in its original form made necessary by the introduction of a modern elevator, I doubt whether the expense of repairing that building would have been more than the cost of glass for the windows and a little paint and putty.

It may be said that this building was not exposed to the extreme test of those awful hours. Yet buildings all round it were totally wrecked, and it stands to-day in practically its original form, except in the substitution of brick for granite for its interior columns.

And this leads me to a digression from the main thread of my argument. For thirty years every engineer, every architect, every builder of repute, has known that stone, especially granite and marble, while not in themselves combustible, are destroyed by fire almost as readily as wood. If any one had doubted it before last winter, the Baltimore fire proved it beyond any doubt. Yet I venture to say that there is not to-day a large city in this country in which there will not be during the year 1905 a large amount of marble or granite used in fireproof buildings, and in parts of such buildings so high above the street that the use of water to protect them from fire will be, so far as fire-departments are concerned, physically impossible.

Is it possible that the American brain, so fertile in every other direction, is unable to cope with the problem of designing and erecting an attractive and suitable exterior for a building which is *designed* to resist fire?

And now let us return for a moment to the false economies which so often confront the underwriter who, from the business point-of-view, is endeavoring to fix a proper price for the indemnity which he has for sale.

One of the commoner forms is the slighting or the deliberate reduction of the protection for the steel framing which is the skeleton of all these great buildings. The records of the cost of construction of some of the larger office-buildings destroyed in the Baltimore fire show that the marble wainscoting and flooring of the halls in these buildings cost more than the protection of the steel frames, and we know that in one building at least, a form of floor construction which was proved to be satisfactory was given up and a cheaper and, as it proved, entirely unreliable form substituted at a saving of one or two per cent. of the cost of the building.

Surely such work as this is not worthy of respect, and is not and can not be remunerative in the long run.

We are asking these steel frames to carry enormous loads, to withstand great strains, and yet we grudge them the slight additional cost of a reasonable protection against fire, not only against a conflagration but against such fires as have and will occur within the building or its immediate neighbors, and we spend twice the money which the proper protection would cost on decoration which may or may not be good art.

Again, it is a common practice to set interior partitions on top of combustible wooden floors, even when the partitions are made

[1] A paper by Mr. F. Elliot Cabot, Assistant Secretary of the Boston Board of Fire Underwriters, read before the Boston Society of Architects.

wholly of incombustible material, and as a result, a slight damage to the wooden floor wrecks twice its value in partitions and their finish.

We use iron face-plates on the fronts of these buildings and let the adjoining brickwork rest upon them so that a slight expansion of the iron displaces many feet of brick facing. Does it pay? Is it good work? Does the result justify it? Surely not.

In the fireproof building, too, we seem to depart from the construction which is justifiable for such work by the great expanse of unprotected windows.

Of course, light and air are most desirable, but from the underwriter's point-of-view it is fair to expect protection from more than the weather in the best type of building.

Vertical openings, too, have been quite a factor in the destruction of several buildings of this type, especially in those of a great height, as they almost invariably act as a flue to draw the fire from one story to another. If a large office-building is to be regarded simply as a stove which will from time to time be burnt out, it is perhaps sufficient to provide for protection to the building itself, but if it is to provide protection for its contents, then the vertical openings and the exposed windows need protection.

I have tried briefly to state why these forms of construction have not been as successful as they ought to have been, and I will endeavor briefly to give the insurance-engineer's hope of what may be done to overcome these difficulties.

Considering first the "mill" form of construction, I believe the automatic sprinkler, the fire-door and the fire-shutter, with a restricted use of combustible finish, will solve most if not all of our difficulties in this direction. I wish architects and engineers would make themselves more familiar with the use of sprinklers, because so much may be done in the construction of the building to make sprinklers thoroughly effective. A smooth ceiling or one with panels approximately 10′ x 10′ or 5′ x 10′ will give sprinklers the best chance to distribute the water to the best advantage.

For the "fireproof" building I must, at the risk of being called a crank, urge the use of "wire-glass" in metal frames, both for exterior use and where it is necessary to light stair and elevator wells.

Cut off the vertical openings, protect the steel frames everywhere and protect exposed windows, then "fireproof" buildings will come nearer to deserving their name.

THE STRUCTURAL DESIGN OF BUILDINGS.—V.

SEVERAL features of the paper by Mr. C. C. Schneider on the above topic, which we published last year, have been found by his fellow professionals to be worthy of unusual and extended discussion, and we should fall short of doing our full duty to our readers did we not give them, too, the benefit of some of the discussion that turned on Mr. Schneider's suggestion that the bearing power of floors should be calculated for a distributed load of only about 40 pounds per square foot.

DISCUSSION.*

L. J. JOHNSON, ASSOC. M. AM. SOC. C. E. (by letter).—Mr. Schneider has certainly done the profession a great service in publishing this paper. The writer begs to express his share of the gratitude for it. While so doing, he wishes to discuss one point which Mr. Schneider brings up—the weight of a crowd of people. He is not reconciled to such low figures as Mr. Schneider cites for this quantity. By his recommendations and his assertion that "a uniform load of 40 lb. per sq. ft. will scarcely ever be exceeded by a crowd of people," he may give the impression that 40 lb. per sq. ft. is a fair estimate of the actual weight of a closely packed crowd, an impression which will not be found to be substantiated by facts.

A few months ago the writer made some experiments on the weights of crowds of his students, and found that 156 lb. per sq. ft. was attainable without any attempt at selecting the men or crowding them to any painful degree of personal discomfort. Results nearly as high are reported by Mr. Stoney, by Professor Kernot, of Victoria, and by C. M. Spofford, Assoc. M. Am. Soc. C. E.†

This knowledge is often important in design. Allowance for it, of course, may be made in any way that may be approved by the judgment of the designer, but, in any event, it should be understood clearly that 150 lb. per sq. ft. may be reached, or even exceeded, under a crowd of people at points subject to special congestion.

For example, students among those who formed the crowd above mentioned expressed the conviction that the throngs leaving the university football field after large games are at one place compressed quite as tightly as were the students in this test. This special congestion occurs upon a drawbridge the width of which between railings is considerably narrower than the street which leads to it. The writer has vivid recollections of being in crowds compacted by the bridges at the Columbian Exposition on "Chicago Day," where the density of the crowd must have been quite as high as that of the crowd of students when weighing 156 lb. per sq. ft.

While 150 lb. per sq. ft. may be reached only rarely, 80 or 100 lb. per sq. ft. must be realized far more often than is commonly supposed. A crowd of 80 lb. per sq. ft. can easily make way so as not to afford serious obstruction to the progress of a person who wishes to go through it, and a little persistence will enable a person to make his way through a willing crowd weighing 120 lb. per sq. ft. The details of the experiments on which these assertions are based, and a collection of citations from American and foreign authorities will be found in *Engineering News*.*

It has occurred to the writer that photographs, showing just what degree of congestion is indicated by loads of about 40, 80, 100 and 150 lbs. per sq. ft., would be of interest at this point. Consequently, a number of volunteers from among the writer's students were weighed and caused to stand in a box made for the purpose. This box was 6 ft. square, in the clear, inside measurement, and with vertical walls, 5 ft. 9 in. high, and without a top. The men filed into the box, and photographs were taken as the weights reached the requisite totals. The camera was at a window some 20 ft. above the top of the box, and the men were asked to look up, so as to be more readily identified and counted, as a check upon the record.

In the first case they were distributed over the available area, and in the second they were assembled along one side of it, the floor space being visibly less than half covered. These ten men aggregated in weight 1,505.8 lb., which, on the 36 sq. ft., made a load of 41.8 lb. per sq. ft.

In the third case the same men and ten additional men brought the total up to 3,013.4 lb., and the unit load to 83.7 lb. per sq. ft.

In the fourth case, four additional men brought the figures up to 3,601.7 lb. total and 100.0 lb. per sq. ft.

In the fifth, thirteen additional men, making thirty-seven in all, brought the result up to 5,552.5 lb. total and 154.2 lb. per sq. ft. The average weight of these thirty-seven men is seen to be 150.1 lb.

In this case, no attempt was made to reach a maximum, but only a full 150 lb. per sq. ft., and a number of the men testified that the congestion seemed to be materially less than that to which they are subjected upon the drawbridge above referred to. Obviously, there are several very short men in the picture who could be replaced by taller men occupying little or no more room, and it seems to be clear that 160 lb. per sq. ft. is quite within the possibilities.

In the light of these experiments, the writer is convinced that 80 and 100 lb. per sq. ft. are of common occurrence throughout whole aisles and passageways, and even 125 lb. cannot be infrequent. The writer knows of grand-stands where 3.3 sq. ft. is the allowance per person seated. This, assuming 150 lb. as the average weight per person, would make 45 lb. per sq. ft., with no allowance for the weight of the seats themselves.

It is freely admitted that the writer's results give figures greatly in excess of those given by the accepted authorities (outside of some municipal building laws), both in the United States and in Europe, but the experiment is one very easily tried by any one who may feel unconvinced.

Doubtless, mixed crowds of men and women, such as football spectators, may weigh less per square foot, with an equal degree of personal discomfort, than the body of students in the writer's experiments.

It should be remembered that a closely packed crowd is not likely to be in a mood to take calmly any undue deflection or appearance of weakness in the floor, and the result of such seeming insecurity is not pleasant to contemplate. In the writer's

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*Discussion of a paper by Mr. C. C. Schneider read before the American Society of Civil Engineers and published in the *Proceedings* of the Society. Continued from page 112 of THE AMERICAN ARCHITECT for December 31, 1904.

†*Engineering News*, Vol. LI., pp. 360 and 426.

Engineering News, Vol. LI., p. 360.

opinion, such floors as those of passageways, corridors, standing-room in theatres, assembly-rooms without fixed seats, ball-rooms, etc., should be calculated for a weight closely approaching 150 lb. per sq. ft., or, in some cases, even more, without exceeding the unit stresses of Mr. Schneider's Paragraph 17. Possibly, a large standing assemblage, such as is common at political meetings, likely to applaud by stamping; or a throng of dancers; or a body of drilling soldiers, might call for an additional impact provision. Moreover, it should not be forgotten that in an assembly-room "with fixed seats" those seats are sometimes removed in order to accommodate as many as can be packed into it standing.

To summarize briefly, the writer begs to maintain:

I.—That the extreme value of the statical load from a crowd of men is a very few pounds, if any, below 160 lb. per sq. ft.;

II.—That there are many structures which contain considerable areas where a load as great as 150 lb. per sq. ft. is to be expected occasionally and fully provided for;

III.—That these facts should be clearly stated, and that the maximum loads should not be left to be taken care of by a concentrated-load specification which might or might not provide for them according to the closeness of the beam spacing;

IV.—That the distributed-load values given in Table 2 ought, accordingly, to be increased materially, at least for ground floors of office-buildings, assembly-rooms, and staircases leading thereto, and in many cases for sidewalks.

H. P. Macdonald, Jun. Am. Soc. C. E.—A case of very excessive floor loading in an office-building has recently been brought to the speaker's attention. In a room, 13 by 16 ft., were stored 1,500,000 pamphlets, weighing 25 lb. per thousand, besides a 1,600-lb. safe and sundry articles, which brought the total load to more than 40,000 lb., giving at least 200 lb. per sq. ft. of floor area.

George H. Blakeley, M. Am. Soc. C. E.—The high authority of the author will undoubtedly commend the proposed specification to those seeking guidance in the structural design of buildings, and, also, undoubtedly, will influence greatly the design of such work. The requirement of the consideration of concentrated loads in the designing of floors is a commendable provision which deserves the attention of those who have not already given the matter the attention that the importance of the subject warrants.

The loadings proposed by the author, however, should be considered carefully before general adoption, as it is a serious question whether they do not produce an asymmetrical design, making the floor joists heavier than necessary and the girders lighter than desirable, within the proper margin of safety.

If it is proper to provide for supporting a 5,000-lb. safe, then, only in exceptional cases could the entire weight of the safe be carried on a single joist. Such a safe would occupy an area of about 3 by 5 ft., and it is proper to consider such a distribution of the load in designing. With joists of 15 ft. span and spaced 5 ft. apart, it is impossible to place such a safe in any position where it would produce a loading of a single joist in excess of that caused by a center load of 3,500 lb. As the proposed specification does not purport to be a simplification of calculation, it would be proper to specify a definite area covered by the concentrated load, instead of considering it under the impossible condition of being concentrated at a mathematical point. Such a modification would produce, in general, a reduction of the sizes of floor joists, and without impairing the adequate carrying capacity.

On the other hand, it is questionable if the specification of a live load of 1,000 lb. per lin. ft. for girders is sufficient to cover the contingencies of loading that may occur in buildings. For example, a perfectly possible case is that of a wing of an office-building with two rooms, each 16 ft. square and with the girder under the partition between the rooms. This girder supports a floor area of 256 sq. ft. It is possible that the occupant of each office may have a heavy safe, which he would not place against the door partition nor against either of the two outer walls of the office, as it might interfere with the windows, but each would place his safe against the partition wall over the girder, in which case there would be a concentration of two safes on the girder. If these were 5,000-lb. safes, then the girder would be loaded by the safes alone equivalent to a uniform load of 1,250 lb. per lin. ft., or 25 per cent. in excess of the load for which the girder was designed, and without any further provision for carrying the 256 sq. ft. of floor area which must still be supported by the girder. Of course, with certain arrangements of the floor framing, with due regard to the area of floor space occupied by the safes, and with precise calculation, the effect of the loading produced by these safes would be very much reduced, and might be even as low as an equivalent of 750 lb. per lin. ft. of girder. But, under a possible arrangement of floor framing, these safes, with due regard to their area of floor space and with precise calculation, would produce an equivalent loading of 1,000 lb. per lin. ft., thus consuming the entire carrying capacity for which the girder was designed and without leaving any remaining provision for carrying the floor space which still must be supported by it. It is quite certain that the authorities in charge of the building would direct the safes to be placed where they would be supported by the girder, though they might direct that they be placed at the wall end or at the column end of the girder, which would materially lessen the effect of the loading. In many buildings, however, there is no intelligent supervision of these matters, and the disposition of safes is left largely to the convenience of the tenants.

In the case of office-buildings occupied by lawyers, it is possible to have bookcases filled solid with books from floor to ceiling, and on each side of the partition over a girder, producing a load of from 400 to 450 lb. per lin. ft. of girder. Such offices are usually of fair size, and, after deducting the effect of the bookcases there may be left in the girder a carrying capacity of less than 30 lb. per sq. ft. of the floor of the offices. Such offices at times may be fairly crowded with people, as in the case of an important hearing before a referee, and may have a floor load of at least 50 lb. per sq. ft. caused by a crowd of people at such a time.

In the case of store buildings, a live load of 1,000 lb. per lin. ft. for girders is insufficient to provide for the conditions of loading that will prevail in such buildings. In the construction of store buildings, the tendency is to space the columns far apart, and 20 ft. from center to center is not unusual. For such a case, with joists spaced at 5 ft. centers, according to the proposed specification, the joists would be designed for a live load equivalent to 160 lb. per sq. ft., while the girders would be designed for a load of only 50 lb. per sq. ft. On a limited area in such buildings it is not unusual to have a crowd of people equivalent to at least 80 lb. per sq. ft., especially on "bargain days" and during the holiday season. It is perfectly possible that on such occasions areas affecting a girder in such a building will be loaded considerably in excess of 80 lb. per sq. ft., as against the 50 lb. per sq. ft. provided for by the proposed specifications. Moreover, portions of store buildings at times partake of the character of light storage buildings, in the receiving and shipping of goods. Crockery and glassware in crates, set side by side and not piled, will produce a load of 120 lb. per sq. ft. Flannels in cases, piled 4 ft. high, produce a floor loading of 100 lb. per sq. ft. Cotton prints in cases, set side by side and not piled, produce a floor load of 93 lb. per sq. ft. Woolen dress goods, in cases set side by side and not piled, produce a floor load of 84 lb. per sq. ft. Brown-sugar barrels, set side by side, produce a floor load of 113 lb. per sq. ft. These and other articles handled in store buildings will at times accumulate over certain areas and fully load the girders; therefore, in the design for such buildings, the possibilities of such loadings should be considered and the girders be designed accordingly.

It is reasonable that the live-load carrying capacity of girders should have some relation to the floor area which they are to support, but, according to the proposed specification, girders spaced at 25-ft. centers would have no more live-load carrying capacity than girders of the same span spaced but half the distance apart, or at 12½-ft. centers. According to the proposed specification, each girder would be designed for a live load of 1,000 lb. per lin. ft., notwithstanding the fact that one of the girders would be called upon to support a floor area twice as great as the other. It is to be questioned if such a design will provide for the possibilities of loading which may occur.

The concentrated-load method of designing floor framing is commendable, but the concentrated load should have a specified area over which it is distributed, and such distribution should be considered in the design of the joists and the girders. It is probable that no girder should be designed for a load of less than 1,000 lb. per lin. ft., but, on the other hand, it does not seem advisable to design any joist or any girder for an office-building, or for a store building, for a load less than 80 lb. per sq. ft.

The reduction of live loads on columns is in more or less general use, but it is questionable if it is proper to consider any reduction of column loading in warehouse buildings. It is not quite clear that the proposed specification sanctions such a reduction of column loads for buildings of this type.

In selecting the proper live loading in the design of buildings, too much consideration should not be given to the question of probability, but due and proper regard should be given to reasonable possibilities of loading which may occur. A specification for general use should be very carefully framed in this respect, and, in the design of a building, should not leave an opening for work which might prove to be inadequate for reasonable possibilities of loading.

JOHN B. CLERMONT, ASSOC. M. AM. SOC. C. E.—It is wise, on the part of the designing engineer, in proportioning a structure, to consider that there is something more than low theoretical live loads, in designing office-buildings, churches, theatres, halls and other public buildings, especially in cases where alterations may be considered as probable.

In a certain case, alterations in an office building involved the moving of a large steel vault, which had been erected on the second story and supported on brick foundation walls to bedrock. This vault had to be transported over the floors of a portion of the old building and a portion of a new building adjoining. Its weight was about 12 tons, and the floors of both buildings were designed for a live load of 150 lb. per sq. ft.

In another part of this building, also on the second story, some changes were made in the steel construction, increasing the sizes of beams and girders and strengthening the supporting columns, in order to support another vault, weighing about 246 tons when complete. All parts of this vault were in sections, excepting the vestibule and door, and these weighed 17 and 10 tons, respectively. These pieces had to be transported over a section of the regular framing for a distance of about 40 ft. It was again found very advantageous to have a floor construction designed to carry a live load of 150 lb. per sq. ft.

While the two foregoing cases may be considered in a measure as extremes, specific cases of overloading in public buildings are of frequent occurrence. These may be caused in various ways, such as overcrowding of persons in small spaces during fire or panic; tenants in office-buildings securing storage space and loading the floors with paper, bulky sample-goods, records, etc., as high as the ceilings will permit; in offices which are used for show rooms where heavy case-goods are constantly handled and often stacked high for lack of space; in fact, it seems almost impossible to foresee the numerous variations in live loads possible in all kinds of public buildings.

The variations in live loads, amounting to as much as 100 per cent. in the building laws of different centers of population, mentioned in Mr. Schneider's paper, are easily accounted for on the ground of their vastly different requirements, both as to the conditions of their commerce and population and because each is based upon local experience. In consideration of this, the establishment of a uniform standard for live loads, in order to harmonize their constructions, would mean to do no less than harmonize their conditions, and would not be conducive to the best results. By this it is not meant that the disparities between their different requirements by law are not subject to a general system of revision for similar requirements, but that the difference between the accepted good practice of these several places and the acceptance of a uniform maximum standard live load of 40 lb. per sq. ft., would be a step in the wrong direction, and, with few exceptions, for all public buildings, a live load of less than 100 lb. per sq. ft. ought not to be considered.

Attention has been called to the shifting of cores in round cast-iron columns. In an office building erected in New York City about twelve years ago, and well inspected during erection, it was found before its completion that one of the interior columns on the first story was cracked for a distance of about 5 ft. below the shelf brackets at its top. This was a case of core shifting directly in the line of the joints of the moulds. The crack was straight down along the joint mark, and, while the column was of ample section to support the load, it was necessary to place stout wrought-iron straps around it. Recently, these straps had to be removed in order to make room for a marble covering, and, at the speaker's suggestion, the column was wound with light, flexible, seven-strand cable. This is an example of what may happen if the inspection of cast iron is not thorough.

OSCAR LOWINSON, ASSOC. M. AM. SOC. C. E. (by letter).—The author's effort to establish a standard specification for structural work is deserving of the highest commendation, and its success will be demonstrated by its adoption, with such modifications as more detailed experience than the author possesses in parts of the field which he has covered, will be a tribute to him for having brought it forward as a standard of reference. The following comments and suggestions are made in reference to some of the matters specified, and the hope is expressed that the compiled results of the discussion will be used as a standard to be changed only by reason of changing conditions or increased knowledge.

In the first place, the author is warned that his live loads for dwellings, hotels and apartment-houses are too small. Take a dwelling, for instance. In the life of every family there occur periods during which the apartments are crowded. Engineers are compelled to design buildings to meet the most unfavorable conditions of loading, and must be prepared for, not only a crowd, but a crowd stamping at the same time, which causes vibration in the building and must be provided for. The writer suggests for dwellings a minimum live load of 65 lb. per sq. ft. In country residence work, it is the writer's practice to design the first floor for a live load of not less than 80 lb. per sq. ft., and in city houses the sizes of the beams and girders are usually determined by their deflection, which should not exceed 1-30 in. per ft. because of the danger of cracking plastered ceilings.

In the case of hotels, the lobby and such rooms as may be occupied for public purposes should be placed in the same class as assembly-rooms.

The author separates assembly-rooms into two parts, those with fixed, and those with movable, seats. This is questionable practice, for it is frequently the custom in New York City theatres and assembly-rooms, to lay a secondary floor over the seats. The writer recommends for such buildings a loading of 125 lb. per sq. ft., his reason being that, under crowded conditions, such as during political meetings, the live load frequently amounts to 100 lb. per sq. ft., and the vibrtaion caused by stamping may easily increase this to the equivalent of 125 lb. Further, in view of Professor Johnson's recent experiments, wherein he obtained even greater loading in crowds, the writer believes the loading adopted by the author to be too light.

Stables and Carriage-Houses.—Stables and carriage-houses should be designed for automobile loads. The writer weighed some automobiles a short time ago, and found that a carriage automobile weighed 4,000 lb., with a concentrated loading of 1,500 lb. on a wheel. The writer would design a private stable in accordance with the loading given by the author, but for the carriage-house of a stable where trucks might be stored he would assume a greater load, his New York City practice being to design such a floor for a live load of 250 lb. per sq. ft. The stalls he would design in accordance with the author's figures.

Sidewalks.—It has been the writer's practice to design sidewalks for a live load of 350 lb. per sq. ft., and he would suggest that the distributed load be made equal to that figure.

Warehouses and Factories.—The writer has frequently been called upon to determine the weights on warehouse floors, and has found loads of 350 lbs. per sq. ft. and greater. He would not recommend less than 250 lb. where either paper or iron is to be stored. In fact, a storage building will frequently suffer because of this.

Though hardly pertinent to this discussion, an instance may be cited where a collapse occurred in a warehouse used to store barrels. Owing to vibration in the building, caused by passing trucks, the barrels became wedged, and threw a bearing wall out into the street. Wedging of this kind will concentrate at times an enormous load on a single section of floor.

Office-Buildings.—This is an age of great and quick changes, and, already, some of the older high office-buildings are being converted into storage buildings, with loads far in excess of those for which they were designed; and, although the writer would be satisfied with a distributed loading of 65 lb. per sq. ft. if he were sure the building would never be used for any other purpose, he thinks a provision of 150 lb. per sq. ft. not at all too large.

Wind Pressure.—The writer believes that a clause should be inserted providing that, where the walls are other than curtain-walls, and the skeleton does not proceed more than three stories in advance of the walls, temporary wind-bracing (wire cables, etc.) should serve. In all possible locations, stiff knee-braces should be insisted upon at all column connections.

Foundations.—The writer would separate wet sand from soft

clay. Quicksand, for instance, should never be used on which to found. Wet sand will frequently bear from 4 to 6 tons, as long as it is confined, and a restriction to 1 ton should not be made absolute. On the other hand, the writer would hesitate long before permitting a load of 6 tons on any but the hardest kind of gravel, and then only when it overlies rock. It is his practice to permit a load of 15 tons per sq. ft. on Portland cement mortar, and he allows only 10 tons per sq. ft. over Portland cement concrete.

Pressure on Wall-Plates.—For the pressure on wall-plates, the writer would use 200 lb. instead of 250 lb.

Shrinkage and Masonry.—Great trouble has been experienced with stone facings on brick walls because of the unequal shrinkage of the brickwork and the stonework; for this reason the writer suggests a class wherein stonework must be considered either as non-bearing, or it should pass entirely through the wall at certain distances in its height so as to get a proper bond. In case of shrinkage, in the former instance, the facing is held by galvanized-iron anchors.

Paragraph 37.—Timber Columns.—It is suggested that a more modern formula than the Gordon formula be used for timber columns.

Details of Floor Beams.—The writer would add that where a floor beam transmits a heavy load it should rest upon a girder if possible, instead of framing it on the web. Where the girder is composed of two or more rolled sections, and unless definite means are taken to transfer the load from one to another, the load should be applied on top if possible.

These specifications will serve very well as a standard for structural engineers. The writer would be pleased to see, included with such a set of standards, standards of practice in such matters as framing timbers, cutting stonework, differentiation of skeleton, cage and independent masonry wall construction, protection and preservation of materials of construction, other than those included by the author, details of construction on piling, and protection against discoloration, efflorescence, etc.

BOOKS AND PAPERS

THERE are two ways of writing an interesting book, the agreeable and the disagreeable, and it is a disappointment to find that Mr. Lethaby has chosen the latter in writing his recent book* on Mediæval Art, for he has a good deal to say that is interesting and worth saying, and it might have been said in a way to draw the reader along instead of making him hesitate to turn another page. The author's mistake—a common one with learned people—is his yielding to the belief that he must give constant proof of erudition by a perpetual citation of authorities in the body of his text. If this book and others which share its vice are intended only for the erudite, well and good; it probably, in such case, is immaterial whether the citations are mixed with the body of the text or relegated to the bottom of the page as foot-notes, where they need not necessarily interrupt the flow of the narrative or foul the scent of the line of argument.

It is a pity the pedantic method was adopted, for the author's thesis is an interesting one and he treats it fairly convincingly; but one is rather repelled from turning back and rereading a passage through dread of again encountering obstacles already once surmounted.

The following passage perhaps exhibits Mr. Lethaby's aim as clearly as any: "Of the causes which produced the phenomena of mediæval art," says he, "a large share is, as will be shown, to be assigned to Eastern forces acting in the West. A thousand years of receptivity seems to have come to a close with the Renaissance.

"The Gothic, indeed stands out as exclusively a Western style, but even this came as a short summer-time, fulfilling a long growth from wide-spreading roots, nourished by the rivers of Eden. There is much more of the East in Gothic, in its structure and fibre, than is outwardly visible. To account for Gothic, we have to account for its historic basis and for the whole atmosphere of mysticism, chivalry and work-enthusiasm, with all the institutions, monastic, romantic and social, which formed its environment. Looking at the slow preparation for, and the rapid passing of, Western Gothic art, and considering the sudden and entire breakdown of its traditions and ideals, I am drawn to the conclusion that the causes which underlay this art are to be found in a long infiltration of the Oriental spirit to the point of saturation, and then the bursting out of the new, yet old, energy shaped to Northern requirements."

To attempt to prove, by reference to "historic basis," that the mediæval art of Western Europe was due to "a long infiltration of the Oriental spirit" is surely an interesting undertaking, and in carrying it out Mr. Lethaby shows the reader how the wave-impulse flowed and ebbed, how Antioch and Damascus, Byzantium, Ravenna, Venice, Lombardy, Palermo, Avignon, each felt the movement and sent it pulsing onward to culminate in the short-lived glory of the completed Gothic. It is an interesting theory, and, told in a popular way, would have a certain breathlessness about it which would surely carry the reader off his feet. Something of the sort seems to have overtaken the author, for in his chapter on French Cathedrals he permits himself this flowing and delightfully expeditious, if somewhat superficial, bit of descriptive writing: "I can hardly leave the subject without at least writing the names of Autun, Avallon, Nevers, Strasbourg, Lausanne, Geneva, Dijon, Troyes, St. Omer, St. Lo. Tours, Abbeville, Bayeux, Mount St. Michel and Cologne, which is hardly the less French for having been built beyond the boundaries of France." You see, his defence is perfect; no critic can convict him of ignorance of the buildings he enumerates. But isn't it an easy way of filling space? Fortunately, Mr. Lethaby has no need to fall back on mere padding.

It is not so many years since it would have been positively startling to find an Englishman so little insular in his prejudices as to write thus about French Gothic: "It is not to be doubted that, in all this, France not only *led*, but *invented*, where others followed. In a very true sense what we call Gothic is the *Frenchness* of the France which had its centre in Paris. If, among the neighboring countries, the Gothic of England comes next, as indeed it does, it is because England was so far French. In the eyes of the Norman kings it must have seemed that their true capital was Rouen, and that England was but a conquered province. William the Conqueror, addressing the citizens of London, called them French and English. Not only French art but French thought and language in the thirteenth century held the predominating place in Europe." Such open-mindedness as this would, not long ago, have convicted Mr. Lethaby of sheer philogallicism and he would have been sent to Coventry by most of his fellows.

The book, which is well worth reading and studying, is illustrated by some sixty plates and more than a hundred cuts in the text. Apropos of illustrations, Mr. Lethaby repines that there is not, somewhere, a clearing-house, as it were, where travelers, students and archæologists, who nowadays are traveling, sketching and kodaking in every part of the world, might file tracings of their sketches, plans and diagrams, together with prints from their negatives, in such a way as to be of use to other students and investigators. As it is, the greater part of such scattered material is sometimes never used by its collector, who often does not suspect its intrinsic worth, or how important its bearing is on some other investigation in which he himself is not interested. Doubtless, such a clearing-house might be of value, but it would take a custodian of rare ability to classify it and make it in any degree available for practical purposes.

*"Mediaeval Art:" from the Peace of the Church to the Eve of the Renaissance. 312-1350. By W. R. Lethaby. London: Duckworth & Co.; New York: Charles Scribner's Sons. 1904. Price, $2.00, net.

THIS* is a handsome and well-printed octavo of about 230 pages, nearly half of which are taken up with prefaces and introductions, and an admirable index and by half a dozen appendices. These give the most important sections of the Factory and Workshop Act, and of the London Building Act, and the Regulations of the London County Council and of the Board of Education, in regard to schools and theatres, and in furtherance of the Public Health Act. These ordinances have, of course, no authority in this country, but the information and suggestions they embody are of great interest and not easily attainable, and it is convenient to have them brought together in this form.

Of the ten chapters which occupy the rest of the book, nine are given to Broad Principles, Aspect, Privacy, Roominess, Furniture, Grouping, Staircases, Miscellaneous Features, and Design, by which is meant the treatment of exteriors. Half a dozen pages are given to each of these topics. They contain a good many interesting though somewhat casual remarks, suggested by personal observation and experiences, and are not without value, though they hardly rise to a serious discussion of either principles or practice.

*"The Principles of Planning." By Percy L. Marks. Second Edition. Revised and enlarged. London: B. T. Batsford. 1905.

The rest of the volume, and much the most valuable portion of it, is occupied by a long chapter upon "Essential Features," covering over 70 pages, more than all the other nine chapters put together. This contains, under more than sixty headings, notes on the requirements of every kind of building, from piggeries to palaces, alphabetically arranged, from "abattoir" to "workhouse." Only a few paragraphs can, of course, be given to each, but the necessary meagreness of the text is supplemented by the ample illustrations of the points made, which are furnished, as the title page says, in "A Hundred and Fifty Plans of Various Types of Buildings, Chiefly of Executed Works by Eminent Modern Architects." These are all Englishmen, and, except Sir Horace Jones, Mr. Sydney Smimke, Mr. Waterhouse and Mr. Belcher, they may mostly be held, without offence, to have only a local fame. But the collection is of much intrinsic interest and can be made of great practical value. Whatever problem an architect has before him, he will probably find here serviceable suggestions toward its solution, suggestions none the less serviceable because the special conditions it attempts to meet are different from his own. The text contains a good deal of information about shapes and sizes, and these particulars and others are brought together at the end of the book in a "Tabulated List of Useful Memoranda," which covers 14 pages and supplies a want which the architects' handbooks fail to supply.

Mr. Marks has really little to say about Principles, and the tone of the book is neither philosophical nor scientific. It would be better described as "examples" of planning. But it is none the less interesting and suggestive.

As one often finds in books of this kind, oftener, perhaps, in England than in this country, the style is deplorable. How can so intelligent a man perpetrate such sentences as these: "The desirability of the unhampered movement of adequate light and heat in any apartment should not need insistance, but still it is too frequently the case that matters mundane are arranged as they should not be, hence the necessity of these remarks. . . . Should a fire-place nook be insisted upon, let the window lights be fixed; it does not answer well that there should not be any special light at all, as this would render the fireside all but useless for reading purposes, except at the expense of affecting the eyesight. However, it is better to overcome any lurking desire to introduce such an ingle-nook; let it be relegated to the limbo of the portefolio of faulty features." But the writer's ideas are general very sensible in spite of this fatuous language.

ILLUSTRATIONS

ACCEPTED LAY-OUT FOR THE CARNEGIE TECHNICAL SCHOOLS, PITTSBURGH, PA. MESSRS. PALMER & HORNBOSTEL, ARCHITECTS, NEW YORK, N. Y.

We must ask our readers to be good enough to understand that certain defects in these reproductions are due to the fact that the drawings had to be photographed, under glass, on the walls of the Architectural League Exhibition.

ELEVATION OF "GROUP I" OF THE CARNEGIE TECHNICAL SCHOOLS, PITTSBURGH, PA.

PLAN OF THE SAME.

"EUROPE": A FIGURE FOR THE UNITED STATES CUSTOM HOUSE, NEW YORK, N. Y. MR. DANIEL CHESTER FRENCH, SCULPTOR, NEW YORK, N. Y.

"GENOA": A FIGURE FOR THE UNITED STATES CUSTOM HOUSE, NEW YORK, N. Y. MR. AUGUSTUS LUKEMAN, SCULPTOR, NEW YORK, N. Y.

"VENICE": A FIGURE FOR THE UNITED STATES CUSTOM HOUSE, NEW YORK, N. Y. MR. F. M. L. TONETTI, SCULPTOR, NEW YORK. N. Y.

This figure, like its companion, "Genoa," is modeled at about twice life size.

ACCEPTED GENERAL PLAN FOR THE JOHNS HOPKINS UNIVERSITY, BALTIMORE, MD. MESSRS. PARKER & THOMAS, ARCHITECTS, BOSTON, MASS.

ELEVATION OF SCIENTIFIC MUSEUMS: ACCEPTED DESIGN FOR THE JOHNS HOPKINS UNIVERSITY, BALTIMORE, MD.

Additional Illustrations in the International Edition.

RIGHT-HAND DOORWAY: ST. BARTHOLOMEW'S CHURCH, MADISON AVENUE AND 44TH STREET, NEW YORK, N. Y. MESSRS. M'KIM, MEAD & WHITE, ARCHITECTS; MR. PHILIP MARTINY, SCULPTOR.

NOTES AND CLIPPINGS.

MOVING A BRICK HOUSE BY WATER.—A few months ago, says the *Scientific American*, we described the lifting of a large brick mansion 160 feet up the face of the steep cliffs that border the Allegheny River, near Pittsburg. Another remarkable feat of engineering is the removal of a large two-story brick building, sixty years old, weighing over two hundred tons, from its former location at Sharpsburg, a suburb of Pittsburg, to Allegheny, a distance of nearly four miles. This in itself is a very clever piece of work; but to make it all the more wonderful, most of the work was performed upon the water. From the moment the house was lifted until it was placed upon its new foundation there arose one complication after another. The long stretch of ground lying between it and the river was of such a soft, marshy nature, apparently without bottom, that the building was constantly in danger of collapsing; but even when these obstacles were overcome, and the house placed upon the shore of the river, a severe flood rose, surrounding the house to a depth half way to th second story, and placing it in midstream. In order to prevent it from being washed away, the blocking and rollers had to be weighted down with immense beams and steel rails. The rushing waters abating sufficiently, the house was moved and lowered upon a large coal barge. This being done, and everything made ready, it was gradually towed down the Allegheny River, but, due to the four low bridges between it and its destination, the barge had to be scuttled before passing each bridge, the water being pumped out afterward. To add to the excitement, it had to be lowered through a lock; and even when the river trip was completed, three tracks of the Buffalo Rochester & Pittsburg Railroad had to be crossed within thirty minutes.

MEDIÆVAL CHURCHES OF HOLLAND.—The work of the Dutch architects of the Middle Ages is, comparatively speaking, a failure, their buildings are often monotonous and devoid of originality, their construction frequently faulty and their detail poor and uninteresting, at any rate to a great extent. Of course there are churches in Holland—such, for instance, as the cathedrals of Maestricht, Utrecht, Bois-le-Duc and Breda, and the minster church at Roermond—which avoid all these defects. But these defects are certainly the rule in Dutch churches, and the exceptions are few and rare. What led to these defects was the fact that instead of originating an architecture for themselves the Dutch mediæval architects copied the plans of their churches bodily from the French; thus nearly all the churches of any size in Holland possess a chevet with radiating chapels, the naves generally have double aisles and chapels, and the smaller churches universally have one or more apses at the east end. The most usual departure which they made from the French plan was in exaggerating the length of the transept and using one western tower instead of two. There are, however, exceptions to this rule, for the church at Arnhem, erected between 1328-1340, has two western towers. Curious examples of this exaggeration of the length of the transepts are to be seen in the great Protestant church at Bergen-op-Zoom, where each transept has six bays, while the nave has only four bays. Having copied the plan of his church from France, the Dutchman borrows his detail ready-made from Germany. He never seems to have given sufficient consideration to the difficulties of site or material; thus, although except in a few instances driven to use brick, he adopts a plan almost peculiar to stone buildings and suggesting, if not absolutely requiring, vaulting to give a reason for its form and construction; and while driven by the insecure foundation to construct his roof of timber, this is generally made like a poor imitation of a stone roof.—*The Architect.*

WORLD'S FAIR ATTENDANCE.—The official report of the director of concessions and admissions of the Louisiana Purchase Exposition shows that the total recorded admissions for the exposition, from April 30 to December 1, inclusive, were 19,684,855, of which 12,804,616 were paid and 6,890,239 were free. The free admissions included from twenty to thirty thousand workmen who were admitted daily for several weeks to complete the work of construction of buildings and installation of exhibits. In the recorded admissions Sundays are not taken into account, that day having no relation to the official admission-records of the exposition.

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CONTENTS

IT is a curious commentary on American civilization, as understood by the Government of the moment, that it is easily possible to appropriate ten million dollars for two battleships while it is wholly impossible to secure a similar sum for the erection of forty or fifty public buildings, which, if not actually needed, would none the less exert a certain civilizing influence more in keeping with the traditions of the republic than are the marine ban-dogs on which the money is to be wasted. The arguments against the public buildings are plausible enough: they are not really needed, for the public requirements are already satisfied by paying rentals much less than the interest on the proposed cost; they are mere pawns in the game which Congressmen have to play in order to retain their position among the country's lawmakers—and the salary that attaches to it; and the actual treasury deficit increases. But the deficit is caused by the battleships; if we did not have these particular Congressmen, we must have others of about the same worth, and the buildings, if not at the moment needed eventually will be, and they are not, like battleships, purposed for destruction but for long life.

IF Speaker Cannon were the really shrewd politician he believes himself to be, in place of boldly thwarting the wishes of many communities, he would take example of Mr. Carnegie's method which has had so much applause, because of its supposed effect in fostering the self-respect of a community, and would say to the sponsors of the bills: "If the communities you represent are really in need of public buildings, let them prove it by raising by subscription so much of the estimated cost, and I will help them to get from the Government four dollars for each one they subscribe." Something of the sort, as things are, not infrequently happens, as a building site is occasionally either given outright or provided at a merely nominal cost to the public treasury. The principle of aiding those disposed to help themselves is a good one and in various ways is recognized and applied by the Government, as for example in providing pedestals or a supplementary contribution for the completion of some public statue, or, again, when the United States joins hands with a State or city in carrying on a public improvement, as is practically being done—the improvements of the waterway in Boston Harbor. It would have been of very real and widespread benefit to have the omnibus Public Buildings bill passed, and so it is regrettable that Speaker Cannon did not think of this fairly obvious means of accommodating his practice to his theories.

THE good Bishop of New York and his youthful architects would seem to be, as cathedral-builders, badly out-classed by the youthful German Emperor and his elderly architect, since the great Evangelical Lutheran Cathedral at Berlin, essentially a finished and furnished structure, was dedicated on Sunday last, while a single great arch, a finished aspidal chapel, and a small amount of work on the choir is all, above ground, that shows that the builders of the Cathedral of St. John the Divine, have not been idle during the same number of years that the Berlin cathedral-builders have been so busy. These two structures are always likely to be considered together, for not only were they conceived about the same time but actual work on them began in the same year. Moreover, the cause and purpose of their being are nearly identical, for both, one of them declaredly and the other constructively, were intended to constitute the provision of an adequate glorifying monument to the Protestant religion, one in the metropolitan city of Protestant Europe, the other in the metropolitan city of the Protestant New World. Apart from the liberal-minded purposes of the founders of the two monuments, the fabrics themselves are about as dissimilar as they well could be. Professor Raschdorff has designed a domed Renaissance building of the general type of St. Paul's, and has carried it on under the strenuous impulsion of his impetuous master and the watchful eye of the church-building Empress, without suffering from the delays imposed by scantiness of funds or the annoying interference of trade union leaders. Messrs. Heins & La Farge, on the other hand, are developing a complicated early Gothic building on a much larger plan and a very difficult site, and are hampered because their building accounts have to be liquidated largely from chance individual subscriptions and not from a treasury fed by Government and Imperial grants. The two buildings very well illustrate the law of opposition, for, we think, that, arguing from known premises, most persons would have looked for the Renaissance structure in America and for the Gothic one in Europe.

THOSE who prepared the list of incorporators named in the House bill for the incorporation of the American Academy in Rome have exhibited such

Entered at the Post Office at New York as second-class matter.

astuteness and so keen a sense of fitness and the adapting of means to ends that they deserve recognition as diplomats of no mean order. It is a distinguished company, truly, and, as most of the names are well known, we have tried to discover, through classifying them, why they had been invited to lend the weight of name and influence to this undertaking. We find, then, that the eighty-two signatories may be grouped thus: architects, twelve; painters, six; sculptors, five; landscape architect, one; museologists, two; politicians, two; literati, six; educators, eight; capitalists, nineteen; and a longer column, which we head "unknown," includes twenty-one names, which are familiar in a way, but which we do not dare to assign to any particular avocation, so will assume they belong solely to the guild of amateurs of art. But the list is judicious and catholic in its range, and could hardly be bettered. Two facts, however, declare themselves with particular insistence—the architects outnumber the combined painters and sculptors, and Macænas is not only there himself, but is accompanied by abundant understudies.

THE recent English publications record a most curious and interesting case of architectural atavism, in the way of a design for a new office-building for the London County Council which is projector, Mr. A. R. Bennett, M. I. E. E., proposes to place upon a new bridge, to be known as the Temple Bridge, which may be thrown across the Thames, from a point near St. Clement Danes over to the Surry Side. The bridge would be rather a complicated affair, connecting by inclines with the underground tramways as well as with the surface roadways, and all traffic of every kind would have to pass through what might be called the lower story of the county hall. This structure, designed in late Gothic and with a central tower and spire rising nearly five hundred feet above high-water mark, would have a total length of over one thousand feet, and a width of seventy feet or more, so that its three floors would give an office area of some four and a half acres, all admirably lighted, since the bridge would run north and south. Although Mr. Bennett proposes a reversion to a condition very like that of London Bridge in the days of Queen Bess, it is really a very taking scheme that he has developed, even its cost, some five million pounds, not seeming prohibitive to an American. But there are many who will feel that to shut out the beautiful river view with a solid building, however well designed, would be too expensive a job even at one-tenth of the cost. Apparently, although a clear height of thirty-four feet above high water is given to the arches of the bridge, sufficient that is for most river craft, the designer has had in mind the permanent level that may be created by the proposed great dam at Gravesend.

THIS reminds us that Mr. Wheelwright, who designed the great bridge now nearly built over the Charles, between Boston and Cambridge, is much troubled by visions of the probable effect on his design of having the water which the bridge spans stand permanently at a higher level than even the normal high-water line, which he naturally had to take into consideration while studying his design. When the Charles River dam is finished and the up-river basin filled, the voids, which, of course, are the effective element in designing an arch-and-pier bridge, will have a different shape and proportion from any that the designer had foreseen. That this is really a very serious matter from the artistic standpoint will readily be understood by any one who has studied and admired the Paris bridges when the Seine is running between its banks, quietly, and then studied them again when the river level had been raised many feet by the spring freshets.

IF it were possible to ascertain accurately the weight and number of persons on the section of the floor of the African M. E. Church of Zion, on Fleet street, Brooklyn, that gave way on Monday night during a funeral service, causing the death of ten persons and the injury of more than one hundred, it would form an interesting example for use in the discussion that is going on over Mr. Schneider's suggestion that the formulas ordinarily used produce floors of wasteful strength. The building and its floor had been in ordinary use with no evil result for some fifty years and the building inspector's examination of the ruin is said to show that the timbers were in good condition and simply gave way because of overloading. To determine just what weight the floor as designed should safely have endured, and the weight under which it actually failed would afford data of value in the discussion. We do not know whether the congregation in question belongs to the order of "shouting" Methodists, but, knowing the emotional character of the colored race, we think it not unlikely that the effects of rythmic vibration may have been added to the ordinary effect of live load.

A NEWSPAPER item says that a house in Saybrook, Conn., was believed to have been fired by the rays of sunlight focussed on a window-curtain by a gold-fish globe, and speaks of the matter as "curious." It certainly is that, but we believe that fires arising from such causes are by no means rare. Some two or three years ago, the writer's son, while at the dinner-table at Meran, in the Tyrol, called his pupil's attention to the way in which sunlight was being focussed on the tablecloth by a full water *carafe*, and suggested that enough heat was being generated to be dangerous. The lad's father, a university professor, opposed the idea, and as they argued they saw the spot on the tablecloth darken, and then flash into flame, which was handily extinguished by the water that had helped convert the *carafe* into a perfect lens. There are many authenticated cases of fires being caused by the old-fashioned bull's-eyes, once generally used for door-heads and side-lights, and the bubbles in crown and cathedral glass have proved to be equally dangerous. Large bubbles in glass used in the skylights over unfinished attics, places often used for the hanging of women's light dresses, should be carefully avoided, and for the same reason the skylights in hay-barns should be inspected. Probably more than one hay-barn, whose destruction was attributed to fermentation and spontaneous combustion, really was set afire through the agency of a mischievous little bubble in the skylight glass: it is fortunate, therefore, that skylights in barns and stables are not very common.

TESTS OF CEMENT, III.*

TIME OF SETTING AND TEMPERATURES ACQUIRED.

CEMENT, according to current specifications, has set when that state has been reached, after gauging, which enables the material to sustain a certain concentrated load, applied by means of a weighted wire, without indentation of the surface, and the time of setting the intervening period after certain other lighter loads have been similarly sustained, or is judged of by the resistance against penetration of a weighted wire through a given depth of cement.

Masons recognize a "second set," the first having been reached when stiffening of the batch is shown under the trowel. The cement is then retempered, and the subsequent induration called the "second set." A liberal flexibility characterizes these definitions.

By one of the weighted wire methods, used by Gillmore, set has begun when the cement will sustain a load of 46 lbs. per sq. in., and has finished when a sustaining power of 733 lbs. per sq. in. has been attained, using wires 1-12 in. and 1-24 in. diameters, respectively. By another method, in use abroad, the cement is said to have set when it will sustain a load of 427 lbs. per sq. in., using a wire .044 in. diameter. The duration is marked by the interval after the wire will no longer penetrate the full depth of the cement cake, 1,575 ins.

These are arbitrary methods evidently, still they aid in showing the comparative behavior of different brands, and this may be accepted as their chief merit, since the indications are that they actually show neither the commencement nor the completion of this stage.

More or less water used in gauging, of course, affects the immediate consistency of the mortar and, it is also well known, accelerates or retards, as the case may be, the time of setting, according to the current methods of determination. The following abridged table and diagram, taken from *"Tests of Metals,"* 1901, show results bearing upon this subject.

TIME OF SETTING OF CEMENTS, ACCORDING TO CURRENT METHODS.

Brand.	Water, per cent.	Time of setting — Gillmore's method — Initial, h. m.	Final, h. m.	Interval, h. m.	German method — Initial, h. m.	Final, h. m.	Interval, h. m.
Whitehall	20	1 49	5 19	3 30	1 28	4 44	3 16
	25	4 15	6 05	1 50	3 25	5 40	2 15
	30	4 59	7 19	2 20	4 33	6 53	2 20
Josson	20	0 30	4 35	4 05	0 05	3 40	3 35
	25	4 10	6 40	2 30	3 10	6 10	3 00
	30	5 35	8 05	2 30	4 50	7 20	2 30
Norton	30	0 37	2 12	1 35	0 25	1 00	0 35
	35	0 49	3 14	2 25	0 34	1 54	1 20
	40	1 02	5 17	4 15	0 40	3 37	2 57
Obelisk	30	1 40	4 05	2 25	0 25	3 20	2 55
	35	2 47	5 02	2 15	1 49	4 12	2 23
	40	3 15	5 20	2 05	2 50	4 15	1 25

The first and second brands in the table are Portlands, the third and fourth, Natural cements. The sample of "Whitehall" was 22 days old from the time of grinding. The "Josson" is a Belgian brand.

Taking these results for what the methods purport to show, it appears that the "Josson," gauged with 20 per cent. water, had initially set in 30 minutes' time after gauging, final set having taken place at the end of 4 hours and 35 minutes. With the same brand, using 30 per cent. water, the time of initial set was deferred until a period of 5 hours and 35 minutes had elapsed, final set occurring at the expiration of 8 hours and 5 minutes.

According to the other method of determination the corresponding periods were somewhat modified. It will be noticed in each method, when 30 per cent. water was used, that initial setting did not occur until about one hour later than final setting appeared to have taken place when only 20 per cent. water was used in gauging.

It is generally admitted that the recognition of the time when the cement is no longer indented by the weighted wire is an uncertain affair, in which case the responsibility for the vagaries of the table should be shared jointly by the personal factor and the method of determination. The rejection of material for failure to comply with the setting clause of the specifications should be cautiously enforced.

The influence of plaster was shown by some samples of "Star Portland," one of which contained, while the other did not, the usual small quantity of this ingredient, commercially employed as a restrainer to control the rate of setting. Without plaster, when gauged with 20 per cent. water, according to Gillmore's method, the cement initially set in 5 minutes, final set being reached in 15 minutes. With plaster, using the same quantity of water as before, the times of setting were 2 hours 10 minutes and 4 hours 25 minutes, respectively. Using more water in gauging the differences were inconspicuous, and with 30 per cent. water, neither sample would sustain the lighter weighted wire within a period of 5 hours after the time of gauging.

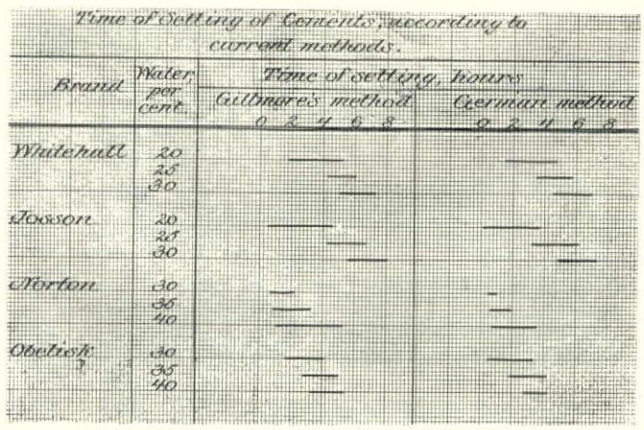
In a later article there will be occasion to refer to the compressive strength of these two kinds of cement, where it will be shown that some portions, at least, had not reached final set for a period of 4¼ days after gauging.

The results on another brand will also be mentioned in which the indurated cement was re-ground and re-gauged after an interval of 6 days 2 hours, and which thereupon displayed cementitious properties in a certain degree.

From these examples it seems that long intervals may follow the time of gauging before the chemical reactions shall have become completed. It is not thought inconsistent with observed data, to infer that conditions of exposure may be such that complete hydration of some cement grains may be indefinitely postponed. Incident to the progressive hydration of the different-sized grains, as indicated in the specific gravity determinations, the finest ones being the first to reach a state of chemical repose, regrinding at a subsequent period might be the means of presenting unhydrated surfaces for deferred action.

The moment when setting actually begins occurs, doubtless, immediately after burning, upon first exposure to moisture, even superficially in the clinker. Fine grinding brings the material into better condition to unite with moisture suspended in the air or with the water used in gauging.

According to current methods, however, that time of setting embraces an intermediate period during the earlier stages of the process, arbitrarily taken, the position of which may be varied at will, and the limits of which are more or less uncertain of recognition. Dry, freshly ground cement may be pressed into the mold by the hand, so as to resist the penetration of the weighted



wire of one of the methods herein described, and according to this method, setting has thereby been inaugurated. Loose cement poured into a quantity of water and removed after a time will, at its lower end, be found capable of sustaining the heavier weighted wire of the other method, while at the upper end it will not possess sufficient strength to do so, without indentation.

As a result, therefore, of variation in strength, incident to difference in density of structure, one end will appear to have set, while at the other end the setting will still appear in progress, both ends having been exposed to the same conditions, excepting the weight of the superimposed material which affected the lower part. In respect to the query whether current methods afford essential aid in the use of cements, it may be remarked that the results of tests on compressive strength do not tend to enhance their importance.

TEMPERATURES ACQUIRED DURING SETTING.

An evolution of heat accompanies the chemical reactions of the process of setting which is very marked with neat Portlands, less pronounced with Natural cements, and with lean mortars hardly noticeable.

The size of the specimen has an influence on the temperature attained. With a small lump of material a slight rise occurs while in a large cake the temperature may reach and even exceed that of boiling water.

Observations on 12-inch cubes of neat Portland cement show a rise in temperature at the center of the mass as soon as the

*Continued from page

material is placed in the mould. At first the rise is slow, from one to four hours usually elapsing, after gauging, before the rate of increase becomes most rapid, which then continues until the maximum temperature is attained. This occurs at six to twelve hours after gauging. The crest with neat Portlands is sharp, and is followed by a slow decline, the temperature dropping to about that of the atmosphere at the end of a day and a half.

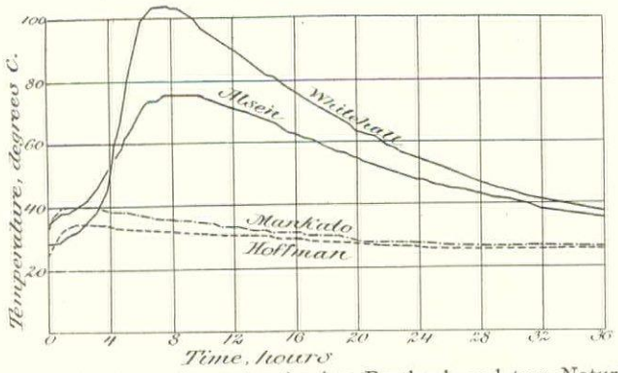
With Natural cements there is a more prompt rise, which is found to be well advanced at the time of the first observation, and may reach a maximum during the first two hours.

The mortars do not gain rapidly in temperature at any time during the process of setting, nor do they reach a very high limit. With mortars leaner than those containing equal parts of cement and sand the rise is but a few degrees.

Referring to the diagrams here presented, No. 1 shows the

No. 1. 12 inch cubes.

Temperatures acquired by cements while setting.



curves of a domestic, and a foreign Portland, and two Natural cements.

The "Whitehall" was twenty days old from the time of grinding, therefore had had little opportunity for partial hydration, and was in a favorable state for the display of energetic chemical activity. It was gauged with 25.2 per cent. of water. The maximum temperature attained was 103.5 degrees C., which was reached 7½ hours after gauging. For nearly three hours the temperature was maintained above that of boiling water. At the end of 8 hours the temperature slowly fell, and one and a half days after gauging was still above that of the atmosphere.

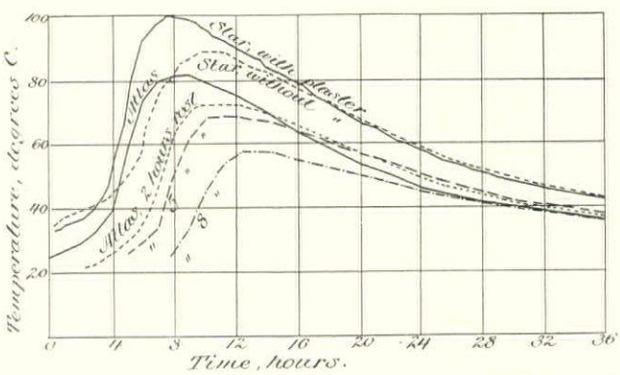
The cube of "Alsen Portland" reached a maximum temperature of 75 degrees C. The age of this cement from the time of grinding was not known, but was at least several months. Assuming that the finer grains had in the meantime experienced an opportunity of hydrating, its lower temperature curve would be accounted for.

The two Natural cements, of the diagram, displayed a prompt rise, but did not reach a high limit, in comparison with the Portlands. The "Mankato" reached 40 degrees C., the "Hoffman" 34 degrees C., the water used being 44.6 and 36.5 per cent., respectively.

On diagram No. 2, are shown two curves with "Star Port-

No. 2. 12 inch cubes.

Temperatures acquired by cements while setting.



land," of which the one having plaster in its composition reached the higher temperature of the two.

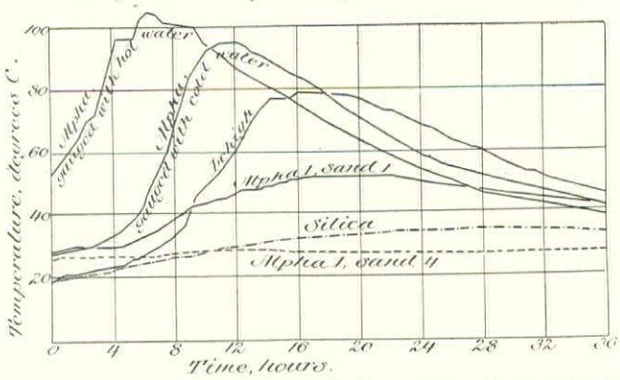
Four curves with "Atlas" cement are shown, of successively diminishing crests. In the first cube of the series the cement was put into the mould immediately after gauging. With the other three cubes the material remained in the mixing bed 2 hours, 5 hours and 8 hours, respectively, before it was placed in the moulds, and allowed to remain undisturbed thereafter.

When spread out in the mixing bed cement does not acquire a high temperature, and at the time these later cubes were formed no marked advance had taken place. During this stage, however, hydration of the cement went on and the lower curves of these subsequently formed cubes represent the rise of temperature during the later stages of the chemical reactions. More water was used with the delayed cubes, and this was found to contribute in keeping down the temperatures. The cube first in the mould had attained its maximum temperature, 81.5 degrees C., at the time the 8-hour batch reached its mould.

On diagram No. 3 is shown the behavior of "Alpha" cement when gauged with hot and with cold water. Prompt and energetic action characterizes the behavior of both Portlands and

No. 3. 12 inch cubes.

Temperatures acquired by cements while setting.



Natural cements when gauged with hot water. Its accelerating influence is shown by the maximum temperatures being sooner reached and higher limits attained than by the use of cold water. The lower curves of mortars are shown on this diagram. The curves of 1:2 and 1:3 mortars would, if plotted, occupy places between those of the 1:1 and 1:4 mixtures.

The Silica cement of this diagram was made of 40 per cent. "Lehigh Portland" and 60 per cent. crushed limestone. Its behavior, which was similar to a mortar, and the relation of its curve to that of the neat "Lehigh" is here indicated.

A rise in temperature of a few degrees only, much less than that displayed by these examples, is traditionally attributed to the presence of free lime, and by some looked upon with disfavor.

To this it may be remarked that the strongest cements as a class have in these tests been found possessed of the greaetst heating capacity, not infrequently exceeding the temperature of boiling water.

Attention is directed to the fact that some cubes did not attains their maximum temperature until a period was reached later than the so-called time of final set under the needle-indentation and penetration methods. It would obviously be regarded as inexpedient to assume that final set had really taken place while the chemical reactions, as indicated by the rise of temperature, were still in progress and prior to the time of its most active state.

In reviewing the indications of the specific-gravity determinations of the ground material, the evidence of the temperature curves and the influence of more or less water used in gauging, with the results of the current methods of judging of the time of setting, it would seem that the weight of evidence was against attaching great importance to the indications of the latter tests.

J. E. Howard.

WATERPROOFING CONCRETE STRUCTURES.*

EVER since concrete has entered so largely into the field of construction as a substitute for stone masonry, there has been more or less discussion as to its permeability, and various expedients have been resorted to to prevent the seepage of water through the material. This refers more particularly to the large masses of concrete built for engineering structures. I am aware that there has been more or less success in making concrete impervious to the action of water by various means, but do not think that any of them have given such satisfaction as to become generally used.

*A paper presented to the American Cement Users' Association by W. H. Finley, C.E.

It is a question whether the addition of alum, soap and other extraneous material does not affect the lasting qualities of the concrete. If the announcement of the Star-Stettin Portland Cement Works that they are now manufacturing, according to a process invented in Germany, a waterproof cement which will become impervious to water, will resist the action of frost, heat, hot water, sea water and diluted acids, is borne out, the question of waterproofing concrete is settled for all time. However, concrete, as usually built in many engineering structures, is not impermeable to the action of water, and some method of waterproofing the same, I think, is vitally necessary. That this is appreciated by engineers is clearly evidenced by the amount of waterproofing that is now being done on concrete arches, abutments, retaining walls, etc. I have recommended for years the necessity of waterprofing both stone masonry and concrete structures where there was any danger of seepage of water, and believe that such a precaution will extend the life of the structure.

A recent examination of concrete abutments, retaining-walls, etc., built in Chicago some years ago, disclosed the fact that water was seeping through the mass in several places, particularly along the parting planes where the work was not carried on continuously. This condition is frequently observed in concrete construction, and I think could be entirely prevented if the back of the structure was thoroughly waterproofed with asphalte.

Some years ago I had occasion to repair some masonry arches built in 1862 that were rapidly disintegrating owing to the infiltration of water. These arches were uncovered, the damaged stone replaced, and the extrados of the arch was plastered with cement concrete and then thoroughly waterproofed with asphalte. Time has demonstrated that this work was very successful. I have since uncovered a number of arches that were leaking, and found that the concrete backing did not prevent the entrance of water. These were cleaned off and waterproofed with asphalte in each case. It is now the practice on a number of railroads to thoroughly waterproof all arches, abutments, retaining-walls, etc. The method generally employed is to use as a first coat asphalte cut with naphtha, to be applied as a paint to the concrete after the same is perfectly dry, and then cover the surface with an asphaltic mastic composed of one part of asphalte to four of sand; this to be smoothed off with hot smoothing irons and thoroughly tamped and pressed into place. If the filling over the arch is ordinary gravel or dirt no other work will be necessary, but if it is filled with broken stone or stone chips it is better to cover the surface of the asphalte with washed roofing gravel so that the broken stone will not cut or damage the asphalte surface.

There are various other methods employed in waterproofing concrete surfaces with asphalte, such as the use of burlap or other fabric embedded in the asphalte coating. It is very difficult to make hot asphalte adhere to a concrete surface, however dry the same may be, unless it is heated by artificial means. Hot asphalte laid on ordinary dry concrete will not adhere, and can be rolled up like a blanket after it has cooled. I have had some success in applying hot asphalte direct to concrete surfaces after the same had been dried and heated with hot sand, but much prefer the use of the asphalte cut with naphtha applied as painting or swabing coat. The cost of this work with present prices of first-class asphalte will range from 10 to 20 cents per square foot, depending upon local conditions. It does not require any special expert knowledge for its application. After a brief coaching the forces as usually employed can produce a satisfactory job.

It might be well at this time to say something about the quality of the asphalte to be used for waterproofing purposes. In the past few years there has been a large development of asphalte for this purpose, and it is now possible to get, at a reasonable price, a pure asphalte that will not flow under a temperature of 212 degrees and not become brittle, when spread thin on glass, at 15 degrees below zero. Also it will resist the action of acids and alkalies.

The following specification is one that I have used with good results in waterproofing works:

"Asphalte shall be used which is of the best grade, free from coal tar or any of its products, and which will not volatilize more than one-half of 1 per cent. under a temperature of 300 degrees Fahr. for ten hours. It must not be affected by a 20 per cent. solution of ammonia, a 35 per cent. solution of hydrochloric acid, a 25 per cent. solution of sulphuric acid, nor by a saturated solution of sodium chloride.

"For metallic structures exposed to the direct rays of the sun the asphalte should not flow under 212 degrees Fahr., and should not become brittle at 15 degrees Fahr. when spread thin on glass. For structures underground, such as masonry arches, abutments, retaining-walls, foundation walls of buildings, subways, etc., a flow point of 185 degrees Fahr. and a brittle point of 0 degree Fahr. will be required. The asphalte covering must not perceptibly indent when at a temperature of 130 degrees Fahr. under a load at the rate of 15 pounds per square inch, and it must remain ductile at a temperature of 15 degrees Fahr. on metal structures and at 0 degree Fahr. on masonry structures underground.

"Before applying asphalte to a metal surface it is imperative that the metal be cleaned of all rust, loose scale and dirt, and if previously coated with oil this must be burned off with benzine or by other suitable means. The metal surface must be warm, to cause the asphalte to stick to it, and the warming is best accomplished by covering it with heated sand, which should be swept back as the hot asphalte is applied. When waterproofing masonry structures, if the surface cannot be made dry and warm it should be first coated with an asphalte paint made of asphalte reduced with naphtha. This is particularly necessary for vertical surfaces.

"The asphalte should be heated in a suitable kettle to a temperature not exceeding 450 degrees Fahr. If this is exceeded it may result in 'pitching' the asphalte. Before the 'pitching' point is reached the vapor from the kettle is of a bluish tinge, which changes to a yellowish tinge after the danger point is passed. If this occurs, the material should be tempered by the addition of fresh asphalte. The asphalte has been cooked sufficiently when a piece of wood can be put in and withdrawn without the asphalte clinging to it.

"The first coat should consist of a thin layer poured from buckets on the prepared surface and thoroughly mopped over. The second coat should consist of a mixture of clean sand or screenings, free from earthy admixtures, previously heated and dried, and asphalte, in the proportion of 1 of asphalte to 3 or 4 of sand or screenings by volume; this is to be thoroughly mixed in the kettle and then spread out on the surface with warm smoothing irons, such as are used in laying asphalte streets. The finishing coat should consist of pure hot asphalte spread thinly and evenly over the entire surface, and then sprinkled with washed roofing gravel, torpedo sand or stone screenings, to harden the top. The thickness of the coating will depend on the character of the work and may vary from ¾ to 2 inches in thickness.

"Where a quantity of asphaltic concrete is required, such as in trough floors on bridges, a concrete should be made in the proportion of one part asphalte, two parts sand and three parts limestone screenings, thoroughly mixed and rammed into place with tamping irons on the first coat of pure asphalte with which the metal was originally covered. At all drainage holes large-sized stone should be carefully placed to insure perfect drainage."

It may not be out of place in discussing the question of waterproofing to call attention to the necessity for provisions for drainage in all concrete and masonry structures. This has not been given as much attention as it should receive. Whether waterproofing material is applied or not, the question of thoroughly draining the structure is of the greatest importance.

In ordinary building construction sufficient attention has not been given by architects and builders to the proper waterproofing of their foundation walls. I have observed recently in this vicinity a number of buildings in process of construction where the excavations for the cellar and lower foundations were made in a clayey material and concrete foundation walls put in without making any attempt to apply a waterproofing or damp-proof coating to the wall, or to provide suitable drainage to carry off the ground water.

In this particular we are falling away behind even the early Roman architects and builders. In all the examples of their work it is evident they gave the greatest consideration in their construction to proper methods for keeping their foundation walls dry, and we cannot do better to-day in such matters than follow the advice of the great architect Vitruvius, who, writing about twenty-five years B. C., described methods of waterproofing and ventilating foundation walls that compare favorably with the best methods used to-day, excepting that we may have better materials for waterproofing than were known at that time.

Asphalte, I believe, makes the best damp-proof or waterproofing material that can be used in foundation walls and for all structures where such provision is necessary. It has been used from the earliest times for the purpose of protecting material from air and water, and we have examples of it in our museums where the mummy cases were sealed with this material more than 3,000 years ago.

BOOKS AND PAPERS

WE closed this really interesting and instructive picture-book* with the ejaculation: "What a chronicle of the 'ready-made!'" Of all the forty-odd "palaces," "châteaux," "mansions"—they are actually so called—there is not more than one or two that suggests growth. They, the great majority, suggest nothing so much as that they have been seen in a shop window by some one with a long purse and incontinently bought, finished, furnished, decorated—complete inside and out; nothing left to be done later, no chance for reconsideration or change of mind, no opportunity for blending in one's own whimsies and no possibility left for one's peculiar idiosyncracies to express themselves.

These buildings unquestionably do have character and individuality, but it is the architect's individuality that is expressed, not the owner's; and when it comes to a man's home, it seems but right that it should bear the stamp of his individuality and not that of some other fellow, as different from himself as day is from night. And yet it is not strictly fair to say that these houses express the individuality of their designers, so many of them are French châteaux, Italian villas, Roman palaces, which might, so far as individuality goes, have been designed by men dead centuries ago, or by any one of five hundred of their modern successors who chanced to have a fairly good collection of books and photographs.

We cannot quite blame the American architects who have produced these exotic structures for their clients, for it must have been "great fun" to build them; but what have the owners been thinking about that they should allow their architects to do such things with their money? The ordinary man who builds, likes to have his house fit his own idiosyncracies, to express his own ideas of comfort, if not of beauty, and enjoys nothing more than, at a later day, "throwing out a bay window," or "running out an L" at the very point and in the very direction use and experience have taught him would produce the most comfortable and cheerful results. But these elaborate homes of the rich are finished—complete works of art that the artist forbids them to meddle with: they are the very apotheosis of the ready-made.

Were it our fortune to be a plutocrat, so that it was necessary to build a "show place" to use up portions of unneeded income and so had to employ a fashionable architect, we would be likely to say: "Well, if this sort of thing is the latest mode—if I've got to have a great colonnade in front and a pergola behind, if I can't have any blinds, if I must have a staircase wide enough for a regiment, and mosaic floors that give me goose-flesh every time I touch them, then, go ahead. But, mind, the third story is to be left unfinished. After you and your men have gone, I'll get a few carpenters and finish that off to suit my own comfort and I'll live there!"

But all this does not explain what sort of a book it is that has so stirred our non-plutocratic spleen. Briefly, the book is as much intended for show as are the places it illustrates. It is a direct imitation—a long distance behind—of that wholly admirable and truly artistic book, "*Gardens Old and New*," published three or four years ago in England. But while that was a wonderful piece of bookmaking in every one of the many departments of the art, and while its illustrations were full of poetry and natural and artificial interest enhanced by historic and legendary association, this American imitation constantly irritates one because photographer, plate-maker and printer have failed to do justice to one another's work, while the subjects illustrated possess neither legendary nor historic interest and smack mainly of the dollar. In the entire series of plates, only those which illustrate some interiors in Mrs. Hearst's "Hacienda" have the charm of personal individuality about them.

The architects whose buildings are here shown have done their work well, and most of the buildings in their exterior treatment are creditable pieces of design and, because of their scale and elaboration, satisfactorily account, under the item construction, for a proper share of the obviously large total cost in each case. But in the greater number of cases the buildings are pure exotics. Mr. Hunt's over-elaborated French château "Biltmore" is no more in place amid American setting than is Mr. Haydel's castellated "Grey Craig," or Messrs. Carrère & Hastings's "Bellefontaine," or half a dozen more that prove how convenient it is for the modern American architect to have a good working library. It really does not seem as if Americans, however rich they actually may be, can ever really feel at home in buildings that have so little connection with the soil and the customs of the fathers.

On the other hand, it is equally impossible that they should not feel at home—and behave as they feel—in such home-like Colonial houses as "The Orchard," Mr. J. L. Breese's home at Southampton, N. Y., by Messrs. McKim, Mead & White, and "Ashford," the home of Mr. Frank Squier at Greenwich, Conn., by Mr. Wilson Eyre. Even the houses of obvious English derivation, such as "Craigston," the home of T. C. Hollander at Wenham, Mass., by Mr. W. G. Rantoul; "Talbot House," the home of Mr. Talbot J. Taylor at Cedarhurst, N. Y., by Mr. C. A. Rich, and the home of Mr. J. G. Wright at Brookline, Mass., by Messrs. Chapman & Frazer, look more as the home of an American man of wealth should look than these other translations from French and Italian surroundings.

But it is not the exteriors and their architectural treatment that distress us, it is the shoppy and theatrical interiors, almost all of them purely factitious, and the great majority simply tawdry. Does the ordinary American man—for in spite of their money these owners are but ordinary American men, like the rest of us—feel that his "tweeds" or even his black "dress suit" or his "Tuxedo" is really in keeping with tapestries, girandoles, consoles, tabourets, mirrors and all the other furnishings originally designed for association with the show-clothes, feathers, silks and jewels of the court of the roi soleil? or is his American commonplaceness any more in keeping with marble seats, which may have been gratefully warm to the toga-clad Roman, the folds of whose draperies harmonized with the statues about him, but which offer but cold comfort in this climate? The blundering is more obvious in the interior than in the exterior treatment, and the probable explanation is that the interiors were turned over to the upholsterer and decorator to work their will upon, with but little restraining oversight from the architect and none at all from the overawed owner, compelled to play the rôle of Mr. Boffin amid magnificence he did not understand and vaguely yearning for his own familiar dust-heap.

Architecturally, this book is interesting and instructive, but it is still more so as a key to American manners and customs, which exhibit the natives of this country as a species of hermit-crab, ready to make a home of any shell cast off by a remote and alien generation.

*"*American Estates and Gardens.*" By Barr Ferree, Editor of the *Scientific American Building Monthly*, Corresponding Member of the American Institute of Architects, and of the Royal Institute of British Architects. New York: Munn & Co. 1904. Price, $10.

IN writing of the death of the late Professor Kerr, we chanced to speak of a novel he wrote in his youth, and that led us to enumerate the few novels we happened to recall which had architects for their heroes, and, amongst these, mentioned "*The Common Lot*," then publishing in the *Atlantic Monthly*. This story is now issued in book form, and the publishers have kindly sent us a copy,* thinking that because its hero is an architect we would be glad to make such mention of the book as would stimulate its sale amongst the hero's fellow-professionals. Frankly, we wish we had not had the book sent in, for we can only speak of it as one of the most repulsive stories we have ever read. We presume that Mr. Herrick must have felt he had a "purpose" in writing the book, but we are at a loss to discover where such purpose is revealed. Nor can we guess what the author means by his title. Is it the "common lot" for an architect to be dastardly weak and little scrupulous where his income comes from? We hope not, we believe not. Is it the "common lot" for architects to put themselves in the power of speculating builders and allow their buildings to be "skinned" while the owner is paying for full compliance with reasonably perfect specifications? Again, we believe not. Is it the "common lot" for architects to have true-hearted wives who believe in them as geniuses long past the time when other people have found them to be whited sepulchres as to both artistic ability and business morality? We hope it may be. Mr. Herrick may have begun life in an architect's office, so far as we know; if not, he has posted himself very thoroughly as to what is known to go on sometimes—but only sometimes—in the building world, and so his story has an air of verisimilitude, which one, who respects both his profession and the great majority of those who practise it, cannot but feel is very unfortunate and really somewhat libellous.

The story, in brief, tells how a young architect, a facile and

*"THE COMMON LOT." By Robert Herrick, author of "*The Web of Life*," "*The Real World*," etc. New York: The Macmillan Company. 1904.

"brilliant" designer, is possessed with the get-rich-quick mania, comes under the influence of a speculating builder and allows him to skin his buildings, sharing in the plunder and living the life of a member of the local swelldom. One of their buildings, an apartment-house, advertised as "thoroughly fireproof," burns and causes the loss of several lives. Conscience stricken, the architect recovers his moral balance and decides to stand trial like a man, in place of escaping out of the country. Through the influence of his lawyer, a one-time lover of his wife, the defendant is cleared of the criminal charge and begins life over on a simpler scheme.

Mr. Herrick uncovers an ulcer, and if it is artistic or good work to paint an ulcer, then he is to be applauded, for no one can mistake it for anything beneficent; it is unmistakably malignant, unpleasant and as little well worth while painting as anything that can be named. We do not believe in making the delights of heaven attractive solely by portraying the discomforts and repulsiveness of hell.

ARCHITECTS' REGISTRATION IN EUROPE AND THE UNITED STATES.

THE following particulars concerning the position of architects in European countries and the United States, which have been collected for the purposes of the Institute Committee now sitting on the question of Registration, are published in the current issue of the *Journal* of the Royal Institute of British Architects.

GERMANY.—The profession is free. Architects who have studied in the State High Schools can enter for the examination known as the Government Architect (Staat Baumeister) examination. This title is obligatory for architects of public works. It is now almost always required for city architects. Ordinary practising architects desiring to hold an official position pass this examination. The three technical high schools of Berlin, Hanover, and Aix-la-Chapelle grant this diploma after a course of four years. The other technical schools do not grant a diploma, but a certificate on leaving school.

AUSTRIA.—The profession is free, as the architect is regarded as an artist. There are Government diplomas, but they are little sought after by artists, as they only have a scientific value.

HUNGARY.—The profession is free; but the architect who would hold an official position must be provided with a diploma granted by the Polytechnic School of Buda-Pesth, after a four years' course. The Courts only recognize as official experts or "directors of buildings" holders of this diploma.

HOLLAND.—The profession is free. The State Polytechnic School of Delft grants a diploma of architect-engineer after a four years' course. This is in no way obligatory.

BELGIUM.—The profession is free. No diploma at all.

SWITZERLAND.—The profession is free. No diploma at all.

ITALY.—Compulsory diploma. Granted by the Government on the recommendation of the Examination Commission of the Government "School of Application." The scientific side is dominant. The same diploma is given to the architect as to the engineer.

SPAIN.—Compulsory diploma. Architect must pass examinations after his studies, and be provided with the diploma granted by the only two schools that exist in Spain: the Superior School of Architecture, Madrid, and the School of Architecture, Barcelona. Diploma conferred through Minister of Public Instruction.

PORTUGAL.—The profession is free. Diplomas granted by the State Schools of Lisbon and Oporto, but not obligatory in any way.

SWEDEN AND NORWAY.—The profession is free. No diploma at all.

RUSSIA.—Compulsory diploma or certificate. Diploma granted by the Imperial Academy of Fine Arts, the Moscow School of Architecture, and the State Polytechnic Schools. Certificates granted to bona-fide practitioners and assistants after passing an examination held by the Technical Committee of the Minister of the Interior. This does not give the title of architect, but the right only to practise.

GREECE.—The profession is free. The Government gives no diploma; but the diploma given by the School of Art of Athens is sought for only by those who wish to occupy an official position.

TURKEY.—The profession is free.

UNITED STATES OF AMERICA.—The profession is free—except in the State of Illinois, where architects must have a license. This license is given by examination by the State Jury, or from the diploma of the University of Illinois.

FRANCE.—The profession is free. The Government gives diplomas to the nominees of the Ecole des Beaux Arts, and the title "Architecte diplômé par le Gouvernement"; but these diplomas give no privileges or rights whatever. And so no official need possess this diploma, or any other certificate granted by an examining body.

COMPARATIVE TABLE.

Profession is absolutely free in:	Profession is free, but Government officials require diploma in:	Diploma is required in:
Austria.		Italy.
Holland.	Germany.	Spain.
Belgium.	Hugary.	Russia.
Switzerland.	Greece.	Illinois, New Jersey, California (U. S. A.).
Great Britain.		
Sweden and Norway.		
United States (save in three States).		
France.		
Turkey.		
Portugal.		

APHRODITE SPEAKS.

[For the sake of future generations, it must be explained that the fair soliloquist is supposed to be the statue now on exhibition in New York, assumed by some to have been carved by Praxitiles and by others to be simply a modern forgery.—EDS.]

STILL they come, these gaping mortals;
How they throng my temple's portals,
Strangely clad, to bow before me.
"Rosy maidens, youths, adore me!
I am she that Love makes mighty!
I am sea-born Aphrodite!
Cyprus, Cnidus, Thebes obey me;
Corinth crowns me. Haste to pay me
Homage due!" * * *

What? Ne'er a flower?
Have I lost mine ancient power?
Where are all my sacrifices?
Weighty Doubts and sage Surmises,
These they bring—a cold oblation!
Is this modern adoration?
Here's no thought of vows or praying.
Hark! what's that his lips are saying?
Sooth! He thinks my past is shady.
What a way to treat a lady!
Well! of all the stupid creatures!
This one doubts who carved my features!
That one turns;—I'm quite indecent!
This one says my sculpture's recent—
I'm a fraud; and that barbarian
Says my marble isn't Parian.
This declares me true Pentelic;
That avows me quite a relic.
(Thank you!) Hush your learned patter;
Cease your doubts! What does it matter?
View me. Think me what you please.
Think that great Praxiteles
Carved me. Think the tale a myth;
Call my sculptor "Jones" or "Smith."
Count my years by thousands. Say
I was fashioned yesterday.
Tell me then, all else forgot,
Am I beautiful, or not?
Art is ageless. Athens knew
Naught in Art but False or True.
Changed is now the race of Earth,
Sordid grown; to measure worth
Simple rules no more suffice.
Greece loved Beauty; ye love Price.

Arthur Guiterman, in N. Y. Times.

ILLUSTRATIONS

MADISON AVENUE PRESBYTERIAN CHURCH, NEW YORK, N. Y. MESSRS. MCKIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y. FRONT ELEVATION OF THE SAME.

AUTOMOBILE HOUSE FOR WM. L. ELKINS, ESQ., ASHBOURNE, PA. MR. HORACE TRUMBAUER, ARCHITECT, PHILADELPHIA, PA.

GLENDALE M. E. CHURCH AND CHAPEL, EVERETT, MASS. MR. C. H. BLACKALL, ARCHITECT, BOSTON, MASS.

BUNGALOW FOR GEORGE F. WILDE, ESQ., DUXBURY, MASS. MR. C. H. BLACKALL, ARCHITECT, BOSTON, MASS.

Additional Illustrations in the International Edition.

CHANCEL SCREEN IN THE MEMORIAL CHAPEL OF THE GOOD SHEPHERD: GENERAL THEOLOGICAL SEMINARY, CHELSEA SQUARE, NEW YORK CITY. MR. CHARLES C. HAIGHT, ARCHITECT, NEW YORK, N. Y.

NOTES AND CLIPPINGS.

A SIPHON PROBLEM SOLVED.—A system for continuously siphoning an Ontario quarry, instead of depending wholly upon the dam and spillway, was desired. The first attempt was made with a galvanized sheet-steel siphon about eight inches in diameter. There was an eight-foot lift, followed by a practically horizontal run of 200 feet over level land, and that was followed by an 18-foot fall. The pipe was carefully made and tested for air-tightness, and was installed in position. The lower end of the pipe was sealed, and the pipe itself was filled from a cock at the top. As soon as the lower gate was released and the current started, the entire pipe collapsed, as a result of atmospheric pressure, the pipe not having sufficient strength to maintain the vacuum necessary to lift the desired volume of water. The next experiment was made with a siphon of two-inch iron pipe, following the same course as the former siphon. It operated satisfactorily during the first day, but on the next morning it was found to be stopped. The process of stopping and filling was again resorted to, and the siphon acted satisfactorily during the day, but on the following morning the same conditions as on the day before were encountered. The conclusion was then come to that there had been an accumulation of air in the pipe as a result of the gradual separation of the air which was in the water, and subsequent experiments proved the truth of this hypothesis. The problem was solved by attaching a reducing elbow at the top of the 18-foot section, reducing the diameter of the pipe from that point to its lower end to one and a quarter inches. This reduction of the diameter of the pipe accelerated the flow of water to such an extent that the air which had accumulated at the elbow and at the top of the 18-foot section in the original installation could no longer accumulate. No further trouble was experienced. —*Fire and Water Engineering.*

REGULATIONS FOR STANDPIPES.—The following regulations for standpipe fire-line work on buildings in New York have been adopted: Standpipes will be required in all buildings exceeding 100 feet in height, erected prior to Dec. 25, 1899, and in all buildings exceeding 85 feet in height erected since that date. Such buildings as come within above classification, and which do not exceed 150 feet in height, in which standpipes (fire-lines) now installed are less than three inches in diameter, must be provided with lines four inches in diameter, and in such buildings as exceed 150 feet in height the fire-line must be six inches in diameter unless the lines already installed are considered satisfactory and approved by the Fire Department. These standpipes must be of wrought iron or steel of sufficient strength to withstand the necessary pressure—in no case less than 300 pounds to the square inch—to force adequate streams of water to any of the floors of the building, or to the roof, and must extend from cellar to roof and be connected with outside two-way, three-inch, standard fire-department connections, with clapper valves and proper caps, placed on street front of buildings, above curb level, in a position accessible for use of the Fire Department and arranged so that the clapper-valves hang properly. These standpipes must be provided with proper valves (gate-valves preferred) and two and a half-inch outlets of the regular fire-department pattern and thread on each floor level, with sufficient standard two and a half-inch hose and nozzles arranged thereto to cover properly the entire floor area, arranged on proper and approved racks or reels, with improved open and controling nozzles. Proper check-valves shall be placed in top and bottom of such lines as are required to use tank or pump supply, or both. The hose outlets and hose must be located within stairway inclosures, except where it is impracticable to do so for reasons satisfactory to the Department. Where more than one standpipe is installed, cross-connections, preferably in the basement, of the same size as the main risers, must be provided. In all buildings over 150 feet in height and in such buildings as come within these regulations as to height and are occupied for living purposes, such as hotels, hospitals, asylums, etc., also in theatres, the standpipe line must have approved tank or pump supply, or both.

SUGAR AS A TIMBER PRESERVATIVE.—A novel method for increasing the usefulness of lumber has been perfected in England. The method consists, in brief, in replacing the air in wood with a solution of beet sugar and removing the excess of water by a subsequent drying. The inventor of the process, Mr. Powell, attains his object by useing a large boiler in which the timber to be treated is placed and the beet-sugar solution pumped in. After the air has all been replaced by the solution the wood is kiln-dried. Examination of the wood seems to show that the sugar is absorbed into the fibre of the woody tissue, and is not simply held in the intercellular spaces. It is claimed that timber treated in this way is no longer porous, will not shrink or warp, and is stronger, heavier and more durable. Moreover, it is said that this wood is not liable to dry-rot; it is hoped that by mixing the proper poisons with the sugar bath the wood will be made resistant to the attacks of fungi and insects.—*Collier's Weekly.*

CAST OF RODIN'S "PENSEUR" MALTREATED.—Considerable sensation was caused by the destruction of the plaster cast of Rodin's "Penseur," which had been placed in the Place du Panthéon in front of the majestic temple dedicated to the illustrious dead. The idea was to determine whether the statue would harmonize with the enormous building, the general opinion being that the statue would suffer from the crushing height of the Panthéon, and that the statue would detract from the pure architectural lines of the edifice, the superb dome of which is the finest in Paris. On a rainy afternoon last week a weird, dishevelled man sprang over the temporary railing that protected the Rodin statue, and, with a huge hammer, pounded it until it fell in pieces. When arrested he explained: "I am thirty-one years old, and was dying of hunger. For ten days I have lived by eating roots of cabbages that I picked up in the streets. Walking by the Panthéon, I saw this statue eating its own fist. Why should I have only cabbage roots to eat, while this 'penseur' should devour his succulent fists? I wrote to M. Pelletran, Minister of Marine, who assembled fifteen ghosts to decide the matter. While they were deliberating I destroyed the statue." Rodin called to see the crazy iconoclast who had thus destroyed the plaster cast of "Le Penseur," and is now having a new cast made to erect temporarily as an experiment before the Panthéon.—*C. I. B., in N. Y. Tribune.*

THE CAMPANILE, VENICE.—The committee entrusted with the superintendence of the work in connection with the re-erection of St. Mark's Campanile, says the correspondent of the *Glasgow Herald*, has published particulars of the progress made during the past year. The report states that during 1904, 3,076 trunks of larch trees, having an average diameter of 8 inches and length of from 12 to 13 feet, have been driven into the ground around the old foundations, which have been thus strengthened sufficiently to bear a load of 16,000 tons and support a pressure of 4.82 tons to the square foot. Larch trees have been used in preference to oak, as their trunks are straighter. The spaces between these piles have been filled up with cement and stones, the whole forming a solid and reliable base on which to raise the superstructure. This foundation has been further strengthened by placing above it a further row of piles laid lengthwise and covered with cement. Up to the present the total expenses connected with the work amount to 115,588 lire (or about $25,117). 79,914 lire having been spent during 1904 and 36,674 lire in the preceding year. Still greater precautions are to be taken to insure the stability of the new structure, and it is estimated that before the base is considered thoroughly reliable a sum approximating $40,000. will have been expended.

WHAT IS A WINDOW?—What is a window? This was the difficult problem which Justice Jelf and a common jury were called upon to decide in London, and such was the divergence of opinion that directly the jury had given its verdict the Judge reversed it. The puzzling point was raised by Mrs. Eliza Crumpler, wife of a potman, who claimed damages from her landlady for injuries received by the window of her room coming down on her head as she was looking for the postman. Although the Working Classes Act requires a landlord to see that windows work properly, it was argued for the defense that a window was no window when it, as in the present case, lacked sash lines. The jury found for Mrs. Crumpler, and awarded her £10 damages, but his lordship held that there was no legal evidence that the landlady was responsible, and entered judgment for Mrs. Quay, with costs.—*Exchange.*

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CONTENTS

"IN this scheme no consideration has been given to increased space within the building, and the problem has been solved strictly according to the architectural necessities of the case." A few years ago, no architect would have dreamed of including in a report to be considered by the Congress of the United States words so impolitic and so obviously showing incapacity for grappling with "practical" matters. That Messrs. Carrère & Hastings ventured to make this very frank, very truthful and wholly praiseworthy sentiment in the report they have just laid before the Joint Commission of Senate and House on the alterations it is desirable to make in the east front of the Capitol is a delightful proof of the assurance that so generally prevails that the most influential and intelligent Congressmen have at length acquired a fair perception that the most important of the conditions that architects have to consider and treat are not always the purely practical and economical ones. This waiving aside of practical considerations, which, probably, many Congressmen felt were the only ones that the consulting architects were appointed to deal with, can hardly prejudice the acceptance of the report which, because of its restraint and display of good sense, wins our hearty commendation.

IN place of seeking an opportunity to do something of overmastering prominence that should mark that portion of the building as unquestionably their work, Messrs. Carrère & Hastings have considered merely the "architectural necessities of the case." These necessities were simply two: first, to give proper apparent structural support to the base of the dome on its eastern side and, second, to add dignity to the central portico. Accordingly their plan brings forward the entire eastern wall of the main building only twelve feet and ten inches, to satisfy the first requirement, while the conversion of the central porch from an octostyle to a decastyle one provides for the second one, both alterations being very simple, very effective and very inexpensive, three very good reasons that ought to have weight in discussing action on the report. Besides these things the architects recommend that advantage of this opportunity should be taken to replace with marble the painted sandstone that still shows on the west front of the main building as well as on the east, the filling of the southeast pediment with sculpture so as to accord with the northeastern one and the replacing with white marble of the present treads of the great flight of steps leading from Pennsylvania Avenue up to the western terraces. Not the least satisfactory point in the report is the inclusion of an estimate of cost, covering all these changes, of considerably less than a million and a half of dollars. The architects also present an alternative design, as perhaps they were invited to do, showing what the effect would be if they should make their alterations with a view first to increasing the available floor-area of the building. In this design, the eastern wall is brought forward thirty-two and a half feet and the architects point out convincingly how detrimental to the general effect any such enlargement would be.

VERY interesting "hearings" have been had recently before the Committee on Cities of the Massachusetts Legislature on the proposed law for the abatement of smoke in the city of Boston and vicinity. The proposed law was first introduced in 1902, but its sponsors only succeeded in having it referred to the next General Court, before which, however, it was not brought, because of the obvious impolicy of urging such a measure during the distress occasioned by the great coal strike of that year. The wisdom of bringing up the measure again cannot be questioned, since the atmospheric conditions have not returned to the state of cleanliness normal before the strike. The proposed measure is very simply expressed: it prohibits in any town situated in whole or in part "within ten miles of the State-house"—thus including the real metropolitan area which covers the city of Lynn on the north as well as the city of Quincy on the south—discharge of "dark smoke or dense gray smoke." The enforcement of the law is left to the boards of health of their respective communities who may proceed by injunction procured from a justice of the Superior or the Supreme Court and secure the infliction on the offender of a fine of one hundred dollars per week. If passed, the law is to take effect on January 1st, 1906, and possible violaters may secure a further exemption of six months' time during which to reform their apparatus and methods of firing.

IN all probability no perfect cure for the smoke evil can be had, short of the universal adoption of fuel-gas or the establishment of central heating-plants, such as is under discussion for the government buildings at Wash-

Entered at the Post Office at New York as second-class matter.

ington, where apparatus can be installed and handled scientifically, regardless of expense. Perhaps either solution may be brought about by law; but most of us can quite understand the Englishman's toleration of the London fog, if a clear and healthful atmosphere can be had only through the abandonment of his cheery open fire, and so, in our own case, prefer to await the compulsion of a definite law. The practical difficulty is that each center of smoke-emission constitutes a distinct and separate problem, and the solution for it cannot be bought off-hand and ready-made at the nearest stove-dealer's. Hence a law which should order the use of a given mechanical-stoker or the adoption of a stated form of furnace would defeat its own ends and cause needless waste of money in the process. A smoke-preventing law must be elastic, and the one before the Massachusetts Legislature seems to meet the situation in that respect, since it only says: "Stop the smoke in any way that you can, but stop it." It leaves the matter of enforcement in as proper and competent hands as any that can be thought of; it allows the members of the Boards of Health to use their own common sense and does not hamper them with such restrictions as were contained in a certain Philadelphia law which established a "color scale," Number One consisting of one thickness of gray glass and Number Two of four thicknesses which were to be used as gauges under certain circumstances described in the law. One thing, at least, should be insisted on by sane communities and that is that every furnace hereafter built in which soft coal is to be burned shall be equipped with a smoke-consuming device approved by the local board of health.

AT one time or another, in books dealing with China or in commercial reports, we have come upon references to "wood-oil" as an important product of that country, but no clue was ever given as to its derivation or use. A consular report by the vice-consul at Hang-chau on "Ningpo varnish," which mentions wood-oil once more, sends us at last to the dictionary which discloses the fact that one kind of wood-oil, "gurjun," is derived from a large tree common in the Philippine Islands, where it is used as an ingredient of coarse paints, as a substitute for tar in pitching boats and as a timber-preservative against white ants. Another kind of wood-oil, "tung oil," is produced in immense quantities in China where the demand for it is so great that the article is unknown to European commerce, and this is regrettable, for it seems to have unusually desirable qualities; for instance, it is said to surpass all other known oils in its drying qualities which make it of the utmost value for calking and painting, or rather varnishing, the universal sampan and junk. It is not supposable that wood-oil is wholly unknown in the laboratories of our varnish-makers, but if it should chance to be, then the fact would form another argument in favor of the "open door."

NINGPO varnish, according to Vice-Consul Cloud, is, from the architect's point-of-view, an even more desirable article to have on the American market, for it has in China, where the knowledge of varnishes and lacquers is profound, a reputation of the highest. A varnish that "does not scar easily and may be scrubbed with boiling water without the slightest injury to its high polish" is the very article that architects have bewailed the lack of when the finishing of the wood-work in bath-room, pantry and kitchen came up for consideration. Again, as the varnishing has to be done in damp weather, Ningpo varnish would seem to find a use in naval architecture. The desirability, perhaps the necessity, of using this varnish only in damp weather or a moist climate is due to the fact that its use subjects the workman to the risk of "lacquer poisoning," and this is not strange, since the sap from which the varnish is made is drawn from a species of ivy, the *Rhus vernicifera*. Once dried, there is no risk of poisoning to those who handle the polished surface. Apparently wood-oil and Ningpo varnish are two articles which ought to be within the reach of the American building fraternity.

WE have often wondered, as we passed along a hotel or office-building corridor, what would happen should we stop and open the valve behind a coil of reeled-up fire-hose. Apparently, it is not certain that anything would have happened had the temptation proved irresistible, for when, last week, a fire occurred in the great Exchange Building in Boston the employés naturally tried to extinguish it with their own apparatus, before calling in the public fire-department. So the hose was rapidly unreeled and the valve opened, while the amateur fireman baced himself to contend with the "kick" of the nozzle when the high pressure struck it. But nothing happened. Never a drop dashed from the carefully polished brass-work. When the real firemen had extinguished the small fire, investigation was had which revealed the fact that, though the great building had been built and occupied for a dozen years, the lower valve of the stand-pipe had never been opened for the admission of water from the street main. A fire in a fireproof building that causes a loss as reported, of several thousand dollars, is too common an occurrence, but the novel condition of this stand-pipe seems to us to reflect very disadvantageously on the thoroughness of examination made by the numerous inspectors of the Fire Department and the Board of Underwriters during the many visits they must have made to the building. Whether a hose be found on a "*General Slocum*" or in a "fireproof" building, inspectors seem willing to accept it, if only its nozzle be sufficiently shining.

COMPLAINTS are made in England that there are too many architects or—what is the same thing—too few jobs. In support of the well founding of the complaint is cited a town which, a few years ago, paid for the designing of its town-hall "the usual five per cent. to the architect and two and a half per cent. for the quantities," while it is now offering only five-and-a-half per cent. for both architectural service and quantities for the new school-house it requires. This way of putting the matter revives the impression that English architects must, because of the quantity-surveying system, net more from their five per cent. commission than do American architects under their system of procuring estimates.

"BE GENTLEMEN."

A SPECIAL committee of the Boston Society of Architects, consisting of Messrs. Robert S. Peabody, Edwin J. Lewis, Jr., and Frank A. Kendall, appointed to consider the annual report of the retiring Secretary, discuss its most important suggestions as follows:

THE proposed adoption of a mandatory inflexible standard of practice regarding the furnishing of sketches to prospective clients* is a far more puzzling question and it is evident that such action cannot be effective unless it has the endorsement and support of every member of the Society.

All of us have noticed that the number of competitions has increased of late, and that there is increased willingness on the part of architects to volunteer sketches without pay. This condition partly arises from dullness in business throughout the country, combined with a great increase in the number of practising architects that our many schools have trained. Is this condition hurtful or advantageous? Is it perhaps hurtful to the profession, though advantageous to the individual? If it is a trouble, can it be lessened? Will resolutions on the part of the Society bring about a better condition? These are the rather searching questions on which, as we understand it, you wish a report from us.

Why is it that we all think an architect is not all that he might be if he competes without compensation, or, what has a similar effect, if he cuts the usual rate of charges? There is nothing immoral about either of these things, unless while doing them one pretends that he does not do them. In what way, then, does an architect differ from the grocer who undersells his neighbor until his profit is of the slightest? In what respect is he like the doctor who does not do so? How does the doctor differ from the apothecary who does cut his neighbor's prices?

These are difficult questions to answer. They lead us to ask what is the real underlying principle on which the professional spirit is based, either in the three old-time "learned professions" or in those that are struggling for a place on a level with them. Is it perhaps based on the fact that professional men sell ideas instead of goods; not drawings but design; not sermons but good counsel; not medicine but sound advice? Is it perhaps founded even more on the fact that to professional men bread-winning, while it is a necessity of life, is not after all what gives them delight in the work each loves? Is it perhaps due to the leadership through intellect which should fall upon men in the professions?

We may not be able to state with exactness the reason why a high professional spirit actually exists among us, but the main fact is that happily it does so exist, and it exists also with strength and life, and we all, young and old, feel and prize it. It does not matter on what reasons it rests. We have it and we want to nourish it and are willing to sacrifice for it, believing, too, that such sacrifice results in ultimate gain. Dignity does not come without some such sacrifice. *"Noblesse oblige,"* and "hustling" is not consistent with the truest dignity. To abstain from improper conduct is not only the price of a dignified position, but is a part of it. How far, then, should this professional spirit prevail among us in opposition to commercialism? What can the profession do about this whole subject?

Is not our position towards the public essentially that of a doctor towards his public, which is thus stated in the Medical Code of Ethics: "The relation of practitioners of medicine to families and households is not like that of tradesmen to their customers. The kind of competition which might be considered honorable in business cannot exist between physicians without diminishing their usefulness and lowering the standard of the medical profession." "In his relations with another medical practitioner and his patients a physician should be governed by strict rules of honor and courtesy. His conduct should be such as, if universally imitated, would insure the mutual confidence of all medical practitioners." This surely applies in all respects to our own profession, and in great measure covers the subject under discussion.

The resolutions that are suggested by our ex-Secretary properly indicate that the point of view of a youth and an older man may fairly be different. The youth wants to get started and sets less store by dignity than the older man. This difference must be reckoned with in any generous discussion of the subject. It is urged that a youth gains no recognition if he takes the same stand that may fairly be required of older men, but who can fairly say that in this day and country? You have but to look around to see large numbers of young school graduates, Fellowship men and Rotch scholars, gaining prompt praise and reward for work obtained in legitimate ways. The public is always seeking the best. Certainly we should be in the wrong, if our professional habits and customs bar out youth. But we do not think that is the spirit of the profession. Our sympathies are heartily with eager and accomplished young architects. We recognize their difficult questions as to conduct. The question of conduct is perhaps never harder than when a young man, thinking he has some work well in hand, is told by his committee that older men are clamoring to present sketches without pay and that he must do likewise or lose his work. Our sympathies, it is unnecessary to say, are not with the architect who thus gets ahead of him. Still your committee cannot accept the position urged by the resolutions —that there may be a period of probation during which youth may properly sow wild oats regardless of the interests of others and of his own ultimate interests. Youth should await opportunities that may be seized upon with reasonable dignity. Surely the only proper attitude towards these matters is one that is proper for all.

Nor does your committee believe that this is a matter that can be regulated by vote of the Society. Certainly such a vote cannot bind a dissenting minority. It is true that the consent of every member might possibly be obtained, or a new association might be formed which would accept certain obligations as to competitions and sketches and rates of compensation, but such a combination or trust would excite grave criticism from the public, and would surely be defeated finally by one or more architects who would not join the trust, or by invaders from other cities. Your committee believes that any such *trust* is as undesirable as the scramble which it is meant to remedy is undignified. They believe that these troubles will continue to a greater or less degree as long as business is a matter of competition instead of co-operation.

In short, your committee does not believe that you can suppress selfishness by rules or bind architects, as the Secretary suggests, by a hard and fast resolution of the Society. The experience of every one of us shows that there are occasions when any individual would wish to break such a rule, and might do so with perfect self-respect and with the approval of his fellows. We cannot enforce observance of a rule that is more exacting than the profession at heart believes in, but we can urge on young and old that selfishness works to the general harm and is undignified and undesirable.

Your committee, therefore, believes that the only remedy for these evident evils is moral suasion. They think it cannot be too often said and repeated that a commission of 5 per cent. has been long agreed upon as a moderate bread-winning commission for work properly done; that a less charge is unremunerative; that a greater charge is perfectly proper for those whose skill makes them able to obtain it; that anybody who cuts these prices by lowering the rate is really breaking the lowest remunerative market price; that to volunteer, without pay, sketches and competition work is also practically cutting prices, as when a 5 per cent. commission was established as usual and proper for ordinary professional services it was never intended to cover expenditures for obtaining work; that if an architect does this, whether he is young or old, he will earn the name among his fellows of being unduly selfish. He will, in short, be a "hustler," and will have to take the odium that attaches to the name along with work thus gained. Young or old must be generous gentlemen, or else bear with others who find them selfish and greedy.

Practically, a code is complete when it says, "Be a gentleman always and in addition as good an architect as possible." That is the substance of the Attorney's oath or of the Medical Society's code. It is when we consider details that our troubles begin, and, in fact, the ultimate guide must always be one's own sense in each case of what is decent and proper. The man who respects himself will be the most respected, but a hard and fast rule as to these details cannot be made and will not be regarded.

Your committee believes in stating our belief regarding this whole matter as fairly and squarely as we can see it, rather than in shirking the truth as to our belief and our practice and leav-

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NOTE.—The suggestion made by our ex-Secretary was as follows:

I should like to find a general sentiment in the Society in favor of the following propositions:

"After three years of independent practice no member shall volunteer sketches or other professional assistance.

"No member shall furnish sketches without compensation unless assured that he alone will be invited or permitted to do so. If other sketches are received, he shall claim a proper payment, at least sufficient to cover the reasonable cost of his drawings.

"No member of the Society shall either personally or through another submit sketches, except as above, or in a proper competition (with professional adviser to assist in preparing the programme and judging the designs), or for an adequate payment according to the schedule of the A. I. A."

ing our position vague and unexpressed. In view, therefore, of what has been said, your committee recommends the omission from our Code of Ethics of Sections 5 and 10,* and the substitution therefor of the following, immediately before section which relates to underbidding other architects:

"SECTION —. This Society is not a trust or trade union, and does not fix rates of charges to be made by its members. It has, however, recommended to architects and to the public a schedule of charges that, through long experience, have been found to be the minimum rates that yield a reasonable profit. Any member whose skill permits him to obtain it may reasonably charge more. Those who charge less break the lowest remunerative price and act contrary to the interest of the profession, and in the long run to their own interest.

"The regular rates of commission do not cover competitive work to obtain employment. This should be paid for separately. If such work is done without charge the result is the same as the charging of less than the schedule rates and is in the same way undesirable and undignified. Such practices diminish the usefulness of architects as unprejudiced advisers and lower the standard of the architectural profession."

HEATING AND VENTILATION.[1]—III.

INDIRECT STEAM HEATING.

THIS system of heating, combines some of the advantages of both the furnace and direct steam, but is more expensive than either to install. The amount of fuel required is about the same as in the case of furnace heating. Instead of placing the radiators in the rooms, a special form of heater is supported at the basement ceiling and encased in galvanized iron. A cold-air box is connected with the space below the heater, and warm-air pipes are taken from the top and connected with registers in the floors or walls of the rooms, as already described for furnaces. A separate stack or heater may be provided for each register if the rooms are large, but if small and so located that they may be reached by short horizontal runs of pipe, a single heater may serve for two or more rooms. If this is done, that portion of the heater supplying each room should be separated from the others by galvanized-iron partitions, extending from the bottom of the heater to the top of the casing. Sometimes it is desirable to divide the cold-air space below the heater in a similar manner, when it is of considerable length and supplies several rooms.

The advantage of indirect steam over furnace heating comes from the fact that the stacks may be placed at or near the bases of the flues leading to the rooms, thus doing away with long, horizontal runs of pipe, and conteracting to a considerable extent the effect of wind pressure upon exposed rooms. Indirect and direct heating are often combined to advantage by using the former for the more important rooms, where ventilation is desired, and placing direct radiators in rooms which are more remote or where heat only is required.

Another advantage is the large ratio between the radiating-surface and grate-area, as compared with a furnace, resulting in a large quantity of air being warmed to a moderate temperature instead of a small quantity heated to a much higher temperature. This gives a more agreeable quality to the air and renders it less dry.

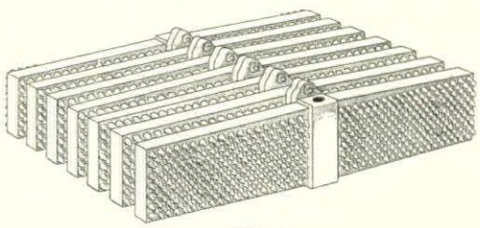

FIG. 9.

Indirect steam radiators are made of cast iron in many different forms, the most common of which is the "pin" radiator, one of which is shown in Fig. 9. They are made in sections or slabs, and a sufficient number of these are connected together to form a heater, or stack, having the required amount of heating-surface. There are several other similar forms, but the standard pin, rated at 10 square feet of heating-surface per section is probably as well adapted to house heating as any. In some patterns the sections are bolted together and in others they are connected with special nipples.

A very efficient form of indirect heater may be made up of wrought iron pipe joined together with branch tees and return bends. A heater of this kind is called a "box coil," and its efficiency is increased if the pipes are "staggered," that is, if pipes in alternate rows are placed over the spaces between those in the rows below. They are commonly made six or eight pipes deep and of sufficient length and width to give the necessary heating-surface and area for air flow between the pipes. It is common to consider one-half the "over all" area of the heater as free for the flow of air between the pipes. The free area between the sections of a standard pin radiator is about 36 square inches.

The casings around the stacks are of galvanized iron, made up in sections by means of small bolts so they may be easily removed for access to the heater in case of repairs. Large stacks are sometimes enclosed in brickwork, built up from the basement floor. The sides of such casings are made 8 inches in thickness, and the top is covered over with a layer of brick and mortar, supported on light wrought-iron tee-bars. Blocks of asbestos or magnesia are sometimes used for the covering instead of brick, and the whole covered over with plastic material of the same kind.

When galvanized-iron casings are used the stacks are supported by hangers attached to the floor joist above by lag-screws. Pieces of pipe or light iron bars are run through loops at the lower end of the hangers and the heater sections placed upon them. Where brick casings are used, the heater sections are supported upon pieces of pipe or small I-beams built into the walls.

The warm-air space between the top of the heater and the casing should never be less than 8 inches, while 12 inches is preferable for heaters of large size. The cold-air space may be an inch or two less, but if there is plenty of room it is good practice to make it the same as the space above. Figure 10 shows a

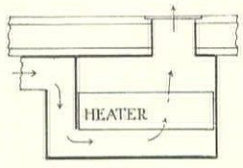

FIG. 10.

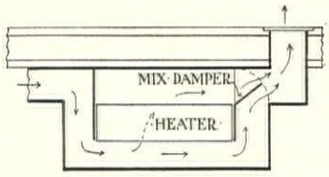

FIG. 11.

section through a stack and casing arranged for introducing warm air into a room through a floor register. The cold-air box is seen at the bottom of the casing, and the air in passing through the spaces between the sections becomes heated and rises through the register to the room above.

With this arrangement there is no way of regulating the temperature of the room except by closing or partially closing the register and thus shutting off the air supply. Figure 11 shows a heater equipped with a mixing damper, a device for regulating the temperature of the air entering the room without diminishing its volume to any great extent. The cold-air duct is brought along the basement ceiling from the inlet window and connects with the cold-air chamber beneath the heater. The entering air passes up between the sections and rises through the register above, as shown by the arrows. When the mixing damper is at its lowest position all air reaching the register must pass through the heater, but if the damper is raised to the position shown, part of the air will pass by without going through the heater, and the mixture entering through the register will be at a lower temperature than before. By changing the position of the damper the proportions of warm and cold air delivered to the room can be varied, thus regulating the temperature.

The objection to this form of damper is that there is a tendency for the air to enter the room before it is thoroughly mixed;

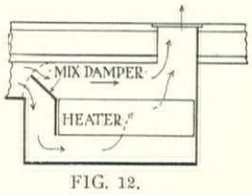

FIG. 12.

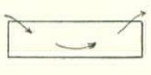

FIG. 13.

*Section 5 now reads:
Section 5. It is unprofessional to offer drawings or other services on approval and without adequate pecuniary compensation.
Section 10 now reads:
Section 10. It is unprofessional to furnish designs in competition for private work or for public work, unless for proper compensation, and unless a competent professional adviser is employed to draw up the "conditions" and assist in the award.

[1]Continued from page 58, No. 1521.

that is, a stream of warm air will rise through one-half of the register while cold air enters through the other. This is especially true if the connection between the damper and register is short, as must necessarily be the case with rooms on the first floor. The arrangement shown in Figure 12 is somewhat different, and overcomes the objection noted in Figure 11 by substituting another. The mixing damper in this case is placed at the other end of the heater. When it is in its highest position all of the air must pass through the heater before reaching the register, but, when partially lowered, a part of the air passes over the heater and the result is a mixture of cold and warm air, in proportions depending upon the position of the damper. As the layer of warm air in this case is below the cold air, it tends to rise through it, and a more thorough mixing is obtained than is possible with the damper shown in Figure 11. One quite serious objection, however, to this form of damper is illustrated in Figure 13. When the damper is nearly closed so that the greater part of the air enters above the heater, it has a tendency to fall between the sections, as shown by the arrows, and, becoming heated, rises again so that it is impossible to deliver air to a room below a certain temperature. This peculiar action increases as the quantity of air admitted below the heater is diminished. At best, a mixing damper is far from being a perfect device; but, if well made, it is much better than nothing, and, although producing cold draughts to some extent in windy weather, it may be made to give quite satisfactory results.

Special care should be taken to make these dampers tight against leakage; they should work easily and close tightly against smooth flanges. They may be operated from the rooms above by means of chains passing over guide pulleys, and should be rigged so as to maintain any desired position.

The efficiency of an indirect radiator depends upon its form, the difference in temperature between the steam and the surrounding air, and the velocity with which the air passes over it. Under ordinary conditions in dwelling-house work, a good form of indirect radiator will give off about 2 B.T.U. per square foot of surface per hour for each degree's difference in temperature. Assuming a steam pressure of 2 pounds and an outside temperature of zero, we have a difference in temperature of 220 degrees, which, under the conditions stated, gives an efficiency of $220 \times 2 = 440$ B.T.U. per hour.

The principles involved in indirect steam heating are similar to those already described under furnace heating. Part of the heat given off by the radiator must be used in warming up the air-supply to the temperature of the room, and part for offsetting the loss by conduction through walls and windows. Where large quantities of air are warmed to a moderate temperature, as in schoolhouses, hospitals, etc., the heat required for these two purposes is computed separately and added together. In the case of a dwelling-house, the conditions are somewhat changed, for a room having a comparatively large exposure will, perhaps, have only two or three occupants, so that if the small quantity of air necessary in this case were used to convey the required amount of heat to the room, it would be necessary to raise it to an excessively high temperature.

The following simple rule has been found to give very satisfactory results in work of this kind, and is especially convenient in computing the radiating-surface for houses having both direct and indirect radiation:

Compute the surface for direct radiation by the methods previously given, and multiply the result by 1.5.

This is a common steam-fitters' rule, but is fully as satisfactory for this class of work as some of the more complicated methods.

In computing the size of boiler for a house warmed with direct and indirect radiation, multiply the "direct" surface by 225, the "indirect" by 440, add the results together and divide the sum by 8,000 times the assumed rate of combustion. Increase the result by 15 per cent., if the mains and returns are uncovered, and the final result will be the square feet of grate-area required.

The required size of the warm-air flues between the stacks and registers depends, first, upon the difference in temperature between the air in the flue and that of the room; and, second, upon the height of the flue.

In dwellings, where the conditions are practically constant, it is customary to allow 2 square inches' area for each square foot of radiation when the room is on the first floor, and 1½ square inches when it is on the second or third floor. The cold-air ducts supplying the stacks should be planned in a manner similar to that described for furnace heating. The air inlets should, when possible, be on the north and west sides of the house. The method of having a large trunk line or duct, with inlets on two or more sides of the building should be employed, if it can be conveniently arranged, and connections made between this and each of the stacks. The area of the cold-air duct for any stack should be at least three-quarters of the total area of all the warm-air ducts leading from it. If the duct is of any considerable length or contains sharp bends, it should be made the full size of all the warm-air ducts.

If a trunk line with two inlets is used, each inlet should be of sufficient size to supply all of the stacks.

The inlets should be provided with some form of damper or slide, outside of which should be placed a wire grating, backed by a netting of about ⅜-inch mesh. In dwelling-houses, vent-flues are sometimes omitted; here, the frequent opening of doors and leakage are depended upon to carry away the impure air. A well-designed system of warming should be provided, with some means for discharge ventilation, especially for bath and toilet rooms and also for living-rooms, where lights are burned in the evening. Fireplaces are usually provided in the more important rooms of a well-built house, and these are made to serve as vent flues. In rooms having no fireplaces, special flues may be carried up in the partitions in the same manner as the warm-air flues. The size in this case may be made 1½ square inches per square foot of radiation for rooms on the first floor, and 2 square inches for rooms on the second, which is the reverse of the warm-air flues.

This is because the velocity of flow depends upon the height of flue and is therefore greater from the first floor. The flues should be joined together in the attic and connected with a brick flue running up beside the boiler chimney. Quite satisfactory results may be obtained by simply letting the flues open into an unfinished attic or roof space and depending upon leakage through the roof to carry off the discharged air.

Inlet registers are placed either in the floor or in the base-board; sometimes they are located under the windows, just above the base-board. The object in view is to place them where the currents of air entering the room will not be objectionable to persons sitting near windows, etc. A long, narrow floor register, placed close to the wall in front of a window, sends up a shallow current of warm air, which is not especially noticeable to one sitting near it.

Base-board registers should be long and low so as to distribute the air as much as possible. The air in this case is delivered along the floor and, if used with a mixing damper set for cool air, may cause uncomfortable draughts about one's feet. In consulting with a number of engineers and contractors regarding the best position for inlet registers, the writer found them about evenly divided between floor and wall locations. It would seem from this that one may be guided somewhat by circumstances, and adopt either position as found most convenient. It is sometimes desirable to keep the floor free, on account of carpets and rugs, while in other cases it is difficult to reach wall registers with warm-air pipes of sufficient size, on account of the construction of the walls.

Registers are preferably placed near the outside walls, especially in large rooms. Warm-air pipes are commonly carried up to the second floor in inside partitions, but they may be run in outside walls, if covered with suitable insulating material. Hair-felt, often used for this purpose, is likely to be destroyed by vermin.

Vent registers should be placed in inside walls, near the floor.

Registers are made of cast-iron, brass and bronze in a great variety of sizes and patterns. The usual finish for cast-iron is black Japan; they are also finished in colors and electroplated with copper and nickel.

Floor registers should be of cast-iron or solid bronze, while plated ones are sufficiently durable for wall locations.

Floor registers are commonly set in metal borders; wall registers may be screwed directly to wooden borders or frames, to correspond with the finish of the room.

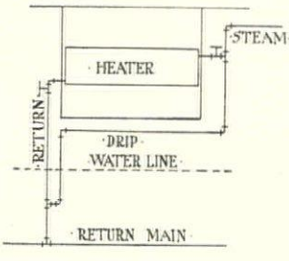

FIG. 14.

Registers with vanes or valves are used for air inlets, while plain register faces, without valves, are placed in the vent openings. The vent flues are usually gathered together in the attic, where a single damper may be used to shut off the whole system at once.

The grille, or solid part of a register face, usually takes up

about one-third of the area; hence, in computing the size, we must allow for this by multiplying the required net area by 1.5 to obtain the total, or over-all area. When a register is spoken of as a 10x12-in., or 12x16-in., etc., the dimensions of the latticed opening are meant and not the outside dimensions of the whole register. The free opening should have an area at least as large as the pipe with which it connects. In designing new work, one should provide himself with a trade-catalogue so as to use only standard sizes, if possible, as special patterns and sizes are expensive.

The two-pipe system, with dry or sealed returns, is used in indirect heating. The conditions to be met are practically the same as in direct heating, the only difference being that the radiators are at the basement ceiling instead of on the floors above. The exact method of making the pipe connections will depend somewhat upon existing conditions, but the general method shown in Figure 14 may be used as a guide, with modifications to suit any special case. The ends of all supply mains should be dripped and the horizontal returns should be sealed, if possible.

The pipe sizes for indirect heating are computed in a similar manner as for those for direct heating, except one square foot of indirect surface counts as two of direct. As indirect heaters are placed in the basement, care must be taken that the bottom of the radiator does not come too near the water-line of the boiler, or the condensation will not flow back properly; this distance should not be less than 2 feet under ordinary conditions. If much less than this, the pipes should be made extra large so there may be little or no drop in pressure between the boiler and the heater. A drop in pressure of 1 pound would raise the water-line at the heater 2.4 feet.

The following table of pipe-sizes has been computed upon the assumption that two-thirds of a pound of steam will be condensed by each square foot of radiating-surface, with a drop in pressure of one-quarter pound in each 200 feet length of run:

Size of pipe.	Square feet of indirect radiating surface which it will supply.
1	28
1¼	50
1½	67
2	185
2½	335
3	540
3½	812
4	1,140
5	2,030
6	3,260
7	4,830
8	6,800

CHARLES L. HUBBARD.

(To be continued.)

A FEW WORDS TO STUDENTS.[1]

SO I say to you, my youthful fellow-students, steer an even keel, if you can, between the Scylla of a superstitious and sentimental regard for the past and the Charybdis of a contemptuous indifference to all its works. If an example is merely old, leave it alone; if it is artistically good, approach it with all reverence and, examining its structure within and without, endeavor to discover the secret of its charm, even as a bee extracts the honey from the flower. Do not make the mistake of supposing that you will necessarily be able to define the exact nature of the secret.

There are principles of architecture as absolutely reliable and yet as vague and ill-defined, as much "in the air," if you will allow the expression, as the laws which govern musical progressions or the methods which underlie true literary form. In no one of these cases can the subtile secrets of the art be distilled in the form of express and mechanical rules. If we desire that our own powers may be moulded and guided on true lines, we must, as it were, live in the storehouses, continually absorbing the spirit of the masters as embodied and expressed in their works. Centuries of experiment and criticism, generation after generation of trained perceptions and cultured intelligence, have gone to determine what is good, what is beautiful, what is true. Shall we throw away the results of all this? Rather let us recognize and admit that our knowledge should be based upon the experience of those who have gone before, and our taste trained and refined in the study of the cultured monuments of the past. . . .

In all good work we shall discover a perfect blending of science and art, so combined that it is impossible to say where the one ends and the other begins. Where these are divorced there can be no true architecture. . . .

Examine the methods of support and resistance, not thinking of only what is necessary, but also how it satisfies the eye. Discover the scientific and mathemtaical problems which have been successfully worked out. Yet do not even in thought separate the science and the art of the building—the two are conjoined, and must be studied together and simultaneously.

In our own experience we find cases where we are much more impressed by the constructive beauty of a building than by any other feature in it. So there is an order of mind to which power and fitness of purpose appeal with unusual force, just as, again, a mathematical mind finds a fascination in the treatment of solids and voids, and of superincumbent masses.

The building must be solid and strong as well as graceful and pleasing. Stability is demanded no less than beauty. In fact, good construction, including the right use of materials, is a prime essential and foundation of all excellence in architecture. Nowhere, I think, is this more forcibly demonstrated than in the career and work of Sir Christopher Wren, who, both by education and the bent of his youthful genius, seems rather to have been of the scientific and mathematical than of the artistic order of mind. Though, like all educated men of his day, he took an intelligent and cultured interest in architecture, he received no special training for such work. Wren took his degree at Oxford at the age of eighteen, became a Fellow of All Souls' at twenty-five, and three years later was made a D.C.L. of Oxford and an LL.D. of Cambridge. Obviously it was not upon the ladder of architecture that he rose to these distinctions. As a matter of fact he was professor of astronomy at Gresham College, and in mathematics and astronomy he acquired for himself a European reputation. He was also President of the Royal Society in 1680. I have adduced these facts to show that though he undoubtedly possessed a very wide range of general knowledge, and was endowed with natural gifts of a wonderfully high order, all these were, in the early part of his career, directed to the practical side of life rather than to the artistic. His art was dormant; it was there, however, and he sometimes gave the rein to it a bit, for he is said to have invented mezzotint, or at least some improved method. It is interesting to speculate what it was that finally drew all his wonderful gifts and powers into the service of architecture. Whether the determining impulse came from within or without—probably a bit of each—I cannot doubt that it was the scientific or constructive side of architecture that attracted him in the first instance and that led him to accept an appointment as Assistant Surveyor-General of His Majesty's Works.

The first important work entrusted to Wren in his new office will serve to indicate, not only the natural bent of his mind, but also the official appreciation of it on the part of the authorities. He was set to examine and report upon St. Paul's Cathedral, which it was feared was in a dangerous condition. It is evident from the report that he did his work thoroughly—the very first thing he did was to measure the whole building carefully—and the insight and experience that he thus gained in constructive work stood him in good stead afterwards. With respect to the roof he says: "It is evident by the ruin of the roof that the work was both ill-designed and ill-built from the beginning—ill-designed because the architect gave not abutment enough to counterpoise and resist the weight of the roof from spreading the walls. . . . This also may be safely affirmed not only by an architect taking his measure from the precepts and examples of the ancients [you see he advocated this], but by a geometrician (this part being liable to demonstration), that the roof is and ever was too heavy for its abutment; for the eye alone will discover to any man that those pillars, as wide as they are, even 11 feet diameter, are bent outward at least 6 inches from their first position. . . . The bending of the pillars was facilitated by their ill-building, for they are only cased without, and that with small stones. . . . but within nothing but a case of small rubbish stones and much mortar which easily crushes and yields to the weight."

Good old times those! Jerry-building is obviously not a very modern institution. Then, too, Wren's first problem in building was a constructive one, for in the wonderful roof of the Sheldonian Theatre at Oxford, which has a span of 68 feet, the scien-

[1]Extracts from a lecture by Mr. John Belcher, A.R.A., President of the Royal Institute of Architects.

tific construction is masterly, and brought him great reputation. Two years later, viz., in 1665, occurred the Great Plague, and Wren took the opportunity to pay a visit to France to study architecture as a fine art. In Paris he studied all the principal buildings, and became intimate with the most celebrated artists there. He was introduced to Bernini, who showed him his designs for the Louvre, for which he says in his Notes he would have given his skin. The old Italian would not let him study it long, and he says he only had time to "copy them in his fancy and memory and shall be able by discourse with a crayon to give a tolerable account of it." He also studied Fontainebleau, St. Germain and Versailles. Of the last-named he says: "The mixtures of brick and stone, blue tile and gold make it like a rich livery—not an inch within but is crowded with ornament." Wren's own work was subsequently distinguished by its color effects and contrasts of texture. He adds, in the letter from which I have already quoted: "The women as they make here the language and the fashions, and meddle with politics and philosophy, so they sway also in architecture. Works of 'filgrand' and little trinkets are in great vogue; but building ought certainly to have the attributes of eternal, and is, therefore, the only thing incapable of new fashions."

These words coming from the man who advanced the architecture of the Renaissance to such a pitch of excellence and succeeded in establishing an English tradition, fine in type and grand in scale—the importance of these words, I say, as a guiding principle for the student cannot be over-estimated.

I hope I may be pardoned for quoting so freely from Wren, and for enforcing my points by the history of his career; but his methods of study and the line of his development are so clearly before us that I am sure we may draw many useful lessons and suggestive hints from them.

LOSS BY FIRE IN THE CONGESTED DISTRICT OF CHICAGO.

THE potentiality of Chicago's congested district in respect to damage by fire was illustrated so forcibly and frequently during the early months of the past year that people have become interested in the removal of the conditions which give rise to such disasters.

A conflagration is a large fire running amuck through the streets, and its possible occurrence becomes remote in proportion as the large fire becomes eliminated from consideration. Facts pertaining to the fire-history of congested districts are therefore of interest in selecting methods which have as their end the avoidance of the sweeping conflagration. It is the purpose of this article to present the more prominent aspects of the fire-record of the Chicago district, some of which have a direct bearing upon the problem of regeneration.

The term "congested" is applied in Chicago to the district bounded by Harrison street on the south, the Chicago River on the west and north and Lake Michigan on the east. It is divided approximately into 100 blocks, 400 feet square from center to center of streets. The aggregate area of lots is about 10,000,000 square feet, supporting 70,000,000 square feet of occupied floors. A considerable portion of the floor-area is devoted to public and semi-public uses: large retail and wholesale houses, office-buildings, old and new, and premises tenanted by miscellaneous traders and manufacturers constitute the remainder of the occupancy. The concentration of value is indicated by the insurance carried which is reported by the State Superintendent of Insurance to average $175,000,000 during recent years. Most of the floor-area is of ordinary construction, dating to a large extent from the Chicago fire.

Investigations of fire-losses deal with a darker Africa of research, and those of Chicago conform to the general rule. It is possible to compile the total losses and subdivide the total according to any desired classification, because each loss has been recorded in the books of the fire-patrol. On the other hand, very little can be obtained to establish the several values at risk which produced the losses.

In the case of automatic-sprinklers it is probable that the average value protected by one head is not less than $200, nor more than $300. This gives a clue to the aggregate value so protected since the number of heads in service may be readily ascertained. For the remaining classes of property, all that can be done is to make the best possible guess at amounts which shall total the $175,000,000 of insurance carried.

The most striking general aspect of the record is the paradoxical conjunction of a high rate of burning with the highest type of business ability in the occupants of the burned premises. Only firms of exceptional standing can maintain a foothold in the heart of a great city, yet some classes of business contribute more to fire-insurance and the direct out-growths of fire-waste than would suffice for the needs of all other benefits of civilization. The persistence of this condition, in the face of the recent advances made by the arts of fire-prevention and fire-protection, cannot be explained with credit to the interests concerned.

The grand total of losses upon which insurance was paid amounted, during ten years, to	$11,345,000
During the first five years of the period the loss was	4,535,000
During the second five years of the period the loss was	6,810,000

This shows an increase of more than 50 per cent. in losses during the second period. By reference to the reports of the Superintendent of Insurance, it appears that the corresponding increase in value at risk was only 15 per cent. The second period was marked, therefore, by a great increase in the rate of burning. The losses which caused the increase, however, came largely from an unusual number of serious fires which may indicate fluctuation rather than growth in the rate of burning. The maximum susceptibility to damage is reached at the end of a seasoning process and large buildings are prepared for occupancy during "boom" years which occur in cycles. Consequently, it should result that the harvest of the fire fiend will encounter fat and lean years. The range of extremes during short periods of time is interesting:

The maximum loss one year was	$2,247,000
The minimum loss one year was	480,000
The maximum loss one month was	880,000
The minimum loss one month was	25

On the contrary, the product of the number of fires is marked by comparative constancy:

The maximum number of fires one year was	125
The minimum number of fires one year was	85
The average number of fires for the first period of five years was	98
The average number of fires for the second period of five years was	107

Apparently, 50 fires may be expected each year from 1,000 buildings, due no doubt to the fact that most of the buildings contain more than one tenant. Several buildings so occupied caused five fires each in ten years, and one as many as seven. A map printed elsewhere in this issue has been prepared in which the location of each fire is shown by a dot of a size commensurate with the loss. The effect upon the eye is striking, and should convince the most sceptical that no construction or occupancy is immune from attack. The vagaries of hazard in this respect are well illustrated by the experience of a prominent business house, which had occupied a so-called "fire-trap" for many years without causing more than one mere false alarm. The growth of the business culminated in new fireproof quarters specially prepared for its needs. The change was celebrated by two fires within twenty months, one of which caused a loss of $33,000, chiefly in stock.

The preponderance of effect in the total of loss, due to a few large fires, has been frequently noted. The record of the district confirms this distinction:

	Number fires.	Loss.
Fires destroying $20,000, and less, total	90%	18.5%
Fires exceeding $20,000, and less, total	10%	81.5%
544 fires, $1,000 and less, averaged a loss of		$280
381 fires, $1,000 to $20,000, averaged a loss of		5,100
102 fires, exceeding $20,000, averaged a loss of		90,600
11 fires averaged a loss of		354,000

Thirty-four per cent. of the total loss was incurred in these eleven fires.

The direct source of the greater part of the loss is disclosed clearly by the classified experience of the years 1900, 1901 and 1902. It comes from buildings of large size, whose floors are framed with wood and are not protected by automatic-sprinklers, although provided with automatic hatch-doors, fire-alarms and the other simple expediments encouraged by ample credits in fire-insurance schedules.

The numerous old buildings of small size, occupied by tenants of little note, produce the most fires, but add only slightly to the total of loss. The elimination of the large fire, which is the recognized progenitor of the conflagration, depends almost wholly, therefore, upon the successful treatment of the comparatively few large buildings of inflammable interior construction from

which these fires emerge with substantial constancy each year. The experience of Chicago shows that this desirable end may be reached through the installation of automatic-sprinklers. In fact, the old combustible building of large area, filled with miscellaneous tenants but protected by sprinklers, shows a smaller ratio of loss than the modern buildings of fireproof construction but without such protection. The writer was informed by a prominent New York fire-insurance authority that this relation obtained also in that city. It need not be deduced that good construction is no longer economical in congested districts, but the enforced application of sprinklers in so-called "conflagration-breeders" may be advocated in behalf of public safety with full confidence that the result will justify the wisdom of the act.

The congested district is an affair of to-day. It is already built and full of spots which may incubate large fires. The heavy-walled fireproof congested district can only be attained through tearing down or burning down the existing buildings. Progress by these methods is very slow. Such a district does not arise at once, even when a conflagration offers the opportunity. The thorough application of the sprinkler, however, may be made by the present generation of business men, and they would be so applied at once if more attention were paid to economic facts and less to insurance-credits—which should not be viewed as true weights and measures in such a matter. The full economic worth of the sprinkler is shown by the classified experience. The contrast between the records of the ordinary and mill buildings, equipped and unequipped, challenges attention. The rates of burning of the unequipped property may be somewhat more or less than the figures given, bu the range of possible error in the case of sprinklers may be clearly defined by reference to th number of heads in service. The loss per head per annum was 6.6 cents on building and contents. If the value at risk per head was $200, the rate was 33 cents on the $100; if $300, the rate was 22 cents.

CLASSIFIED EXPERIENCE YEARS, 1900, 1901, 1902.

	Loss.	App. rate burning.	
Old style office buildings	$47,000	16 cts.	$100
Fireproof buildings	38,000	3 "	"
Contents of office buildings	40,000	13 "	"
Equipped fireproof buildings	No loss.		
Contents of fireproof buildings	No loss.		
Ordinary and mill buildings	680,000	95 "	"
Contents of ordinary and mill buildings	2,600,000	166 "	"
Equipped ordinary and mill buildings.	2,000	9 "	"
Contents of equipped ordinary and mill buildings	22,500	3.4 "	"

Note.—Exposure loss charged to point of origin = 6.50% of total loss.

The number of fires in the sprinklered buildings equalled the expected average of 50 per 1,000 per annum.

In the light of the above showing, some reference to the use of sprinklers should be formed in city ordinances. If the intent of the provisions to secure safety from fire is to achieve results, the one thing needful has been largely neglected. To illustrate: The Chicago ordinance prescribes an incombustible enclosure around passenger-elevator shafts in buildings of ordinary construction. The terms of the ordinance are retroactive, but do not apply to fireproof buildings. The wisdom of such enclosures in the fireproof building would be unquestionable, but their insertion in old buildings of ordinary construction is of doubtful utility. The closing of a hole in a tin pan might have an obvious significance which would be lacking in the case of a sieve. So long as the elevator-shaft or stair-well is handy, the fire invariably uses one or both in its ascent. In the absence of these facilities, however, it is almost equally prompt in passing right through the ordinary floor. Thus, an unfortunate owner recently enclosed the passenger elevator-shafts in an old building, as compelled by the city. To-day the enclosures form an additional item of loss in the general wreck caused by a fire. The remedy indicated by the symptom was clearly the sprinkler and not the elevator enclosure.

It requires merely a closer approximation to economic facts on the part of building ordinances and insurance schedules to secure not only comparative immunity from sweeping fire in congested districts, but also a great lessening of the annual burden which accrues from those of common occurrence.

HERMAN B. SEELY.

ILLUSTRATIONS

THE MAIN TOWER: BROADWAY TABERNACLE, BROADWAY AND FIFTY-SIXTH STREET, NEW YORK, N. Y. MESSRS. BARNEY & CHAPMAN, ARCHITECTS, NEW YORK, N. Y.

For plans and description, see the *American Architect* for February 18 last.

DETAILS OF THE SAME.

NORFOLK COUNTY REGISTRY OF DEEDS, DEDHAM, MASS. MESSRS. PEABODY & STERNS, ARCHITECTS, BOSTON, MASS.

A COMPETITIVE DESIGN FOR THE CARNEGIE TECHNICAL SCHOOLS, PITTSBURG, PA. MR. CALVIN KIESSLING, ARCHITECT, BOSTON, MASS.

FIRE MAP OF CHICAGO'S "CONGESTED DISTRICT."

This plate is printed in illustration of the article, "Loss by Fire in the Congested District of Chicago," elsewhere in this issue.

A COMPETITIVE DESIGN FOR THE CARNEGIE TECHNICAL SCHOOLS, PITTSBURG, PA. MR. B. F. WILLIS, ARCHITECT, YORK, PA.

Additional Illustrations in the International Edition.

GENERAL VIEW OF THE BROADWAY TABERNACLE, NEW YORK, N. Y. MESSRS. BARNEY & CHAPMAN, ARCHITECTS.

NOTES AND CLIPPINGS.

EBONY-GROWING IN CALIFORNIA.—It is now thought that ebony will grow in California, and some trees are to be taken there from Mexico, and an attempt made to grow them.—*Exchange.*

NATION GETS BACK BIG TREES.—The final steps in the recession to the Federal Government of the Yosemite Valley and the Mariposa big trees so far as California is concerned were taken, March 3, by Governor Pardee, when he signed the bill providing for the regrant.—*Exchange.*

THE LAZARUS SCHOLARSHIP.—The Jacob H. Lazarus scholarship for the study of mural painting will be awarded next autumn by the Academy of Design for the fourth time. The winner will receive $1,000 a year and traveling expenses for three years, during which period he must work in Rome under the guidance of the Academy. The scholarship is open to any unmarried male citizen of the United States. Candidates must enter their names before October 1 next, and pass a preliminary examination in perspective, anatomy and painting from the nude; the final competition will be held in November, and the prize awarded in time for the winner to begin work in Rome in January. The Academy committee in charge of the matter consists of Frederic Crowninshield, J. Carroll Beckwith, Edwin H. Blashfield, George W. Breck, A. D. F. Hamlin, Francis C. Jones, George W. Maynard, A. T. Schwartz and Edgar M. Ward. Further particulars may be obtained from Philip C. Süs, clerk of the Academy, at Amsterdam avenue and One Hundred and Ninth street, New York City.—*New York Evening Post.*

PROPOSED MEMORIAL TO THE CHEVALIER ST. SAUVEUR.—Senator Prentiss Cummings's resolve for the appointment of a recess commission to consider a memorial to the Chevalier St. Sauveur is worth while passing, in order that the people of Massachusetts, and of Boston in particular, may learn something about the man to whom it is proposed to erect a monument. There are very few people in Boston who have ever heard of the Chevalier, and still fewer know why it is proposed to erect a monument to him. It is a question whether a commission would favor such a memorial, although unless one is erected the State will not be keeping its promise. The officer in the fleet of Count D'Estaing, who was injured by American citizens in an affray in this city September 16, 1778, and who died a few days later from his injuries, may not have rendered any great service to this country in the war for independence. Yet he was a Frenchman, an ally of this country in time of need, and his death, although never fixed upon anyone, was doubtless caused by American citizens. For this reason the General Court of Massachusetts passed a resolution for a memorial to him. Reasons of State are said to have led to a delay, and the promise has never been carried out. We doubt that Senator Cummings cares much whether a memorial is erected to the Frenchman or not, but he believes the Commonwealth should make its word good and keep its record clear. If a like idea of the integrity of the Commonwealth and the duty of its citizens actuated every lawmaker, we should hear little about "graft" in legislative councils.—*Boston Herald.*

The American Architect and Building News

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CONTENTS

A VERY effective step towards assuring to the city of Washington the outwardly artistic appearance which is its due has been taken by President Roosevelt this week. He has issued "an executive order"—a form of pronouncement altogether too like an "imperial ukase" to be wholly acceptable to a democratic people—to the effect that the site for every public building to be erected in that city hereafter must be selected with a view to conforming with the recommendations of a general plan for the improvement of the city. Passing over the change that seems to be taking place in our methods of government, whereby a Presidential "recommendation" takes on the air of a dictatorial order, we think there can be no difference of opinion as to the general wisdom of the President's purpose. But, as control of the District of Columbia and the direction of all the municipal affairs of the city of Washington rest, not in the President but in the Congress, it is not impossible that this "executive order" should be resented by the latter body as a trespass upon its prerogatives, as it certainly is. In some measure, the President makes his position more possible by making his order refer to "a general plan" and not to "the general plan." He could hardly have expressed himself otherwise, for though he, of course, must have had in mind the Burnham-McKim-Olmsted plan, that plan has not yet been definitely accepted by Congress, so the defenders of Congressional dignity may console themselves with the thought that, if they see fit, they can still adopt "a general plan" altogether different from that which the President fancies he is helping to carry out by the issue of his executive order.

IT IS likely that the issue of this order will have the effect of making the next Congress, early in the session, take up and finally settle the fate of the plan for the improvement of Washington, which at present has only the implied support of the Senate. It is inconceivable that those who are interested in the scheme, impersonally and from a sense of the demands of public spirit, should have to keep permanently on the qui vive, so that they may defeat any intended or accidental attempt to make impossible the carrying out of the scheme in its entirety, as happened recently in the matter of determining the site for the Agricultural Building on the Mall, and yet, until a general plan is adopted, that is just what they must do. As matters are, and always have been, the real-estate market in the city is very vitally concerned with the selection of sites for possible future public buildings, each one of which offers a chance not only to owners of eligible sites, but to the larger number of owners of surrounding property of which the value must be enhanced by the neighborhood of the new building. Anything that can put a stop to the temptation our legislators are under to have their decision on a public matter affected by their own private interests as real-estate speculators is to be desired. It is quite possible that the delays to which the Burnham-McKim-Olmsted plan has been subjected are due to the influence of real-estate speculators—official or unofficial—who are holding up the scheme until they can secure control of the properties which are to be affected by its execution.

THE President's order, we see, now that we have the full text before us, also includes the appointment of a "consultative board," consisting of Messrs. Bernard K. Green, chairman, Daniel H. Burnham, Charles F. McKim, Frederick Law Olmsted and Augustus St. Gaudens—who are to serve without pay, under the Secretary of War—the approval of which board must be secured both for the site and for the proposed building before operations can begin. It further appears that the order is intended to cover only cases where a discretionary right of selection of design and site is vested by law in any "head of a department," that is, in any executive official who as such properly comes under the direct control of the President. Congress may still frame laws dropping a building down upon any site that may please it, without causing friction with the President and his consultative board. But the creation of this official body, in sympathy with the general plan for the improvement of Washington, is a distinct though not very important step in the right direction.

THE *odium theologicum* seems in danger of losing its reputation for hatefulness, because of the bitterness of the *odium archæologicum* which the followers of the modern art of archæology display in the discussions they carry on between themselves. The bitterness which archæologists so often show is perhaps due to the fact that very many archæological matters have a bearing on the trustworthiness of the Old Testament historical narratives, and consequently have attracted the

Entered at the Post Office at New York as second-class matter.

attention of numberless clergymen already adepts in the bitter art of controversial argument upon vague and imperfect premises. The latest archæological quarrel, that between the Rev. J. P. Peters, D.D., and Professor H. V. Hilprecht, promises to have very unfortunate results for the Free Museum of Science and Art of the University of Pennsylvania, of which the latter is at present the director. Both gentlemen have had connection with exploratory expeditions in Babylonia, Dr. Peters somewhat earlier than Professor Hilprecht, and, after the fashion of his kind, the later explorer seems to have done what he could to belittle the work of his predecessor and overthrow his deductions. He was so unwise as to do this obviously grateful task in print, and this seems to have been unfortunate both for him and for the Museum, since Dr. Peters has rejoined by attacking the account that Professor Hilprecht has given of his own wonderfully important discovery of the "temple library" at Nippur, and produces proof that some of the seals and cylinders, translations of which have been made use of by Professor Hilprecht, are known to have been discovered eleven years before the alleged unearthing of the so-called "temple library"; in other words he charges that the latter, if not non-existent, is a premature fake, so far as actual uncovering goes. The immediate result of this discussion, which obviously must have later stages, is the withdrawal from the Museum's Board of Managers of several of the most zealous supporters of the exploratory undertakings, the loss of whose large subscriptions to the expeditionary funds will be seriously felt.

AN apparatus that, as alleged, is sold in New Jersey for seventy-five dollars, but which the owner hopes, with the aid of municipal ordinance, to sell in New York City for five hundred dollars, gains in value in such inverse ratio to the distance it travels that it is no wonder that people think there is some sort of "graft" in the matter that requires investigation. The article in question is one of the two forms of elevator safety-catches that comply with the new specifications of the Building Department which the Superintendent of Buildings, Mr. Hopper, is trying to have installed in every passenger-elevator now running in New York. The apparatus in question is undoubtedly a good and effective one, but the margin of profit is so large that we do not wonder that the Realty League—a body organized for the purpose of resisting "the illegal demands of city officers"—proposes to fight the Superintendent's order through all the courts. It is figured that there are ten thousand passenger-elevators in the city, almost all of which are already equipped with some form of safety device, most of them reasonably efficient, which under the new order must be replaced by the favored article, of a net profit to—someone of, say, four hundred dollars, or a total profit of some four million dollars. The announced intention to fight seems really very praiseworthy.

THE most fantastic decision under the official interpretation of our present beneficent fiscal law was recorded last week, in the form of a ruling by the Board of United States General Appraisers to the effect that a certain picture, "hand-painted" at that, must pay a forty-five per cent. duty, not as a modern "work of art" but as a "manufacture of cotton"! The picture is the work of a certain Melozzo da Forli, who is said to have a studio in the Vatican, and was imported for the adornment of a Chicago church, the importers being prepared, apparently, to pay duty under the art schedule if they could not get it through free as being intended for an educational institution, or on some other plea. But the General Appraiser said, "No, we do not dispute that the picture is hand-painted, charming and a work of art, but we can't let it come in under our art schedule, since that declares that pictures are painted only 'in oil or in water-color' and you can see for yourselves, dear sirs, that your picture is painted neither with oil nor with water-color but only with aniline dyes; it therefore cannot come in under a twenty per cent. duty, but must pay forty-five per cent. as a manufacture of cotton." But, as they evidently felt that the value lay somewhere in the dye and not in the canvas, we wonder they did not look up and impose a higher penalty under some clause of the chemical schedule, if that governing the entry of coal were not high enough.

IT is perhaps fortunate that the recent letter of our Chicago correspondent did not fall under the eye of Mr. Charles Norman Fay, as it, perhaps quite unintentionally, conveyed the impression that the new Thomas Music-hall in that city was not acoustically wholly satisfactory. Mr. Fay, who is one of the original orchestra trustees who induced Theodore Thomas to establish himself in Chicago, has just replied at great length and with much severity to certain criticisms of the hall which had been published in the *Reader*. Mr. Fay declares that, so far was it from being an acoustic failure and because of that helping to cause the death of the famous orchestra-leader, Mr. Thomas "actually danced a jig on the conductor's stand," to express his delight with the perfect conditions revealed at the first private test of the room, and that he at once cabled to the architect, Mr. D. H. Burnham, then absent in Manila, that "quality greatly exceeds all expectations." It is satisfactory to know that in one more case the attempt to conquer echo and reverberation and to obtain all proper aid from resonance has been successful; and yet equal study and care have been expended on many an audience hall that has proved impossible, alike for music and for speaking.

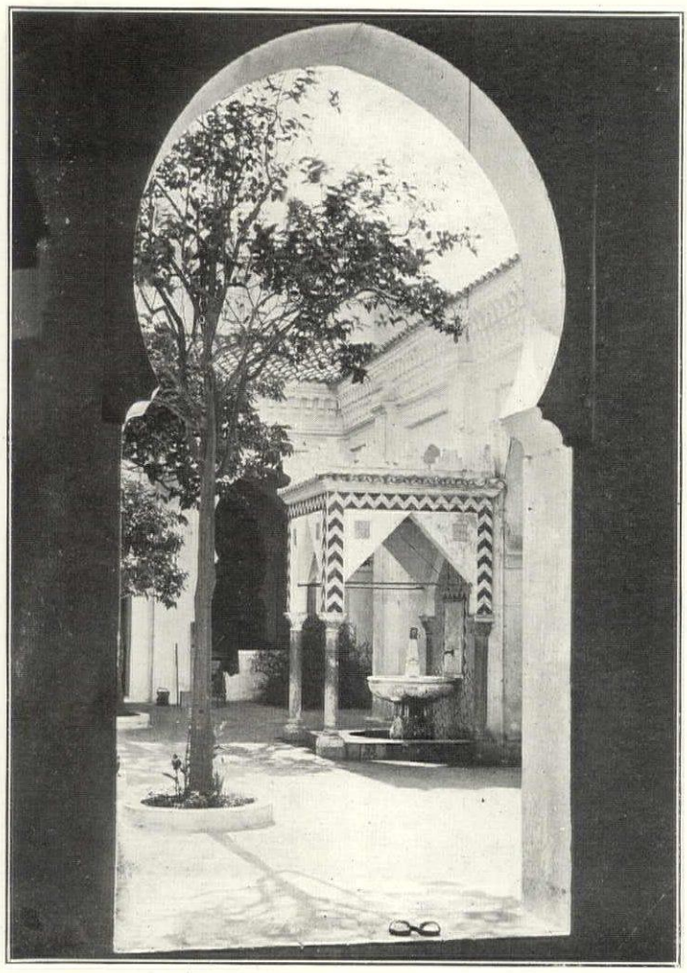
PROBABLY it is not generally known that the Royal Academy has what the London *Post* characterizes as a "wise law" that forbids its professors of painting, sculpture and architect to "speak of the achievements of living men." The wisdom that forbids that an artist's work shall be promoted from the Luxembourg to the Louvre within ten years of his demise is perceptible enough; but it seems of a different and less sublimated kind than that which forbids a lecturer to refer to, or draw his lessons or warnings from, the successes or failures of contemporaries. The Academicians themselves seem to doubt the wisdom of the rule, or at least to make it of little avail, by forcing their own works upon their own exhibition walls, if they cannot force their names and acts upon the lips of their lecturers.

THE ANCIENT ART OF NORTH AFRICA, I.—ALGIERS.

THAT North Africa is warm in mid-winter is a delusion—although, of course, snow and cold winds are "quite unusual." But, on the other hand, one cannot help doubting the truth of guide-book statements, as it is a curious fact that any unpleasant sample of weather we may encounter is "quite exceptional." This is the experience of every traveller.

Arriving at Algiers on the afternoon of the 3d of January, after a villainous voyage, owing to the mistral which prevented the boat leaving on the 31st of December, we were greeted by snow-covered mountains and two or three inches upon the ground. "Quite exceptional; it is fifteen years since we had any." Naturally; were it usual, we should not have taken the trouble to go so far, as equally good or better examples of snow-clad hills can be found nearer home.

Algiers, as an Oriental city, is disappointing. The Arab town remains, somewhat shorn of its character, but the French houses have so increased that they smother native mosques and civil buildings. From a height giving me a view of the whole city, I could only count five or six domes. The French houses are so high that one sees nothing else. They are, of course, handsome and solid, of stone and of good workmanship; but they might be in Paris or Bordeaux, in Avignon or Cette. No town has any distinctive feature in these days, and the broad streets and squares which give sun and light to the men of the North, must make a hell upon earth in the Southerner's summer. We, many of us, have suffered from a Parisian sun and a temperature of 96 or 102 degrees in the shade, when the house has been so baked through that it took two or three days to cool; but what must these same houses and wide streets be in Algiers in midsummer? The old architects and planners of cities knew what they were about, and built in a fashion suitable to the climate; we moderns seem to be men of one idea, and never take into consideration climate and temperature. Skyscrapers may do in the States, but in London they shut out the little light we can hope to obtain for six months out of the twelve.



FOUNTAIN IN THE COURT OF THE MOSQUE OF DJANIAA, ALGIERS.

CEMETERY OF SIDI ABDER RAHMAN, ALGIERS.

The public library of Algiers, although no older than 105 years, is a fine building in pure Moorish style. Many of the houses have fine doorways, and studded about are Moorish fountains.

The oldest mosque is that of Djaniäa el Kebir, built about 1018 by Tachfin, Sultan of Tlemçen, a man of great taste and knowledge in building, to whom Algeria owes much of its finest architecture, that of Tlemçen.

The interior is a large rectangular hall, divided into several aisles and courts. The columns are of antique marble, but there is no decoration of any kind, except pendent lamps, which makes it doubly impressive. Indeed, these empty mosques, where a few people worship in silence, strike one as far more solemn, much fuller of the invisible and totally spiritual Presence of God than our Christian churches, with their confusion of symbols, and aids to prayer in the way of pictures, flowers, lights and the like. The Christian sees the Presence: the Moslem only feels it. Doubtless he is as great a formalist as the rest of us, but his prayer seems to be far more infused with devotion. He is with Allah; he requires no aids to faith and no intermediary, no music, nothing emotional; and yet he absolutely "falls down and worships" wherever he may be. The call to prayer one rarely hears in Algiers—possibly the most Oriental example of the muezzin was in the Rue de Caire of the Paris Exhibition of 1878. Certainly, one sees no one upon the minarets calling the faithful to their devotions, except in small towns and villages.

Of quite a different character is the mosque of Sidi Abder Rahman, which is a mass of draperies, banners, ostrich eggs and other votive offerings hanging about the tomb of the saint. The latter is of wood, painted red, yellow and green; but other tombs in the mosque are covered with exquisite designs carved upon the marble. The whole building is veneered with encaustic

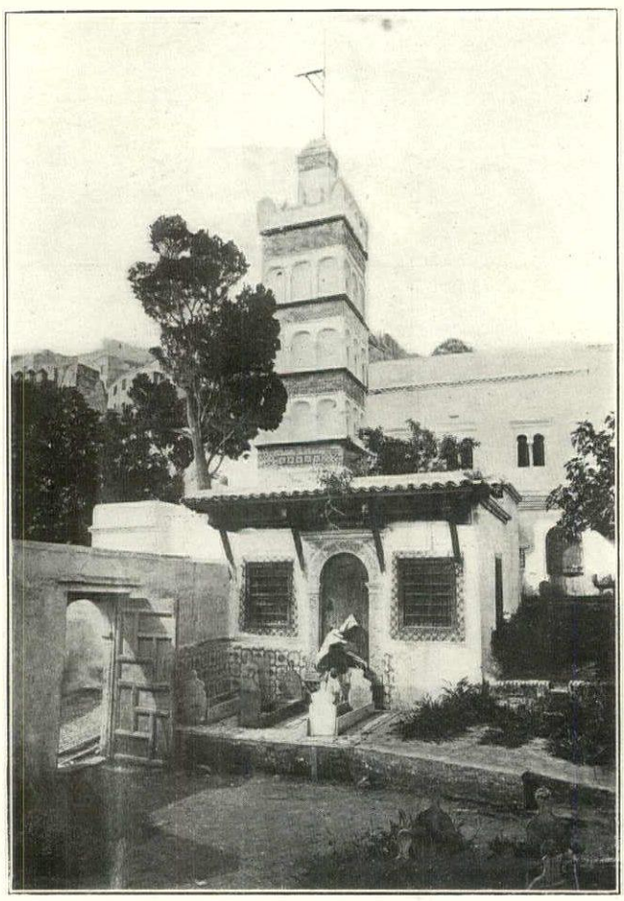
tiles of great beauty. The last Deys of Constantine Ahmed and Khader Pasha were buried in this mosque, which was built at the end of the 14th century.

The new mosque, the Djaniäa el Jadid, was built in 1666 by a Genoese architect, who was put to death by the Dey in consequence of the plan being that of a Greek cross. This is likely to be nothing but a tradition, as most of the true Moslems have a tattoo mark upon their foreheads of this form.

The colonnade belonging to the first-named mosque, which runs along the Rue de la Marine, is elegant; and in the main courtyard is a very beautiful fountain. Another marble fountain is in the centre of the colonnade.

There is an interesting ceremony outside Notre Dame d'Afrique every Sunday after vespers, that of saying the service for the poor wrecked and drowned. Upon a granite sarcophagus a black pall is laid, and the clergy, leaving the church, stand in front of the bier and recite the prayers for the dead. It is a touching and pathetic ceremony which no traveller should miss. Some of the guide-books (Cook's Tourist) call it "Blessing the Sea," which, of course, is nonsense.

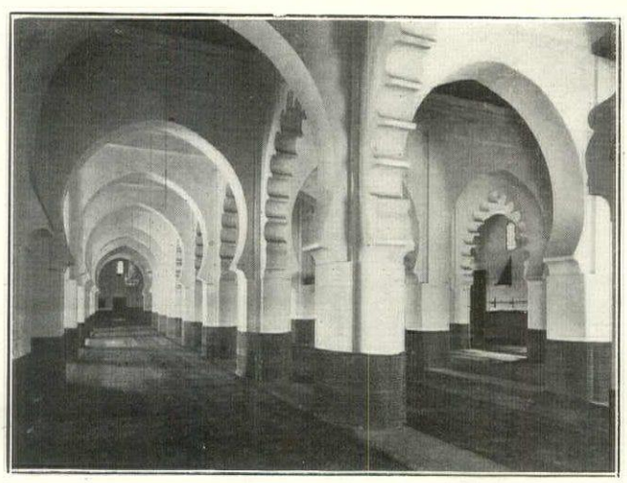
This church is solidly built in a sort of Moorish style, but is architecturally no better and no worse than the votive churches of Montmartre, Paris, Notre Dame de Fourvierès, Lyons, and N. D de la Garde, Marseilles. But, whereas the latter are a mass of mosaic-work, N. D. d'Afrique depends for decoration upon votive offerings of wax limbs, models of ships and small figures of children. These all have outstretched arms and presumably represent the bodies of children whom the prayers of the faithful have saved from death—or possibly the souls of those who have died. Some of them are arranged after the manner of the friezes of angels in many of the Italian churches, hand-in-hand, forming festoons.



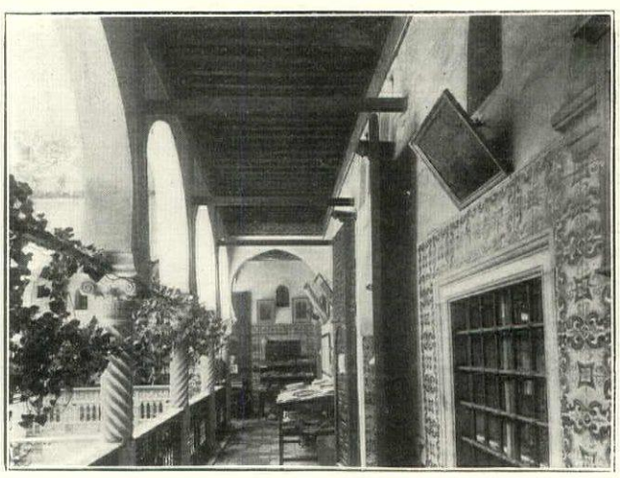
MOSQUE OF SIDI ABDER RAHMAN, ALGIERS.

The Museum is a new building erected at Mustapha Superior for the antiquities found in and about Algiers, which were formerly in the Public Library. It is already too small for its contents. The first idea was conceived by Berbruger, but the Central Government's plan was to send all antiquities, Roman or Moorish, to the Louvre, and, naturally, the early Governor-Generals played into the hands of their sovereigns. Moreover, the Governors were almost all military men, and, therefore, probably not of artistic tastes. The person who succeeded in forming a museum was the civilian Bresson, in 1845, when a few rooms were given up for the purpose in the palace of the Djenina. The museum was subsequently moved from place to place. In 1862 it was located at the Bibliothèque. In 1889 the Central Government committed the blunder of giving over the collections to the municipal authorities without retaining any control or supervision, and some ten years later the municipality determined upon a sale of their valuable possessions. The sums obtained were beneath contempt, such as 15f. for the Dey's chair. Happily, purchasers were not found for many valuable objects, and when M. Cambon became Governor-General the state of things was amended. The new building was begun, and in 1896 the collection (what remained of it) was moved from the Library. The military authorities gave up some of their treasures and private persons contributed, and thus a very fair collection of Roman and Arab remains are to be seen. There are still many treasures from Algeria—slabs, sarcophagi, remains of statues, etc., in the Louvre (mostly in the rooms upon the ground floor adjoining the Renaissance sculpture), but North Africa is unearthing so many artistic treasures which attract travellers—Cherchell, Timgad, Carthage, Limbese—and which cannot be sent to Paris, that we may safely leave the Louvre the little it possesses from the great Continent.

The Museum is well arranged. The entrance court is interesting in having some Roman mosaic pavement utilized, and round the colonnade various steles are placed. In the centre is a fountain.



INTERIOR OF THE GREAT MOSQUE, ALGIERS.



INTERIOR OF THE MUSEUM, ALGIERS.

Amongst the ancient sculptures are a Venus found at Cherchell —a copy of the Venus of the Capitol. A curious blunder in the catalogue may be noted: "*Trouvé en* 1864, *porté au Musée d'Alger en* 1856." Another replica of a Greek work is the Shepherd or Enfant Satyr and a Hermes. The wreathed head of the Emperor Hadrian from Carthage is very beautiful.

An antique marble column and capital is worthy of notice —found at Tlemçen. Also the sarcophagus of a child from

Susa. On the front is a medallion supported on each side by Cupids. The medallion is round and bears the portrait of the defunct. At each end is a little winged Cupid weeping.

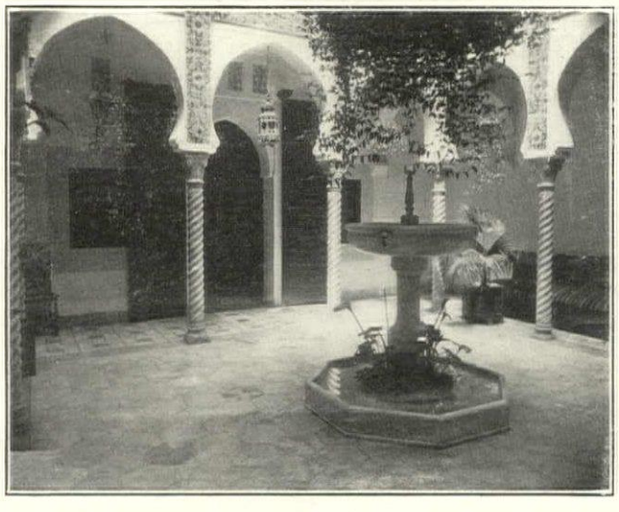
Some curious reliquaries in stone are of the same form as the early Cloisonné and Champlevé enamelled ones, oblong, with pointed ends and roof. One of them bears the name of St. Pastor, and is dated N. Aurés, M5. Another, that of S. Julian, is an oblong box on feet and surmounted by a pointed roof, ending in

EXTERIOR OF THE MOSQUE OF DJANIAA, ALGIERS.

a Greek cross. A Christian sarcophagus of the fourth century has some good carving—many Biblical subjects.

Among the Musulman remains are many inscriptions upon stone. One relates to the son of Abder Rahman. "This is the tomb of one who had an intense need for the Divine mercy, Messoud, son of Abder Rahman, the Algerian." Another tomb comes from the mosque of this saint and Tsalbi, about the eleventh century. Mosques dedicated to the memory of Sidi Abder Rahman are to be found in many parts of the country.

The Cathedral of Algiers is a converted mosque. The marble columns of the interior are part of the latter, but the exterior is entirely modern. The pulpit is the original *mimbar* and is com-



COURT OF MOORISH HOUSE, ALGIERS.

posed of some beautiful mosaic-work. The sanctuary is domed, the domes being supported by grap prophyry pillars.

The church contains the tomb enclosing the bones of S. Geronimo, who was martyred by the Moors. The account of his life and death is given by a Spanish Benedictine in a publication of 1612. M. Berbrugger, the curator of the Library, studied the work and drew the attention of the public to it, hoping that the body of the victim might be found. The story is as follows: During an expedition made by the Spanish garison of Oran in 1540, a young Arab boy was taken prisoner and baptized. When eight years of age he fell into the hands of his Arab relatives, and until he was 25 he lived the life of a Mohammedan. He then returned to Oran, intending to practise Christianity. This did not prevent him from joining some of his compatriots and making a raid upon the Arabs of the neighborhood. The boat was chased by a Moorish corsair, and all the members of the expedition taken prisoners. Efforts were made to force Geronimc to recant, but as he remained steadfast to the faith he was condemned to death and sentenced to be thrown into a mould in which a block of concrete was to be made. His feet and hands were tied with cords and the sentence was carried out, the block being built into an angle of the fort.

Haedo carefully described the exact spot, adding: "We hope that God's grace may one day extricate Geronimo from this place and reunite his body with those of many other holy martyrs of Christ, whose blood and happy deaths have consecrated this country."

The fort was destroyed in 1853, and on the 27th of December the skeleton of the martyr was discovered in the very spot indicated by Haedo. The bones were removed and interred with great pomp in the cathedral. Plaster of Paris was run into the mould, with the result that a perfect model of the body was obtained, showing not only his features, but the cords which bound him, and the texture of the clothing. The model is now in the Museum.

SOPHIA BEALE.

SANITARY PLUMBING AND OUR PLUMBING LAWS.—III.*

BOSTON, March 1, 1905.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir—The following paragraphs correct one or two points in my article on "Sanitary Plumbing and Our Plumbing Laws," published in the AMERICAN ARCHITECT of December 24 and 31, 1904, during my absence in Europe.

Certain matters in my lecture at the Institute of Technology seem not to have been quite satisfactorily brought out, as several architects have already asked me for the explanations, after reading my article published in your December number. I hope you will see it advisable to publish these addenda at your convenience, for the reasons which will be clear on reading it.

The matter is now up for hearings at the State Home here, and is of particular interest at the present time.

Very sincerely yours,

J. PICKERING PUTNAM.

FIGURES 9 and 10 of page 107, taken in connection with the text describing them, gives at first sight the impression that the ordinary "pot," or reservoir, traps cannot be used under sinks or in positions where greasy matters abound in the waste water without danger of clogging in such a manner as to convert them in time into S-traps.

This is not the case, and it is very important that the subject should be made perfectly clear, because otherwise it might be supposed that complete safety cannot be obtained with ordinary simple appliances.

It is only necessary to use with all traps proper *flushing appliances* in order to secure entire safety; and where the traps are used under sinks, *special flushing devices*, such as have been invented by Waring, Gerhard and others, have proved perfectly efficient.

These sink-flushing devices act on the principle of the siphon flush tank, in that they discharge periodically and automatically through the trap and waste pipes a large valume of water after the greasy matters therein have partially cooled and congealed, and thus they prevent the deposit of sediment along the inner walls of the trap and waste pipe.

This point was more clearly brought out in the lecture than in the printed report of it.

Where the vent pipe is used it is evident that it provides a pocket entirely beyond the scouring area of the water flush, and and may thus in time become closed by the spattering and condensation of vapor even under powerful flushing, while, on the other hand, the body of the trap enjoys the full advantage of the scour.

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*Addenda to paper published in numbers of 24th and 31st December, 1904.

The cuts, Figures 9 and 10, were explained in the lecture as follows:—

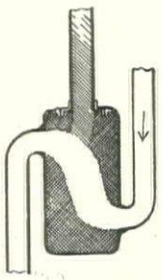

FIG. 9.

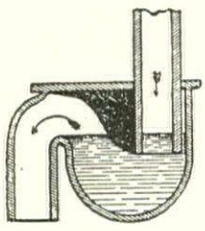

FIG. 10.

RESERVOIR TRAPS SHOWING CLOGGING UNDER SINKS DUE TO THE USE OF INSUFFICIENT FLUSHING.

The clogging could have been avoided by the use of sinks constructed on the principle of the flush tank as devised and recommended by Waring, Gerhard, and others.

There are many other forms of anti-siphon traps on the market to-day which are also more or less self-scouring and which were shown in the lecture. With these a simpler flushing device is sufficient to keep them entirely safe from clogging even under sinks. The patents on many of the best of these traps and of the flush sinks have expired, so that the public now has the advantage of the free use without back-venting of pot traps and special flushing sinks, on the one hand, or of self-cleansing anti-siphon traps and simpler flushing devices, on the other, at a minimum cost and with absolute safety.

It should also be added that the unvented pot and other anti-siphon traps can easily be inspected through their clean-out caps, and periodically cleansed in cases where the owner prefers this to the use of the more expensive special flushing sinks. The mouth of the back-vent pipe, on the other hand, is usually altogether inaccessible for cleansing, especially when it is connected with the waste pipe at some distance beyond the crown of the trap. Hence a vented S-trap places the house occupant between Scylla and Charybdis. If the vent mouth is placed near the crown of the trap, it destroys the water seal by evaporation. If it is placed at a distance from the crown, it becomes inaccessible for cleansing. The only safety lies in prohibiting altogether the use of the "back vent," and in requiring the use of some form of trap which cannot be siphoned, and of fixtures constructed either on the principle of the flush tank or with outlets large enough to provide a thorough water scour. It should be noted that through an error of draughtsmanship in Figure 14 the ice chest and its trap shown on the upper story are placed a few inches too low. Where the refrigerators can be conveniently placed over each other in the different stories of a house, it would be well, where rigid economy is not a prime essential, to connect their traps with a special waste pipe descending to the basement and discharging over a sink, as shown in Figure 15. But the sink trap should be an anti-siphon trap like the rest, without back vent.

The item of back-venting forms a large percentage of the total cost of plumbing to-day, and where it is a question of alterations of buildings already completed it may easily constitute the principal item of expense. Indeed, the cost item is more often entirely prohibitory in alterations. The house owner prefers, in most cases, to forego the advantages of installing a plumbing fixture in a finished house, even though it may be greatly needed for health and comfort, rather than allow several stories to be cut into and perhaps permanently disfigured for back-venting alone as the price of attaining it.

No part of the building laws of to-day calls more urgently for immediate amendment than the plumbing laws, and those who are responsible for the present conditions or who permit of their continuance should be required to show some reason for their position.

If objection to immediate change is made on the ground of insufficient information as to the facts, then the whole matter should be placed at once in the hands of an impartial expert commission for investigation. The apparatus necessary for thorough investigation is already available without expense to such a commission, or could be duplicated by them for a sum not exceeding a hundred dollars. With such an apparatus, taken in connection with the published statements and demonstrations of acknowledged authorities in science and bacteriology now accepted by all students of the subject, it remains to be shown why the following points have not been thoroughly proved, namely:—

(1) That the back-venting of traps now required by law is both dangerous and very costly, and that simpler means are now known which afford entire safety with less expense. (The Boston Society of Architects have already voted unanimously for the amendment of this law.)

(2) That the use of the main house trap equally prescribed is an evil, having no compensating advantage.

(3) That the method of jointing iron pipes now required is unscientific and unsatisfactory, and that other and entirely suitable methods are now known.

(4) That no proper provision for flushing the waste-pipe system is provided in the statutes.

(5) That the number of traps required is excessive and the provisions for their arrangement unwise.

And finally (6), that the requirements for flushing water-closets are antiquated and unnecessarily costly.

COST OF THE PRINCIPAL STRUCTURES IN WASHINGTON.

THE cost of certain public buildings in Washington has been figured out by C. E. Kemper, supervising architect of the Treasury Department, for the information of the House. The total cost of the Capitol, including the old building, practically destroyed in 1814, is given as $17,071,849.41—the new dome cost $1,047,291.89—it is the most costly public building in Washington.

Repairs and improvements on the White House have cost $1,752,289.21 since 1807, but there is no record in the architect's bureau of the original cost of the building. [But up to the time of its partial destruction by the British, in 1814, $334,334 had been expended upon it, so the original or first cost may fairly be taken as $300,000.—*Eds.*] The State, War and Navy building cost from 1872 to 1891 $10,071,916.77, while the cost of the Treasury Department building has been $7,250,540.88, including $6,128,553.45 for original construction and furnishing. The Patent Office represents an investment of $3,652,705.81, and the Interior Department building $2,231,981.59. The Post Office building, including the site, cost $3,305,490.77. The Pension Office building, comparatively modest, cost from 1883 to 1895 $906,820.55 for construction and repairs. The Printing Office, since 1861, has cost $1,900,-858.97. The Congressional Library cost $6,920,081.94, and the Agricultural Department buildings $398,581. The Bureau of Engraving and Printing cost $659,447.32; the National Museum $303,178.41, and the Army Medical Museum and Library $247,-908.14. The total is more than $56,000,000, and the list includes only a portion of the Federal buildings in Washington.—*N. Y. Tribune.*

BOOKS AND PAPERS

THE Report of the Tenement House Department of the City of New York has been published in two substantial volumes,[1] the first containing a wealth of maps, plans and diagrams, with numerous before-and-after-taken illustrations, while the second volume is given up to a mass of exceedingly valuable, if not altogether interesting statistical matter. There are no such extensive slums in New York as have made the London Whitechapel district synonymous with misery and wretchedness, but a mere glance through this report will show what abject poverty sometimes means even in a well-regulated city. The conditions of filth, disease, insufficient light, total absence of ventilation, and horrible sanitary appliances are hard to believe for one who sees New York only on Broadway or Fifth Avenue, and the constant menace of such conditions is strikingly brought out, though never distinctly stated, in many pages of the report. The poor we shall have always with us, and the only compensation is that there are also with us men like Mr. DeForest who are willing to give their energy and their time to the thankless task of at least partially righting the terrible wrong which the very poor tenement houses make manifest.

The conditions in New York City are peculiarly unfavorable to satisfactory solutions of the ideal tenement-house plan. After trying for so many years to squeeze every human habitation into a 20 or 25-foot unit with light only from front and rear, with the example set all the time by the houses of the more prosperous classes, wherein the staircases are uniformly dark, the lavatories

[1] "*First Report of the Tenement House Department of the City of New York.*" Robert W. De Forest, Tenement House Commissioner. Jan. 1, 1902-July 1, 1903.

seldom with outside light and air, it is no wonder that even yet, with all the careful study that has been given to it, the most satisfactory plan for a tenement house thus far evolved is no better than the dumb-bell scheme with interior courts which are fit to live on only so far as they are kept scrupulously clean, a condition which is impossible in a tenement-house district. We confess, in the light of the tenement-house plans included in Mr. DeForest's report, that the possibilities of the future seem far from encouraging, and the city's rectangular plan and absurd adherence to uniform size of the lot will always make it extremely difficult to produce small tenement houses that can possibly be well planned. Mr. Phipps has announced that he proposes to spend a million dollars in attempting to find a more reasonable solution of the tenement-house problem, but the sad feature about all attempts such as he will make is that, judging by all the past, his improved dwellings will at once be filled not by the submerged classes who need relief so much, but by those who are much higher in the social scale and will welcome his houses because of the reduced rent. The miserable disease-infected tenement houses will be even more crowded and the work of succeeding tenement-house commissioners will not be any easier as time goes on and more model tenement houses are erected. Just what we are going to do about it is another question, which trenches far more on the domain of economics than of architecture.

A RECENT editorial[1] has characterized the present as the reinforced-cement age. Certainly never before was any one material so markedly in evidence, and uniformity of practice is the surest way of arriving at definite tangible knowledge in regard to possibilities of material. The American Society for Testing Materials, through a committee, reported by presenting a standard specification for cement which embodies a statement of the very best modern practice. This has been issued for circulation in a convenient pamphlet form by the Cement Department of the Illinois Steel Company.

THE square[2] has been used for countless ages, but the personal equation has so largely slipped away from the modern mechanic's work that we are apt to forget what a handy instrument it is and how much can be done with it. Its uses and possibilities are very clearly and interestingly explained in this volume of scarce a hundred pages, and the large possibilities of the square will probably be a surprise to many people who read it. Few carpenters thoroughly appreciate such things now-a-days, but it would be much better for our work if they did.

WHEN a specialist undertakes to write upon some department having to do with architecture one expects the ordinary statement that all previous investigators are at fault. It is a pleasant surprise, therefore, to note in Dr. Rowe's book[3] the frank acknowledgment that his studies have led him to the conclusion that all the important principles of lighting of schoolrooms were not only definitely known but were capable of actual demonstration. He has made it his business to test this conclusion carefully, to ascertain the facts, and the reasons underlying them. The result has demonstrated quite thoroughly that the main principles of school lighting are solved already and solved practically. The problem for the future is simply to get all concerned to know and respect the requirements. There is, nevertheless, some reasonable difference of opinion, but, on the whole, there is really little to object to in this little volume. The precedents quoted are such as would command respect from practical people, and the concensus of opinion on all the points relating to the subject is both comprehensive and easily appreciated. We do not personally share the writer's partiality for prismatic lights, and indeed most tests with which we are familiar seem to show that plain factory ribbed glass is quite as good as some of the much more expensive prisms, but there are undoubtedly some cases where a bad condition can be made more tolerable by such devices. The book embodies the best results which have been attained in New York, Boston and St. Louis, the three cities which have most scientifically and practically studied the schoolhouse problem.

AT rare intervals in the world's history there arises a great artist endowed with the ability to see the beauty in the human form and to present it in a shape which commands the admiration of all ages. Quentyn Matsys is a type of the artist who did not have this faculty. He could see the human form and depict it with most marvelous accuracy while absolutely ignoring the entire element of beauty. Seldom has the world produced that keen sense of the æsthetic which both sees and portrays. Such was the endowment of Verrocchio,[4] one of the greatest and most progressive artists of the Renaissance, though perhaps the least known and appreciated of the great masters of the fifteenth century, a man whose work has shared with that of Donatello's the admiration of all his successors. He had that keen Greek sense of the beautiful which he was able to translate into everything he did. His productions were not necessarily perfect, in a material sense, and all his work was more truly objective than subjective in its nature, but in all his art there is the feeling of rich, abundant life. His men and women, to say nothing of his horses, were transfixed living, and the life is just as keenly appreciated to-day as it was in the fifteenth century. If he had produced nothing more than the Colleoni Statue, his title to fame would still be undisputed. It is not too much to say that the Colleoni is the finest equestrian statue in existence, perhaps the grandest monument of the Renaissance. It is the incarnation of audacity and conquest, and embodies in concentrated measure all the exuberant physical and intellectual force of the epoch. The Venetians refused to give it the honorable site claimed by the dead General, and with a petty quibble relegated it to a little-frequented and unimportant square. Verrocchio, by the grandeur of his work, avenged the State's ingratitude. The statue dominates not only the small piazza where it is placed, but, lifted high above its insignificant surroundings, seems to sway and subdue Venice herself with its imperious sovereignty. That this should have been the work of a man living at a time when there was so little to inspire him, shows how keenly he could draw from Nature of her best and avoid the dreary ugliness which seemed so inseparable from the work of many of the artists of the Renaissance. The Putto with Dolphin in the Palazzo Vecchio is another of Verrocchio's most highly known successes. It is not as beautiful as the similar figure in the collection of Gustave Dreyfus at Paris and, of course, it has nothing of the dignity of the more stately compositions, but for mocking, dancing grace, a glint of sunshine in the midst of the stern old castle, it is unsurpassed. In sharp contrast with this is his terra-cotta study for an "Entombment" now in the Berlin Museum, which, in superb antomy, in the balance of the composition, the flexibility of movement and the facility of technique, stamp the work as belonging to the highest period of artistic development. Verrocchio is little appreciated by the casual observer. He attained skill in sculpture, architecture, painting, goldsmith's work, bronze-founding and mechanical engineering, and he lived the life which we associate with that of the sturdier artists of the Renaissance, devoted entirely to his work, dissipating no part of his forces in personal indulgence and though showing in his work such a keen love for life, seeming to have had no time to touch life on its human side. He found in the various arts sufficient outlets for his energy, and whether as an engineer, casting the bronze cross and ball to crown Brunellesco's cupola, or working with the unwieldy technique of the Renaissance painters, he was able to impress his strong, keen, æsthetic sense on all his associates, so that the school which he founded was one of the most virile and successful in Florence. His life could not have been a happy one. In his youth he was forced to part with property belonging to his father to meet expenses, and notwithstanding an abundance of work he had to appeal to the commissioners of the statues of Or San Michele because he was in great poverty, with the burden of a large family, especially the dowerless daughters of his brother Tomasso reduced to extreme misery. He never married, and died at the age of fifty-three while in the zenith of his powers. His temperament as an artist was peculiarly plastic. Many of his paintings seem more like studies for reliefs than as pictorial representations, and his peculiarly gracious qualities are most apparent in the round.

His biography is clearly and concisely presented in this volume and supplemented by very complete photographs and descriptions of all his known productions.

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[1] "*Report of Committee on Standard Specifications for Cement.*" American Society for Testing Materials.

[2] "*The Steel Square Pocket Book. A Practical and Handy Treatise* Giving the Best and Simplest Methods of Using the Carpenter's Steel Square. By Dwight L. Stoddard. New York: Industrial Publication Co. 1904. Price, 50 cents.

[3] "*The Lighting of School-Rooms.*" A Manual for School Boards, Architects, Superintendents and Teachers. By Stuart H. Rowe, Ph.D. New York: Longmans, Green & Co. 1904.

[4] "*Verrocchio.*" By Maud Cruttwell. Imported by Charles Scribner's Sons: New York. 1904. Price, $2.00.

ILLUSTRATIONS

UNITED STATES POST-OFFICE, NASHUA, N. H. MR. F. MANTON WAKEFIELD, BOSTON, MASS.

PLAN OF THE SAME.

DETAILS OF THE SAME.

As usual, in the case of buildings designed under the Tarsney act, the working drawings have all been prepared in the office of the Supervising Architect.

ENTRANCE FRONT: HIGH SCHOOL, METHUEN, MASS. MR. HENRY VAUGHAN, ARCHITECT, BOSTON, MASS.

REAR VIEW OF THE SAME BUILDING.

TICKNOR PRIMARY SCHOOL, DORCHESTER AND MIDDLE STS., SOUTH BOSTON, MASS. MESSRS. ANDREWS, JAQUES & RANTOUL, ARCHITECTS, BOSTON, MASS.

HOUSE OF MRS. W. B. OGDEN, 39TH ST. AND MADISON AVE., NEW YORK, N. Y. MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.

Additional Illustrations in the International Edition.

SCULPTURED GROUPS ON THE CHAMBER OF COMMERCE BUILDING, NEW YORK, N. Y.

DE WITT CLINTON: GROUP ON THE LIBERTY ST. FRONT OF THE CHAMBER OF COMMERCE, NEW YORK, N. Y. MR. DANIEL CHESTER FRENCH, SCULPTOR.

NOTES AND CLIPPINGS.

THE MCCLELLAN STATUE FOR PHILADELPHIA.—The equestrian statue of General George B. McClellan which is to be erected on the south side of the Smith Memorial Arch in Philadelphia, has been completed by Paul W. Bartlett.

THE DOME OF THE BRITISH MUSEUM READING-ROOM.—The reading-room of the British Museum is crowned by a spacious dome, which is about thirty feet wider than that of St. Paul's Cathedral. It is 140 feet in diameter, and, with its 60,000 superficial feet of glass, springs more than 100 feet in height. Neither St. Peter's at Rome nor Santa Maria at Florence is a match to it. It is larger by 45 feet than the dome of the Capital at Washington, by 35 feet than that of Darmstadt Cathedral, by 33 feet than that of St. Sophia, Constantinople, and spreads 16 feet farther than the concave roof of the tomb of Mohammed Adil Shah at Bijapur.—*Exchange.*

CARNEGIE INSTITUTION WORK.—At the recent annual meeting in Washington, D. C., of the Board of Trustees of the Carnegie Institution, announcement was made that during the year 114 grants, aggregating $355,070, had been made to further researches in the several branches of science, and $1,000 paid to each of twenty-four research assistants for specified scientific investigation. The larger projects undertaken by the Institute during the year include: The establishment of a Department of Experimental Biology, with Stations at Cold Spring Harbor, L. I., and at the Dry Tortugas, Fla.; of a Department of Economics and Sociology; a Bureau of Historical Research; a Department of International Researches in Terrestrial Magnetism.

HOW A NEW YORK REAL ESTATE DEAL TURNED OUT.—A man owned some thirty-two lots in the neighborhood where the Mills Hotel stands now. He decided to sell; $60,000 was the price he wanted, but he felt almost apologetic about suggesting such an inordinate sum. However, when he spoke of the matter to a friend, the friend became interested, was quite satisfied with the price, and handed him a check for $2,500 directly, arranging to pay the balance later. This was pleasant and certainly reassuring. Nevertheless, the man who had sold the lots was haunted by the fear that he had inveigled his friend into purchasing by nefarious means. So he went to him and said, "Look here! I hope I didn't badger you into buying those lots by hinting that they might fall into undesirable hands and prove an annoyance to you. Of course I would have guarded against that when it came to the point. I'll tell you what I'm going to do. I'll keep your check for six months or so, to give you plenty of time to think this thing over. And if at the end of the six months you don't want the lots, just say so and I'll return the check." And this happened in New York—"curiouser and curiouser" it seems, the longer we reflect upon it. The result of this very naive real estate deal was happy in both cases. The original owner had his $60,000, and the new one grew opulent with Arabian-nights swiftness; for twelve or fourteen lots went to a Frenchman for $132,000, and the rest of the land was disposed of for the same amount. But the original basis of his increasing prosperity was a sand-heap. It was a huge sand-heap, and upon its unstable eminences one of Napoleon's ex-generals had been wont to teach school. Poor old warrior! I hope they let him pursue his incongruously gentle calling (for which, all honor!) in some more peaceful and enduring corner of the city. For sand was at a premium in New York. The fortunate possessor of the sand-heap demolished it by barrowfuls at a shilling the load, and as the demand increased cannily raised the price to three shillings a load, and when the sand-heap finally disappeared, it left a gold-heap instead —$75,000 it bequeathed to its owner—its last will and testament. But it is the original bargain that it is especially refreshing to contemplate.—*Grace Hodson Boutelle in the Boston Transcript.*

NATURAL-GAS WELLS, THEIR COST AND LIFE.—There are some questions in the production and transportation and consumption of natural gas known to the experienced operator, but utterly unknown to the layman, or even to consumers. It is a business of itself, almost a profession, and as far removed from the business of making coal gas as Kamchatka is from Patagonia. The present situation in the gas business affects Kansas City vitally, both as to permanence and abundance of supply and cost of fuel. To the end that these questions may be answered as far as possible, an expert of many years' experience in the Pennsylvania and Kansas gas fields furnishes some interesting figures, which have been verified. In the first place, a stated daily capacity of 900,000,000 cubic feet, such as the Kansas Natural Gas Company now owns, does not by any means guarantee that amount of gas going through the pipes. The 900,000,000 cubic feet represents the amount of gas flowing into the air at the mouth of the pipe, but when it comes to forcing the gas through a pipe it is a different matter. Thus, from a well of three pounds open-flow pressure through a five-inch pipe, the capacity of the well was 8,609,000 cubic feet a day. The same well, when connected with the pipe line, showed only 800,000 cubic feet daily production. Thus, 900,000,000 cubic feet production means about 8,700,000 daily pipe-line production. Another point is the life of the well. That is dependent on the consumption. The more gas used out of a well the shorter its life. But the average in the eastern fields is from two years to ten years, according to districts. There is no rule for this. There are wells which have been worked regularly for six or seven years and are still strong producers, and there are wells which have been worked two years and are now "dry." Much depends on the use of the fuel in the life of the well. To equal a ton of coal in heat-producing capacity in a residence between 10,000 cubic feet and 12,000 cubic feet of gas is required. To equal a ton of coal in steam-producing capacity it requires from 20,000 cubic feet to 22,000 cubic feet of gas. This is because of the intermittent use of gas in the homes and the constant use under the boiler. In speaking of a ton of coal is meant the best grade of Pittsburg coal. The cost of gas increases necessarily with the years. As the gas is consumed the daily capacity of the well decreases, through the decrease in rock pressure, which is the natural pressure, and as this pressure decreases it must be supplied by artificial means, such as compressors and giant pumps and such devices. This machinery increases the cost of production, and as the cost of production increases the price to the consumer increases. Thus, while it costs 10 cents a thousand cubic feet to produce gas this year it may require 15 cents to produce a thousand cubic feet next year. As the wells are exhausted, new ones must be drilled and this drilling adds inevitably and properly to the cost of production. The cost of a pipe line is another thing. To construct a 12-inch or 16-inch pipe line from the Kansas fields to Kansas City, a distance of 200 miles, will cost from $15,000 to $18,000 a mile. This would mean an investment on pipe line alone of $3,000,000 to $3,600,000. The leases owned by the Kansas Natural Gas Company comprise 600,000 acres and from $2,000,000 to $3,000,000 lease price and development. Lateral lines, the mains in Kansas City, for instance, will bring the total investment price—that is, the cash expended before they begin to supply gas—to between $12,000,000 and $15,000,000. This is considered a moderate estimate. There is no question as to the supply at this time. There is enough to supply the whole country. When it is considered that less than 20 per cent. of the known gas territory has been drilled, there is a practical guaranty of supply for many years to come.—*Topeka (Kan.) Capital.*

The American Architect and Building News

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CONTENTS

NO searching for recondite causes is needed in the case of the accidents which made various parts of Harlem and The Bronx a noisy and rather dangerous place on Sunday last, not less than four brick buildings in process of construction having collapsed during the day in different parts of that quarter of the city. The sudden rise in temperature was the immediate cause and, though it is probable that there may have been some settling of foundation walls and piers, we believe there was sufficient settling in the walls themselves to cause their own overthrow, even if they had been built on the most solid of foundations. The walls that gave way first were northern walls, in most cases rear walls where workmanship is habitually slighted, which had obviously been "run up" during the exceptionally steady cold weather of the winter. Not being favored by the noonday sun, in all probability the mortar in no single mortar-joint in the entire wall had had the remotest chance to set, but as soon as it became chilled froze at once, expanded and remained expanded until Sunday's warm wave attacked it. If it were possible to remove instantly and evenly all this expansion in these frozen joints there would be caused an actual drop of several inches in a six-story wall which would create a shock that no wall could stand. But even if the expansion was gradual, the shrinkage in height was no less actual and the distortion of the floors, from front to rear, may have caused the overthrow of material, barrels, bricks or what not, and sent them against the settling outer wall with enough impact to explain how some of the walls happened to fall outwards.

THE cause of these concurrent collapses seems perfectly obvious and the responsibility presumptively rests, this time, with the men on whom all the loss will fall, since no life was lost and the money damage must be borne by the builders. There is a section of the Building Code that forbids the laying of brickwork when the temperature is below twenty-four degrees, but, like the rest of the code, many builders believe it is only needful to observe it while the inspectors are in sight, and are not oblivious to the fact that rear walls are less under observation than front ones. Really trustworthy mechanics using heated bricks and mortar mixed with salt water, or properly tempered with sodic carbonate, or using neat Portland cement might safely be allowed to carry on bricklaying in all but the severest weather, for such men can be counted on to observe and reason, and conscientious enough to unlay in the morning the top courses they find were not properly protected overnight. Such men, however, are not to be found on every job and a hard-and-fast rule that forbids brick-laying of any kind when the temperature is below a fixed point is a reasonable measure, although quite a useless one unless rigidly enforced.

THE appeal to State pride is never so persistently made as when a contract, a "plum" that is, is on the point of being awarded to a citizen of another State, and, probably, no architect who ever won a competition for an important public building in another State altogether escaped the envious machinations of the friends of local practitioners or, more generally still, local contractors. Had Mr. Cass Gilbert hailed from Milwaukee in place of St. Paul, we doubt whether any of the very unpleasant discussion about the proposed capitol building for Wisconsin would ever have offended eye or ear. The latest argument is that the Capitol Commissioners, having been appointed, before the partial distruction by fire of the old building, to devise means for the enlargement and improvement of that building, actually exceeded their power in holding a competition for the new building, which the fire made obviously necessary. This point has been upheld by the State's Attorney-General who refuses to pay to Mr. Gilbert the money, fifteen hundred dollars, that was to go to the author of the selected design as payment on account. Further than this he argues that, if it is wrong to pay anything to Mr. Gilbert, it is also wrong to pay second and third money, one thousand dollars in each case, to the architects winning these ranks in the award. The logic is good, but that will not make it any the less distasteful to the advocates of State's rights, since the designs placed second and third were prepared by Wisconsin architects, who have reason now to feel that their vociferous friends have done them a doubtful service in making them a sacrifice to the fetish of State pride. The Milwaukee *News* makes a further point which is perfectly sound. It points out that both in the old commission and in the proposed new one there are justices of the Supreme Court, and urges that it is grossly improper that judges before whom may be brought cases growing out of the interpretation or imperfect execution of the contract should have any part or responsibility for its drawing or awarding. We do not recall noticing that this point has before been

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raised, and yet it is not uncommon to find judges members of such commissions. Of course, in case of actual suit the judicial commissioner would decline to sit in the case; but there might be a subtile feeling of fealty to a brother official that might insensibly have an effect on the judge who did hear the case.

FINDING himself most amusingly in danger of being legislated out of office through his own "executive order," President Roosevelt has modified the order, to which we referred last week, creating a Consultative Board of Architects to have control over certain building matters in Washington, so that the members in place of serving without pay are to be paid ten dollars per day and expenses, while actually discharging their duties. It seems that a recently enacted law forbids any department or officer of the government to accept voluntary service for the government, and provides that "any person violating any provision of this section shall be summarily removed from office." The members of the Board, who would have been quite willing to serve without pay, will be no less willing to pocket the honorarium, if by so doing they aid the President to escape unintended hari-kari.

A GHOST who, in place of sedately stalking up and down, gibbering and dismally clanking its chains, actually talks violates the well established laws of phantasmology. Mr. Oscar Bluemmer, who confesses to have played the "ghost" in the preparation of the design for the million-dollar court-house for the Borough of the Bronx, New York, which has just been approved by the Municipal Art Commission, seems unwilling to be bound by the laws of the game, but talks in a manner which causes much distress to his employer. Moreover, he has a most worldly appetite, quite out of keeping with his unearthly occupation, and has filed a complaint with the Supreme Court in which he charges that Michael J. Garvin, until recently Building Commissioner for the Bronx, to whom the job has been awarded, since the design was submitted in his name, refuses to live up to the agreement and pay him one-half of the commission on the work, twenty thousand dollars of which he believes is now due to and collectible by him. Mr. Bluemner is said to be a medallist of the Royal Academy at Berlin, and, to have spent two years in architectural study in Paris, and to be otherwise equipped as a trained and experienced designer. Mr. Garvin is understood to deny that there was any such agreement between himself and the complainant or that the latter had any hand in preparing the accepted design. As every one knows that "ghosts" are employed in architectural offices, there is nothing strange about the allegation, save that this particular ghost has become endowed with speech and capacity for looking after his interests in quite a mundane way.

A RATHER interesting case, which has its instructive features for architects who have public bodies for clients, is likely to come up for settlement in a Massachusetts court of equity. Mr. Olin W. Cutter has in the last few years designed several successful buildings at East Cambridge for Middlesex County and his commissions upon the main contracts have been properly taken care of. But, as the work extended over several years, and as there were, besides the usual extras, several unimportant alterations, minor work or what not that called for his professional attention, he found when his duties had been fully discharged that he had an unsatisfied claim upon the county in the sum of rather more than thirteen thousand dollars, and to secure payment of his claim he has been forced at length to bring suit. The case was heard in chambers upon an agreed statement of facts, the result being that the Court awarded him the sum of twenty-two hundred and fifty-nine dollars, an amount so inadequate that the case will probably be brought to trial before a jury in a higher court. Apparently, there was not much disposition to dispute the justice of the claim, but the county, through its counsel, saw fit to take advantage of one of those technicalities which do so much to make the common man disbelieve in laws and lawyers. The defense set up was that the State Legislature had limited the cost of the buildings to five hundred thousand dollars and as there was only six dollars of that amount undisbursed, the county, much as it would like to do otherwise, could only pay six dollars to the architect who had served it so satisfactorily. Fortunately, on looking into the accounts, there was found to be an unexpended balance from the appropriation for heating and ventilating and also that some of the minor items in Mr. Cutter's account could be charged against other branches of the government. So, in one way or another, there was scraped together and offered to the plaintiff the sum named above. But two thousand odd with expressions of good will are less desirable than thirteen thousand odd, and we feel that Mr. Cutter should have no great trouble in getting better treatment at the hands of a court of equity or, possibly, through inducing the next Legislature to pass a bill for his relief.

CONSIDERING the number of State-houses that have been destroyed, partially or totally, by fire during the last score of years, one would think that buildings of that particular class would be kept well protected by insurance and that, seeing that the premiums are paid from the public treasury, no one would think that the policy of self assurance was adapted to the situation. Yet the State of Connecticut has just decided not to insure the capitol at Hartford—where if anywhere the real merits and economies of insurance should be understood—and has considered it better business to save four thousand dollars a year on a policy for one million dollars, even if it does leave at risk a building and contents irreplaceable with thrice that sum.

LAST week there died in Pawtucket, Mr. William R. Walker, an architect, better known as General Walker, for, after serving through the Civil War as a lieutenant in one of the Rhode Island regiments, he became greatly interested in the militia of the State and served through all its grades, having at length held the rank of major-general for several years. During a considerable part of the last thirty years Mr. Walker had a thriving practice which his activities in political paths in a large degree secured to him. In this way he was able to design a considerable number of school-houses and town buildings as well as much private work.

HEATING AND VENTILATION.—IV.

DIRECT HOT-WATER HEATING.

A HOT-WATER system is similar in construction and operation to one designed for steam, except hot water flows through the pipes and radiators instead of steam. The flow of water through the system is produced solely by the difference in weight of the water in the supply and return pipes, due to the difference in temperature.

When water is heated it expands, and thus a given volume becomes lighter and tends to rise, and the cooler water flows in to take its place. If the application of heat is kept up, the circulation thus produced is continuous. The velocity of flow depends upon the difference in temperature between the supply and return, and the height of radiator above the boiler. The horizontal distance of the radiator from the boiler is also an important factor.

Hot water is especially adapted to the warming of dwellings, owing to the ease with which the temperature of the water can be regulated. When steam is used the raditors are always practically at the same temperature, while with hot water their temperature can be varied at will. A system for hot-water heating costs more to install than one for steam, as the radiators have to be larger and the pipes more carefully run. One disadvantage in the use of hot water is the danger of freezing when radiators are shut off in unused rooms. This makes it necessary in very cold weather to have all parts of the system turned on sufficiently to produce a circulation, even if it is slow in some parts. Hot-water boilers or heaters differ fom steam-boilers principally in the omission of the steam-space above the heating-surface.

The passages in a hot-water heater need not extend so directly from bottom to top as in a steam-boiler, since the problem of providing for the free liberation of steam bubbles does not have to be considered. Practically, the boilers for low-pressure steam and for hot water differ from one another but little in the character of the heating-surface, so that methods already given for computing the size of grate-surface can be used with satisfactory results in the case of hot-water boilers. It is sometimes stated that owing to the greater difference in temperature between the furnace gases and the water in a hot-water boiler, as compared with steam, the heating-surface will be more efficient and that a smaller boiler can be used. While this is true to a certain extent, different authorities agree that this advantage is so small that no advantage should be taken of it, and the general proportions of the boiler should be calculated in the same manner as for steam.

Automatic regulators are often used on hot-water boilers for the purpose of maintaining a constant temperature of the water. Such regulators are constructed in different ways, some depending upon the expansion of a metal pipe or rod at different temperatures, and others upon the vaporization and consequent pressure of certain volatile liquids. These means are usually employed to open small valves which admit water-pressure under rubber diaphragms, and these in turn are connected by means of levers and chains with the draught doors of the furnace, and so regulate the draught as required to maintain an even temperature of the water in the heater.

Cast-iron radiators and circulation coils are used for hot water as well as for steam. Hot-water radiators differ from steam radiators principally in having a horizontal passage between the sections at the top as well as at the bottom. This construction is necessary in order to draw off the air which gathers at the top of each loop or section; otherwise they are the same as steam radiators, and are well adapted for the circulation of steam, and in some respects are superior to the ordinary pattern. Hot-water radiators are usually tapped and plugged so that the pipe-connections can be made either at the top or bottom. The efficiency of a hot-water radiator depends upon the temperature at which the water is circulated. The best practical results are obtained with water leaving the boiler at a maximum temperature of about 180 degrees in zero weather and returning at about 160 degrees, thus giving an average temperature of 170 degrees in the radiators. Variations may be made, however, to suit the existing conditions of outside temperature. We have seen that an average cast-iron radiator gives off about 1.5 B.T.U. per hour per square foot of surface per degree's difference in temperature between the radiator and the surrounding air, when working under ordinary conditions, and this holds true whether filled with water or steam. If we assume an average temperature of 170 degrees for the radiators, then the difference will be may be taken as the efficiency of a hot-water radiator under the above conditions, which represent good average practice.

This calls for a hot-water radiator about 1.5 times as large as a steam radiator to heat a given room under the same conditions. $170 - 70 = 100$ degrees, and this multiplied by $1.5 = 150$, which is common practice, although some engineers multiply by the factor 1.6, which allows for a lower temperature of the water. Water leaving the boiler at 170 degrees should return at about 150 degrees; the drop in temperature should not ordinarily exceed 20 degrees.

A system of hot-water heating should produce a perfect circulation of water from the boiler to the radiating-surface, and thence back to the boiler through the returns. The system of piping usually employed is shown in Figure 15. In this arrange-

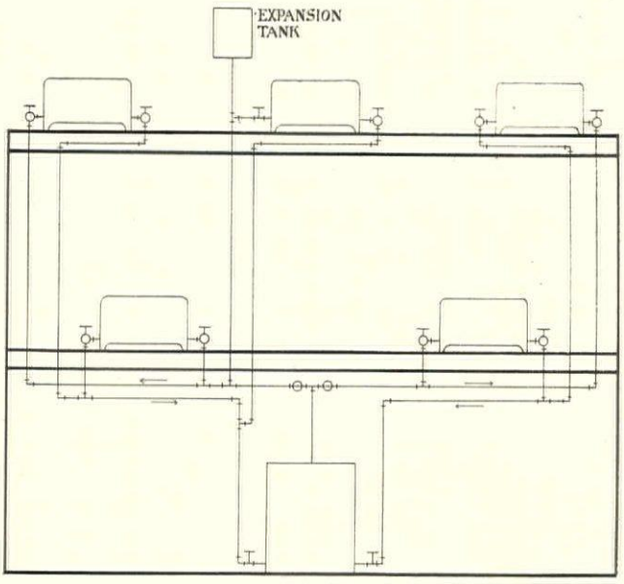

FIG. 15.

ment the main and branches have an inclination upward from the boiler; the returns are run parallel to the mains and have an inclination downward toward the boiler and connect with it at the lowest point. The flow-pipes or risers are taken from the tops of the mains and may supply one or more radiators as desired.

The return pipes from the radiators are connected with the return mains in a similar manner, although the connections are usually made in the side instead of the top.

In this system great care must be taken to produce a nearly equal resistance to flow in all of the branches so that each radiator may receive its full supply of water. It will always be found that the principal current of heated water will take the path of least resistance, and that a small obstruction or irregularity in the piping is sufficient to interfere greatly with the amount of heat received in different parts of the same system.

Every hot-water system should be connected with an expansion-tank placed at a point somewhat above the highest radiator. The tank must, in every case, be connected with a line of piping which cannot be shut off from the boiler. When water is heated, it expands a certain amount, depending upon the temperature to which it is raised, and a tank or reservoir should always be pro-

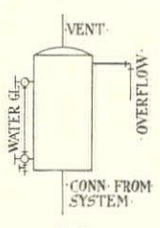

FIG. 16.

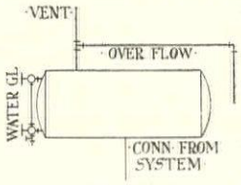

FIG. 17.

vided to care for this increase in volume. Expansion-tanks are usually made of heavy galvanized-iron or steel in one of the forms shown in Figures 16 and 17, the latter being used when the head-room is limited. The connection from the heating system enters at or near the bottom of the tank and an open vent-pipe is taken from the top. An overflow connected with a drain-pipe or sink should be provided. Connections for supplying the boiler with water are often made both at the boiler and at the expansion-tank, the former to be used when first filling the sys-

tem, as by this means all air is driven from the bottom upward and is discharged through the vent at the expansion-tank. Water that is added afterward may be supplied directly to the expansion-tank, where the water-line can be noted in the gauge-glass.

An altitude gauge is often placed in the basement and the red hand or pointer set to indicate the low-water line in the expansion-tank. When the movable pointer falls below the colored or fixed one, more water may be added, as required, through the feed-supply at the boiler.

When the tank is placed in an attic or roof-space where there is danger of freezing, the expansion-pipe may be connected at the side of the tank, 6 or 8 inches from the bottom, and a circulation-pipe taken from the bottom and connected with the return from an upper-floor radiator. This produces a circulation through the tank the same as in a radiator, and keeps the water hot. A ball-cock is often placed in the tank and so arranged as to prevent the water from falling below a given point.

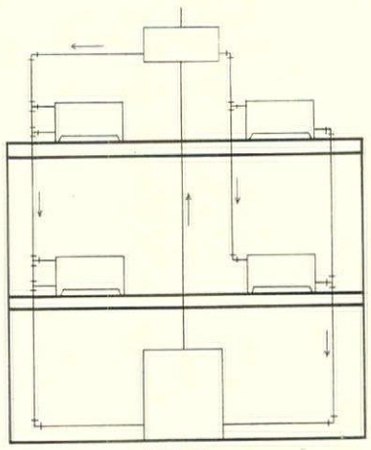

FIG. 18.

In small houses the expansion-pipe is often connected with the house-supply tank instead of using a separate one.

The size of the expansion-tank depends upon the volume of water contained in the system, and the temperature to which it is heated. The following rule for computing the required capacity of the tank may be used with satisfactory results:

Divide the square feet of radiation by 40 and the result will be the required capacity of the tank in gallons.

Figure 18 shows a system of piping often used with very satisfactory results. A single riser is carried directly to the expansion-tank, from which branches are carried to the radiators as shown.

With this system of piping the air in the water rises at once to the expansion-tank and escapes through the vent, so that the use of air-valves upon the radiators is not necessary.

There are various methods of connecting the radiators with the mains and risers. Figure 19 shows a radiator connected with horizontal flow and return mains below the floor. The manner of connecting with a vertical riser and return drop is shown in Figure 20. The supply is often connected with the bottom as well as the return. As the water tends to flow to the highest point, the radiators on the first floor should be favored by making the connections at the top of the riser and taking the pipe for the upper floors from the side. Figure 21 illustrates this method of connection.

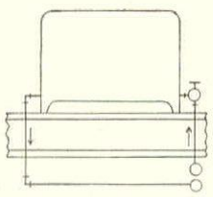

FIG. 19.

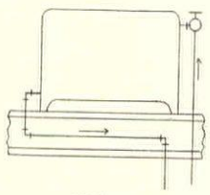

FIG. 20.

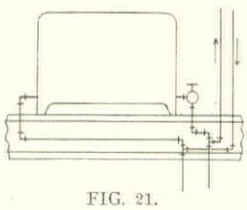

FIG. 21.

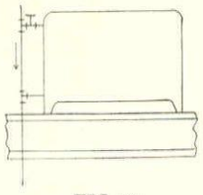

FIG. 22.

The connection shown in Figure 22 is often used with the overhead system, as indicated at the left in Figure 18.

When the connection is made in this manner the cooler water from the radiators is discharged into the supply-pipe again, so that the water furnished to the radiators on the lower floors is at a lower temperature, and the amount of heating-surface must be correspondingly increased to make up for this loss.

An increase of 10 per cent. for each floor is sufficient for this under ordinary conditions.

Sometimes the boiler and piping are arranged for either steam or hot water, since the demand for a higher or lower temperature of the radiators might change. The object of this arrangement is to secure the advantages of a hot-water system for moderate temperatures, and of steam-heating for extremely cold weather.

While this system has some advantages in the way of cost over a complete hot-water system, the labor of changing from steam to water is more or less troublesome, and should the connections with the expansion-tank not be opened, serious results might follow.

Gate-valves should always be used in the mains in connection with hot-water heating, although angle-valves may be used at the radiators.

There are several forms of radiator valves made especially for hot-water work; their chief advantage lying in a device for quick opening and closing.

It is customary to place a valve only in the supply connection, as that is sufficient to stop the flow of water through the radiator. Sometimes each riser is separately valved and provided with a draw-off pipe and valve, so that in case of leaks the riser to which a radiator is connected can be shut off and the radiator drained before making repairs. This arrangement should always be provided in the case of large houses. The ordinary hand pet-cock air-valve is about as satisfactory as any for hot-water radiators, although there are several automatic valves on the market. In case an automatic valve fails to close, much more damage will be done by water than by steam.

All fittings such as elbows, tees, etc., should be of the "long-turn" pattern. If the common forms are used, they should be a size larger and bushed down to the size of the pipe.

The size of pipe required to supply any given radiator depends upon our conditions: First, the size of the radiator; second, its elevation above the boiler; third, the length of pipe required to connect it with the boiler; and, fourth, the difference in temperature between the supply and return.

The heat given off by a radiator always insures a difference in temperature between the columns of water in the supply and return pipes, so that as long as heat is supplied by the furnace the flow of water will continue. The greater the difference in temperature of the water in the two pipes, the greater the difference in weight, and consequently the more rapid will be the flow. The greater the height of the radiator above the boiler, the faster will be the flow for a given difference in temperature.

As it would be a long process to work out the required size of each pipe theoretically, the following tables have been prepared, covering the usual conditions met with in practice. The first gives the sizes of horizontal mains and has been calculated on a basis of 10 feet difference in elevation between the center of the boiler and radiators, and a difference in temperature of 17 degrees between the supply and return, for different lengths of run:

Size of pipe.	Square feet of radiating-surface. 100-ft. run.	200-ft. run.	300-ft. run.	400-ft. run.	500-ft. run.
1	30	....	....	....	....
1¼	60	50	....	....	....
1½	100	75	50	....	....
2	200	150	125	100	75
2½	350	250	200	175	150
3	550	400	300	275	250
3½	850	600	450	400	350
4	1,200	850	700	600	525
5	....	1,400	1,150	1,000	700
6	....	....	....	1,600	1,400

The second table gives the sizes of vertical risers for supplying direct radiation on different floors, assuming the drop in temperature to be the same as before and the height of the stories 10 feet each.

Size of riser.	Square feet of radiating surface. 1st story.	2d story.	3d story.
1	30	55	65
1¼	60	90	110
1½	100	140	165
2	200	275	375
2½	350	475	...
3	550	...	...
3½	850	...	...

(To be continued.)

CHARLES L. HUBBARD.

THE MODERN FRENCH SCHOOL OF SCULPTURE.[1]

IN the history of sculpture there are found three schools quite distinct in character, each of which has had a profound influence upon the sculptor's art. One of these is the Greek, the second that of the Italian Renaissance and the third is the modern French school. The influence of the first two has been practicall determined by the judgment of posterity. The French school still lives, and it is not yet possible to determine precisely its position and its influence as compared with that of the others.

There are no other distinctly great schools of sculpture in the world besides these three. The Assyrians and the Egyptians had their sculptors, some of whom did notable work, but neither of these nations founded what can properly be called a school of sculpture.

There were Gothic sculptors whose work is most interesting and even rises to greatness at times, but it is generally subservient to an architectural design and used for the purpose of ornament. There are many Gothic figures on tombs and monuments besides those which are used in connection with buildings, but the sculptors of these produced few detached statues intended to exist for themselves alone, without connection with any architectural or monumental work. In his aim and effort the Gothic sculptor closely resembled the Greek, who adorned temples and public buildings. The Greeks, however, not only ornamented their buildings with exquisite sculptures, but also produced individual works of rare beauty quite independent of their connection with any building. This the Gothic sculptor did not do to any considerable extent, and it is for that reason, mainly, that he cannot be said to have founded what could rightly be called a school of sculpture.

BARTOLOMMEO COLLEONI, VENICE.
Verrochio & Leopardi, Sculptors. After an etching by Unger.

Each of the three great schools has its distinguished characteristics which are plainly marked and full of interest to the student of sculpture. To the Greek the idea of beauty was supreme. What was not beautiful had no place in art, according to his thought. He also cared much for repose and placidity. None of the great Greek statues are violent or unrestful, though the subject may call for intense action. Even the "Laocoon" is reposeful, though its subject is a tragic struggle between life and death.

This idea of beauty and repose was dear to the Greek because he loved the world he lived in and had but vague conceptions of any other world that could be more beautiful than this. It is strange that his intellectual struggles and conquests find so little expression in his art, but such is, nevertheless, the fact. He seems to have thought art a sacred thing, not to be disturbed by problems of philosophy, statecraft or war. It was to him a kind of religion and always beauty and peace were the supreme gods of his art world. When a Greek made a statue of a god, he aimed to give the expression of peace in power and power in peace, but beauty of feature, form and line was always an essential part of such a conception. The statues of Phidias and Praxiteles were inspired by these thoughts. Even the frieze of the Parthenon, though it commemorates the conquests of the Athenian hero, Theseus, is absolutely reposeful and beautiful in the entire conception as well as in every part, however small, that enters into the general design.

The Apollo Belvedere in the Vatican is another apt illustration of the Greek thought about his gods. Power, peace in consciousness of conquering strength, and the most perfect manly beauty find here a complete and absolutely harmonious expression. The so-called Venus of Milo is another example of this Greek idea, quite as perfect in its expression of the womanly peace and power as is the Apollo in expressing their manly side. The Greek admitted no idea of conflict or doubt in the statues of his gods. Such struggles were beneath them. They were supreme and wholly restful in their power and their beauty.

When the Italian came to study the Greek and, almost with rapture, admire his beauty, the world was not as it had been in the palmy days of Athens. There had been great struggles, both physical and mental. Physically, the Roman had overcome the Greek, but in the mental struggle he had not been victorious. Here the Greeks were still the masters. Nevertheless, there was a wonderful awakening of the mind in the time of the Italian Renaissance and new problems were constantly presented which neither the Greek's thought nor his ideas of beauty could satisfactorily solve. Some of these problems were connected with the religious life which the Italian must, perforce, deal with because of Christ and His gospel. This was the disturbing element which interfered with the completeness of the Greek's intellectual work and even of his artistic work, so far as it had to do with the mind or the spirit.

In the time of Lorenzo de' Medici, when the flower of the Italian Renaissance burst into full bloom, the power of the spiritual element in art and life was not consciously recognized to nearly so great a degree as that of the intellectual element. It was true that the painter, the sculptor and the architect worked mostly for the Church, but it was equally true that the work of each of them was becoming more and more intellectual and scientific. The mind of the time was in a ferment and the old, still wine of the Greeks was thereby greatly agitated and disturbed, though its flavor and its quality were appreciated and admired.

This reaction against Greek calmness and quiet went too far. Even the greatest master of the Italian Renaissance, Michael Angelo, has often been accused of exaggeration. The scientific and intellectual mastery of this mighty man was so profound that he could not help expressing it in his works, and, therefore, his statues and his paintings did seem exaggerated because they went so far beyond what had ever before been done in art in expressing the conceptions of the intellect. The statue of the thoughtful Duke Lorenzo expresses better than any other work the intellectual side of the Italian Renaissance. Here there is no exaggeration whatever. There is a quietness in its outward aspect that suggests the Greek work, but underneath there is a tremendous struggle of the mind, which is felt as deeply and tragically as the mood of Hamlet when he was weighing the advantages of life and death. The same spirit is found in Michael Angelo's frescos of the prophets and sybils in the Sistine Chapel; but here something of the spiritual as well as the intellectual struggle is shown because of the imperative demand of the place and the subject. The Greek slaves made for the mausoleum of Julius are similarly inspired. They struggle physically in their bonds, but their mental struggle, touched only by some tragedy of the spirit, is even more profoundly expressed than the physical

[1] A lecture by Mr. Walter Cranston Larned, delivered at the Art Institute, Chicago, in the season 1904-5.

anguish. No Greek ever produced such statues as these. Only the intellect of the Italian Renaissance could have produced them.

Other great sculptors of this Renaissance time must be spoken of, because they illustrate the intellectual development of their day in ways quite different from those of Michael Angelo. Donatello was a thoughtful man, but he had a playful spirit. He did not care to carry his problems too far. In a way, he was Greek, especially in his love of beauty, but some of his Saints and Apostles are very majestic, though always intensely human. His dancing boys on the frieze of the choir-screen in the Duomo of Florence are almost as merry as Greek fauns; but there is, nevertheless, some thoughtfulness about them, even a touch of spirituality, quite different from the Greek work, though not nearly so deep and convincing as the figures of the children on the frieze of the opposite choir-screen, which are, perhaps, the masterpieces of Lucca della Robbia.

Benvenuto Cellini was the prince of goldsmiths, but he aspired also to heroic work, nor did he fail in this, as his statue of Perseus in the Loggia at Florence abundantly testifies. He was greatly influenced by the Greek, but, nevertheless, the intellectual and scientific spirit of his day also profoundly affected him.

Some of the sculptors of this period, like Orcagna, John of Bologna and Mino da Fiesole, were much influenced by this spiritual side of their art. Both Lucca and Andrea della Robbia felt this influence more profoundly than any of them. Their works in bas-relief are closely akin to the religious painting of Fra Angelico.

It is easily to be seen from a comparison of the works of these great artists what problems were meeting the awakened Italian mind in the days of the Renaissance. It must be remembered that this period was a long one. Michael Angelo lived nearly a hundred years. When he was a young man, Leonardo da Vinci was almost in his prime and the teacher of Leonardo, Verrocchio, had passed away. Verrocchio himself was, nevertheless, a potent factor in the sculptural development of the Italian Renaissance. His equestrian statue of Colleoni at Venice might almost be called a connecting link between the work of Greek and Roman and that of Leonardo and Michael Angelo. Ruskin says that this statue of the Venetian Duke is the finest equestrian statue in the world. Some prefer that of Marcus Aurelius at Rome. The critics of the time of Leonardo da Vinci say that his statue of the Duke Sforza of Milan far surpassed either of them. Most unfortunately this has been destroyed and it is only possible to judge of it by the master's sketches and the impassioned words of the contemporaneous critics.

Verrocchio's Colleoni is very human and realistic. There is also intellect in it and a good deal of the Greek repose. Michael Angelo made no equestrian statue, but both his "Moses" and "David" have in them something of the spirit which animates Verrocchio's masterpiece at Venice.

From this brief allusion to some of the notable works of sculpture of the Italian Renaissance it is easy to see the domination of the intellect at this time in the world of art, and this is certainly the predominant characteristic of the second great school of sculpture that the world has known. Nevertheless, it must be carefully noted that Michael Angelo, who was by far the most intellectual of all the Renaissance masters, had no followers. He did not attempt to found a school. In his day he was unique and he still is unique, like Shakespeare or Goethe or Wagner. There were many who sought to imitate him, but not under his own teaching. Shakespeare might as well have had pupils in the art of writing dramas.

Bernini is the most prominent of those who attempted to imitate Michael Angelo, and the lamentable failure of most of his work shows the utter impossibility of his attempt. He even exaggerated the most exaggerated of Michael Angelo's work so far as the outside part of it, the muscular and anatomical side, was concerned, but of the intellect which inspired every work of the great master he had no conception. His works are, therefore, almost grotesque in spite of a considerable technical mastery. If the spirit is lacking the flesh is necessarily weak.

From this analysis of the Greek and Renaissance schools of sculpture it would seem that the problem of the Frenchman in our own day was a very serious one. He could not be merely an imitator. Originality is an essential part of all great work, and this cannot be studied and cultivated: it is born like the genius of the poet.

If the Frenchmen had not an inspiration of their own they could not hope to be great and independent sculptors. But they did have an inspiration and it was quite different from that of either of the two great schools which had preceded them. The modern French sculptor is a student. He is well acquainted with all that has preceded him in the world of art. He has in the École des Beaux-Arts a training-school unequalled in the world to-day, nor has it ever been surpassed in the rigor, thoroughness and comprehensiveness of its course of instruction. Here he must be trained. The exacting requirements of this school must be met before his genius can unfold its own wings and soar toward fame. The modern French sculptor's environment is, therefore, different from that of his brethren in the two other great schools, since no such comprehensive place of instruction as the École des Beaux-Arts was known either to the Greeks or the Italians of the Renaissance time.

This opportunity of study does not, however, account for the peculiar quality of the modern French school of sculpture. To understand this it is necessary to look deeper than the material side and find what mental and spiritual influence have been at work in this last of the three great schools.

As to the intellectual influence upon sculpture it would hardly seem possible to go farther than the greatest Italians had already gone. Nevertheless, the Frenchman did go farther. His intellect was better trained and he knew far more of science than most of his Italian brothers of art. One thing that did not play its proper part in Italian sculpture was the influence of the spiritual upon the mental. This influence is felt in the greatest of the Italian masters, but has not found complete development in their works.

It may be surprising to find that the French sculptor of to-day has recognized the power of the spirit in his work more than any of the other great sculptors. The quality which is often called "realism" is also marked in the modern French school. This might be thought to be opposed in effect to the spiritual quality, and to a certain extent that is true. But this realism comes from a close study of life not only in its outward but in its inward aspects. No true realism has to do with the outward alone, because the mind and the spirit are just as real as the body.

(To be continued.)

THE PRAXITELEAN PHRYNE.

THE recent exhibition in New York of a statue of Aphrodite antique, cinquincento or modern, according to individual preference, has provoked an unusual amount of discussion in the public prints, most of which revealed anything more than a very superficial knowledge of the subject-matter of the discussion, but now and then something appeared that gave evidence of intelligence and scholarship.

Because of the ingenuity with which he supports his theory and because of the real human interest that lies behind it, it seems worth while to put on record the following letter which Mr. J. C. Bayles, M.E., Ph.D., addresses to the New York *Times:* D

"The wonderfully fascinating statue which has attracted so much attention at the National Arts Club admits of an interpretation quite different from that which has hitherto been given it.

"The solution of any mystery, to be a solution at all, needs to be perfectly consistent with itself and leave nothing unexplained. The man who carved this great work knew what he was doing, and had a perfectly consistent purpose throughout. To trace this purpose and find in it what seems to the writer a perfectly satisfactory explanation of the work in whole and in detail is what I shall attempt. Since, in he last analysis, art criticism is a matter of opinion, I offer no apologies to any one for the courage of my convictions.

"It seems to me wholly probable that this is the work of Praxiteles or a copy from his work so nearly contemporaneous in date as to entitle it to rank as the most perfectly preserved relic of the Praxitelean age of Greek art. It seems to me wholly improbable that it was intended to represent Aphrodite at all, for the excellent reason that it does not. The lack of any evidence of an attempt to idealize the proportions of the figure, and the presence of what seems to me indisputable evidence that it is a portrait statue of a woman whose anatomical peculiarities are easily accounted for, and which are faithfully and lovingly preserved, are the bases of my hypothesis.

"The presence of the dolphin perhaps warranted the hasty conclusion that as this was the conventional symbol of Aphrodite, or one of them, Aphrodite was of course intended. This name, signifying "born of the sea foam," applies to the nascent daughter of Zeus and Dione, who rose from the waters near Cythera and was carried by the creatures of the deep to the shores of Cyprus.

Thus represented, she would be standing in or on the water. The figure under review is neither in nor on water. No sculptor, unless a fool, would have attempted to represent water by a level slab of marble scored with ripple-marks. Aphrodite at the moment of her creation would not have been so anxious to go ashore that she would have started to walk there.

"The figure we are considering is walking—timidly and almost hesitatingly, indeed, but with the weight carried firmly on the left foot and the right partly raised for a forward step. The need of a support under the raised heel, to give strength, accounts for the strut which connects it to the pedestal. A sculptor who wished to convey the impression that the figure was on water would have given the requisite support in a rolling wave or undulation and thus avoided the expedient which, assuming that she is walking on water, would have been ridiculous. The spread of the toes of the foot which carries the weight shows very clearly to my mind that something more stable than water is meant to be under it. Moreover, the feet are not those of a being just created who is using them for the first time. They have a muscular development which comes only from systematic use for a specific purpose. The turn of the head, enabling the walking woman to look down a line perpendicular to the path she is following would seem to suggest that she was more interested at the moment in what was beside her than before her.

"But the dolphin? That is not a land creature, and what is its purpose? My judgment is that it has a double function. Primarily, a support for the figure was needed. The area of cross-section at the left ankle and right instep is relatively so small as compared with the average cross-sectional area of the body above the knees that even a slight jar might break it off close to the pedestal. The usual expedients of the Greek sculptors—column, tree-trunk, flowing draperies, loves, etc.—would have been incongruous in the circumstances, even ludicrous. Moreover, it was desired to indicate by a symbol the near presence of water; hence the supporting dolphin which has come to meet the woman at the edge of the ocean. If he could have been left out, however, it is a safe assumption that he would not have been put in, since the symbol was not needed to suggest the meaning.

"I believe the statue under discussion to be a portrait of Phryne, and that it commemorates an event as well attested as any in early Greek history not connected with dynastic changes or military operations, and consequently not provable by collateral historical evidence. During the period when Phryne was most in evidence, the feast of Poseidon was held on the shore at Eleusis. At the close of the ceremonies she stepped from the multitude, dropped her garments, and, in the sight of all the people, stepped into the sea to offer to Poseidon the tribute for her charms. Apelles and Praxiteles were both present, and each saw in the incident something worthy of commemoration.

"The essential difference in their points of view was that Praxiteles was a lover of Phryne, and Apelles, so far as we know, was not. Praxiteles saw the woman; Apelles gained an idea. The result was that both these artists commemorated it, each in his own way. Apelles painted the Aphrodite which we all know, idealizing the figure to the limit of his imagination. Praxiteles modeled Phryne as she was, in the act of stepping into the water at Eleusis—and, womanlike, more interested in the people on the shore, who were probably giving voice to noisy acclamation, than in the sea, which was without incident, and in which she had no idea of drowning herself.

"If this hypothesis is reasonable, we have in the work of Praxiteles, Phryne as she was, doing exactly what she did. She is on the seashore. She is advancing toward and into the water. The shrinking together of the body, as suggested by the slight stoop, the forward bend of the shoulders, and other signs, suggest the momentary chill of nudity in the open air and also the intuitive modesty which would make such an ordeal a bit trying even for a courtesan. That she looks squarely to the left rather than straight ahead is perfectly natural in the circumstances. Presumably Phryne cared a great deal more for popular applause than for the appreciation of anything so intangible as Poseidon.

"The position of the right hand is significant. In obedience to the requirements of the Athenian law, Phryne wore on the nipple of the left breast the gold cap or thimble which was her safeguard and protection. To touch it sanctioned in her an act which in a woman not so safeguarded might have shocked the public taste even in Greece. Phryne had a right to stand nude before the people, if she wanted to ,and this right was assured by her badge which, it may be assumed, had a very different significance as affecting social status in the fourth century, B. C., than it would have to-day. Her offer to rebuild at her own cost the walls of Thebes if the authorities would place thereon a bronze tablet inscribed: 'Destroyed by Alexander; Rebuilt by Phryne, the Courtesan,' would seem to show that she was not ashamed of her title, and presumably not of her profession. The modern point of view was probably not held in the early days referred to.

"The figure is that of a woman and not a goddess, since it is not idealized at all. The feet have the development in the great and three adjoining toes which comes from the training of the dancer, which Phryne was. The small toe is rudimentary—a peculiarity so pronounced as to be almost a deformity. Real feet are sometimes that way, idealized feet never. The ankles are relatively thick and strong, which they probably would be in one born near Thespiae, on the foot-hills of Mount Helicon. The legs are those of a young and athletic woman, but lack the exaggerated calf development resulting from the practice of the modern ballet. She falls below the ideal of perfection just in the details in which Phryne might have been expected to fall, for in early life she was presumably imperfectly nourished, since she had to gather capers for a living. Still she is wonderfully beautiful, and intensely human. That her lover should have preferred to model her as she was and not as another might have idealized her is natural enough. He could afford to do it without putting his reputation into contemporaneous jeopardy, whatever may have happened to it since.

"I at first thought it a statue of Aphrodite for which Phryne had posed. I now thing it not intended even to suggest Aphrodite, but that it commemorates in as faithful portraiture as the artist was capable of the incident of Phryne at Eleusis. My reasons for so thinking, if not convincing, at least have the advantages of being intelligible and consistent."

THE NEW BERLIN CATHEDRAL.

THE new Protestant cathedral in Berlin, built at a cost of £500,000, was dedicated on Monday in the presence of the German Emperor and Empress. The cathedral stands upon the site of an humbler Rococo edifice, which was erected between 1747 and 1750 by Frederick the Great from designs by Boumann, and restored in 1820 by the architect Schinkel for Frederick William III.; its dimensions were 290x134 feet.

So far back as 1871 the preparation of the plans was intrusted to the architect Geheimer Baurath J. C. Raschdorff, although the design has been officially described as the Emperor Frederick's own. The foundation-stone was laid by the present Emperor on June 17, 1894, so that the work has been executed in less than 11 years. In its erection Professor O. Raschdorff has been associated with his father. The site is close to the eastern arm of the Spree, on the island which contains the Royal Castle and the great edifices of the Royal Museum and National Galleries. The cathedral, which is built of Silesian gray sandstone in the style of the Italian Renaissance, covers an area of 61,740 square feet, or a little less than that occupied by York Minster (63,800 square feet). The central dome, with the cross which surmounts it, reaches a height of about 374 feet, or nearly 79 feet less than the height of the dome of St. Peter's in Rome, and over 9 feet more than the generally reputed height of St. Paul's in London. The total length of the building is over 374 feet, and its breadth 252 feet 6 inches. It is seated for 2,100 persons only.

The chief façade is treated in two orders, and the dome itself is flanked by four minor cupolas surmounting open square towers, the cornices of which are also supported on pilasters. Over the arch of the great portal is a colossal statue in bronze by Schafer representing Christ in the attitude of benediction. It is flanked at the corners of the minor towers and at the base of the second story by the figures of the Twelve Apostles, executed by well-known German sculptors.

In front of the façade a broad flight of steps leads to an entrance hall, connected by five doorways with the central portion of the church, which has the form of an irregular octagon. Facing the entrance is the semi-circular apse containing the altar, at the back of which are three rectangular windows, the stained glass of which represents the Crucifixion, the Nativity, and the Resurrection. In the northeastern of four semi-circular niches which are placed at diagonal points in this central edifice is the pulpit, and above the other three niches, supported by pillars of black Labrador marble, are stone balconies, which will respectively constitute pews for the Court, the Prussian Ministry and the choir. Above the last of these is the organ, built by Sauer, of Frankfort-on-the-Oder, and having 114 stops. Modern German

glass mosaic has been employed in the decoration of the interior of the cupola and elsewhere. The internal dome has a height of 242 feet 9 inches, and a diameter of 108 feet.

In this dome the mosaic work illustrates the Beatitudes in groups designed by the painter Anton von Werner, and there are also bas-reliefs illustrating Biblical scenes, the work of Otto Lessing. The altar, a plain table of white marble, supported by columns of colored marble, is surmounted by a reredos which exhibits gilt bronze figures of the Twelve Apostles after designs by Rauch. Both altar and reredos formerly stood in the old cathedral. Over the eight pillars which support the central portion of the edifice are the statues of the Reformers, Luther, Zwingli, Calvin and Melancthon, and of the four German sovereigns who promoted the Reformation, Duke Albrecht of Prussia, the Elector Joachim II. of Brandenburg, the Elector Frederick the Wise of Saxony, and the Landgrave Philip the Magnanimous of Hesse. To the south of the central area of the church and separated from it by folding-doors are the Church for Monuments and the Church for Baptisms and Marriages. From the former steps lead down to the crypt, which extends under the greater part of the building, and is lighted from without as well as by electric lamps. The so-called Church for Monuments is surrounded by five chapels, and is at present devoid of all ornament except the red marble columns which support the arched roof and the entrances to the chapels, the square pilasters of which are of yellow, red and green veined Mexican onyx marble. The side chapels will contain a projected monument to Prince Bismarck and the existing sarcophagi of King Frederick I. and his Queen and the Elector John Cicero.—*Building News.*

ILLUSTRATIONS

NORTH AISLE: ROGERS MEMORIAL CHURCH, FAIRHAVEN, MASS. MR. CHARLES BRIGHAM, ARCHITECT, BOSTON, MASS.

TOWER VESTIBULE IN THE SAME CHURCH.

DOORWAY BETWEEN SOUTH AISLE AND PORCH IN THE SAME CHURCH.

UNITED STATES POST OFFICE AND COURT HOUSE, ELIZABETH, N. C. MR. JAMES KNOX TAYLOR, SUPERVISING ARCHITECT, WASHINGTON, D. C.

UNITED STATES POST OFFICE, NATCHITOCHES, LA. MR. JAMES KNOX TAYLOR, SUPERVISING ARCHITECT, WASHINGTON, D. C.

ST. PAUL'S CHAPEL FOR COLUMBIA UNIVERSITY, NEW YORK, N. Y. MESSRS. HOWELLS & STOKES, ARCHITECTS, NEW YORK, N. Y.

This plate we are able to place before our readers through the courtesy of the *Columbia University Quarterly.*

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Additional Illustrations in the International Edition.

THE CHANCEL: ROGERS MEMORIAL CHURCH, FAIRHAVEN, MASS. MR. CHARLES BRIGHAM, ARCHITECT, BOSTON, MASS.

PULPIT AND ORGAN-CASE IN THE SAME CHURCH.

NOTES AND CLIPPINGS.

Permessi for Students in Italian Art Galleries.—The new regulations for the admission of artists and students gratis to the Italian galleries and excavations are very much more stringent than they have been hitherto, and it would be of great service if newspapers would draw the attention of their readers to them. In the case of artists and students, they should now submit their credentials to the Italian Ambassador in London, and on his certificate a pass will be granted. Until lately the certificate of the artist's consul was accepted. Now unless the artist has provided himself with a certificate from the Italian Ambassador in his native country he must make his application to the Ambassador accredited to the Court at Rome, who must first judge whether the applicant belongs to a "recognized academy," and if, in his judgment, he does, he forwards his application to the Minister of Education, who eventually sends a pass to the Embassy, whence it is usually forwarded to the Consulate of the city from which the application is made, and then by the consul transmitted to the applicant. The pass, when obtained, permits the bearer to measure, sketch and photograph, and to go in and out of the gallery or excavation, free, as often as he pleases. If he wishes to copy a picture, he must apply to the director of the gallery in which it is exhibited, who will inform him under what conditions he may work. Amateurs can obtain permission to photograph on application to the director of the gallery or excavation in question. The application must be on stamped paper of 60 c., which can be procured of any tobacconist in Italy.—*The Architect.*

One of the Wonders of Japan.—One of the wonders of Miyajima is an enormous structure called Thousand Mat Hall, a name which means that one thousand of the regulation 3 x 6 foot rice-straw mats are required to cover its floor. All rooms in Japan are measured in this way, instead of by feet, so in talking about houses one always says a "six-mat room" or "three-and-a-half-mat room," until one begins to think in divisions of 18 square feet. Thousand-Mat Hall was erected in the sixteenth century out of the wood of a single camphor tree, say the Japanese records, that are always so full of such perfectly wonderful details. If this be so, camphor trees must have grown very large in Japan in the sixteenth century, since the building rests upon a hundred or more piles, each a giant tree trunk in itself, beside which the roof is upheld by at least fifty pillars that were fifty forest monarchs once upon a time. Then there is a floor in the structure made of 18,000 square feet of cedar planks 1½ feet wide and 5 inches thick, so one must needs believe that its builder out-miracled the miracle of the loaves and the fishes, if Japan's sober records are to count for anything.—*Leslie's Weekly.*

Legal Damage Due to Lightning.—In the *Monthly Weather Review* of the United States Government there is a report of an interesting trial for damages due to lightning, at Dijon, France. In this case the court held that half the damage litigated over was due to lightning and the other half to the violence of the wind; and, further, that one-half should be borne by the insurance companies. The parties in interest then came together and adjusted the matter. Some years ago a United States Circuit Court of Appeals held that forecasts of local rain have not yet attained such commanding respect by reason of their accuracy as to justify the holding of shippers guilty of culpable negligence if they do not provide against damage by heavy rains when light local showers are predicted. "The case of local rains is different from that of storms of great violence, whose existence, course and time of arrival are publicly announced by signals which the master of a vessel is bound to observe."

With regard to the case on trial before the court at Dijon, the record shows that on June 30, 1901, at about 6 P. M., after a day of exceptional thunderstorms, an extremely violent wind occurred, producing great destruction. Besides the destruction due to the wind, many cases were found in which the damage was undoubtedly due to lightning. Public opinion and the local press attributed everything to the passage of a tornado. The work of destruction was accomplished in a few moments, and was followed by a heavy fall of hail over a large area, after which occurred an exceptionally heavy rain. The Administration of the Docks of Burgogne attributed a certain damage to lightning and demanded that the repairs should be made by the nine companies in which they were insured; but, on the contrary, the insurance companies maintained that the disaster was equally attributable to the wind, and that, according to their policies, they did not insure in any manner against damage done by "hurricanes or cyclones, tornadoes or any other meteorological or electrical phenomenon, except thunder and lightning."

In the trial before the judges the facts of the disaster, the wind and the lightning, were abundantly established. Then came a large mass of testimony relative to phenomena observed in Europe and America in connection with thunderstorms and tornadoes. Written or printed documents were presented from about twenty meteorologists, including Professors Alexander G. McAdie and Alfred J. Henry of the Weather Bureau. Considerable time was given to the study of analogous cases of destruction by other tornadoes, such as that of Monville, Aug. 19, 1845; St. Claude, Aug. 19, 1890, and an elaborate study was made of the destruction in the present case, Dijon, June 30, 1901, most of which was evidently due to wind. After three days of pleading the civil tribunal of Dijon finally rendered its judgment substantially in accord with the opinion of two of the three experts, namely, Galliot, Engineer-in-chief of Bridges and Roads; Pigeon, Professor in the Faculty of Sciences at the University of Dijon, and Julien, civil engineer in Paris.

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PRESIDENT ROOSEVELT'S habitual impulsiveness has, in the matter of his well intended effort to promote the beautification of Washington, resulted in curious complications and something that looks very like a dead-lock. His original "executive order" declared that the new Consultative Board of Architects was to serve without pay. On being informed that a recent enactment made it impossible for the government to benefit by unpaid service, he amended his order and directed that the members should each be paid a per diem of ten dollars. Since then, he has been informed that there is no money with which they can be paid, for there is an older statute law, having particular relation to the executive branch of the government, which requires payments to be made on executive order only in the case where the service for which payment is to be made is specially named in the bill under which the appropriation was made or is covered by the general or special limitations which govern the disbursement of contingent funds. Apparently, close scrutiny is unable to discover a permissive clause which will allow payment to be made to the Consultative Board. It is evident then that this body of advisers can render no service, since the law in one place declares that if they work they must be paid and in another place that as they cannot be paid, therefore they will not be allowed to work. The President's action, therefore, in place of being helpful to the scheme that well informed people wish to see carried out, is likely to be merely prejudicial to it, since, as we said at first, the act was one likely to irritate the members of the Congress, whose rights it obviously invaded.

IT seems to us, however, that so far as its essential elements go, the "plan for the improvement of Washington" is under a protection more potent even than the President's. The public will not endure such a breach of simple good-faith as would be implied by the abandoning or essential deforming of the scheme, seeing that it was only to enable its execution that the Pennsylvania Railroad so generously volunteered to abandon its right-of-way across the Mall. That the general plan for the improvement of Washington should eventually be carried out was clearly a part of the "consideration" for which its right-of-way was abandoned. The government stands further pledged to carry out the scheme in this way: it has authorized the District of Columbia to appropriate the sum of three million dollars to be contributed by it toward the erection of the great union depot and the terminal facilities connected with it. Unquestioned as the benefits of the new station will be, the District would hardly have been allowed to bond itself in such an amount if the carrying out of the general plan of improvement were not, in this case too, part of the consideration. So the government is morally pledged to both the railroad company and to the District. As the making of such an appropriation was unusual, it naturally met with opposition in the courts; but the District Court of Appeal has just handed down a decision upholding the rightfulness of the action and the case is hardly likely to be taken to the Supreme Court of the United States. For these reasons the President's well intended effort to direct matters was not really necessary, but, as things turn out, distinctly unfortunate.

THE recent collapse in New York, of several too-hastily built houses, has resulted in the condemnation of many more of the same type, that must be partially torn down and rebuilt. It has resulted, too, in the ordinary diatribes in the daily papers and unreasonable aspersions on the personal character of the head of the Department of Buildings, who, unfortunately, happened to be in Florida at the time of the mishap. His superior officer, the Borough President, however, did what was needful in the premises and appointed a commission of three to enquire into and report upon the accidents and their causes, and until such report is made it is only proper to assume that it will be fair and unbiased. There are those, however, who have grave doubts whether a fair and unbiased report on building matters in New York can be had at any time. The trouble unquestionably was due to the character of the inspection and the moral qualities of the inspectors, and for deficiencies in both these respects the public itself is responsible and will continue to be responsible, until it takes efficient steps to remodel the whole matter and adopt some modification of—an improvement upon, if possible—the district-surveyor system that operates so admirably in London. Quite apart from the personal qualifications of the inspectors, there are not enough of them employed by the Department to give proper inspection to the work of even an average season.

MR. DISTRICT ATTORNEY JEROME, who now and then hits the right nail, has, quite accidentally and without realizing the full value of the idea, made a

Entered at the Post Office at New York as second-class matter.

really excellent suggestion, which, if acted on, would bring home to the public its own responsibilities in the matter. He said to a reporter: "If there are not enough inspectors to inspect buildings, then issue enough permits for only so many buildings as the inspectors can inspect." If the last few words were made to read "competent inspectors can fully inspect," the suggestion, if acted on, while it would only partly cure the evil, would very shortly bring home to the public what was the thorough cure the case called for. It is well known that Mr. Hopper, the present Superintendent of Buildings, asked this year for a much larger appropriation, on the plea that he needed more inspectors and better pay for them; but the arguments with which he supported his request were so puerile that everyone felt that his demand was properly denied. In other words, they doubted the good intentions of the disbursing agent. This doubt was as unfortunate as it was probably undeserved, for the fact is that twelve hundred dollars per year is not proper pay for the service, and if the old men were good enough for the work, even they certainly deserved an increase in pay. Men in such positions should be of the force and character that in any other walk of life would command more than mere mechanics' wage.

ONE of the interesting incidents connected with the collapse of thawing buildings in New York on March 10 is the filing of a lien for ten thousand dollars for foundation-work, mason-work and concrete, done between December 2 and March 9, by the mason who lays the lien. As his work seems to have been too imperfect to stand up, it should not be difficult to lay a claim for damages against the unfortunate mason in at least an equal amount. The case, if it comes to trial, should produce some interesting revelations; at all events, it offers a chance to get the matter before the courts in the case that the Borough President's commission should bring in a "whitewashing" report.

LIKE many others, we have grieved to find that Baltimore has been able to take so little advantage of her late disaster, in the way of arranging lines of traffic and centers of interest in the "burnt district." The ground-rent system that prevails in that city and the multiplicity of conflicting interests of ground landlord and tenant stood in the way of that concerted general movement which would have enabled the radical changes that were desirable. But if the city has lost this chance of improvement, it is all the more imperative that it should not waste such advantages as it has, and one such advantage is seriously endangered just now. Because of the great diversification of its territory, Baltimore is naturally a very beautiful city and one of its vantage points is now threatened, since a certain party is seeking to build on Monument Square a modern skyscraper apartment-house, and is trying to have set aside, as unconstitutional, a law enacted by the last legislature that fixed a height-limit of seventy feet for all buildings erected within one block of Washington Monument. As we do not know the terms and conditions of this most judicious enactment, we cannot express an opinion as to its legal standing and can only hope that it was soundly founded and properly drawn. Now, while Baltimore is in a sense a commercial city, the genius of the people and the climatic conditions stand in the way of its becoming a hustling modern town where speed counts for everything, consequently, we feel it can well spare itself the pangs of a skyscraper epidemic. To have the sedate, sober, refined old houses that cluster about the Cathedral, along Franklin Street, up Charles to Monument Square, replaced by modern apartment-houses, would be to lose architectural work of real value, such as few American cities nowadays still possess.

SENATOR SAXE has introduced at Albany a bill which, if it cannot be improved by extension, ought to be adopted. The bill provides that, hereafter, no theatre or place of entertainment can be built save of fireproof material and upon a corner lot, and further separated from adjacent buildings by ten-foot passageways. These are very modest requirements and should be adopted, if better ones cannot be secured. There is nothing more inhumanly barbaric than the way in which theatre-builders allow themselves, and are allowed, to imperil the lives of their fellow creatures through the maintenance of places of amusement on inside lots. It is perfectly true that as satisfactorily fireproof a theatre can be built on an inside as upon a corner lot, but it is almost equally true that an inside theatre cannot discharge its audience as rapidly and safely as can one built on a corner, and hence is less panic-proof than the latter. The law should be amended so as to require frontage on three streets, if the more desirable condition of complete isolation on all sides cannot be insisted on.

MÆCENAS, who was invited to act as incorporator of the American Academy at Rome, has very promptly and very handsomely shown that he recognized what was expected of him and was ready to make good those expectations. In the very few weeks that have elapsed since Congress passed the bill incorporating the Academy, six gentlemen have each promised to contribute the sum of one hundred thousand dollars, so that the speedy acquirement of the million dollars needed for endowment seems well assured. An income of fifty thousand dollars, with the prices which permanent residents in Rome enjoy, is quite enough to enable the director and his coadjutors to carry on their work in an efficient and creditable way. We hope the new institution may continue as long as its older sisters already in the field, and that its history may be marred by nothing in the way of jealousies and futile bickerings, and that the recipients of its bounty may look back on their term of residence at the Villa Mirafiori with the same enthusiastic love that the French Prix de Rome men feel for the Villa Medici.

THE accident this week in the East River where, by the blowing out of the roof of the tunnel chamber in which they were at work, four workmen were driven up through seven or eight feet of silt and twenty feet of water and yet escaped practically uninjured, is an incident that Jules Verne would have delighted to make the central feature of one of his fantastic stories. Curiously, the ubiquitous kodaker seems not to have been on hand to take a "snap" at the first man as he was shot twenty feet into the air, borne by a column of spray, mud and air.

FACING CONCRETE WALLS.*

EXPOSED concrete walls should not be plastered. It is a needless expense, and the results in variable climates are unsatisfactory. It is difficult to apply cement mortar uniformly to the face of hardened concrete, and it is apt to crack off and discolor, especially if the concrete behind it is porous enough for the water to penetrate it. For waterproofing walls not exposed to the atmosphere, cement plaster is sometimes serviceable.

Mortar for patching irregularities and pockets, which will occasionally occur in the best work, and for filling holes, must contain the same proportions of cement and sand as the concrete, or it will set a different color.

The treatment of the face of concrete is determined by the character of the structure. A fair surface, suitable for work which is not exposed to view, and even for sheds or other buildings where the appearance need not be regarded, has been obtained by the authors on 4-inch and 6-inch walls by using merely a very wet mixture of cement, sand and gravel, with care in placing and puddling, so that none of the stones, many of which were 2 inches in diameter, collected in pockets against the forms. Such treatment will result in a sandy finish, showing the joints in the forms less than a smoother one.

FIG. 1. FACE CUTTER.

To produce a smooth mortar surface, a thin tool like a spade or an ice cutter, shown in Fig. 1, may be thrust down next to the moulds as the concrete is placed, so as to force the stones back from the face and allow the mortar to cover every stone, care being taken not to pry the moulds.

One of the best methods of finishing for a large smooth surface is to spade or cut the faces as described, and then, after the forms are removed, to pick them with a hand tool, shown in Fig. 2, or a pneumatic tool adapted for the purpose. The Harvard University Stadium is finished in this way, and the photograph in Fig. 3 shows a near view of the surface. On the left is the concrete showing the impressions of the plank forms, and on the right is the finished surface. If this picking is performed by hand, it is done by a common laborer. The surface he will cover per day depends upon the hardness of the concrete. It must not be too green or the tool will loosen the stones, while if set very hard the labor is unnecessarily great. On the average a man may be expected to cover about 50 square feet per day of ten hours. The picks require frequent, at least daily, sharpening. For the best appearance, the size of stone in the concrete should be limited to about ¾ inch to 1 inch. This method of picking was employed by Mr. E. L. Ransome in the construction of the Pacific Borax Works in New Jersey. A pneumatic tool suitable for this work is made with a circular end containing a number of points, using which a man should cover 400 to 500 square feet per day.

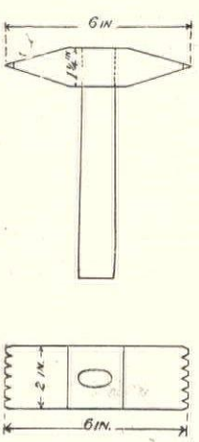


FIG. 2.—PICK FOR FACING CONCRETE.

Mr. C. R. Neher† states that with labor at $1.50 per day bush-hammering will cost less than 1½ cents per square foot.

A surface of washed concrete is shown in the photograph, Fig. 4. This finish, used by Mr. Henry H. Quimby* for surfacing concrete bridges in Philadelphia, is obtained by hand or with a hose. Hand methods are usually preferable because of the difficulty of applying the hose at exactly the right stage of hardening. In either case the forms must be removed as soon as the concrete is sufficiently hard—a period varying from 6 hours to 2 or 3 days, according to the character of the cement and the weather—and the washing done immediately. For washing by hand, a plasterer's float, or a small board 1 x 3 x 6 inches, is used and the cutting is done by sand rolled between the board and the wall, with plenty of water. The concrete face after this process may sometimes be too green for rinsing clean, when the final cleaning is deferred for a few hours. Mr. Quimby states that a laborer should wash and clean 100 square feet of surface in less than one hour. If the concrete has become too hard before washing, a comparatively smooth finish is obtained in a similar manner or by vigorously rubbing the surface with a rough brick.

Mr. H. P. Gillette† mentions a method employed in one case on the New York Central R. R. of chiseling sloping grooves, about ¾ inch deep and 2 inches apart, upon an old discolored concrete surface.

For a very smooth mortar surface, such as may be required for mouldings, curved surfaces or carving, the interior surface of the mould may be plastered about ¾ inch thick, by hand or trowel, just in advance of the laying of the concrete, so that the concrete and mortar may set up as one mass.

The advocates of dry mixed concrete often require a piece of board corresponding in width to the thickness of the layer of concrete, to be placed on edge close to the form, the concrete rammed against it, and then the board removed and the space filled with mortar mixed in proportions 1:2 or 1:3. Another method,‡ adopted by the Illinois Central R. R., which can be used with mortar of a wetter consistency, is to place a thin board or a strip of sheet iron at the required distance from the form, usually about 2 inches, then to fill in the mortar between it and the mould, and the concrete on the other side of it, when it may be removed. Different specifications require thickness of mortar or rich concrete ranging from 1 inch to 6 inches, but in the best modern practice, facing mortar is omitted altogether, and the concrete is made wet enough to present a good surface.§

FIG. 3.—SURFACE OF "PICKED" CONCRETE.

FIG. 4.—SURFACE OF WASHED CONCRETE.

Marking the surface to resemble masonry is considered unnecessary from an architectural point of view, for the work is actually a monolith and should have that appearance, but if it is desired, triangular pieces may be nailed to the forms, or if tongued-and-grooved plank are used, the horizontal moulding

*From *Concrete, Plain and Reinforced*. By Frederick W. Taylor, M.E., and Sanford E. Thompson, Assoc. M. Am. Soc. C. E., to be published by John Wiley & Sons, New York.

†Journal Association of Engineering Societies, January, 1902, p. 41.

*Personal correspondence.

†*Engineering News*, July 24, 1902, p. 66.

‡*Engineering News*, Nov. 29, 1900, p. 380.

§Other methods of facing are described in the Report of the Association of Railway Superintendents of Bridges and Buildings, 1900.

may be formed by a strip of wood gotten out to the preferred shape, and planed with a tongue and groove so as to fit between two planks.

The size of moulding depends upon the class of masonry which is to be imitated. Mr. Edwin Thacher specifies triangular mouldings 2 inches wide by 1 inch deep. Mr. E. L. Ransome has used with good effect a strip like that shown in section in Fig. 5.

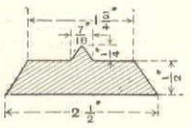


FIG. 5.
JOINT MOLDING.

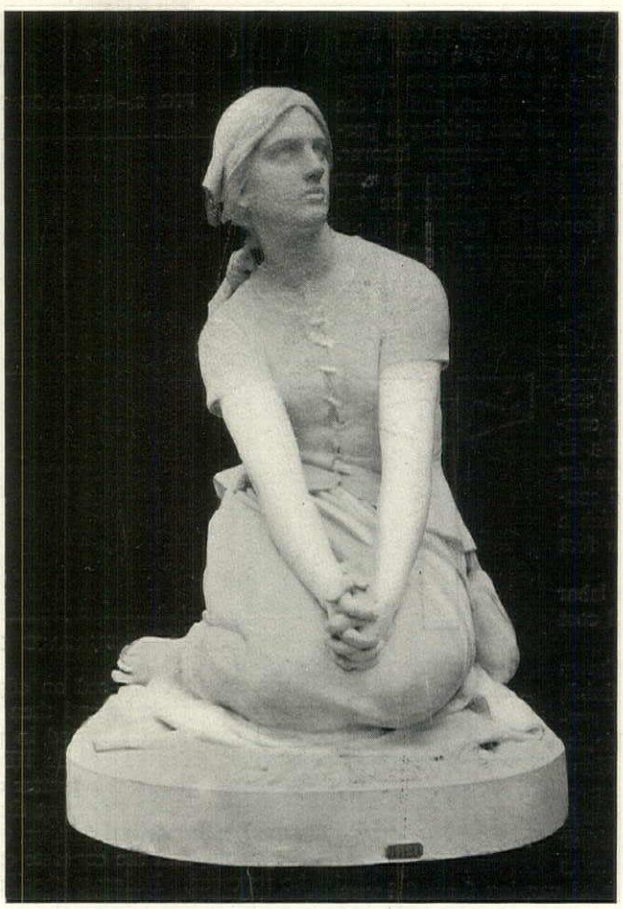
The appearance of a concrete face as left by an ordinary form may be smoothed and rendered more impervious and brought to a uniform color by washing with grout. In England† it is customary to use a rather stiff mortar in proportions one Portland cement to three sand, which is applied with a plasterer's hand-float, and worked in so thoroughly as to leave no body on the surface. In the United States the proportions most generally adopted for grout are one part cement to two parts sand, and it is sometimes put on with a whitewash brush or a small whisk broom. 1 : 2 mortar is considered better for this than richer proportions.

Mr. Clifford Richardson suggests the addition of puzzolanic material, or in other cases, lampblack, to produce uniformity of color.

THE MODERN FRENCH SCHOOL OF SCULPTURE.[1]—II.

IN order to show by object-lessons the prevailing and vital characteristics of this last school of sculpture, it will be necessary to examine carefully the prominent works of the men who founded the school and whose genius has made it what it is.

Paul Dubois has been called the founder of the Modern French school of sculpture. His statue of the "Florentine Singer," now in the Luxembourg, had an originality that challenged the judgment of the critics and gave them a problem by no means easy of solution. In some ways this figure resembled the works of Cellini and Donatello. In other ways it was altogether different. As to its technical mastery there could be no difference of opinion. The scientific training of the French artist had prevailed here, and careful comparison failed to show that, technically, his work did not equal that of the Italian masters. But there was more in it than the technical part, a beauty almost like that of the Greeks. There was a peculiar spirit, elusive, intangible, most difficult for any critic of the day to seize upon and define. The difficulty both of comprehension and explanation came from the complexity of the influences which had affected the sculptor. His work was distinctly a product of modern thought, as applied to art. No single thought of any school that preceded him would suffice. It was necessary to use all that had gone before and add what the fuller and wider knowledge of his time had given. Something else was added and that was his own personal individuality, which is quite distinct.



JOAN OF ARC.
Henri Chapu, Sculptor.

This young Florentine playing his lute is a new conception just born into a new world. He is full of music, gay and lightsome as well befits him, but he is not merely gay; there is some thoughtfulness in him, youthful though he is. He does not gambol like a faun or dance like Donatello's children. There is restraint in his attitude, which does not, however, interfere with its lightness and grace. It seems as if the air about him was heavy with thoughtfulness and had somewhat impeded the free action of his limbs, and even the careless amorousness of his serenade. It was no longer the day of the troubadour. Even the lover thought while he sang.

The influence of the spiritual element is not profoundly felt in this statue, though there is a suggestion of it. In other sculptors of this school spirituality soon came to exert a remarkable and in some ways a determining influence.

One of the favorite subjects of the modern French sculptors is Joan of Arc. Many of the greatest of them, like Frémiet, Barrias and Chapu, have devoted their best energies to an expression of the immortal Maid of Orleans. From this fact it is easy to see that patriotism had much to do with the development of spirituality among the modern French sculptors. One has only to think of the time in which they lived to see how this might easily, perhaps necessarily, be true. There had been the conquests of Napoleon, which greatly excited and exalted the patriotic spirit of the French. There had been the disastrous war with Germany, which had cut this spirit to the quick, but had by no means killed it, but rather nerved it, even in the valley of humiliation, with the thought of retaliation and revenge. At such a time it was natural that she who had saved France from the power of England should again become a prominent figure in the thoughts of all Frenchmen, sculptors as well as the rest.

When the sculptors came to examine her life and her personality they found that the spiritual was perhaps the dominant characteristic. They could not express her at all, if they left out her spirituality. This was a new problem and a most fascinating one. The study of it has resulted in the achievement of some of the most remarkable statues of modern times. Among these, perhaps the most wholly spiritual is that of Chapu, who represents the Maid in the attitude of one entranced by a vision, a simple country girl inspired by her communion with the Mother of God. The spiritual power of this wonderful statue is so deep and convincing that it would be hard to believe that any religious sculptor or painter could have lifted the soul higher or filled it with more intense religious aspiration.

Barrias's statue of Joan of Arc at Rouen is even more wonderful. The sculptor must have been deeply excited by the very thought of creating a fit embodiment in stone of her whom he, like other Frenchmen, almost worshipped, a statue to be placed upon a hill-top that overlooks the scene of her martyrdom. This hill is called "Bon Secours"—good help—a simple but beautiful expression of the work the martyred Maid had done.

There is a monument here and a chapel sacred to the memory of Joan of Arc. Probably Barrias came here before he began his statue. He looked down from hence upon the spires of St. Ouen and the the Cathedral of Rouen. He could see the conical top of the round tower which has replaced the one in which the Maid was tried and condemned as a witch. He could also see the marketplace in which the fagots were piled about her after she had been bound to the stake. The busy life which now swarms about the sacred spot perhaps owes its very existence to the heroic spirit that ascended thence to its home above. This must indeed have been an inspiration to the sculptor. He rose to the opportunity.

Joan of Arc must here be expressed as a conqueror in arms, a mailed leader of her knights, also a conquerer in the spirit, not to be daunted even by the flames that rose consumingly about her, for in the very midst of her anguish she called upon her con-

[1] A lecture by Mr. Walter Cranston Larned, delivered at the Art Institute, Chicago, in the season 1904-5.

fessor to hold the crucifix higher that she might see it above the smoke. Barrias chose for his statue a figure in full armor, but bare-headed. The fettered hands are clasped, though not in the attitude of prayer. The girlish head is turned upward and the eyes are seeking those visions which had come to her in the orchard at Domrémy, shaping and directing her triumphant course toward the achievement of her country's freedom. In this masterwork is seen a union of the best qualities of the schools of sculpture that had gone before and what is added is of vital importance —it is the deep intense spirituality of which the Greek knew nothing and even the Renaissance sculptor but faintly perceived.

Only in poetry can any adequate description be given of this work, so masterly in execution, so unique in environment.

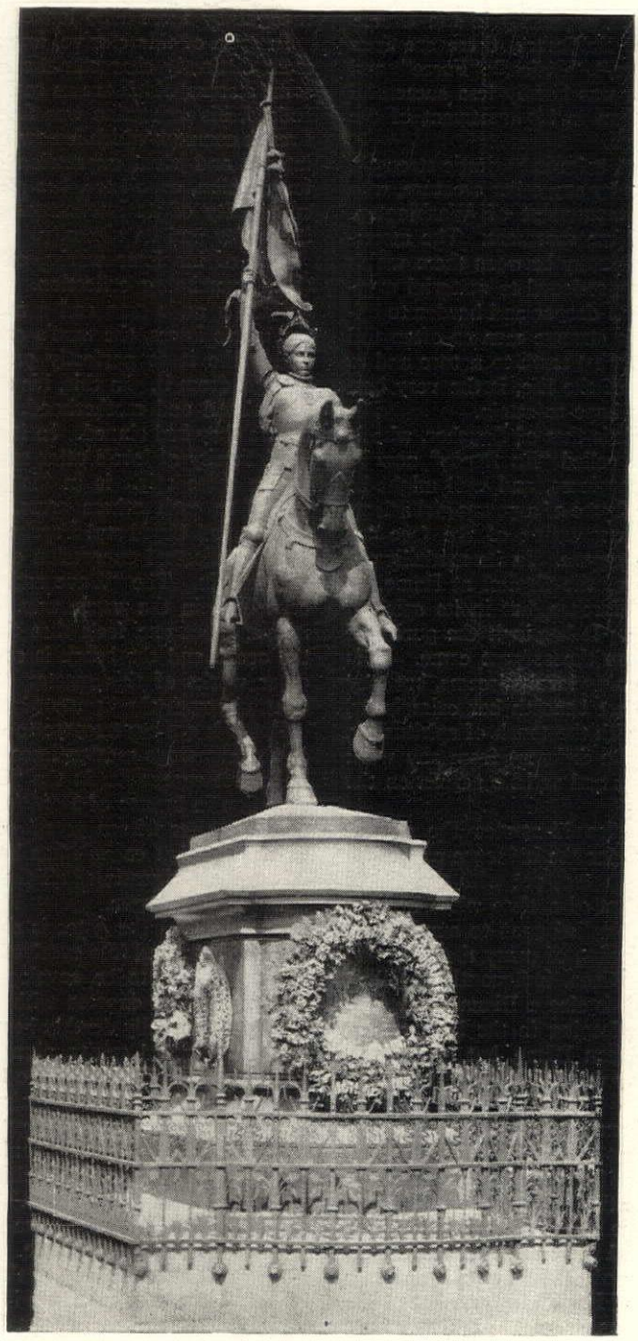
"Oh! Captive Maid upon thy
hill-top lone
Keeping perpetual vigil o'er
the land
Thy young heart broke to
save, forever stand
Clothed in immortal white-
ness, and o'ershone
By the wide heavens—a vic-
tim to atone
By thy pure consecration
for the crime
And shame, and madness of
wild, warring time.
Yea, stand through all the
ages to command
From out the vast unseen by
the strong plea
That clasps those fettered
hands, a bright array
Of holy shapes, whose white
wings silently
Shall lead thy gear, loved land
upon her way
To victory divine on fields of
life
Where Light and Darkness
wage supernal strife."

Not only Chapu and Barrias chose Joan of Arc as their supreme subject. Frémiet, too, another of the greatest masters of this modern French school, has made an equestrian statue of her which stands on the Rue de Rivoli in Paris, not far from the Louvre. This work is not so spiritual as either of the others, though there is in it much of the spirit. Here the Maid is represented in her martial aspect, armed a cap-a-pie, mounted on her charger, going forth undauntedly to war at the head of her battalions. Perhaps no other statue in the world has in it the peculiar quality which is here perceived, because the subject is absolutely unique. It is a maiden, a very young maiden, admitted captain and leader of the armies of France, leading them to victory after victory, not only by the strength of her physical arm, though that well held the lance in rest, but also by that kind of strength which might have nerved the arm of Michael when he led the armies of heaven to victory. Technically, the work of Frémiet equals the others. It is one more product of that École des Beaux-Arts, whose rigorous requirements can alone produce such work. This influence of Joan of Arc upon the modern French school of sculpture is in itself enough to show what part the spiritual played in its development.

Upon the scientific and imaginative sides, Rodin and Barye stand preeminent. There is also a poetic side, best illustrated, perhaps, by the works of Falguière and Boucher.

Rodin has so marked an originality that his works must be treated separately, as one would treat the works of Michael Angelo in their connection with the school of the Italian Renaissance. Great genuises all must stand, each on a separate pinnacle which raises them above their brother workers, although these were of the same school and actuated by the same principles.

This is also true of Barye. He had a particularly close and intimate relation to the modern French school of sculpture upon its scientific side, but the personal quality of his genius is so marked that in his own field he stands almost alone. Barye was primarily a sculptor of animals, though he was also a painter of them, and in this latter field has even been compared with Delacroix, the modern French master of animal painting. Something of Barye's inspiration may even have come from the Assyrian. The chase of the lion was a favorite sport with the kings of Assyria. Upon the walls of the palace of Assur-bani-pal, the Assyrian king, was wrought in stone a dying lioness. Wounded unto death by her fierce pursuers, and about to breathe her last breath, the power and the unsubdued majesty of the creature yet remain.



JOAN OF ARC, PLACE DES PYRAMIDES, PARIS.
E. Frémiet, Sculptor.

The treatment of this superb bas-relief is broad and free. There are no trivialties, no wasting of force upon petty details. The masses are large, well understood and handled with boldness and precision, and it is principally from the skilful handling of these that the great expressiveness and power of the whole work come.

Another remarkable Assyrian conception is the bas-relief of the monarch Assur-bani-pal himself, pouring a libation at his altar upon the heads of four lions which he has slain. Though the great beasts are dead and their bodies lie stretched helpless at the feet of their conqueror, yet each head is full of the power and savage majesty of the king of animals. A similar spirit is found in the works of Barye, though he by no means imitated the work of the Assyrian sculptor.

From the time of the unknown Assyrian artist who wrought this dying lioness and these dead lions, down to the time of Barye, there has been no distinctly great sculptor of animals. In the Grek friezes the horse is often admirably treated, and this is also true of the notable equestrian statues of the world, especially those of Verrocchio and Donatello. It seems, however, to have been reserved for Barye to discover the inmost secrets of animal life and embody them, whether in bronze or painting, in all their vivid intensity.

The lions produced by Barye and placed in the gardens of the Tuileries were so different from the artificial lions of earlier times that the critics, accustomed to academic and conventional art, knew not what to make of them, and one of them said, with great indignation, "Since when has the Tuileries become a menagerie?" On account of this vivid realism and utter abandonment of conventional and academic methods, it was long before the works of this greatest master of animal sculpture in the world could gain admission to the French Salon. Barye had never been to Asia or Africa. He studied his lions, his tigers, his

panthers, his crocodiles, his bears, his elephants and his reptiles in the Jardin des Plantes at Paris. There he studied them in exactly the same way and actuated by precisely the same spirit which induced the work of Michael Angelo when he took a solitary cell in the hospital of Santo Spirito at Florence, and alone dissected the dead bodies that he might learn the inmost secrets of their anatomy.

The result is the same in both cases—an absolute truth to nature, a scientific technical expression of that truth, and the touch of the imagination, giving also the secrets of the will-power and dominating vital instinct which put in action and brought into vivid life the bones and muscles and sinews, either of the man or the animal.

The work of Barye did at last attain adequate recognition, not only in France, but in other countries, especially in the United States. In Mount Vernon Place, at Baltimore, there are four great groups by Barye called "War," "Order," "Force" and "Peace." These show that the artist was hardly less successful in his mastery of the human form than in his treatment of the animals which were usually his subjects.

Among these groups is a grand lion, calm in majestic strength, well tested and known to be invincible by any other creature, who sits and looks upward toward the monument of Washington. Barye's lion figure is small in actual measurement. The monument is very high. Yet there is a harmony between them which shows that greatness in art is not proportioned to material magnitude, but has to do with things much deeper and harder to apprehend, yet so clearly true that it is strange men so often fail to learn the meaning of them, namely, that truth to nature and to life and to the spirit which is a part of the life, is the very best and highest thing that any artist can hope to attain.

In marked contrast to Barye's work is that of Boucher, who is at times a poet-sculptor. His figure called "En Repos" now in the Luxembourg, is one of his masterpieces, and well might be called a poem in stone. It is the nude figure of a young girl asleep. The attitude of the form and the expression of the face are alike expressive of the most perfect repose. In its modelling it might be compared with the Venus of the Capitol at Rome, or even with the Venus di Medici at Florence, but in its spirit it is very different from either of these. It has in it the purity of an angel, the innocence of Eve before the serpent came. It is also thoughtful. The maiden is dreaming lovely dreams, but they are not idle fancies. There is intellect beneath her calm brow. It is this intellectual quality, joined with the touch of spirituality, which makes this exquisite statue quite different from any work of a Greek sculptor, though in beauty and artistic perfection the idea of the Greek prevails in it.

Falguière's conception of Diana also illustrates the use of Greek art and adoration of beauty under the influence of French science and intellectuality. It is poetic, too, not with the simple poetry of the older days, but with that of a time when life has become more complex and the poet is called upon to express not one thought or emotion alone, but a union of many thoughts and many feelings. It is a triumphant Diana, indignantly repelling any intrusion upon her privacy, but it is also a Diana who might yield to love if she saw Endymion sleeping in the light of her own moon. It is indeed a very modern Diana, but in attitude, expression and modelling it is in many ways similar to the Apollo Belvedere.

This statue, too, is in the Luxembourg, where the French collect the greatest works of their masters in painting and sculpture. After the artists who have in their lifetime received the honor of representation in this great collection die, the best of their works are taken to the Louvre. Some of the statues which have been here described will doubtless find their place at last in that marvellous gallery wherein are many of the best works not only of the French artists of all the ages of French history, but of the masters in art of all the other nations, from the earliest times down to our own day.

It is time now to turn to Rodin, the most intellectual, the most scientific, the most imaginative, the most original, but not the most spiritual, of all the sculptors of the modern French school. His works have excited much controversy, as did those of Michael Angelo. Sometimes they seem unfinished. The figure is not completed. Some of it still remains imprisoned in the rock from which it was hewn. The sculptor did not dare to set free more of his conception because what he had done seemed to him a sufficient expression of his thought.

Michael Angelo saw the form of his "David" in the huge, ungainly block of stone which no other sculptor could use. His genius was sufficient to set this form entirely free from its prison of stone and the very spirit of him who is to be the king of Israel stands forth complete in power and beauty, though he is still but a youth going forth to battle with the giant who had spread terror and dismay among the armies of the Lord of hosts.

Rodin sometimes set his spirits free from the enveloping stone, but when he left them still partly imprisoned in it there comes an elusive, mysterious charm quite impossible to define, but its source is in the imagination. The artist does not seek to express all his thought. He suggests its essential qualities. He carries it so far that it is possible for the imagination to supply the rest. Thus he greatly stimulates the thought and gives to the beholder a personal and exciting interest in his work because he will, perforce, seek to add to what has been so masterfully expressed that which the artist purposely did not express, but left to be completed in thought by those who looked upon his work.

In spite of this elusive, imaginative quality, which is, perhaps, most distinctly characteristic of Rodin's work, he has produced some statues which are as realistic as the paintings of Velasquez. Indeed, his reputation was first firmly established by a bust of a French countess which is now in the Luxembourg. This is a most intense and vivid expression of life and character, though the imagination, even here, has played its part. It is modern in the complexity of its intellectual expressiveness, but it is Greek in its beauty and its sincerity.

One of his later works, called "The Kiss," is also to go to the Luxembourg collection. The sculptor's effort here was to portray a nude man and a nude woman, the woman resting on the man's knees, the man's arms about her and hers about him, and make it so perfectly pure that no one could get an evil thought from it. In this, his success is perfect. It is the kiss of fatherhood and motherhood. It is the kiss of Adam and Eve before they had sinned. In it there is no thought of wrong, only the intensity of love's utter self-abandonment.

The same spirit is in his figures of "Paola and Francesca" locked in each others arms. Even the figures of Venus and Adonis and Cupid and Psyche have this same perfect purity, this most intellectual expression of what human love may be if it is without sin. The "Wave and the Beach" is another great work conceived in the same way. They embrace each other for a moment, but one feels that the wave will sink back again into the ocean and the beach is sorry to have him go. Like all the other works of this master, thoughtfulness makes the meaning of it, although the beauty of form is exquisitely perfect.

But it is not my purpose to enter upon any detailed description of the numerous masterpieces of Rodin, because his genius finds its fullest expression in the "Gates of Hell," an attempted interpretation in bronze of Dante's Inferno. These gates are not yet finished, after fifteen years' of work. Perhaps they never will be finished, but enough has been done to show that here is one of the most gigantic of all the conceptions of sculpture since the sculptor's art began.

Upon one of the gates is shown the torture of the souls who are being plunged into everlasting ice. Upon the other, the agony of those about to be enveloped in eternal flame. The lines of the composition express with equal mastery the deathly cold of the ice, the equally deathly heat of the fire. In the expressions of these condemned spirits, plunging down toward their everlasting death either in the ice or the fire, is found the same thought, the utter hopelessness and despair of a soul forever lost.

The poet sits above the gates. His expression is even more tragic than that of the lost souls. There is here the intense suffering of a perplexed mind, which had had to deal with the most serious of human problems. There is in it the agony of unsolved doubt. It would seem to express rebellion except for the patience of the calm attitude. In this calmness, in this deliberate intellectual attempt to solve the tremendous questions with which his mind has grappled, there is a suggestion of the thoughtfulness of Michael Angelo's immortal "Il Penseroso" upon the Medici tomb, but in just such measure as the problem of Dante was more complex, more human and more deeply vital, so is the expression of the poet's figure more tragic and closer in touch with those thoughts that have agitated the minds and souls of men more than any other thoughts in all the ages since man's history began.

Rodin has sought to embody in stone the spirits of other great poets and writers, among them Victor Hugo and Balzac. These works have not met with universal approbation. They have been attacked like some of Michael Angelo's productions, with the accusation of exaggeration and even grotesqueness. In fact, the storm they raised among artists and critics has not yet subsided, nor can it now be said just what place in art these remarkable figures will hold as the years go on and the sober judgment of

posterity comes to consider them dispassionately. It is certain that these statues are quite different from the work of any other artist. It is possible that the sculptor has transgressed the proper limits of his art in the effort to express the tumultous, untamable yet most intellectual and poetic natures with which his chisel was called upon to grapple.

It must, however, be remembered that exaggeration properly used is a perfectly legitimate means of artistic expression. Many truths can only be thus expressed in art or literature. No literally painted landscape is true. Its salient features must be exaggerated in a painting in order to produce the effect upon the mind which the scene itself produces. The life of the characters of Dickens's is so true, so close to the heart of humanity, that they cannot die. They are, and always will be, living and real, yet their intense vitality has often been produced by exaggeration and reiteration, which is another form of exaggeration. It may be that in the "Victor Hugo" and the "Balzac" and in some of his other works, Rodin has gone too far in the use of this powerful but dangerous help in artistic expressiveness, but in the figure of "Dante" he has not gone too far either in that or any other direction.

While Rodin is exceptional among the modern French sculptors, or, indeed, among all sculptors, yet in this statue of Dante he is almost typical of his school and of his time. There seems to be here the consummate mastery of all the technical resources of all the schools, and the consummate mental expression of the artist's own time, beside the individual conception of genius which must always stand alone, no matter in what school or in what place it may be found.

Strange it is that the subject of this supreme work of the modern French school of sculpture should be a mediæval poet, but Dante was a world-poet, like Shakespeare or Goethe. As the artist has embodied him, he is studying exactly the same problems which are discussed in Rodin's world, which always will be discussed during the time of man's existence. Therefore, the subject is of universal interest and from that very quality may well typify the spirit of the modern French school of sculpture.

The art of this school both studies and defies tradition. It will use whatever it finds that is good wherever it finds it, and will use it in its own way. It despises nothing that has in it an artistic truth, however feebly expressed, and no academician, however strongly entrenched in popular favor, can choke it or even hinder it, if there is falsity or pretence in his way of working. Truth is its watchword. To attain to the truth in art or science or religion is becoming increasingly difficult with the increasing power of human faculties and the ever-widening fields toward which they are directed.

The modern French sculptor has need of every weapon of his art. Not one of them will he throw aside until he has tested it. He has already found the old armory insufficient, though it has supplied him with many a trusty blade and spear. When the need came he could forge a new sword from the ancient steel whose forging needed the fire of the modern crucible of thought, just as Siegfried, the fearless human hero, could weld together the broken and useless fragments of a sword that once had seemed invincible in its divine power.

Like Siegfried, the French sculptor has used the mastery of his newly forged weapon in breaking down old barriers and opening new fields in the artists' world of thought.

WALTER CRANSTON LARNED.

COMMUNICATIONS.

WORKING-DRAWINGS MADE UNDER THE TARSNEY ACT.

BOSTON, March 22, 1905.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sirs:—In connection with the publication of my drawings for the Nashua Post Office building in your issue of March 18, my attention is called to the following note in the table of illustrations:

"As usual, in the case of buildings designed under the Tarsney Act, the working drawings have all been prepared in the office of the Supervising Architect."

In behalf of accuracy it seems proper to call attention to the fact that under the Tarsney Act, *no* drawings are prepared in the office of the Supervising Architect; but, on the contrary, full architectural service, including designs, working-drawings, details, supervision, etc., are furnished by the private architect to whom the work is awarded, and in the case in question all drawings for the Nashua Post Office building have been prepared in my office.

Respectfully yours,

F. MANTON WAKEFIELD.

[We cannot profess that our blunder was due to any slip of the pen, for the statement was made in the simple belief that it was supported by the facts; indeed, we had to turn to the rules formulgated under the instruction of Secretary Gage before we could feel sure that Mr. Wakefield was right and we wholly in the wrong.—EDS. AM. ARCHITECT.]

"ARCHITECTS' REGISTRATION."

URBANA, Ill., March 22, 1905.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sirs:—I request permission to correct some erroneous statements on page 75 of article on "Architects' Registration," issue for March 4, 1905.

Three States now have license laws controlling the practice of architecture therein: Illinois, where the law has been in force for nearly eight years; New Jersey and California, whose laws are based on that of Illinois and are not materially different.

Examinations are made and licenses are issued in Illinois by a Board of Examiners, appointed by the Governor, consisting of five practising architects.

The examinations of applicants continue for two and one-half days, and comprise the topics particularly specified by the license law. A graduate from any one of the six leading architectural schools in the United States, comprising just the men who would be accepted for Associate Membership in the American Institute of Architects without stated examinations, is credited with a sufficient knowledge of construction, and he is not examined therein, thus being exempted from the examinations of the second day only. It is therefore evident that graduates from these six schools of architecture, including that of the University of Illinois, are treated exactly alike, and that they are exempted from two-fifths of the examinations only.

Very truly yours,

N. CLIFFORD RICKER,

President Illinois Board of Examiners of Architects.

ILLUSTRATIONS

FACTORY OF THE AMERICAN ARITHMOMETER CO., DETROIT, MICH. MR. ALBERT KAHN, ARCHITECT, DETROIT, MICH.

The accompanying illustrations show a factory recently completed for the American Arithmometer Company, who until October, 1904, were located in St. Louis, Mo.

The factory site is 320 ft. square, fronts on Second Ave. Boulevard, and occupies the entire block between Amsterdam Ave. and Vienna St.

The factory portion is one story in height, the two-story part of the building containing the offices and gymnasium, and occupies a frontage of 280 ft. and is 42 ft. deep.

The main entrance admits to a reception room in the center of the building on the ground floor. From it leads a marble staircase to the general and private offices above. The superintendent's office opens at one side of entrance hall. The partitions around this latter are filled with clear plate glass, thus affording a general view of the factory.

The factory proper consists of a machine-shop, 320x126 ft., and a wing 88x192 ft. The former is divided into bays 16 ft. 9 in. from center to center of each, with columns spaced 20 ft. 10 in. on centers. This spacing of bays afforded a convenient size for lengths of shafting, all of which is arranged to be interchangeable. All parts of the shop are flooded with light, saw-tooth roofs making this possible. The general construction and sizes of these saw-teeth have proved very satisfactory. The gutters between are of ample size; the window sills are 16 in. above the highest point of gutter, to allow for heavy falls of snow, and the sashes are 7 ft. high. The gutters empty into copper sumps, and are connected to the interior cast-iron columns. These latter are coated on the inside with asphaltum and serve as conductors. Below the sash of saw-tooth roofs are provided small condensation gutters of copper, which at every column connect into same. Every other sash in the saw-teeth is arranged to swing on center pivots. These are operated by geared ventilating apparatus.

In the wing on the second floor is the gymnasium, 50x85 ft., and 14 ft. high to lower member of trusses. Dressing room, shower and toilet are provided for the gymnasium, which latter is used by employés for meetings, balls, conventions, games, etc.

The locker room contains three hundred and forty (340) expanded metal lockers 12 in. x 12 in. x 5 ft., with double enameled

iron wash troughs, supplied with hot and cold water, between lines of lockers.

For the women employed, a locker and wash-room, bicycle-room, toilet-room and a resting-room are provided on the front of the building, and adjoining their department.

The second floor office portion provides for the general offices of the company.

The building is constructed of non-combustible material throughout, with brick walls, faced on the outside with a standard size paving brick, and on inside in factory portions with sand-and-lime bricks, enameled five coats, and presenting the appearance of enameled bricks. The floor and roof construction throughout is of the Kahn system of hollow-tile and reinforced-concrete. The spans vary from 16 to 20 ft. In this construction hollow tiles are laid end to end on wood forms in straight rows, the rows of tile being about 4 ins. apart In these 4-in spaces are dropped first 1-in. of cement-concrete for fireproofing, then the Kahn trussed bar, with its rigidly attached prongs pointing diagonally upwards, and then the spaces are filled with a wet mixture of cement-concrete, thus forming a series of reinforced-concrete beams approximately 16 ins. *o. c.* The floor-tile and beams average 10 ins. in depth, and are calculated to carry 100 lbs. of live load, with a factor-of-safety of four. Tests of four times the live load produced only slight deflections. The roofs are similarly constructed with 4-in. hollow-tile and concrete beams, the inside being plastered a heavy coat of cement-mortar, the outside covered with Carey's standard magnesia roof-covering,with which also the gutters are lined. The roof spans are 10 ft. from truss to truss. This form of hollow-tile and cement construction has proved itself thoroughly satisfactory in every way, light in weight, easily and quickly installed, and comparatively inexpensive, costing in this case about 10 per cent. more than ordinary mill-construction. Its sound-proof qualities as well have been put to the fullest test in the office-building, and results have been eminently successful.

Fireproof roof construction has always been somewhat of a problem; various forms were considered, among them solid concrete, hollow tile between steel purlins, ferro-inclave, etc. The form adopted proved not only less expensive, but entirely free from all condensation, an objection so common in most concrete construction. Details of the construction as designed by the Trussed Concrete Steel Company, the manufacturers of the trussed bar and contractors for the work in this building, are shown in detail.

The building is heated with Evans-Almiral Company's system of hot-water heating. Power is for the present obtained from the Edison Company, though boiler-capacity and engine-room are provided for future installation of own power plant. The factory portions are heated by pipe coils suspended from walls below the windows, and from base of saw-tooth directly under sash. The latter arrangement materially assists in keeping the gutters between the roofs free from ice and snow. The office portions are heated with direct cast-iron radiators. The mains supplying the coils in machine-shop are run just above and supported on the I-beam grillage which supports the shafting and the roof construction. No pitch of pipes being necessary in the form of heating adopted, this permits of a very neat arrangement of piping.

The entire interior of factory is painted white, and the cleanly appearance proves inviting to the employes. The attention paid to the details for the latter's comfort and health has in this case proved itself of direct benefit to the owners, as it has in most similar cases: good workmen from many other plants are continually seeking employment here. All are eager to become associated with the concern.

The building is lighted by electricity. All wiring is run in pipe-and-tile conduits. The machine-shop is in general lighted by large arc-lamps suspended overhead, but each machine has an individual incandescent light supported on ½-in. pipe standard, which is a continuation of the conduit system, being brought up through the concrete floor, and contains the wires.

Additional Illustrations in the International Edition.

THE CHANCEL: ROGERS MEMORIAL CHURCH, FAIRHAVEN, MASS. MR. CHARLES BRIGHAM, ARCHITECT, BOSTON, MASS.

PULPIT AND ORGAN-CASE IN THE SAME CHURCH.

[NOTE.—Owing to unexpected delay in transit, the edition of these two plates reached us too late for inclusion in our issue for last week, and too late to cancel the statements that they were to be found in it.—EDS.]

NOTES AND CLIPPINGS.

WANTED, A CLEARING-HOUSE FOR STOLEN WORKS OF ART.—The difficulty of recovering stolen art works, once they have been taken out of the country, leads the Paris *Bulletin de l'Art* to propose some sort of international agreement under which museums or other public institutions may seize property stolen from them, no matter in what country it may turn up. All museums cannot expect to be so fortunate as the church in Ascoli, to which Mr. J. P. Morgan returned a priceless vestment of which it had been robbed. The *Bulletin* gives an account of the efforts now made by the city of Mâcon, in France, to recover three illuminated leaves that were abstracted some years ago from a wonderful manuscript book belonging to its city library. They have finally turned up in the hands of a London dealer, who asks $3,000 for them. The French Government offers $500, and the rest of the money may be raised by subscription.—*New York Evening Post.*

MUSEUM OF RELIGIOUS ART AT AVIGNON.—The Papal Palace at Avignon, which has been used as barracks for over fifty years, is now to be turned into a museum for religious art. The chapel, the council hall and the private apartments are to be restored, as far as possible, to their state in the time of Gregory XI.—*Exchange.*

ENORMOUS RESERVOIR IN THE CANTON SCHWYTZ.—An enterprise which is soon to be commenced in Switzerland is certainly unique in Europe, if not in the world. An enormous reservoir is to be constructed by damming the River Sihl, in the canton of Schwytz. This artificial lake will then occupy a whole valley and contain ninety-six million cubic metres of water for the alimentation of a powerful hydro-electric installation destined chiefly for the electric traction on the railroad. The wall will be 78 feet high and about 300 feet in length. A difference of level will thus be obtained between this basin and the Lake of Zurich, in which the water will flow by means of a tunnel with a fall of 480 metres, producing a force of 28,000 horse-power during twenty-four hours or 60,000 during eleven hours. A contract has been signed by the Government of Schwytz and that of Zurich, and the work is to be commenced some time during the spring.—*English World's Work.*

THE COMPLETION OF THE PALAIS DE JUSTICE, PARIS.—According to a scheme which dates from the Second Empire, the Palais de Justice when completed was to occupy the whole of the parallelogram comprised between the two arms of the Seine, the Boulevard du Palais, and the end of the Ile de la Cité adjoining the Pont Neuf—always with the exception of the picturesque houses looking on the Place de Harlay, several of which still preserve their aspect unaltered since the days of Louis XIII. Some vandals have wished to destroy these, to replace them by a new square in front of the Henri IV. statue. This project has again been brought forward for discussion, and the completion of the Palais de Justice is at present engaging the attention of the Conseil-Général of the Seine. The official plan, as presented by the architect, M. Tournaire, is considered to be open to criticism in some points of detail. For instance, on the Quai des Orfèvres—where there stands at present a block of building erected by M. Diet in the style of the Italian Renaissance, it is proposed to erect a new building in a totally different style, and separated from (or connected with) the other building by a tower which is merely a bad copy of the Tour St. Jacques or the tower of St. Germain Auxerrois. This is the portion of the scheme most criticised, since it has no *raison d'être* in itself, and would hide from view, moreover, the flèche of the Sainte Chapelle, a gem of mediæval architecture which is already far too much buried and hidden by the surrounding buildings. At the angle of the Boulevard du Palais and the quay the architect proposes another tower to which no objection is made, and the design of which recalls aptly the ancient towers of the Conciergerie, the clock-tower especially. The conclusion of the Conseil-Général is that the plan must be remodelled, more especially in the matter of the first-named tower on the Quai des Orfèvres. It is suggested that something in the nature of the "Porte du Palais de Justice" (so-called) at Bordeaux would be suitable here, and would also have the advantage of not interfering with the view of the flèche of the Sainte Chapelle.—*The Builder.*

The American Architect and Building News

VOL. LXXXVII. SATURDAY, APRIL 8, 1905. No. 1528.

CONTENTS

THE promulgation of the protocol of the proposed alliance between Harvard University and the Massachusetts Institute of Technology has produced a very soothing effect on the too-clamorous alumni of the latter institution, who, a short time ago, vowed they would never consent to such an arrangement. We do not wonder that they no longer murmur, since the conditions of the alliance as suggested seem to us to be overwhelmingly to the greater benefit of the Boston school. The fact that there now seems to be no similar outbreak of objection on the part of Harvard alumni seems to us very signal testimony to the value of the liberal education with which their alma mater has endowed them. Meanwhile, that department of each institution in which we are most interested is, by the terms suggested, specifically excluded from sharing in the benefits which may accrue to other departments of the several institutions. Because the architectural school at Harvard has been given an adequate building and a satisfactory endowment, it was felt by the Harvard Committee to stand on a very different footing from the architectural department of the Institute of Technology, and so was exempted by name and title from having any part in the proposed compact. As Mr. and Mrs. Robinson are still alive, they can, if they choose indicate their willingness that the School of Architecture should join in the alliance, but this is unlikely, since the chances are that they have already been consulted and have expressed the natural feeling that, except the Harvard school stand by itself, the memorial they had created to their son must lose most of its value. Hence it is that, if the alliance shall ever be consummated, there will be two schools of architecture within a mile of one another, distinctly separated in management and possibly in policy, and yet forming departments of great educational undertakings which, in part, are closely allied and have mutual interests. It will be a curious situation and no one can guess how it may develop, whether the two schools of architecture shall have equal and normal growth or whether one will in time become moribund and, if so, which will prove itself the fittest survivor.

THE possession of a good building and an adequate endowment are important considerations for such a school, so important that it is not surprising to find Professor Hamlin, the head of the School of Architecture at Columbia University, in a report just made, enumerating them as the chief desiderata which the present condition of the school suggests. In point of accommodation the Columbia school is fairly well off for the moment; but where several departments are housed in the same building, it is not easy to make equitable provision for the growth of each. An endowment, next to instructors of the highest worth, is the most important asset a school can have—in fact the last implies the first, if the responsible head of the parent institution knows his business, since it enables the retention of the really able men or their procurement, if they are not already in service. The Columbia School of Architecture has given too good an account of itself to lack friends, so we trust that some of them will find themselves willing and able to supply the needs to which Professor Hamlin points, and, in doing so, they should feel they are doing better service to the country than if they were spending their money on the American Academy in Rome.

OUR belief that a State Architect is not a particularly desirable institution, either for the individual who fills the position or for the State who pays for his services, undergoes a modification in regarding the history of the present functionary of that title for the State of Illinois. The law creating a State Architect fixes his salary at five thousand dollars per year, but makes no provision for office expenses and draughtsmen's hire. According to the allegations, Mr. Bruce Watson, on assuming office, at once came to the conclusion that since the law did not specifically state that he must not do so, therefore he was free to put in a bill for each job done, figured at the usual five per cent rate. Although this ingenious line of reasoning caused some complaint and opposition, both the salary and the commissions seem to have been paid to Mr. Watson, who in this way has received between January, 1901, and March, 1905, the total amount of fifty-five thousand six hundred and seven dollars, or an annual income of about thirteen thousand seven hundred and fifty dollars. It is to be assumed, of course, that out of this sum was paid the expenses of running the office, usually computed in the profession as being equal to fifty per cent. of the commissions received. As Mr. Watson's bills for commissions foot up over forty-five thousand dollars, and as one-half of this sum should have covered the office expenses, it would seem that Mr. Watson's sophisticated bit of reasoning had enabled him to, at least, double the income the State obviously intended he should receive for his services. The deduction is well within probabilities, since office-rent probably does not figure in the case and traveling-expenses may have been avoided by the easy process of procuring railroad passes. In this case the official position seems to have been a very good thing for the incumbent, at least.

Entered at the Post Office at New York as second-class matter.

WE imagine that, in some way, beyond the apprehension of the layman, the rights of the feme couvert are accountable for what looks like a rather unreasonable judicial decision in the Northwest. Mr. Herman Kretz, of St. Paul, Minn., recently sued Mrs. Hunter Doll and her husband for his commission, as follows: "Furnishing plans, forty dollars; conferences and planning apartment-houses, four hundred dollars." The judge ordered a verdict for the defendants after hearing their affidavits. The case is not fully reported in the daily papers, but Mrs. Doll's affidavit seems to have recited merely that she owned the site, had seen certain sketches made by Mr. Kretz, but had objected to the erection of the building when the scheme had been suggested by her husband. His affidavit admitted that he had arranged with the architest and contractors for the erection of the building without his wife's knowledge and consent, but that the buildings were being paid for with his own, not his wife's, money, and that there had not yet been any agreement how the rent, when accruing, should be divided between the parties in interest. Upon these affidavits the court ruled against the plaintiff, and yet, seemingly, there was no denial that he had rendered service or allegation that he was overcharging for the same. Architects who now and then dabble in real estate, know, of course, that a good title can be had only when the grantor's wife, if he has one, signs away her dower right in the estate, but, on the evidence of this case, it would be well, since so much property stands honestly or dishonestly in women's names, for each architect to exact from his client's wife an affidavit that she knows of and consents to her husband's operations.

THE Master Builders' Association of Boston makes a very justifiable protest against certain bills now pending before the Massachusetts Legislature, the object of which is to secure an eight-hour day for all mechanics and laborers employed in work for any county, city or town in the Commonwealth. The new measures apparently seek only to extend to others the privileges of short hours now enjoyed by those engaged on National, State or on municipal work in Boston. Quite apart from the inequitableness of compelling, by legislation, the payment of a nine or ten-hour rate for an eight-hour day, the new measures would breed boundless confusion and discontent in the matter of shop work, where some hands might be engaged on private work, while their neighbors at the bench were allowed to lay down their tools at an earlier hour for the reason that, on that day, they chanced to be gluing-up, say, the panelling for the selectmen's room in North Truro. Under the proposed laws, it would apparently be fair for a workman to decline to begin his job until he was satisfactorily assured whether it was for the benefit of a private customer at one rate or for a public one at another.

A FEW weeks ago the insurance interests of New York interfered to prevent the too hasty awarding of contracts for the installation of an auxilliary system of salt-water supply for fire-service. Five million dollars had already been appropriated for such installation after a system had been devised and approved, and the Commissioner of Lighting and Water Supply believed that such a system had been worked out, and that for it thorough specifications had been prepared upon which reliable bids could be based. But the underwriters justly felt that their interests were such that their own experts should have opportunity to study the approved scheme before contracts were made, and this study is now proceeding. Meanwhile a reminder that other places have a salt-water service is found in a report of a test of that auxilliary service, made in Boston last week. These tests are made occasionally, merely to make sure that things are in working order, for it is really an emergency, rather than an auxilliary, system, as the underwriters object to goods being wet down with salt water save as a last resort. The pipes form merely a short loop through the wholesale district, and when needed are fed by a fire-boat coupled on at the water's edge, the engineer on the boat receiving his orders from the hoseman by an electric wire run along the hose. On Sunday, working with a head of two hundred pounds of steam and discharging twelve hundred and fifty gallons of water per minute, six streams seem to have been kept in play, throwing water to the height of one hundred feet, and when siamesed into a "jumbo deluge set" producing such a torrent of water that the value of the service was visible to any onlooker. The chief of the Department, however, is satisfied that there should be an electric pumping-plant for the system, since, at the very time when the salt-water service would be of greatest use, the fire-boats might be busy elsewhere.

IT may be remembered that owing to a curious lack of knowledge of the facts, or to obtuseness of some kind, there was quite needlessly destroyed, during alteration to the hall it adorned, the earliest (probably) piece of mural decoration that this country could boast—the the frieze had been carefully preserved by Mrs. Paul the buildings of the Massachusetts Institute of Technology, Boston. Lately, the architect of the building, Mr. W. G. Preston, learned that the original sketches for the frieze had been carefully preserved by Mrs. Paul Nefflen, the widow of the artist who painted the frieze, and because of this fortunate happening the present graduating class has taken the matter up and proposes to reproduce one or more sections of the frieze this year, leaving to succeeding classes the task of completing the work. Any attempt at a restoration proper is out of the question, since the original frieze was painted in distemper and the attempt to remove the present covering of oil paint would also result in the destruction of the distemper that has probably been absorbed into it. Although the proposed reproduction, even if as good as or better than Nefflen's work, can never have the sentimental value that attached to the original work because of its antiquarian value, it is very well worth while to carry out. It seems to us, however, that the possible removal of the Institute, and the abandonment to other uses, or destruction, of Rogers Building should be kept in mind, and that the students should have the panels painted, or better still should themselves paint the decorations, on canvas in their own drawing rooms, so that the revived decoration might easily be transported to new quarters and not left to degradation or destruction,

EXPERIMENTS WITH A THEATRE MODEL[1]

THE pamphlet, which bears the above title, appeared in Austria in January, 1904, shortly after the great calamity of the Iroquois Theatre fire in Chicago. It is published under the auspices of the Society of Engineers of Upper Austria, which Society some years ago had made a special study of theatre-fires by means of a theatre model, the result of which experiments has been the belief that all such great theatre calamities have for a basis a common cause. Herr Franz Neumann, the Chief Engineer connected with the Austrian State Railways in Linz, was the first to point out that this common cause was to be found in the physical theorem of the expansion of air by heat and in the over-pressure caused by said expansion. The experiments and the report of this Society were made in the years 1884 and 1885 but they were not published at that time. It has now been deemed advisable, for the sake of preventing similar disasters as that at Chicago, to make them public, particularly in view of the fact that the results of the experiments are as applicable to-day as at the time when they were made.

The Committee of Engineers selected from the members of this Society caused a model of a theatre to be built with a view of making experiments.

Experience has taught that the majority of theatre-fires break out on the stage and statistics seem to show that from year to year the number of such fires increases, because of the greater requirements as regards decorative and lighting effects, though they are not necessarily always fatal. When a fire breaks out on the stage of a theatre during a performance one of two things invariably happens; either the flames are put out in the first few moments, and this as experience has taught does not occur very often, or else the flames catch very quickly the dry masses of stage scenery whereby the air in the stage house is highly heated and expanded, and if it cannot expand it causes a high pressure. Since many of the older theatres are not provided in the upper part of the stage with sufficient openings to relieve the expansion of the air and to permit the gases of combustion to pass off into the atmosphere, it often happened that when the fireproof curtain was lowered it bulged out by the over-pressure of air and was forced through the proscenium-opening into the auditorium.

The expansive force of the heated air has been found to be so strong that an excess of pressure will exist not only on the stage, but also in the auditorium. This excess in air pressure is stated by these engineers, who have made the experiments, to be perceptibly greater than the pressure which exists in the gas-pipes, the result being that not only will the gas cease to escape, but on the contrary air will enter the gas-pipes and, of course, will extinguish the lights. Then, again, the excessive air pressure existing on the stage will make an effort to equalize itself with the outer air pressure, the result being that the people in the audience will find their death by the heated irrespirable gases coming from the stage.

As will be readily understood, the burning of scenery on the stage is accompanied by a loss in the amount of oxygen in the air and by an increase in the amount of irrespirable gases, such as carbon monoxide, carbon dioxide and other products of combustion. The breathing of such gases renders people benumbed and unconscious in a very few seconds, so that the persons in the audience cannot find the time to save themselves. It is also a matter of observation that the means for auxiliary lighting of corridors, passages and stairs, by candle or oil lamps, will fail unless they are supplied with special flues admitting fresh air from out of doors, and also are protected against the entrance of the expanded air. In this way the means of exit are thrown into darkness, and the panic amongst the persons in the theatre is much increased.

It is well to note that, as the examples of the Ring Theatre fire in Vienna, of the Brooklyn Theatre fire, and of those of Nice and Chicago have shown, all this happens so quickly that the time for these events must be measured not by minutes, but by seconds only. The Committee points out in its report that this expansion of the air explains in a simple way all those phenomena which repeat themselves at all theatre-fire calamities. Contrary to the views expressed by other experts (2), the Committee of Engineers referred to urged that the first and most important protection to the public consists in means for the removal of the heated air and of the gases of combustion from the stage. They admit that this precautionary measure might not be required in a theatre built and equipped in an absolutely fireproof manner, but they also claim that no such theatre has, up to the present day, been built and that even if the house itself could be made fire-resisting the stage scenery cannot well be constructed so it will not burn.[3]

The above described action takes place during the first period of a theatre fire; during the second period the auditorium, the passages and minor rooms begin to burn; the third period occurs when the ceiling is destroyed and the roof of the building falls in, whereby both smoke and gases of combustion find a ready exit. At this period the firemen can again stay in the building and the gas flames will again burn, if lit.

Unless a theatre fire is subdued in its incipiency all attempts to extinguish it are useless, and usually the building burns down to the ground, in some cases menacing surrounding buildings and property.

The experiments made by the Committee referred in particular to the first period of a theatre fire. The theatre model which was constructed was one-tenth full size, and it was shaped substantially after the plan and section of the Ring Theatre in Vienna, see figure 1 and figure 2. In the auditorium (*a*) there were placed two gas lights, one candle, two vegetable-oil lights, and one kerosene light, an additional oil light was placed in a glass lantern. Manometers recording the pressure of air were attached to the outside of both the stage and the auditorium, also to a gas chandelier, which was located about 18 feet from the model. There was also an unprotected gas flame attached to the outside of the auditorium. Two groups of experiments with this model were made: in the first series the stage of the model was not provided with ventilating flues, whereas the second series was intended to demonstrate the action of large ventilating flues. In each experiment two or three kilogrammes of paper were hung up in the stage portion

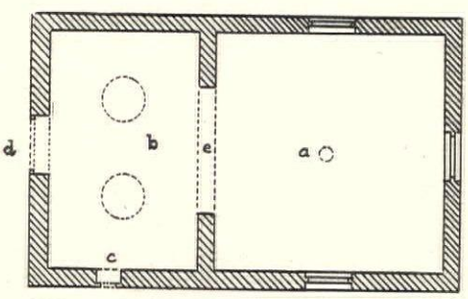


FIG. 1.—PLAN OF THEATRE MODEL.

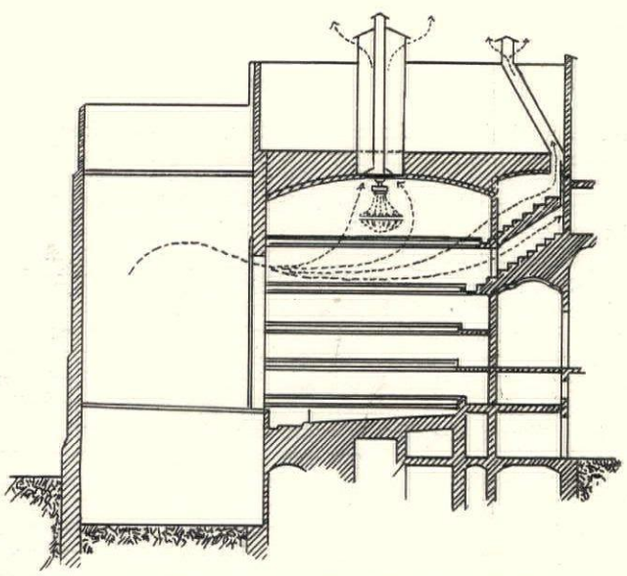


FIG. 2.—LONGITUDINAL SECTION THROUGH THE RING THEATRE, VIENNA.

(*b*) of the model. The proscenium opening was provided with a fire-curtain (*c*), which was lowered during the experiment.

The paper was lighted, and after 17 seconds the air-pressure caused by the heat forced the curtain into the auditorium: after 19 seconds the gas-flames became extinguished, and it should be noted that this happened even before the auditorium was

[1]Bericht des Vereines der Techniker in Oberösterreich über Versuche an einem Theatermodell und Massregeln zum Schutze des Publikums bei Theaterbränden—Linz, 1904.

[2]See the article of Herr Baurath Manfred Semper, published in THE AMERICAN ARCHITECT of Jan. 21, 1905.

[3]As many will remember, another Society of Austrian Engineers (the Asphaleia Society), made, in 1881, suggestions for the thorough fireproofing of the scenery, which, however, have been embodied in but a few theatres (opera house at Buda Pesth, theatre at Holly, Auditorium Theatre in Chicago, etc.).

filled with smoke. The greatest excess pressure took place 20 seconds after lighting the paper and was recorded by the manometers as follows:

In the stage-house 170 mm. (6.693 inches) of water.

In the auditorium 162 mm. (6.378 inches) of water.

The pressure of gas in the gas-pipes was equivalent to 29 mm. or 1 1/7 inches water pressure. Several times the excess pressure was so great that the water was forced out of the manometers, it being over 200 mm., so that the above given figures do not even represent the maximum pressures which occurred.

The kerosene light became extinguished after 29 seconds, the candle flame and the oil flame after 31 seconds. The excess of air-pressure forced the gas back into the gas-pipes, so that even the flames which had been applied outside of the model of the building became extinguished.

It is also noteworthy that at the door marked (*c*) on the plan, which was provided in the model for the lighting of the paper, flames issued which were from 7 to 10 feet long, so that it is safe to state that at this door no inward suction of air took place. These experiments conclusively explain the sudden extinguishing of the gas-flames in the Ring Theatre fire at Vienna, and while the matter is of less importance at the present time when the majority of theatres are lighted by the incandescent light, it is nevertheless interesting because it points out that the so-called auxiliary lighting in the corridors and stairs would usually, if accomplished by means of gas, fail at the critical moment. Candle and oil lamps used for the lighting of exits should therefore always be provided with separate conduits for the admission of air to the flames, and they should be enclosed with tight-fitting glass and metal doors so that they would be protected against the entrance of the expanded air.

Furthermore, the experiments seem to point to the fact that no safety-curtain could be constructed which would be sufficiently strong to withstand an excess pressure of from 1/50 to 1/60 atmospheres, corresponding to a pressure of from 20 to 24 tons on a curtain having an area of 120 square metres, or about 1,200 square feet. Any proscenium-curtain fitted up would necessarily bend and buckle, and through the apertures on the sides the heated air and the gases of combustion would necessarily enter into the auditorium.

The Committee finds its views confirmed in the account of the burning of the new Municipal Theatre in Szegedin (Hungary), for here, according to all the accounts published, the iron curtain was pushed out of its grooves and buckled so much that the flames caused the firemen standing in the boxes to retire after a few seconds. The fact is also mentioned that in the experiments the door at the rear of the stage (*d*), which was made of strong sheet iron, became bent owing to the enormous pressure.

The conclusion of the experimenters is that no iron curtain can be considered trustworthy except the stage be provided with large ventilating flues. They do not wish to argue that the fireproof curtain is not necessary, but they emphasize the fact that the first and most important means of protection for the public, as well as for the actors and workmen on the stage, is the arrangement of sufficiently large vent-flues in the stage roof.

Referring again to the experiments made with the theatre model it was demonstrated beyond a doubt that the air in the auditorium would become irrespirable because analysis showed that it contained from 4 to 6 per cent. of carbon dioxide and about ½ per cent. of carbon monoxide. In the court proceedings which followed the Ring Theatre fire, Prof. Hoffman testified that air which contains 10 per cent. of CO_2 will suffocate people, but he also stated that the CO would become dangerous to life in much smaller quantities, for a percentage of 0.05 caused difficulties in respiration and a percentage of from 0.5 to 1.0 invariably causes death. This coincides with the reports of many such calamities, where many bodies were found in the seats with heads lowered, showing that they became asphyxiated before they could even leave their chairs.

The second series of experiments was made with a view of proving the efficient action of large ventilating-flues over the stage roof. In these experiments the arrangement of the theatre interior remained the same as shown in Figure 1. The lower end of the ventilating-flues was closed with rings covered with paper. As soon as the flames reached these rings the paper burned through and the now open flues permitted the flames and smoke to escape. One of the ventilators opened up after 12 seconds, the other after 20 seconds: the greatest excess of air-pressure in the stage-house occurred after 13 seconds and was registered as being 2mm. water pressure, whereas no excess pressure at all occurred in the auditorium. The slight existing pressure caused the curtain to sway somewhat, but after 27 seconds it was drawn into the stage and burned. The gas-flames in the auditorium did not become extinguished, but the other flames were put out by the increased air currents towards the stage, the petroleum flame being extinguished after 42 seconds, the open oil flame after 43, the protected oil flame after 44 seconds and the candle light remaining burning in two experiments, while in two others it also became extinguished after 44 seconds. The two gas-flames, as well as the candle-flame burned with a flame drawn horizontally pointing towards the stage.

Analysis of the air of the auditorium showed some traces of CO_2, but absolutely no trace of CO; some smoke penetrated into the auditorium.

These experiments proved conclusively that it is feasible, by arranging sufficiently large ventilating-openings over the stage, to prevent during a stage fire the hot gases of combustion from being drawn into the auditorium; and that, moreover, the corridors and exits may then safely be lighted with gas-flames. Finally, the experiments tend to show that if the iron curtain is lowered in time the people in the audience will be sufficiently protected by the same until they can make their escape in safety.

Referring now to the construction of such stage ventilating-flues, it is evident from the preceding that they must be opened immediately after the fire has been noticed. Mechanical closures operated by hand may fail to give sufficient protection, because at the critical moment the stage personnel may neglect to manipulate them properly. Automatic metallic closures must also be condemned because they may rust up or may become bent by the heat during the first moments of the fire. Iron flap-valves which open up by their own weight when unloosened may not be reliable, because the great excess pressure may force the flaps against the flues and prevent their opening.

All these objections may be removed if the closures of the vent-flues are made of a material which is readily destroyed by fire. As such materials the Committee recommends hemp or jute textile fabrics, or celluloid covered with paper. These would prevent under normal conditions an annoying draught of air on the stage. The ventilating-flues themselves should be constructed of fire-resisting material in order to remain efficient as long as possible during a conflagration. The openings of the flues above the roof should not be provided with wire mesh, because this is apt to become stopped up by the ascending pieces of burning paper. The top of the flues should extend above the roof of the stage as much as the stage roof is higher than the auditorium roof. The lower end of the vent-flues should be located where the flames of a fire would at once reach the enclosing paper strips.

The report of the Committee closes with a theoretical calculation of the required sizes of such flues. For example, it is calculated that for a stage having a cubic space of 1,000 cubic metres, the sum total of the areas of the ventilators should be 2 square metres. It is considered immaterial whether one large or several small ventilating-flues are provided for.

Wm. Paul Gerhard.

ROYAL MEMORIALS.*

IT was a happy inspiration that directed the form of the Queen Victoria Memorial—a great work, and a monument not devoted to the interests of any particular section of the public, but open to the enjoyment of the whole world who choose to come and gaze and remember; a work whose only use is beauty, and only purpose glorification—not only for our present satisfaction, but for a symbol to future centuries, when our hospital buildings, our soup-kitchens, and our clocks of to-day, will be torn down and cast aside.

A heavy responsibility lay upon the distinguished committee appointed to determine the exact form the memorial was to take, but there was a general confidence that the demands and requirements would be fully appreciated. Examples abounded; examples that might be followed, and examples that must be shunned. For there exist—as I shall presently show—a few noble monuments to great rulers departed, and many failures—monstrous, effete, ridiculous, vulgar, in turn—which seem to have served less to warn the public against the false in sentiment and the bad in art, than to accustom and reconcile them to the sight of what is

*Extracts from a paper by Mr. Marion H. Spielmann, F.S.A., read before the Society of Arts and published in the *Journal* of the Society.

poor, pompous, and meretricious. It is for this reason that the nation expects that the memorial to Queen Victoria shall be the finest expression of national feeling and of national art to which the race can give utterance. . . .

Before we proceed to examine the designs for the memorial, it will be useful and interesting to see what has been done in somewhat similar cases by foreign countries and peoples. In this way, we here shall be equipped, according to our powers, to form a sound opinion on the subject, and to judge how far—and, I may add, how admirably—this English scheme may compare with what has been done elsewhere, by the greatest artists of their day, by the most glory-loving and art-loving nations of Europe.

I take Russia first, and choose as the earliest of the modern royal and national memorials to put before you the colossal equestrian statue[1] of Peter the Great in St. Petersburg.

It is not a Russian production, although made in Russia; it is the work of Falconnet—all but the head of the Emperor, which is by his daughter-in-law. The curiosity, the marvel, about it is, that although it weighed 16 tons, the statue is said to have been originally cast in one piece; and the balance of the rearing horse, supported on his hind legs and tail (which contains 10,000 pounds of metal) was wonderfully calculated. The pedestal consists of a block of granite weighing 1,500 tons, which was cleverly rolled from a neighboring village to the spot on cannon-balls along an iron tramway. It was set up, you will recollect, by the Empress Catherine II., to the masterfulness of her great predecessor, in 1772, after taking twelve years to complete.

The column, erected in 1832 by "grateful Russia" to the memory of Alexander the First, derives its chief renown from being a monolith, and the greatest of modern times. The shaft weighs 400 tons. In one piece (as I have said), it is of red granite, 84 feet high, cut down from its original measurement of 102 feet, as it was feared that that enormous length was too dangerously great for its diameter of 14 feet. The whole, with the figure of the angel on the top, is 155 feet high, erected on its base—equally of one piece, and of red granite, 25 feet high. It also is the work of a Frenchman—of the architect, M. de Montferrand (the designer of St. Isaac's Cathedral), and was polished after it was set up. This rather foolish work cost not less than £400,000.

I say "foolish" because, for my part, I never could appreciate the idea of a mere column to the memory of any man, even if it has the virtue of being in one piece, and even if—especially if—it is crowned by a statue of the gentleman chiefly concerned; unless, of course, it is intended as a landmark, as is the case with the Napoleon Column at Boulogne. The figure cannot be seen. The shaft is an elongated cylinder—a poor shape when unsupported by others or by architectural forms; an opinion I venture to assert in the face of such precedents as Trajan's Column in Rome, the Vendôme Column in Paris, and the Duke of York's Column in London, where the figure is raised far above the chimney-pots and beyond recognition, with a lightning conductor through its brain! There is little or no invention, no play for artistic design, in such a device, in spite of a well-designed base. It is merely a stone pole, which perhaps to the popular mind is its chief attraction; for it gives no opportunity for thought or fancy in the designer, and consequently throws no strain upon the intelligence, or upon the artistic emotions of the man-in-the-street, or even the man in the town council.

The monument of Nicholas I. was erected in 1839. Seen from a distance, the rearing horse seems poor enough beside the fine massive proportions of the base, an enormous pedestal composed of granite of various colors.

Viewed nearer still, the proportions of the horse do not improve, and there is something to criticise on the score of taste in the details of the whole. The bas-reliefs represent the chief episodes in the life of the Czar, with four emblematical figures around the upper portion of the base which are portraits of his wife and three daughters. Although the great lamp-posts interfere somewhat with the view, they add not a little richness to the whole.

The monument of the Empress Catherine II. was carried out by two Russian sculptors, Mikeshin and Opekushin, but the work was cast by an English firm in St. Petersburg—Mr. Baird's.

Set up in the Nevski Prospect, in front of the Alexander Theatre, it looks well when seen close; but at a distance its compactness tells against it, and the figure and the poor architectural base, with too little variety of outline and silhouette, tend to merge into a form like a hand-bell. Nine figures, in high relief, of Catherine's chief supporters in her government and reform are arranged in sitting posture around the pedestal. The female figure on the left is that of Princess Woronzoff Daschkoff, the first president of the Academy of Arts of St. Petersburg. Forty-nine feet is the height of the monument, which was unveiled with great ceremony in 1873.

Austria is not behind in the matter of royal monuments. The most important is that of the Empress Maria Theresa[2]—an elaborate composition, in which the architecture and sculpture are well balanced—erected in front of the Imperial Palace, and between the great twin museums built by Hasenauer, the architect who designed this pedestal. The sculptural portion is by von Zumbusch. The dominating figure of the Empress, in bronze, 19 feet high, is enthroned on the marble pedestal, 43 feet high. She salutes her people, and holds in her hand the sceptre and Pragmatic Sanction—the symbol of unity of the Austrian Empire.

One of the defects of this imposing composition seems to me to be the variety of scales on which the various figures are designed. The ideal personifications of Strength, Wisdom, Justice and Mercy, at the feet of the Empress, although life-size, look like dolls in comparison; and the equestrian figures, the isolated figures, and those in high relief, cleverly as they are arranged, tend by their different sizes to confuse the eye. This is a difficulty which Mr. Brock has successfully overcome. I show this enlargement in order to demonstrate the mistake of placing fully detached figures against a low relief in which they are in direct relation. Here we have a group of Eckhel, the numismatist; the historian Georg Pray, and Glück and Haydn—the former holding the child Mozart's hand—and, as we see, the shadow thrown by Glück's head upon the distant building helps to destroy the balance of the composition and confuse the whole. This work dates only from 1888, when it was set up by the Emperor Francis Joseph as a centenary celebration. It occupied altogether over 14 years, and cost £72,500. From these works, conceived in the conventional spirit, let us turn to more recent memorials in France, raised, in this case, not to a sovereign, but to modern statesmen, eminent and patriotic.

The monument to Gambetta[3] in Paris is interesting to us for more than one reason. Raised to a great statesman, and so, I fear, not quite legitimately introduced here, it is a capital type of the silhouette much affected by French sculptors, and by other nations who follow them. The statue of Gambetta illustrates conclusively enough the denunciation of the frock-coat in sculpture so amusingly set forth by that admirable critic, M. de la Sizeranne. The garment does not lend itself to poetry, whether in words or stone. The modern coat does not cover only, but masks and conceals the body, the beauty of which it ought to suggest, not only the forms but movements. Movements of the figure, the action of the wind, or action by the body, are all alike stultified by a coat, held by buttons which prevent not only proper play of the figure, but also of the natural folds which should follow every movement—that is to say, all the material for beauty in a human body and its action. Compare the fine action of a man—as of a Spanish or Italian peasant—throwing his cloak around him, with the ridiculous antics of one of us wriggling into his coat, and judge whether the illogical covering is not monstrous, artificial, unadaptable to the body, cylindrical in aim; in every particular opposed to the figure it clothes. And to ask a sculptor to represent the human form, clothed impeccably and photographically in its coat of to-day—to be, in fact, a tailor in stone—would be like expecting Ruskin to write his fine oratorical and poetic passages in the terms and with the flags of the signal-book.

It will be conceded that it is somewhat in this spirit that the modern sculptor has to deal with the frock-coat, if he is to deal with it satisfactorily and interestingly. We see here to what lengths the sculptor has gone to get variety; he has put his subject into a gale of wind. This lack of repose in the marble group, however, is partly intended to typify the fury of events, and the tempestuous career which form the background in which Gambetta's life is set.

The taste may appear to some a little strained in its details, but the effect is very fine, nevertheless, especially in the power given by the two bronze flanking figures, "Strength" on the left and "Truth" on the right; a form of composition, "elbowing-out," as it were, at the sides, giving power and grace, which we shall presently see again. The pyramid—a form on which Mr. Brock has determined for the Queen Victoria Memorial, though with greater restraint—is here somewhat emphasized; it is surmounted by the bronze figure of "Democracy"—a maiden repre-

[1] See THE AMERICAN ARCHITECT for Sept. 13, 1890.

[2] See THE AMERICAN ARCHITECT for Oct. 6, 1888.

[3] See THE AMERICAN ARCHITECT for Oct. 12, 1889.

senting the Republic, seated on the winged lion. Of this fine monument in stone and bronze, admirable in its architectural treatment, M. Aubé was the sculptor, and M. Boileau the architect.

In the great memorial set up to the honor of President Carnot[1], by Henri Gauquié, the sculptor, and M. Naudin, architect, and recently unveiled, after four years' preparation, in Lyons—the city in which he was assassinated—we have a design belonging to the class of which the Gambetta in Paris is perhaps the most important example. This is weaker and more attenuated in design, and yet, being more complex in its lines, it is still somewhat imposing in its way. Side figures are again used to impart an air of strength and stability to the whole, and the parts are well imagined. The effort to get away from the tyranny of the coat, so characteristic of the modern French sculptor, is apparent here as in the Gambetta memorial; yet even the freely-treated overcoat has to be thrown back in order to afford a glimpse of the evening dress-coat underneath, or how would a Frenchman recognize a President? It cost only £10,000, of which £6,000 went to the architect and £4,000 to the sculptor.

Spain is hovering, hesitating, between the past and a very poor present, too. Perhaps I ought to apologize for putting before you the prodigious model for the memorial to King Alfonzo XII., now in course of execution and erection by Señor Quérol, who is generally considered to be now the leading artistic figure in Spain, and is really an able man. But with this riotous spirit we can have no sympathy; there is here nothing of the dignity of sculpture, or of the repose of the death monument, which, however glorious, however turbulent, may have been the life and reign of the monarch it honors, though it represent the splendor, must always avoid the mere fuss of life. But why all this clang of glory? Was King Alfonzo—whose memory we all respect—so mighty a conqueror? We have a sculptural *tour de force*, in parts lamentably skilful, hopelessly unimpressive; a debased taste which we deplore when we recognize it in "Vienna goods" or "articles de Paris," or even in wedding-cakes. This exuberant production would have been a constant regret and eyesore to every Spaniard who can still appreciate the dignity and true nobility of Velasquez and Spain; but I have recently ascertained that the cloud of horsemen mounting into the pedestal has been cleared away, and the low semi-circular screen has been enlarged and elaborated in imitation of Sir Aston Webb's by the clever architect, Señor Don José Riera.

Turning to Belgium, we come to her principal modern memorial monument, which has been erected in Laeken, to the north of Brussels. It belongs to the canopied series, and set up, as it is, on the summit of an eminence 200 feet high—the Montagne de Tonnerre, it shows a somewhat better proportion perhaps than appears on the screen. This highly-decorated but ill-designed Gothic structure, which, to undiscerning eyes, may recall the spires of Cologne, is dedicated to King Leopold the First, the consolidator of the Belgian monarchy, a statue of whom, by Geefs, stands in the interior. The architect was M. de Curte. The pierced work, surmounted on the apex by a statue of St. Michael, imparts a lightness to what might otherwise have suggested the heaviness of an extinguisher; but yet we cannot be quite strangers to Ruskin's feelings, when he scoffed at Gothic church steeples set up on the ground.

Germany has a number of important monuments, and the most recent crop, if not exactly fine, is plentiful.

The first, and, to my mind, still the finest of any, is the statue in Unter den Linden to the Emperor Frederick the Great[2], whose memory had to wait until 1851 for this act of tardy justice. Then Rauch was commissioned to execute this great bronze monument which is so original in idea, so excellent in effect, so good in light and shade, and so fine in its technical details of texture and finish.

"It is impossible," it has been said, "to realize, with such means, a more imposing work." When it was begun this monument was never intended to be so large and important—Rauch's sketch models prove that, and show how he modified and developed his first conception into what we now see. The statue itself (17 feet high) boldly endowed with the monarch's own peculiarity of dress—the queue to the hair and the walking-stick dangling from his hand—is a striking effigy. And the general arrangement of the granite pedestal, 25 feet high, is simple in its mass and excellent in design.

The great bronze groups represent, with the utmost fidelity to fact and likeness, the commanders during the Seven Years' War, in number thirty-one. There is, of course, a variety of scale here, too, in the figures, but it does not force itself upon the eye.

The equestrian figures (comprising Duke Ferdinand of Brunswick; Prince Heinrich of Prussia; General Seydlitz, and General Ziethen) are very cleverly introduced; the hinder quarters of each animal are cast in high relief—and the fore parts entirely detached in the round. This is a device which Rauch had previously adopted in his severely pseudo-classic statue of Maximilian Joseph I. at Munich, where the four lions had been similarly treated by him in 1835—sixteen years before.

Up on the slopes of the Rhine, in the Niederwald, opposite Bingen, on the spur of a hill 740 feet high, stands the great national monument[3], commemorating the founding of the German Empire in 1870 and 1871. It was designed by Professor Schilling of Dresden, and approved in 1877. It was inaugurated by the Emperor William I. in 1883. The architectural base is 78 feet high—roughly, about the extreme measurement of Mr. Brock's memorial from the ground to the tip of the Victory's wing. The enormous figure of Germania, symbolizing the unity and strength of the Empire—is 33 feet high. The Eagle of Empire is a leading feature of the base, which is flanked by figures of Peace and War, between which is a great panel in high relief, containing portraits of King William of Prussia, mounted, and the other princes and generals; and below are the figures emblematic of the Rhine and the Moselle. The monument cost £55,000, and occupied six years in execution. The vast proportions and heavy mass and outline of this noble work are adopted partly with a view to effect, as a great landmark in the surrounding country; an effect which is successfully secured.

A less impressive work is the Prince Bismarck Monument, which stands before the Reichstag Buildings. It is by Herr Reinhold Begas, the sculptor, who for so long has had the special favor of his sovereign, and who is held to be partly responsible for the Sieges Allee—the Avenue of Victory—which is the joy of Berlin, the joy of admiration in one half, and of scoffing criticism in the other. For although this continuous pæan of triumph is natural enough, the glory being great, it is thought by some that all this fanfare is apt to be a little too flamboyant.

The figure of Bismarck stands 6½ metres high—the scale wisely adopted for all the other figures—which seem to be so strangely detached from the principal feature. It will be observed how here, also, the sculptor has wrestled with the uniform, and how by dropping down the upper corner of the coat, unbuttoned, and by casting the skirt into horizontal folds by the drag of the sword-hilt, he seeks to modify the distressing inaction of the formless and unsympathetic garment. In front is Atlas, typifying the bearing by Bismarck of his own world, and some other peoples', upon his shoulders. To the left the sibyl, with her book, symbolizes wisdom, and the helmeted maid on the right, statesmanship.

The back shows the figure of Siegfried, the all-conquering knight and craftsman, at work on his sword—a sort of early Nibelungen Bismarck. The sculptor, as on other occasions, has deliberately offended against, or, at least, departed from, what is sculpturally legitimate by making his figure get off the pedestal, and stand, as it were, among the public. He had done this before in his great fountains—the Schloss-brunnen in Berlin—and so has shocked the purists past all imagining. Whether the effect he has secured by this strange overhanging is worth the sacrifice is a serious question.

The sculptor, with all his helpers, completed this memorial, after only four years' work, in the seventieth year of his life.

Similarly, in the case of the statue[4] of the Kaiser Wilhelm the Great, in Berlin, utter failure attended the first competition, which, in 1888, attracted not fewer than 147 sculptors. At the limited competition which followed, the Emperor signified his preference for the work of Begas, who received the commission at the end of 1892. In supply £400,000 was proposed in 1894, but the amount was cut down to £200,000; and as the unveiling was to be a centenary celebration the sculptor was ordered to proceed and to get the work done by 1897—by which date the Bismarck monument was awaiting him to execute. Feverish activity reigned in his studio. An army of clever young sculptors and students were at work under the master, on the details, and Begas centered his attention on the equestrian group of the mounted Emperor, whose horse, his favorite charger, "Hippocrates," is being led by "Peace"—of all people!

The statue is 29 feet high, or about 13 feet higher than Rauch's Frederick the Great. At the sides are the figures of "War" and

[1] See The American Architect for Aug. 7, 1897.
[2] See The American Architect for Oct. 1, 1887.
[3] See The American Architect for June 25, 1887.
[4] See The American Architect for April 13, 1901.

"Peace," independently sprawling out of the composition down the steps, a trick—or perhaps I should say, an artifice—which is greatly affected by Begas.

At each corner are "Victories" on globes, with flowers and wreaths. Projecting from the base are threatening, snarling lions—which the figure of "Peace" above cannot render reassuring—uncomfortably astride of bundles of banners and tattered flags, bayonets, gun-carriage wheels, cuirasses, helmets, cannon, and shells in bristling confusion; and the emblems of the Imperial sovereignty trickle, as it were, down the front steps.

The colonnade behind is 260 feet long, and it is to be remarked, that of the series of important memorials we have seen, this is the first—and, with the exception of another to follow, the only—important work (besides the recent statue of the Empress Augusta) that is thus supported by architectural embellishment.

This monument, therefore, has importance for us; and in view of our great work that is to come, we are bound to criticise it. For we cannot but consider it spotty in light and shade—baroque in style—even fussy; as if it wanted some good, serious sculptor of refined taste and artistic restraint to come and tidy it up. It has been described by a German critic as a "Siegeshymnus"—a "Hymn of Triumph." But it does not sing. It seems, in spite of its great qualities, to shout glory, if in rather a sugary voice—not in the simple notes of modest thankfulness, but rather in a "trample-on-your-enemies" tone of voice, with the motto, "Defiance, not Defence."

In 1896 the memorial to the Empress Augusta was unveiled at Coblenz. The statue and the bas-reliefs are in white marble by Professor Moes, of Carlsruhe, and the architectural portion by Bruno Schmitz, who occupies so distinguished a position in Germany. It is difficult to admire this work very greatly, but it aims at dignity and a happy union of the arts.

In Italy of late years monuments have been multiplied, and the chief of them have celebrated Garibaldi and King Victor Emanuel. That of Garibaldi,[1] at Rome, erected on the Gianicolo, is by Professor Galloni. Although a national memorial, it does not seem a great work, in spite of fine passages; and the ultra-modern fighting groups at front and rear of the pedestal contrast oddly with the almost classic repose of the rest. Compare this equestrian group here with that on the Garibaldi monument at Milan and you will recognize a finer group, in which the tail of the horse recalls that in Alfred Stevens's unfinished model of the Duke of Wellington. This well-proportioned monument, with the fine figure of Italian liberty sheathing her sword, is by the sculptor Ettore Ximenes.

They who think—there are a few, but not many—that a large sum ought not to be expended on our great memorial, should consider what is being done elsewhere in order to commemorate a great national hero and national event. To Victor Emanuel modern Italy owed her revival, her liberation, her consolidation into unity, as one great people and one nation, taking her place at last—after how great an interval!—among the great Powers of Europe. To him, it was felt, a mighty memorial should be raised—to him and to the Third Italy—and no sacrifice was thought too great to compass this end. The structure was to take the form of a vast scenic architectonic screen on the Capitoline Hill, and to provide for the inclusion of a great equestrian statue, to be led up to by flights of steps 27 metres high, which the sculptor Signor Enrico Chiaradia was to model. That group is now in existence, although I believe the plaster has not yet been cast into bronze.

In the first competition a hundred designs—all of them models—were sent in. In the second only six, to the first two of which a prize of £400 was to be allotted. The second prize was awarded to Signor Luigi Boffi for a design imposing for its size rather than by its taste. The little figures at the foot of the steps and on the first landing disclose the monstrous proportion intended.

The design of Bruno Schmitz, who was nearly successful for the Emperor Frederick memorial, and that of the Count Giuseppe Sacconi were bracketted first, and each received the £2,000 premium. The series of steps in the case of the former seem to involve a terrible, almost a prohibitive, obstacle to any but the athlete and the man in training to mount near enough to the statue to examine it.

That[2] of Signor Sacconi, who was at that time a young man of twenty-five, is of a finer aspect, and to it was finally awarded the commission. More elaborate than any we have yet seen, not so much as a structure as a series of structures, it was estimated to cost £360,000, but £320,000 were spent on the site, the substructure, and the preliminary operations. Although it was begun in 1884 it is by no means within sight of completion. Up to 1898 not less than £1,040,000 had been spent, and it is expected that before it is finished it will have cost £2,000,000 sterling. Of this sum, however, a good deal has gone, of course, in expropriations, and further expenditure has been incurred by the determination to vault over the interesting archæological remains discovered when the site was being cleared. Since then there have been numerous radical modifications, external and internal; the groups of sculpture in the open and in the baldacchino, and the pan-Athenaic frieze, were for a time retained. Internally, there is the introduction of great vaulted halls below the marble terraces; and, externally, the suppression of the attic of the colonnade and the broadening of the frieze, the entablature being given a more pronouncedly monumental character. This drawing will show the great change which has taken place in the design in the lower story. The details are pre-Palladian, and are based on more classic models. Against the aggregation of vast halls, marble terraces and colonnades, rising one above the other, Chiaradia's gigantic statue-group will stand forth. The tiny figures indicated at the side of this reproduction from a water-color drawing of the latest view illustrate the size and scale of the final work.

This is the tribute of impoverished Italy to her great King. To our greater Queen, wealthy England has as yet subscribed to her memorial but one-eighth part of the sum to be expended there, and so has crippled the whole scheme.

When we come to the statues and memorials of our own sovereigns we cannot help recognizing how poor and commonplace in conception in the past has been the imagination which has produced them, to say nothing of the stinginess which has dictated the scale. Take the Bombay statue[3], which is said to be the delight of the Indian population as a whole. The statue of Queen Victoria, set up near the Telegraph-office, is by Noble, and was uncovered by Lord Northbrook in 1872. It is in white marble, and the pedestal and canopy have perhaps the chief interest; but the whole of it, including the statue, as I have already remarked, is said to impress the native mind enormously. It cost 182,450 rupees, nominally, that is £18,250, of which the late Kande Rao Gaekwar contributed £16,500. This was for a long while the chief statue of Queen Victoria in India.

If such is the effect on the native mind, how will the population be impressed by the sight of the mighty memorial which India is about to erect to the glory of Queen Victoria, from the designs of Sir William Emerson. Subscribed for by the Indian public, by English residents, and by the native rajahs, who contributed munificent donations, this great building, erected on the Maidan in Calcutta, is estimated to cost not less than £350,000.

The building, faced entirely in white marble, Greek and Indian, is 340 feet long and 225 feet broad, and is raised 12 feet high on a terrace 35 or 40 feet wide that entirely surrounds it.

Italian Renaissance in style, with just a *soupçon* of Oriental flavor in the treatment of the domes and in certain details, the building is finely planned—in the form of a capital H—and contains Durbar, Queen's Hall, and Prince's Hall, with picture-galleries, sculpture-galleries, and galleries for the display of arms and trophies. It is led up to by a grand flight of steps, at the head of which will stand Mr. Frampton's statue of the Queen. The corner towers are 30 feet square, and the dome, 70 feet in internal diameter, is about 170 feet to the top of the gilded figure of "Victory," which surmounts it.

Beneath it is the circular Queen's Hall, lined with white marble and panels of the marbles of India; so that, in the middle of a beautiful and spacious park, there will rise the glittering marble structure upon a terrace of white marble, with the snowy dome soaring into the air, and visible from every point of the river and the Maidan.

What have we done in Great Britain as national, not as municipal efforts? We have the George III[4] in Waterloo-place, which was originally designed by M. C. Wyatt at the command of the king, as a "St. George and the Dragon," and which, on the monarch's death, was actually altered by the Government's order—a brilliant idea—from the saint to the king (by judicious addition of costume, exchange of helmet for periwig, and so on, and the removal of the superannuated dragon), and there is Tribute No. 1 to a deceased British Sovereign!

Then we have the Albert Memorial[5]—a better thing than many are willing to allow, though greatly harmed by the poverty of many of its details and by the coldness of the invention. It merits more attention than the rest, for, whatever may be said of

[1] See The American Architect for March 20, 1897.
[2] See The American Architect for March 19, 1892.
[3] See The American Architect for July 30, 1904.
[4] See The American Architect for Nov. 22, 1890.
[5] See The American Architect for Jan. 31, 1885.

it as a whole, it was a very sincere effort to do the best that could be done, with the help of the men at the top of their profession; and it was by far the most costly monument which had ever been put up. Only £60,000 had been subscribed by the public —and that was the amount paid to the trustees whom the Queen had appointed. Five hundred thousand pounds were voted by Parliament. Sir G. Gilbert Scott, the architect, was paid his commission on £100,000; and so far as the architects were concerned, the prime cost of the monument was £142,916. The gilding of the spire alone cost £10,000, and Queen Victoria spent a very large sum out of her privy purse before the work was finished. She had originally desired an obelisk, but a suitable piece of granite could not be obtained; perhaps, too, she hesitated at the cost (you will remember that the Alexander column at St. Petersburg came to £400,000); but when it came to embellishing the Memorial, the Queen did not stint the cost, whatever it might be, in doing full honor to Prince Albert's memory.

There had been a limited competition, in which P. C. Hardwick, R.A.; G. Gilbert Scott, R.A.; Charles and Edward Barry, James Pennethorne, Prof. Donaldson, and M. Digby Wyatt took part.

Scott's work was selected: it was not really one of Ruskin's "Gothic towers upon the ground"; but a copy of the Baldacchino, or rather of the true canopy over the altar at the east end of S. Paolo fiore le mure in Rome. It also resembles that in St. Cecilia, and in the Anjou tombs at Naples as well. The flèche is built at the intersection of the groining on a steel-girder gridiron flooring, which perhaps hardly shows the architect to great advantage beside Kemp, the untaught designer of the Scott Memorial, which requires no iron supports whatever in its valid construction. We must not forget, however, that iron ties are used freely in Gothic architecture in Italy and elsewhere—even in Westminster Abbey. But Scott did not choose to expose them.

The enormous mosaics were all designed and executed by Mr. John R. Clayton, who, since the failure of the gold, has recently succeeded in inventing a method of completely coating his tesseræ in glass, so preventing the gold from perishing from any cause whatever. It was he, the young friend of Gilbert Scott, who suggested, for the groups that were to be placed on the four awkwardly-exposed bases isolated from the monument, the appropriate subjects of the four quarters of the globe as emblematic of the Empire; and, on the same evening, being challenged, made a sketch for each. He saw that a great core was wanted for each group; and so introduced the biggest animal in each continent—the bull, elephant, camel and buffalo. P. Macdowell, R.A., took "Europe"—very poor in design; Foley, "Asia" —a more scholarly arrangement; W. Theed, "Africa"; and John Bell, "America." Of the other figures, "Commerce" was entrusted to Thomas Thornycroft, and "Engineering" to John Lawlor, and the great frieze of figures in the Podium were carried out by Mr. Armstead, R.A.; J. Birnie Philip and Calder Marshall, R.A. The whole of the sculpture work is in Sicilian marble. The "Spire" is 175 feet in height. The work was begun in 1864, and was unveiled by Queen Victoria—without the seated figure of the Prince by Foley (that by Marochetti having been rejected)—in 1872; four years later the statue was completed, and the whole unveiled in 1876.

ILLUSTRATIONS

UNITED STATES POST OFFICE AND CUSTOM HOUSE, GRAND HAVEN, MICH. MR. JAMES KNOX TAYLOR, SUPERVISING ARCHITECT, WASHINGTON, D. C.

PLANS OF THE SAME.

DETAILS OF THE SAME.

OFFICE BUILDING, WASHINGTON STREET AND DIX PLACE, BOSTON, MASS. MR. C. H. BLACKALL, ARCHITECT, BOSTON, MASS.

ALL SOULS' CHURCH, BRAINTREE, MASS. MR. EDWIN J. LEWIS, JR., ARCHITECT, BOSTON, MASS.

MEDFORD CONGREGATIONAL CHURCH, HIGH STREET, MEDFORD, MASS. MESSRS. BRAINERD, LEEDS & RUSSELL, ARCHITECTS, BOSTON, MASS.

"THE COMING OF THE WHITE MAN." PORTLAND, ORE. MR. H. A. MAC NEIL, SCULPTOR, NEW YORK, N. Y.

This group, which now stands in the City Park, is to be one of the permanent reminders of the Lewis and Clark Exposition, which is held this year. It represents the chief Multnomah and a companion as they sight the explorers' boat as it comes through the Cumberland River gap.

Additional Illustrations in the International Edition.

THE ROGERS MEMORIAL CHURCH, FAIRHAVEN, MASS. MR. CHARLES BRIGHAM, ARCHITECT, BOSTON, MASS.

NOTES AND CLIPPINGS.

THE DECORATIONS FOR THE MINNESOTA STATE HOUSE.—The cost of some of the sculptured and painted decorations of the new State Capitol at St. Paul, Minn., is as follows: The bronze quadriga, by Daniel C. French, $35,000; four lunettes in the Supreme Court chamber, by John La Farge, $40,000; four paintings in the dome rotunda, by Edward Simmons, $30,000; two paintings in the Senate chamber, by Edwin H. Blashfield, $25,000; general decorative painting, by Elmer E. Garnsey, $125,000; historical painting for Governor's room, by F. D. Millet, $4,000; and historical paintings for Governor's room, by Douglas Volk, $3,000. Other paintings are still to come from Kenyon Cox, Henry O. Walker and William A. Mackay.—*Exchange.*

THE LAFAYETTE WASHINGTON MANTELPIECES.—While serving as a member of the Inauguration Sub-committee, appointed to mark points of historic interest, J. I. Keefer, of Washington, made an interesting discovery. He made it while attending to the making of the old Octagon House occupied by President Madison in 1814, after the British had burned the White House. Mr. Keefer said:

"For a long time I had been hunting about the old houses connected with the history of General Washington to see if I could find anything of a famous mantel brought to this country by General Lafayette during the Continental war, which was one of a pair. A few weeks ago I found the much-sought object in the old Octagon House, corner of Eighteenth Street and New York Avenue, where for years it has stood. On a corner of it I found the marks of the French maker, which correspond with those on the other one exactly. The Harewood House, Charleston, W. Va., which was built by General Washington for his brother, Samuel, where Louis Philippe (afterward King of France) spent nearly a year, and where Washington delighted to bring Lafayette, contains the other mantel. Harewood House still remains in the family of Washington and is unchanged.—*New York Times.*

A "BUREAU OF AUTHENTICITY."—Owing to the prevalence of spurious but often deceptive imitations of old and of contemporary masters, the Society of the Friends of the Luxembourg Museum, under the patronage of M. Dujardin-Beaumetz, Under-Secretary of State for Fine Arts, is about to organize a "Bureau of Authenticity" for works of art. A number of experts are to be attached to the bureau, duly provided by the Prefect of Police with the full authority of police magistrates. There is to be a thorough search, high and low, for falsified pictures and statuary. The idea is new in France, and its application will meet with almost insurmountable difficulties, but M. Dujardin-Beaumetz is confident that with patience and indefatigable perseverance these will in due time be surmounted.—*C. I. B., in New York Tribune.*

CARPENTERS' STRIKE THREATENED IN CHICAGO.—The carpenters' executive council of Chicago mailed an ultimatum to all carpenter contractors, warning them that unless a new scale, carrying a 5-cent an hour increase, a Saturday half-holiday all the year round and a provision for a rejection of non-union made material in building were not signed before April 3, union carpenters would cease work on that day.

FIFTY YEARS AGO.—The *Builder* for March 18, 1905, contains this interesting extract from its issue for March 17, 1855: "Telegraphic Progress.—Telegraphing Without Wires!—Among the most startling wonders of this wonder-working age, is the announcement that M. Bonelli, of Turin, has invented a new electric or magnetic telegraph, by which trains in motion on a railway are enabled to communicate with each other at all rates of velocity, and, at the same time, with the telegraphic stations on the line, while the latter are simultaneously able to communicate with the trains; and it is added that M. Bonelli is in possession of a system of telegraphic communication by which wires are entirely dispensed with. The idea, however, is not new; we have repeatedly alluded to its possibility; but like multitudes of such ideas the suggestion drops into oblivion and reappears after a while as a fresh novelty. Who was its real originator we do not know, but the nearest approximation to its practical realization we remember anything of was the mode by which a Dundee gentleman transmitted messages across rivers and straits without any intervening or subaqueous wire. Still wire was necessary, and a good long coil too, at either extremity of the space telegraphed through."

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CONTENTS

IT is disappointing to learn that the case of Gibbon *vs.* Pease, to which we referred recently, has gone against the hope of the profession and that the matter of the ownership of architects' drawings is left in the same unsatisfactory condition as before the case was heard on appeal. It was the hope of the architectural societies in England and their allies that, through the pleadings in this case, the ruling in the case of Ebdy *vs.* McGowan, which has of late been the leading decision, might at last be overthrown. Unfortunately the Lords Justices of the Court of Appeals declared specifically that the principles involved in Gibbon *vs.* Pease were similar to those involved in Ebdy *vs.* McGowan, and that therefore they must decide in conformity with the decision reached in that case, namely, that unless the owner received the drawings he need not pay the architect for his work. The mistake made in all these cases has been the introduction of testimony showing that it is the "custom" amongst architects to retain drawings as mere instruments of service, for the courts will always hold, and we think rightfully, that no trade or profession can establish laws or rules binding on the general public without that public's knowledge and consent. The plea that the architect sells service as other professional men do and not drawings as chattels is a safe one, and the argument should turn about that mainly, and care should be taken not to bring forward the allegation that drawings are made merely for the architect's own convenience since, if he chose, he could erect the building and give the client the service he pays for without ever setting pencil to paper. The argument is too fallacious and hurts the case immeasurably. It is true that, given plenty of time and being personally present on the job at all times, an architect might erect a pretty complicated building, without making formal and complete drawings. But it is still more true that, as architectural work is actually executed, unless very complete and elaborate drawings are made it would be quite impossible to have buildings erected by ordinary building mechanics for the sum and within the time named in the contract.

THERE must have been something thoroughly unfortunate in the words or the manner of the counsel who presented the early pleadings in these architect's drawings cases. The attitude, manner and words of the court testify to an impatient intolerance that seems to indicate that the court's temper had been unnecessarily ruffled. This is unfortunate, of course, and more than this it seems to us it must have been quite unneeded, for the case suggests that had the simple *argumentum ad hominem* been used the result would have been different. There are distinct points of resemblance between the services rendered by an architect and by a lawyer. In each case the client pays the professional man merely to produce a result—by what means is immaterial and unstated—in one case to create a structure and in the other to win a suit. The lawyer after winning, or losing, his case, never thinks of handing to his client with his bill the brief and pleadings he has used. No, these are neatly docketed and then dropped into the tin box marked with the client's name and stored to gather dust on the lawyer's shelves. Why, then, should the lawyer, when his time comes to sit on the bench, require the architect to deliver over to his client the brief and pleadings—the drawings that is—of which the architect had made use? One would think that the analogy must be apparent even to the legal mind and also the greater commercial injustice of the requirement. The lawyer would rightfully decline to surrender his papers—there is matter therein that may be of service to him later—and yet those particular pleadings would in all probability never be of use thereafter to his client, even be he never so litigious. On the other hand the court requires an architect, who has agreed to perform only a single service, for which service alone he has been paid, to surrender material which enables the duplicating of the service by the client, if he chooses, innumerable times. By taking the position it does, the court surely makes itself *particeps criminis* before the fact in certain possible contingencies.

IT is very unfortunate that Ebdy *vs.* McGowan has become a leading case, because the court there had before it the most unbusinesslike and therefore most defenseless of professional men, a clergyman, and the most businesslike, an architect, and good will in such cases usually inclines to the weaker side. Moreover the case was one of abandonment, that is, the result the architect was employed to achieve never eventuated. After the plans for the vicarage had been prepared, the clergyman changed his mind, deciding not to build, and asked for his bill and the drawings. The architect furnished the bill but retained the drawings, and when the bill remained unpaid sued to recover. His course in so doing was an ultra foolish one, for it should have been obvious to him that a court would be likely to rule that if a man be forced to pay he must receive something in return. There obviously could be no tangible result in the shape of a vicarage and therefore the clergyman must be entitled, for his payment, to the next most

Entered at the Post Office at New York as second-class matter.

tangible thing, the drawings. Moreover, the possibility of abandonment was foreseen and provided for at the time the agreement between the two parties was made, and, knowing how clients usually feel in such cases and knowing, of course, the temperamental peculiarities of clergymen, the architect must have entered on his work with a clear understanding that in case the work did not proceed delivery of the drawings would be required. In similar cases of abandonment architects would be wise to surrender the drawings in return for an undertaking in which the client agrees that, in case of a revival of the enterprise, the work shall be carried on only by the original designer. The case of Gibbon *vs.* Pease was one of the more usual kind; here the entire result the client desired had been accomplished, and so the court was not under moral compulsion to see that he "got something" for his money and hence must have the drawings at least. His demand for them and the court's final award may, therefore, be considered purely academic. But, as it was a mere case of alteration, the architect might safely have surrendered the drawings without undergoing the risk that the client might use them on another job, and so be in a position to perpetrate a constructive fraud on his professional adviser. The architect's refusal to surrender the drawings was, therefore, also purely academic, and the case could have been presented as a matter of principle on one hand and the other, so discussed and so decided. Unfortunately it was discussed, considered and decided not on its own merits but in the light of the earlier case of Ebdy *vs.* McGowan, where both the physical conditions and the moral aspects were distinctly dissimilar.

THE commission appointed by Borough President Ahearn to enquire into the cause of the recent collapse, four or five weeks ago, of buildings in different parts of New York—twenty of these buildings, on eight separate sites, are included in the list—has made a very satisfactory sort of report. It declares the buildings were hastily and carelessly built, of poor materials and in defiance of the building code, and that the inspection given by the public officials was inefficient. This every one supposed was the case, and the report only makes plainer that the Bureau of Buildings through its inefficient inspection and tacit approval of what was being done is, so far as the public is concerned, the guilty party. But, as we have said before, even capable and conscientious inspectors could not do properly the amount of work that should be exacted,—but this does not mean that even half-competent inspectors should not have stopped the building operations on each of these structures long before the thaw which was, of course, the proximate cause of the collapses. In its report the commission makes some excellent suggestions. We believe that in the report on the Hotel Darlington accident, a year or so ago, it was urged that architects should not furnish drawings unless they were to be allowed to supervise the execution of the work. The present report puts the matter even more strongly for it recommends that "Architects be required by law to supervise the construction of buildings for which they furnish plans." That is a capital recommendation and will have the support of every capable man in the profession. Its enforcement would do more than any one thing to better the present unsatisfactory state of affairs, since it puts the responsibility squarely on the man who by education and training best knows what responsibility means, who knows what things are likely to go awry and how they should be prevented from so doing. But supervision does not mean superintendence and there is still need of intelligent foremen and competent and fearless public inspectors. Perceiving that it would not be fair to increase an architect's responsibility and yet leave the work the law would compel him to supervise at the mercy of incompetent workmen, the report further recommends that "all contractors for mason work or structural-steel work should be licensed," and that it should "be unlawful to permit the building of mason work or the erection of structural iron work by persons not licensed." These are the best and most important of the suggestions contained in the report.

MEANWHILE the Superintendent of Buildings, Mr. Hopper, who does not seem to understand how seriously his own integrity is impugned by the various charges that have been brought against himself and his bureau, preserves an unseemly air of jauntiness which leads people to feel that he has but vague ideas of the reality of his responsibilities. He is preparing his official report on the collapsed buildings which possibly may disclose how it came about that the provisions of the Building Code were allowed to be disregarded—in other words, who got the money and who paid it. Mr. Hopper is also engaged in preparing his defense against charges formally presented against him by a manufacturer of floor flanges, who alleges favoritism and unlawful discrimination. He is also busy considering the peculiar nature of certain forms of concrete flooring which allow a too-confiding workman to drop successively through four of them, and, incidentally, he may be marvelling at the toughness of New York mechanics who can without great bodily injury be blown up through a river bed or fall down through concrete floor after concrete floor. In the intervals left by these personal occupations, Mr. Hopper has found time to condemn a large amount of so-called fireproofed wood that was about to be used for the interior finishing of the great Trinity Building.

A GOOD many Americans will be interested to learn that the Royal Academy has been pleased to honor Mr. Reginald Blomfield, as, several years ago, they honored his uncle, Sir Arthur, and has elected him an Associate. Mr. Blomfield, whose sketches and drawings are always artistic and satisfactory, has devoted himself mainly to domestic architecture, and has designed an unusually large number of important "country houses," as the term is understood in England. But we fancy that his claim to membership in the Academy rests in no small degree on his writings; at all events, he is probably best known in this country by his *"History of Renaissance Architecture in England,"* published in 1897, and by the work, *"The Formal Garden in England,"* published in 1900, and prepared in collaboration with Mr. F. Inigo Thomas.

AMERICAN ARCHITECTURE.

A Foreign Art With a National Future.

ARCHITECTURE in the Old World is a national development. When we hear a building referred to as French, Italian or Spanish we know instinctively what is meant. There are certain definite methods of design which are invariably embodied in each composition. When a structure is described as an excellent example of American architecture, all that we know is that it is excellent.

Architecture in America we have—American architecture is still in its infancy. It is an undisputed fact that, considered as one of the fine arts, our architecture possesses few national characteristics. Our transplanted civilization and our rapid economic development have alike been unfavorable to the growth of a representative art.

Nations tell the story of their evolution in their architectural monuments. Our nation was founded under heterogenous social and political influences, and our architecture is the echo of these conditions. Although the aborigines of North America had nothing to give, many nationalities brought their fully developed civilizations to the New World, thereby surfeiting us with precedent, no part of which was indigenous.

Having all this precedent and but few years for the sifting process, the practice of building as an art did not keep pace with our industrial progress, as this very progress keeps the modern American architect so engrossed with more imperative duties inconsistent with artistic accomplishment that he has neglected to devote his time and thought to the creation of an American ideal. Ultimately, however, a national architecture will be created as the result of the industrial changes inseparable therefrom.

These changes are already making the architect's present position in the arts untenable. They will in turn relieve him of many of the duties which are now considered an essential part of an architectural practice. In the scientific and mechanical branches of the work under the architect's control close attention to these duties has developed distinctively American characteristics. Similar devotion to design should cause his art to become equally national.

Architecture has always responded to the needs of civilization. The works which we recognize as types of their periods were in their day its most successful responses; successful mechanically, structurally and, above all, artistically. They were creations of an age when the architect was thoroughly equipped for his task; when he devoted time, thought and concentrated energy to his work. He evolved his design with local materials, by the use of local methods, to meet a local demand. The result was local.

Architecture was most vital where the conditions were most exacting. In the days when Italy was torn into political fragments each city developed an architectural type unlike its neighbor. The style of the Florentines marked as distinct an epoch in the history of art as the work of the Hindoos. The Florentine architect was the natural heir to the Classic traditions of his soil; but he too was conscious of foreign influences. Romanesque and Saracenic art formed part of his heritage. Unlike his modern prototype, however, he did not create his designs by adopting any of these styles in its entirety and fitting each to his requirements in its turn. With these types as a basis he created still another, and original artistic progress kept pace with social development. Like the successful modern architect, he combined the talents of an engineer with his genius as an artist; but the conditions under which he lived and worked allowed him to give the proper amount of effort to both branches of his art.

The architect of the Renaissance had but one or two commissions under his charge at one and the same time. He lived with his work; each detail had his individual attention. Time was a secondary consideration. The craftsmen that he required were usually found in his own town. The trades with which he dealt were few. It was possible for the architect to proclaim himself an expert in all the crafts essential to the execution of his design He was indeed the master builder.

Architecture in America had, on the other hand, no indigenous basic principles. Each group of settlers in what afterwards became the thirteen colonies brought to our shores the traditions of its native land. Except in the case of the English, wherever one nationality was left in undisturbed possession for an extended period it left its stamp upon its buildings. Even Holland, whose occupancy was short, bequeathed the high stoop to the modern dweller in what was once New Amsterdam, and the prevailing type of old Dutch farmhouse can still be seen dotting the valley of the Hackensack. Spain through its monks and soldiers left its indelible mark in Florida and California, and on the Pacific Slope, where the occupancy of Spanish-speaking races extended over three centuries, its influence is still felt, and is a potent factor in modern design. The French came nearer to evolving a distinct American type than any other race of settlers, and the neo-Spanish dwelling of the old City of New Orleans, with its many-storied balconies, is a unique example of adaptability to environment rarely found in Frenchmen; but as this type was distinctly tropical, it was unsuited by its very nature to become national. It is naturally from Englishmen, whose sovereignty finally extended over the entire thirteen colonies, that our architecture drew most of its early inspiration. The English settler represented two distinct types—Puritan and Cavalier. To the Puritan, devotion to an æsthetic ideal was almost ungodly; to the Cavalier, fashion was the law. The Puritan built purely as a protection from the elements. The Cavalier imported his architecture, as he imported all other refinements. When the civilization of the colonies reached the point where its buildings could be considered from standpoints other than that of simple utilitarianism, the Georges were on the throne of Great Britain. In England, the truly national styles created in the Gothic period and in the days of Queen Elizabeth were on the decline. The influence of Sir Christopher Wren and his followers was supreme. The prevailing type of English work was Italian, or, as it came to be known, Georgian. It was distinctly un-English, but it was the fashion. This fashion was imported, and much good work was done in the Colonies in this temporary mode, creating the type that we now know as "Colonial," which to-day, in the absence of any more characteristic development, is mistakenly considered American.

During the early part of the nineteenth century the architecture of the United States was still an echo of the mother country's. We still continued to follow the British fashion, as we responded first to the Classic revival, with all its dreariness and unsuitableness, and then to the Gothic movement of Victoria's reign, so insistently fostered by Ruskin and his followers, and so clumsily imitated on this side of the ocean by untrained and uneducated men. During these years the art of architecture in the United States reached a state of degradation seldom equalled in a civilized nation.

With the era of business prosperity following the Civil War and culminating in the Centennial Exposition, there came an awakening—artistic and industrial. Stimulated by the tremendous business energy of the nation, new problems were presented to the architect for solution, problems peculiar to American civilization, for which there were no precedents.

Richard M. Hunt and H. H. Richardson had become potent factors in American architecture. They had come under the influence of the French Schools. In the days when most of our architects had graduated from the carpenter's bench, these two men were trained designers. For the first time the United States possessed a few educated men properly equipped to grapple with peculiarly national problems. Hunt led along purely academic lines; but Richardson seemed to discard his scholastic training and evolved a modern type based upon the Romanesque of the south of France. Under his facile hand it grew in character and vitality, until our architecture was completely dominated by one man. Romanesque became the fashion, and American architects were so used to following the latest mode that the country was soon dotted with hundreds of examples of Richardsonian Romanesque of varying degrees of purity. For a short time the type seemed almost national, if not indigenous. It was at least the first American fashion.

Since that time we have had many other modes, each taken up with the season. Coincident with the Exposition of 1876 and the rise of Richardson, the Jacobean type of structure associated with the reign of Queen Anne had its brief day of popularity; but this peculiarly feminine development was soon found to be thoroughly unsuitable to American requirements except when applied to works of the smallest type.

The next influence to proclaim itself emanated from the schools. Beginning with the Institute of Technology in Boston, institutions in which the study of architecture formed part of the curricula increased in the United States, and academic training promptly asserted itself in enthusiasm for the Renaissance of Italy, particularly of the Florentine type. Our architects slavishly copied the work of the Italians of the fifteenth and sixteenth centuries, and some of our best known men began their successful careers at this time by basing their reputations upon creditable but exact copies of these masterpieces of Italian art.

The influence of training along these academic lines soon

caused Americans to turn towards the fountain-head of architectural education and, for a number of years, more and more American students have been found in the ateliers of the École des Beaux-Arts in Paris. With their return came the French vogue—not the French of France, but the French of the schools—and, to-day, to be in the fashion, your design must be French.

The graduates of the Beaux-Arts have made a positive impression upon the American work of the last ten years. As alumni of one school they are closely banded together, and by a carefully prepared propaganda, carried on with great insistence through established schools and private studios, they are making a most serious attempt to manufacture artificially, out of foreign ingredients, a national style. They have succeeded in making the French type the prevailing fashion; but already a still newer mode dawns upon the horizon. Owing to the influence of progressive Germany, and particularly to its excellent exhibit at the Louisiana Purchase Exposition, the signs of the times point to still another change, and throughout the Middle West the influence of the "Secession" is already making itself felt.

The "Secession" is the modern protest against precedent created in a nation where historic style has been the all-pervading influence in industrial design. Its introduction into the United States is too recent to have had a very positive effect at this time; but it should be particularly applicable to a new country where its followers need not face the difficulties which have hampered its originators, who were bound by the tyranny of one national type.

As each of these fashions arose in turn most of our architects accepted them just as they are given in the text-books. With rare exceptions, each designer has chosen a recognized style as a prerequisite to the study of his problem; and in many conspicuous cases he has gone even farther and selected a particular building, which after careful dissection he has adapted to his more modern conditions. Under these circumstances a national architecture has been an impossibility.

For the first time in our history we have a body of men educated for a special purpose, who have as a class failed to keep abreast of our national development in one of the main departments of the work for which they have been trained. This failure is not due to want of ability. Far from it. Most of the architects of the newer generation are virile and cultured men. But virility and culture can accomplish nothing without concentrated effort; and under the pressure of our modern industrial system this effort has been diverted to other and more urgent channels.

This being a materialistic age, the vast majority of our buildings of the character that make for architectural development are erected for purely commercial reasons. Every advance in science and mechanics is eagerly seized upon. Radical changes in the building-arts have complicated modern construction to such an extent that no one man can grasp their intricacies and honestly proclaim himself an expert. The changes which the business methods of the building-trades are undergoing are equally radical. This is an age of feverish business haste. As a nation we pride ourselves upon the promptness with which we accomplish results. Economic success in building-operations is generally dependent upon rapidity of construction. Both owner and contractor show an increasing tendency to act through corporate interests. The mechanic, the laborer and, frequently, the contractor can be dealt with only through their organizations, through which the building-industries are utilizing and developing the forces of co-operation to the fullest extent.

In the midst of this feverish haste the architect is supposed to be an authority in all the varied services necessary for the construction of a huge modern work within the minimum limit of time. A busy architect may have a dozen such structures under way coincidently. In order to vitalize his claim to perform mechanical and scientific service in an expert capacity, he attempts to keep abreast of the times by acting as civil engineer, sanitary expert, heating and ventilating specialist, professional electrician, and so continuing through the whole gamut of endeavor necessary for the solution of his complicated constructive problems. In some instances he employs professional assistance; but even then he attempts to supervise the work of the experts with the utmost exactness, notwithstanding the fact that each branch is in itself a study to which other men devote their entire careers.

The architect's claim as an authority in economics is based solely upon the exigencies of his employment. The client demands exact and careful supervision of financial interests as being paramount to all other considerations. His work must be constructed at the minimum cost and produce the maximum income. This duty is imperative. It cannot be delegated to employés, as is the case with many of the more strictly architectural functions of his practice. To hold his clientèle the architect gives the best of his time and thought to the business of answering this demand. He involuntarily bends his energies to this end and makes himself thoroughly familiar with the latest and most improved methods of construction, in order that he may be able to erect his building with the utmost dispatch. High taxes and one year's loss of rentals may mean financial disaster to his client, and hence to himself.

During the few moments that he has to spare from these exacting duties, he occasionally attempts to design, or at least to make the roughest sort of a sketch, which is turned over to a draughtsman for further elucidation. More frequently the sketch itself is the work of the draughtsman, over whom the architect exercises purely advisory supervision. When the design is finished the architect signs his name and assumes responsibility.

Under these conditions most of our architectural works are evolved by men whose lack of experience prevents effective acquaintance with existing sociological conditions, the intimate knowledge of which is essential to the creation of a national type. Generally these draughtsmen have received careful training in the schools. Historic style is the main resource. Mistaking transient modes for permanent motives, they are compelled to achieve results with such haste that careful study is impossible, and even for those who desire to be original the text-book becomes the only sure and safe guide.

When the draughtsman has obtained the necessary experience to make him a competent designer, he, too, becomes an architect and, if successful, must in turn leave his designing to subordinates. These young men, fresh from the schools, the real sponsors of most American work of to-day, are apt to be orthodox in their tastes. Their education prescribes exact rules of procedure. In the beginning of their careers, which is the only period when they actually design, they have not yet learned that their school training was simply a preparation of the designing faculty for the actual problems of an architectural practice. Under the influence of this system much American design has become judicious copying, and it is commendable in exact proportion to the judiciousness with which the copying is accomplished.

What of the future? What has architecture to offer in the development of our national art? Its ranks are being recruited from the best types of our young men, whose education in the technical schools, both at home and abroad, is equal to any that the world affords. Many of our active practitioners are men of broad view and great ability. There are two conspicuous examples of American architects who have devoted time and concentrated energy to their designs, whose work shows strong personal and wholly original characteristics. It has devolved upon a Chicago and a Philadelphia practitioner to demonstrate the ability of American designers to meet modern conditions untrammeled by precedent. The Westerner's solution of the steel-frame building is as modern and national as the building itself. It plainly indicates its structure. It makes no pretense to being supported by masonry. Its glittering expanse of windows laughs at precedent, and proclaims a new and light structural material. The Philadelphian's treatment of the more humble problems of domestic architecture is equally original, for although he shows perfect familiarity with historic style he has chosen and combined according to his own untrammeled taste. He sees no lack of harmony between Gothic mouldings and Renaissance ornament, and the results have justified his convictions. The whole profession has contributed to the solution of the small American suburban residence, and the modest frame dwelling is one triumph of national architecture, in which all of the workers may claim a share. There were no precedents to hamper the designer. There were no historic motives in the material used. There were no complicated methods of construction, such as are involved in the larger works. The problem was purely architectural, and its solution appealed to that large middle class, which is itself so characteristically American. The result has proved satisfactory, whether considered from an economical, mechanical, artistic or national point of view. It is the one bit of purely American architecture evolved under conditions compelling and permitting original artistic thought.

Thus in this isolated field, where the American architect has expended time and energy, he has produced national types, and in the realm of science and mechanics, where economic necessities have compelled constructive inventiveness, he is also thorough and original. How can the American architect be allowed to devote equal energy and to obtain equal results in the broader art of design which in its ultimate aim is the quality which distinguishes him from the engineer?

In England, where the same conditions obtain to some extent, a small band of men is attempting to solve the question by making it a rule to accept only a limited number of commissions in each year; agreeing with each client to devote personal attention to his work, with the understanding that the fee be increased above the usual amount.

In the United States the solution is being forced by our corporate interests. This is an age of specialized and co-operative effort. Modern industry is subdividing its energies to the utmost. It puts definite metes and bounds to every man's labors, and exacts of each only the work for which he is best equipped.

The greater portion of our large architectural works are no longer promoted by private patrons. Corporations large and small are now in control. Their activities functionize the powers of the owner as well as the contractor, and frequently appear in both capacities. At the head of each of these enterprises is an expert in executive management. He knows to a nicety just what he requires of each unit under his control, and realizes their limitations with exactness. He knows that as business counsellors his financiers excel. He appreciates fully that his mechanical experts are far more competent to advise in heating, in electricity and in engineering problems than his architect. But he knows further that no one is as competent as his architect to design and to assemble his multifarious technical forces. He needs the architect as a supervisor purely in an advisory capacity. He therefore insists that the architect should simply design and assemble the constructive parts, and he places the burden of the details of business, of mechanics and of science with those best fitted to render the maximum amount of expert service.

This is the system of the large corporations whose activities are becoming such a revolutionary force in the building-trades.

Their programme is being imitated by the small corporation especially formed in order to finance one building, an arrangement so frequent that in our large centers of population the private owner is almost eliminated. The system is bound to reduce the power of the architect as a business force; but when he is shorn of many of those duties which now consume all of his working hours, he will again have leisure to devote his abilities to his specialty. Thus the disease is its own cure, and the economic evolution which has forced the architect into a position alien to his art will in time restore him to his proper place. He will then be able to create, to construct, and above all he will again design. With the enormous energy and undoubted ability which is our national endowment, who can doubt that under these conditions the American architect will produce new types truly national artistically as well as constructively, and not copies of the forms and methods of older lands.

CHARLES H. ISRAELS.

HEATING AND VENTILATION.—V.

INDIRECT HOT-WATER HEATING.

THE radiators for indirect hot-water heating are of the same general form as those used for steam. The deep-pin radiators rated at 15 square feet of heating-surface per section are well adapted to hot-water heating. Figure 23 shows a good

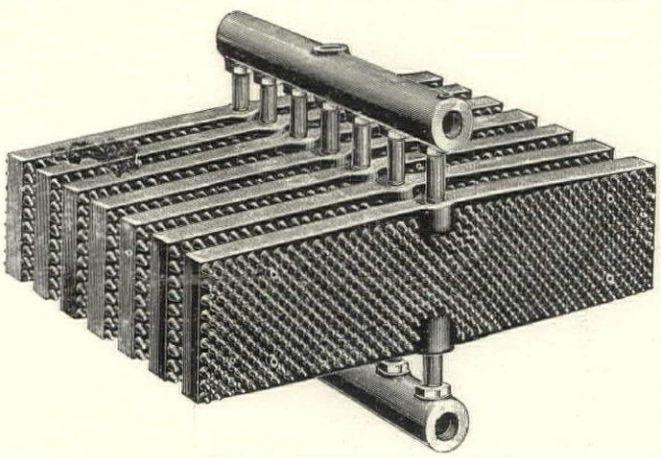

FIG. 23.—DEEP-PIN RADIATOR.

form for water circulation and also of good depth, which is a necessary point in the design of hot-water radiators. They should not be less than 12 or 15 inches to give good results.

The sizes of indirect heaters for water may be computed in the same manner as for steam; that is, first determine the required surface for direct heating and multiply the result by 1.5 for pin-radiators of good depth. For other forms the factor should vary from 1.5 to 2, depending upon the depth and proportion of free area for air flow between the sections.

The casings around the stacks, the sizes of flues and registers, may be determined in the same manner as for steam.

Regulation of temperature in the rooms may be obtained by varying the temperature of the water in the boiler, by mixing-dampers, or by a combination of the two. Another method is to make up the stacks in two banks of shallow radiators, instead of one bank of deep radiator, and connect the upper bank with an automatic control system which shuts it off or turns it on as required. This will be mentioned more fully under the head of automatic control. In indirect hot-water work it is not desirable to supply more than 80 to 100 square feet of radiation from a single connection. When the requirements call for larger stacks they should be divided into two or more groups according to the size.

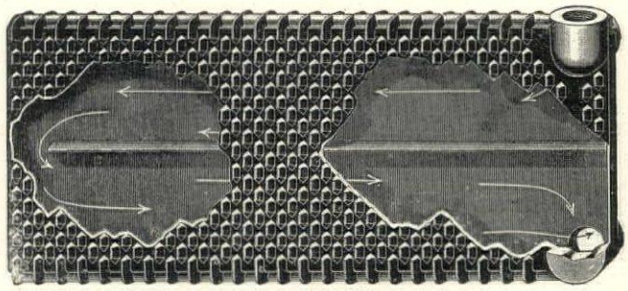

FIG. 23a.

The supply-mains should rise from the boiler to a point near the basement ceiling, then branch and slope downward with a pitch of about an inch in 10 feet to points over the stacks, then drop and make connection at such points as the special form of radiator requires. The tops of the main risers from the boiler should be vented through half-inch pipes, the same being connected and carried to the expansion-tank, where connection may be made either with the expansion-pipe or the vent from the tank. As most of the air is liberated from the water in the process of heating up in the boiler, it will be carried off at once by the vent-pipes before it has a chance to pass into the supply branches and stacks.

Air in a heating system always tends to rise to the highest point, and as the supply-pipes are graded upward from the stacks to the tops of the risers over the boiler, the air in the entire system works toward these points and is carried off through the vent-pipes, before mentioned. As an additional precaution, ⅜ inch vents may be taken off from the supply-pipes just before they drop to the stacks. These vents should be brought down to points easily reached from the basement floor and provided with pet-cocks. The returns should be taken from the bottom of the stacks and carried at a lower level back to the boiler. Conditions may make it necessary to bring back several separate returns to the boiler, but it is considered better to use one or two large flow mains and the same number of returns, where it can be conveniently done.

As the difference in elevation between stacks and boiler is necessarily small, the pipes should be of ample size to offset the slow velocity of flow through them. The following sizes for runs up to 100 feet will be found ample for ordinary conditions. Some engineers make a practice of using somewhat smaller pipes, but the larger sizes will in general be found more satisfactory, although for short runs the pipes may be made a size smaller if desired.

Size of pipe.	Square feet of radiation.	Size of pipe.	Square feet of radiation.
1	15	3	300
1¼	30	3½	400
1½	50	4	600
2	100	5	1,000
2½	200		

SCHOOL-HOUSES.

Thus far we have only considered the *warming* of buildings, no special provision having been made for *ventilation*. In furnace and indirect steam and water heating, a certain amount of fresh air is required for carrying the heat to the rooms, but the problem is considered from the side of heat-supply rather than air-supply. In the case of school-houses the matter of ventilation takes equal rank with that of heating, and the two must be treated separately. Before taking up the different systems of supplying air for ventilation, let us consider briefly the composition of the atmosphere and the method of determin-

ing the required amount necessary for maintaining certain standards of purity within a room.

It is a well known fact that atmospheric air is not a simple substance but a mechanical mixture. Oxygen and nitrogen, the principal constituents, are present in very nearly the proportion of 1 part of oxygen to 4 parts of nitrogen by weight. Carbonic-acid gas, the product of all combustion, exists in the proportion of 3 to 5 parts in 10,000 in the open country. Water in the form of vapor varies greatly with the temperature, and the exposure of the air to open bodies of water. In addition to the above, there are generally present, in variable but exceedingly small quantities, ammonia, sulphuretted hydrogen, sulphuric, sulphurous, nitric and nitrous acids, floating organic and inorganic matter and local impurities. Air also contains ozone, which is a particularly active form of oxygen, and lately a new constituent called argon has been discovered.

Oxygen is the most important element of the air, so far as both heating and ventilation are concerned. It is the active element in the chemical process of combustion, and also of a somewhat similar process which takes place in the respiration of human beings. Taken into the lungs it acts upon the excess of carbon in the blood, and possibly upon other ingredients, forming chemical compounds which are thrown off in the act of respiration or breathing.

The principal bulk of the atmosphere is nitrogen, which exists uniformly diffused with oxygen and carbonic-acid gas. This element is practically inert in all processes of combustion or respiration. It is not affected in composition, either by passing through a furnace during combustion or through the lungs in the process of respiration. Its action is to render the oxygen less active and to absorb some part of the heat produced by the process of oxidation.

Carbonic-acid gas is of itself only a neutral constituent of the atmosphere, like nitrogen, and, contrary to the general impression, its presence, in moderately large quantities (if uncombined with other substances) is neither disagreeable nor especially harmful. Its presence, however, in the air provided for respiration decreases the readiness with which the carbon of the blood unites with the oxygen of the air, and therefore, when present in sufficient quantity, may cause indirectly, not only serious, but fatal results. The real harmfulness of a vitiated atmosphere lies in its other constituent gases and the minute organisms which are produced in the process of respiration. It is known, however, that these other impurities exist in a fixed proportion to the amount of carbonic acid present in an atmosphere vitiated by respiration. Therefore, as the relative proportion of carbonic acid may be easily determined by experiment, the fixing of a standard limit of the amount in which it may be allowed also limits the amounts of other impurities which are found in combination with it.

When carbonic acid is present in excess of 10 parts in 10,000 parts of air, a feeling of weariness and "stuffiness," generally accompanied by a headache, will be experienced; while with even 8 parts in 10,000, a room would be considered "close." For general considerations of ventilation the limit should be placed at 6 to 7 parts in 10,000, thus allowing an increase of 2 to 3 parts over the proportion present in outdoor air, which may be considered to contain 4 parts in 10,000 under ordinary conditions.

The amount of air required to maintain the standard of purity can be very easily determined, provided we know the amount of carbonic acid given off in the process of respiration. It has been found by experiment that the average production of carbonic acid by an adult at rest is about .6 of a cubic foot per hour. If we assume the proportion of this gas as 4 parts in 10,000 of the external air, and allow 6 parts in 10,000 in an occupied room, the gain will be 2 parts in 10,000, or, in other words, there will be $\frac{2}{10.000} = .0002$ of a cubic foot of carbonic acid mixed with each cubic foot of fresh air entering the room. Therefore, if one person gives off .6 of a cubic foot of carbonic acid per hour, it will require $.6 \div .0002 = 3{,}000$ cubic feet of air per hour per person to keep the air in the room at the standard of purity assumed, that is, 6 parts of carbonic acid in 10,000 of air.

It is customary in good practice to provide for 50 cubic feet per pupil per minute in grammar and high schools, and 30 cubic feet in primary schools. The latter figure is called for by law in Massachusetts.

Air is moved for ventilating purposes in two ways: first, by expansion due to heating; and second, by mechanical means. The effect of heat on the air is to increase its volume, and therefore lessen its density or weight, so that it tends to rise and is replaced by the colder air from above. The available force for moving air obtained in this way is very small, and is quite likely to be overcome by winds or external causes. It will be found in general that the heat used for producing velocity in this manner, when transformed into work in the steam engine, is greatly in excess of that required to produce the same effect by the use of a fan. Ventilation by mechanical means is performed either by

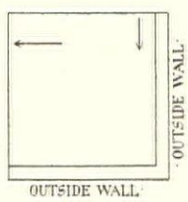

FIG. 24.

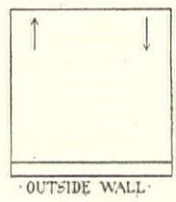

FIG. 25.

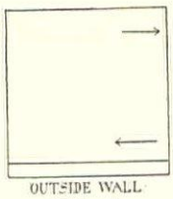

FIG. 26.

pressure or suction. The former is used for delivering fresh air into a building and the latter for removing the foul air from it. By both processes the air is moved without change in temperature, and the force for moving it must be sufficient to overcome the effects of wind or changes in the outside temperature. Some form of fan is used for this purpose.

In the case of school-rooms where large volumes of air at moderate temperatures are provided, it is best to admit it through openings in the wall at a height of 7 or 8 feet from the floor. This gives a more even distribution, as the warmer air tends to rise, and hence spreads uniformly under the ceiling; it then gradually displaces other air without sensible currents or draughts. The cooler air sinks to the bottom of the room and can be taken off through ventilating or discharge openings placed near the floor. The relative positions of the inlet and outlet are often governed to some extent by the building construction, but if possible they should be located in the same side of the room. Figures 24, 25 and 26 show common arrangements. The vent outlet should always, if possible, be placed in an inside wall, else it will become chilled, and the air flow through it will become sluggish.

The heat loss by ventilation may be found as follows: One B.T.U. will raise the temperature of 1 cubic foot of air 55° at average temperatures, or it will raise 55 cubic feet 1°, so that the heat required for the ventilation of any room may be found by multiplying the cubic feet of air supplied per hour by the number of degrees it is to be raised, and dividing the result by 55.

Example: What quantity of heat will be required to warm 100,000 cubic feet of air to 70° for ventilating purposes, when the outside temperature is 10° below zero?

$$100{,}000 \times 80 \div 55 = 145{,}454 \text{ B.T.U.}$$

There are five systems, or combinations of systems, commonly used for the warming and ventilation of school-houses, as follows: Furnaces, indirect gravity, indirect gravity combined with direct radiation in the rooms; fan system with supplementary heaters at base of flues, and the fan system with direct radiation in the rooms.

Furnace Heating.—For school buildings of small size, the furnace system is simple, convenient and generally effective. Its use is confined as a general rule to buildings having from 2 to 4 rooms, although furnaces are sometimes used for 8-room buildings. One furnace is not commonly made to warm more than two class-rooms, as the warm-air pipes connecting the furnace with the flues must be short, to obtain the best results.

Like all systems which depend upon natural circulation, the supply and removal of air is considerably affected by changes in the outside temperature and by winds. The furnaces used for school-house warming are usually built of cast-iron, this material being durable, and easily made to present large and effective heating-surfaces. To adapt the larger sizes of house-heating furnaces to schools, a much larger space must be provided between the body and casing, to permit a sufficient volume of air to pass to the rooms. The free area of the passage should be sufficient to allow a velocity of about 400 feet per minute.

The size of furnace is based upon the heat lost by conduction through walls and windows plus that required for ventilation. With more regular and skilful attendance, it is safe to assume a higher rate of combustion in school-house furnaces than in those used for warming dwelling-houses. Allowing a maximum combustion of 6 pounds of coal per hour per square foot of grate, and assuming that 8,000 B.T.U. per pound of coal are taken up by the air passing over the furnace, we have $6 \times 8{,}000 = 48{,}000$ B.T.U. furnished per hour per square foot of grate. Therefore if we divide the total B.T.U. required for both warming and

ventilation by 48,000, it will give us the necessary grate-area in square feet. It has been found in practice that a furnace with a fire-pot 32 inches in diameter, and having ample heating-surface, will heat two 50-pupil rooms in zero weather.

The velocity of the warm air within the uptake flues depends upon their height and the difference in temperature between the warm air within the flues and the cold air outside. The action of the wind also affects the velocity of air flow.

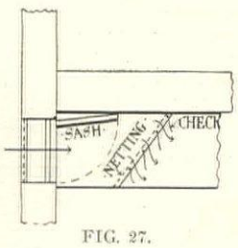

FIG. 27.

It has been found by experience that flues having sectional areas of about 6 square feet for first-floor rooms, 5 for the second-floor, and 4½ for the third, will be of ample size for standard class-rooms seating from 40 to 50 pupils in primary and grammar schools. These sizes may be used for both furnace and indirect gravity steam heating.

In mild, damp weather the air-supply will fall somewhat below the standard desired; but if the flues are made much larger they will furnish more air than can be heated in cold and windy weather. The cold-air supply duct may be made ¾ the size of all the warm-air flues, if free from bends, or the full size, if obstructed in any way. Each furnace should, if possible, receive air from two sides of the building, preferably the north and south or the northwest and southeast. Each duct should be of sufficient size to supply the full amount of air required, and should be provided with an air-check similar to that shown in Figure 27. To make the system more complete, mixing-dampers may be placed in the warm-air flues. A typical arrangement of furnace, air-ways and dampers is shown in diagram in Figure 28.

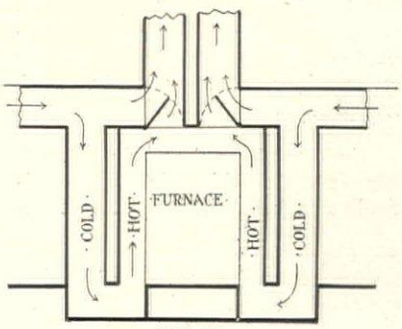

FIG. 28.

The vent-flues may be made 5 square feet for the first floor and 6 from the second and third. They may be arranged in banks and carried through the roof in the form of large chimneys, or may be carried to the attic space and there gathered by means of galvanized-iron ducts connecting with roof vents of wood or copper construction. The former arrangement, however, is to be preferred, when it can be provided for. All roof vents should extend well above the ridge of the building in order to prevent down draughts caused by the air currents striking the roof and being deflected into the flues. Flues starting above the basement should in general be covered with a hood of some form to keep the snow and rain from falling into them. Where a hood is used, the free opening under it should be made twice the area of the flue. This is done because in case of winds the entire discharge from the flue is in one direction and must pass through only two of the external side openings under the hood. Roof vents starting at the attic floor, or above, should be provided at the bottom with water-tight pans of copper or galvanized-iron, with suitable drains, to prevent rain or melting snow from reaching the ceilings below. All vent-flues through the roof should be provided with dampers for closing when school is not in session. In order to make the vent-flues "draw" sufficiently in mild or heavy weather, it is necessary to provide some means for warming the air within them to a temperature somewhat above that of the rooms with which they connect. This may be done by placing a small stove, made especially for this purpose, at the base of each flue. If this is done it is necessary to carry the air down and connect with the flue just below the stove.

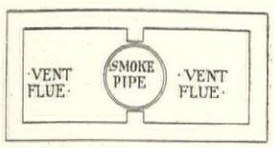

FIG. 29.

A much better method, and one equally effective, is to use a wrought-iron chimney-stack for the furnace and carry it up between the two vent-flues, as shown in section in Figure 29. If a separate furnace is used for each two rooms this arrangement may be used in each case. The inlet and outlet openings from the rooms into the flues are commonly provided with grilles of iron wire, having a mesh of 2 to 2½ inches. Both flat and square wire are used for this purpose, the weight of wire depending upon the size of opening. For ordinary work, 5/16 inch flat wire or ⅛ to 3/16 inch square wire may be used, set in light channel-iron frames. In the best class of work, flanges are riveted to the channels and the grilles screwed to wood grounds or frames. Shut-off dampers should be placed in all cold-air inlets, and doors opening from the basement into the cold-air box should be provided for use at night or when the school is not in session.

ILLUSTRATIONS

SKETCH FOR A PROPOSED COUNTRY CHURCH AND PARISH HOUSE. MESSRS. FRANCIS R. ALLEN & CHARLES COLLINS, ARCHITECTS, BOSTON, MASS.

BRANCH PUBLIC LIBRARIES AT TOMPKINS SQUARE, 135TH STREET AND RIVINGTON STREET, NEW YORK, N. Y. MESSRS. M'KIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.

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SPRING HOUSE AND BOTTLING WORKS FOR H. RICKER & SONS, POLAND SPRINGS, ME. MR. H. C. WILKINSON, ARCHITECT, WASHINGTON, D. C.

HOUSE OF HERR W. SCHWAB, DARMSTADT. HERR L. SCHAEFER, ARCHITECT.

This plate is copied from *Architektonische Rundschau.*

Additional Illustration In the International Edition.

VIEW FROM THE SOUTHEAST: ROGERS MEMORIAL CHURCH, FAIRHAVEN, MASS. MR. CHARLES BRIGHAM, ARCHITECT, BOSTON, MASS.

NOTES AND CLIPPINGS.

A Reinforced Concrete Warehouse.—A brick and reinforced concrete warehouse has been built in Toronto, Ont., for Brown Bros. at practically the same figure as for slow-burning mill construction. The building is 192 ft. by 42 ft. in plan, with stories 10 ft., 15 ft., 14 ft. 6 in., 13 ft. 6 in., and 13 ft. 6 in. high from basement up. The floors are designed to carry 300 lbs. per square foot, and the columns are on 16 ft. by 12 ft. centers. The columns are reinforced by steel rods at the corners, with a wrapping of expanded metal like the hoops of other systems of construction. The columns are connected by concrete girders reinforced with six rods near their bottom surface, some of these rods being bent upwards at the ends. Instead of stirrups or loops, the girders have sheets of expanded metal at their ends. The floor-beams are of similar construction, but smaller.—*Building News.*

The Fatal Electric Sapping of Niagara Falls.—The special correspondent, F. C., of the New York *Evening Post* adduces the following proof to show how nearly destructive of the great Falls would be the enactment of the bill now before the State Legislature allowing a certain power company to use so much of the water in Niagara River as would "generate continuously 400,000 effective electrical horsepower at a head of 150 feet." To generate this power it would be necessary to send through the turbines, consequently abstracting it from the present flow over the brink of the Falls, 36,080 cubic feet per second. Now Dr. John M. Clarke, State geologist, declares on the authority of "a competent hydraulic engineer" that when the flow is reduced by 40,000 cubic feet "the water will be down to rock bottom," and then "the American Falls, though still forming a cataract, will be but a ghost of their ancient magnificence. Let one-fifth more of the water be abstracted beyond the line we have already calculated, and the American channel will be dry. That is, in effect, double the amount of 40,000 cubic feet, and when 80,000 cubic feet have been taken away from the present flow the Canadian channel will still be an interesting object, but the American Falls will be wholly gone."

The destruction of the Falls is designed, not through direct "harnessing" of the Falls themselves, but through drawing off and diverting the waters from the river above the cataract. As long ago as 1885 this design was put into partial execution, when the Legislature began giving away, free, franchises to power companies. Nine companies have been equally recognized, or chartered in New York. Five or six of these still exist, but only two are operating. These are the Niagara Falls Hydraulic Power

and Manufacturing Company, and the Niagara Falls Power Company. They are permitted to abstract water from the Falls supply as follows:

	Cubic feet per second.
N. F. H. P. & Mfg. Co.	7,700
N. F. P. Co.	8,600
Total	16,300

Three Canadian companies on the Canadian side, all active, have statutory limitations as follows:

	Cubic feet per second.
Canadian Niagara Power Co.	8,900
Toronto and Niagara Power Co.	11,200
Ontario Power Co.	12,000
Total	32,100

Thus for the five operating companies on both sides of the Falls, the amount they have been granted the right to consume is 48,400 cubic feet per second.

United States Government engineers have reckoned the average flow at 224,000 cubic feet per second; and Dr. Clarke observes in a paper in the *Popular Science Monthly*, that "Goat Island, picketing the frontier, divides the water unfairly, giving much more than three-fourths of their volume to the Canadian side, so that abstractions of water will make themselves first perceptible in the shoaling of the American channel."

Reduce that flow to 184,000 cubic feet per second and the American channel bed will be barely covered with water; reduce it to 144,000 and no water at all will be flowing over the American Falls. The two active American and three Canadian companies when using all they have been given title to will reduce the flow to less than 184,000. Let the Lockport company cut in and seize 36,080 cubic feet more per second, and there will be left only a flow of 147,920 cubic feet per second—and you can walk dry-shod upon the crest of dolomite limestone over which now passes that sublime rush of water which constitutes one of the beautiful wonders of the natural world.

PLUMBERS' UNION MUST PAY.—Judge Ellis, sitting in the District Court at New Orleans, La., on March 17 ordered the Plumbers' Union to restore Stephen Schneider and Edward Shekeler to membership and to pay them $1,000 each, with interest, for expelling them some months ago. Schneider and Shekeler were union plumbers and members of the State Board of Examination of Plumbers. They were ordered by the union to vote in the Board for a certain candidate for inspector, but declined to do so, exercising their individual preference and declaring that the union could not control their votes as members of a State Board. For this they were expelled and blacklisted. The verdict for damages is against the union itself and against all its officials and its individual members. The defendants were further enjoined from interfering with Schneider and Shekeler in their business and from discouraging and interfering with any person working with them or employing them, whether by threats or force or otherwise.—*The Metal Worker.*

AFGHANISTAN AS A SEA POWER.—The jibes that are often bandied about concerning the prowess of the Swiss navy are taken in good part by the peaceful mountaineers, but similar fleers may not be swallowed as easily by the fierce subjects of the Ameer of Afghanistan, who is just now seeking a means by which he can secure a seaport connected with his own capital by rail.

VENTILATING SEWERS THROUGH HOUSE SOIL-PIPES.—The subject of sewer ventilation comes more closely to the attention of municipal engineers than the plumbers. Still, when the house trap is dispensed with, it becomes a part of the plumber's work. Charles R. Felton, city engineer of Brockton, Mass., says that the omission of the trap at the wall of the house is not enough of a novelty to cause any shock to sanitarians to-day. In Brockton there is no trap at the wall of any building connected to the sewer. This system has been in use for 11 years, and, while it may have no particular signficance, it is interesting to state that the death rate in that city for the last census year, and also for the last year, as reported by the State Board of Health, was the lowest of 23 cities in Massachusetts, having a population of over 25,000. The recommendation to adopt this system was made in 1893, and the engineer has never yet heard any complaints as to its practical working.—*The Metal Worker.*

THE CONDITION OF ST. MARK'S.—The scaffolding necessary for the restoration and strengthening of St. Mark's at Venice is now completed, and the engineers, Signori Manfredi and Marangoni, are busy directing the work. The condition of the cathedral, now that it has been possible to examine it closely, is found to be graver than appeared from the report of the two engineers, the weakest point being the Paradise and Apocalypse vaults. Though every care will be taken to maintain the vaults as they originally were, some part of them will have to be demolished and rebuilt; but it is impossible to say now in what proportion, as it is only in the process of demolition that the weaknesses will become fully apparent. The examination of the interior structure of the St. Alipio corner, which was excluded from the restorations made about the middle of the 19th century, has revealed an even graver state of things. The foundations of this corner have since then continued to sink, and the corner now stands independently from the rest with only one iron bar, put there in 1780, to keep it and the main body together. The corner will have to be demolished and reconstructed in order to strengthen the foundations. It will probably be necessary to remove and replace some of the ancient mosaics.—*Building News.*

PRIZE ESSAY ON CONCRETE-BLOCK CONSTRUCTION.—The publishers of *Engineering News* and the *Cement Age* are offering a first prize of $250 and a second prize of $100 for the best papers of from 5,000 to 10,000 words on "The Manufacture of Concrete Blocks and their Use in Building Constructions." The manuscripts, which must be anonymous, will first be examined by the editors of "*Engineering News*" and they will submit the five or more which they consider best to a jury consisting of Mr. R. W. Lesley, Mr. R. L. Humphrey and Prof. Edgar Marburg for final awards.

All manuscripts must be received not later than July 31, 1905, at the office of the Engineering News Publishing Co., 220 Broadway, New York. Full particulars may be obtained at that address.

WHERE SOME OF THE FIRST AMERICAN GOLD IS.—The beautiful flat wooden roof (or rather ceiling) of Sta. Maria Maggiore, so elaborately carved and paneled from the designs of that graceful architect, Giuliano da Sangallo (1445-1516), is covered with a thick layer of the first gold brought from America by Columbus and sent in homage to Pope Alexander VI., a Spaniard, by Ferdinand and Isabella.—*New York Times.*

KITCHENER'S SPOILS OF WAR.—I understand that at Chatham there are now to be seen four colossal bronze figures of Boer worthies, which were brought back from the Transvaal at the time of the war. They are at present disposed about an open space in front of the arch that has been erected at the Royal Engineers' Institute as a Royal Engineers' war memorial, and in a recent letter to the local press the honorable Secretary of the Memorial Committee explained that they are the private property of Lord Kitchener, and are only in this position temporarily. A correspondent writing from Chatham asks how such articles can become the private property of an officer, and suggests that such things ought not to be treated as loot at all. If the Duke of Wellington had brought back from Paris in 1815 valuable public statues of Napoleon, Ney, and other French heroes, they would hardly, I take it, have been treated as his private property, nor, if the nation had assumed possession of them, would their exhibition in a public square in England be regarded as conducive to an "entente cordiale." We profess to be desirous of cultivating something of this kind with the vanquished Boers, and on that ground I should think the statues would be better placed in Pretoria than in England.—*London Truth.*

A NOVELTY IN SWISS HOTELS.—A unique hotel is being built in Switzerland. As far as its location is concerned it certainly will be the most exclusive hotel in the world. On the so-called Hammetschwand, on the Lake of the Four Cantons, there rises a solid rock to a height of about 2,395 feet. At a height of about 1,800 feet the rock forms a huge shelf or projection, and on the latter the hotel will be built. This projection has been pierced by a gallery, and a steel tower nearly 550 feet in height supports the rock projection, thus making the latter safe and secure. An elevator will take the guests and tourists up to this hotel, from the veranda of which one will enjoy one of the finest views in Switzerland. In other words, this hotel will practically be built on the top of an immense steel tower. The hotel will be completed in about four years.—*Boston Transcript.*

The American Architect and Building News

Vol. LXXXVII. SATURDAY, APRIL 22, 1905. No. 1530.

CONTENTS

THE partial destruction by fire a few weeks ago of the temporary studio building of the National Academy of Design which that body has occupied at One Hundred and Tenth street, New York, ever since it sold its property on Twenty-third Street, causes a considerable real loss and a more real inconvenience in the way of interrupting the classes and destroying or injuring the equipment. It is, however, a rather fortunate happening, since it makes known to the public that the Academy is not only still in doubt as to the advisability of building its permanent home so far up town, but more than slightly inclined to join with kindred bodies in providing in a more accessible site the suitable exhibition galleries which the large artistic fraternity of the city and its varied interests so seriously needs.

IN thinking, at various times, over the possibility of establishing at Columbia University that School of Fine Arts of which there is so great a need, we have always been perplexed when it came to consider the way in which the practical routine of instruction in art was to be administered. Thes University was already in train to develop its architecture department, so that part of the programme obviously would not be troublesome, but we could not make it appear right and proper that a university established to foster the *belles lettres* should concern itself, through its salaried professors, with the grinding colors, the scraping of pallettes and all the things those processes stand for, things that are manual rather than intellectual and, so, not just suited to an academic atmosphere. In the scheme which, in its broad outlines, has just been made public, President Butler of Columbia University provides a very simple, very natural and practicable solution, one that is so obviously right that it can only have been reached after a patient consideration of an indefinite number of other possibilities and the elimination of one scheme after another as its vices came to be fully understood. In brief, Columbia invites the National Academy of Design, on the one hand, and the Metropolitan Museum of Art, on the other, to join with herself in founding and maintaining a great school of Fine Arts, pledging herself, for her share, to look after the moral and intellectual growth of the future students, which naturally falls under the guidance of the holders of academic chairs, while the Academy of Design is to have charge of their manual and technical training. The Metropolitan Museum of Art will have its real and efficient influence just in proportion as it may develop and build up those lines in its collections that are of greatest use to the art student in showing what perfected results he must aim to equal or surpass.

THE scheme seems to us very simple, practicable and well devised, and far more likely to come to a successful issue than if a larger and more elaborate scheme had been fixed on, one which should unite—or attempt to—all the many and diverse art interests of the metropolis, an undertaking which would probably result in nothing, because of the multiplicity of interests, each one clamoring for recognition and sulking or being obstructive because not recognized to the degree desired and strenuously demanded. In the coalition suggested there are only three bodies, each of which has standing in the great educational and art world, each of which is already engaged in doing imperfectly the very things it is now suggested shall be better done. To a degree, their present efforts do not so much overlap as leave wide gaps between which ought to be bridged and filled in, gaps which easily can be filled under the method suggested. President Butler, whose proposition may be found in another column, uses two or three very happy phrases to which we wish to draw attention. He speaks of art as "an element in civilization," and then shows his liberal-mindedness by acknowledging that "the history of art education shows that artists can only be made by artists," but he obviously hopes that the artists educated at the new school may be "scholarly artists," men with brains properly developed, not atrophied, while fingers have been trained to abnormal dexterity.

TWO bequests have been made to the public in different quarters by which estates of approximately one million dollars each have been placed in the hands of trustees to administer for public ends. Unfortunately, we forget both the name of the testator and the community which is to benefit by the most interesting of these bequests, so interesting that it seems as if it must attract the imitation of others who cannot carry their wealth with them, and find that the world already seems to be well provided with libraries and hospitals. This benefactor instructs his trustees to give instant relief, so far as income will allow, to those who are overwhelmed by a sudden, general calamity. This, we apprehend, would have caused them to offer aid to the victims of the "General Slocum" and the "Iroquois Theatre" disasters, as well as to those who were damaged by the Galveston flood. The idea is a noble one and deserves repeated imitation, although the trustees have thrust upon them a responsibility to which the selection of "Carnegie

Entered at the Post Office at New York as second-class matter.

a responsibility to which the selection of "Carnegie Heroes" is as nothing. The second bequest is one by which Mr. Benjamin Ferguson, a wealthy lumber merchant, hopes to benefit Chicago, and, as the administration of the bequest is left in the hands of the trustees of the Art Institute, his hopes are not likely to be materially defeated. By the terms of the bequest the income of the estate is to be used in procuring and erecting in Chicago fountains, statues or monuments "commemorating worthy men or women of America, or important events of American history." If we assume the income to be forty thousand dollars a year—a very good price for an equestrian monument—in a dozen years Chicago may have as many bronze "men on horseback" as even Washington itself, while, if we assume eight thousand dollars as a fair price for a single pedestrian figure, in the same period Chicago could boast of a veritable sieges allée, on the Berlin model; or, if the trustees prefer drinking-fountains at five hundred dollars each, in much less time it could make a display of tinkling or dripping water that should shame Viterbo even. But the erection of products of the sculptor's art is not limited to a dozen years, but goes on and on indefinitely, so that one result of this very unusual and very interesting bequest is that, sooner or later, Chicago will be a very Mecca for sculptors from all parts of the world.

SPEAKING of statuary, it is interesting to know that steps are being taken to raise money enough to have cast in bronze that wonderful piece of anatomical modelling known as the "Falling Gladiator," by Dr. William Rimmer, the plaster cast of which has for some years been in the Boston Museum of Fine Arts. The figure is so little over life-size that there was some excuse for the critics of the time when it was first exhibited declaring, as with one voice, that it was not a modelled figure but merely a plaster cast from life. Like other men of genius Dr. Rimmer did not recognize his true forte; he believed he was intended by nature to be a great painter, and was embittered because no one would admire his atrocious efforts with the brush. As a sculptor, he should have made his mark, for he had an unrivalled knowledge of anatomy and was not deficient in imagination.

THE report of the Museum of Fine Arts, Boston, for the year 1904, is unusually full and interesting and partly because the President, Mr. S. D. Warren, has had the happy thought to make his part of the report cover the last decade. During the past year the museum expended for the purchase of works of art of divers kinds a larger sum than ever before, namely, nearly two hundred and seventy thousand dollars. Of this sum over one hundred and seventy-five thousand dollars was expended in the purchase of Classical antiquities, but as to this particular field it is announced that "further acquisitions from the Museum's late source of supply are not at present contemplated." This large outlay for one branch was justified because the collectors had the happy combination of time, money, and patience, directed by great knowledge, and because it was difficult to believe that "the happy combination could ever exist or recur." Although museum exhibits do not necessarily bulk large, relatively with their cost, the fact that in the last ten years the Museum has itself expended on works of art more than thirteen hundred thousand dollars, taken in connection with the gifts, bequests and loans it has received during the same period, shows how it is that a new building is so desirable. As to the plans for the new building the report says nothing more definite than that a report and sketch plans for it are expected from the architects. As usual of late years, the treasurer has to show a deficit, this time amounting to some twenty-one thousand dollars, nearly double that for the preceeding year, which we suppose had to be made good out of capital. It must be borne in mind always that the Museum has no grant from the public treasury but relies on its own funds, gifts and the annual subscriptions of many individuals, these subscriptions last year yielding over thirteen thousand dollars.

THE growth and increase in value of the department of Classical Art, which is at once due to and the cause of what looks a little like a disproportionate outlay of funds, are largely due to the fact that the present Director of the Museum retains his old position as Curator of Classical Art, and so naturally has the interest of this branch more at heart than any of the others. No one, we feel, has the least disposition to grumble because of this result, for the department has now been brought to a condition of very real rank and value, and can for the moment be allowed to stand still. In accomplishing this excellent result Mr. Edward Robinson has not only added to the reputation of the Museum under his charge, but has increased his own, one pleasant result being that the University of Aberdeen, Scotland, has just conferred on him its degree of Doctor of Laws.

APPARENTLY the framers of our tariff law were unaware that one of the most cherished forms of art expression was represented by etchings and though, somehow or another, they did get hold of the word they included it in a section under a commercial heading where a duty of twenty-five per cent was levied. This fact was brought to light recently by the assessing of this duty upon a consignment of some etchings by Miss Mary Cassatt, which the importer expected would come in free as "the work of an American artist temporarily residing abroad," for there was as little doubt as to Miss Cassatt's standing as an artist as there was of her intention not to make Europe her permanent abiding place. Fortunately Judge Waite, of the General Board of Appraisers, had a better knowledge of art than the lesser functionaries and so the ruling was reversed.

ARCHITECTS and sculptors who are in the habit of competing for public monuments may find it worth while to address inquiries to the Peruvian Consul at Philadelphia or San Francisco and ascertain the terms of the competition to be held for the design of a pedestrian statue of General José de San Martin, to be set up in the public square at Lima. General San Martin played the part of liberator not only in Peru in 1821, but in Chili at an earlier date, and in Argentine as well.

HOSPITAL SANITATION—I.

THE crowding together of a large number of disabled or diseased persons in a confined area requires the most complete and carefully considered sanitary arrangements. If the application of modern sanitary principles and the installation of approved sanitary appliances are required in the case of ordinary dwellings, wherein only a few healthy persons are sheltered, they certainly become of vital importance in the case of buildings for sick and helpless patients. These considerations should form the basis for the planning and erection of hospital buildings, for unless they are recognized and lived up to by the building committee and the architect for a hospital, success from the point of view of hygiene cannot be attained. It follows that while everything should be done to make such buildings safe and healthful, the expenditure of money for purely architectural display or ornamentation should be discouraged.

For large as well as small hospitals, it is always advisable to engage the services of an hydraulic and sanitary engineer. In the case of hospitals to be built outside of city limits his professional services should be sought at an early stage of the planning of the building, for many problems will arise, such as the selection of a suitable site, and questions regarding drainage and water-supply, which can best be solved with the aid of a practical and experienced specialist.

Two essential and general sanitary requirements apply to all hospitals, namely: *First*—In the grouping of the buildings and in the planning of the arrangements of the floors, provide plenty of air circulation and plenty of light. This applies particularly to the hospital wards, to the toilet-rooms, the pantries and closets.

Second—Maintain an absolute cleanliness inside as well as outside of the buildings.

We shall see to how great an extent the water supply, sewerage, plumbing and ventilation systems will assist in securing the fulfillment of the above conditions.

For a hospital building within city limits the sewerage problem is not a difficult one, for the reason that in the majority of cases a connection with the street sewer will be feasible. If, however, the building is located in a suburb or in the country it becomes necessary to provide an individual sewerage system and to decide upon questions, such as the location of the sewer outfall and the possibly required purification of the sewage.

For many reasons it is better to adopt for hospitals located in the country the well known "separate" system of sewerage, for this requires smaller sizes for the mains and laterals, and the purification of the sewage, where necessary, is more readily and more cheaply accomplished. Hospital sewers should be free from deposits, self-cleansing and well flushed, absolutely water-tight and fully ventilated. Sufficient manholes should be provided, and between them the alignment should be straight: junctions and changes in direction should be made in the manholes where possible. The lateral sewers should be well flushed, either by periodic hose flushing or by means of an automatic flush-tank. Sewers should be constructed of vitrified earthen sewer-pipe for all outside lines, but where sewers cross under basements of buildings and under other special conditions, it may be better to use iron pipe. The joints should be well made with Portland cement, and the inside of the pipe should be smooth and free from obstructions. The pipe should be laid on a firm foundation, and, where this does not exist, a bed of gravel or concrete should be provided, or the sewer pipes may be carried on saddle piles. In localities which are damp or wet from springs, drainage of the soil and removal of the sub-surface water is required, and may be accomplished by means of porous unglazed tile drains laid with open joints.

In a brief article it is impossible to consider in detail the question of sewage disposal, and hence its consideration is entirely omitted.

In order to render a sewerage system efficient and successful it is necessary that an abundant water-supply should be provided. Water-supply and sewerage are closely allied, and where only one is provided serious trouble may result. A larger supply of water is required for hospitals than for other buildings. The quality of the water should be of the highest character and above the slightest suspicion of contamination. Frequently the water-supply for a hospital must be purified on a large scale, and this is accomplished either by mechanical or pressure filters, or in large sand-filter basins. The drinking-water should be filtered in one of the household filters, which deliver water free from germs if properly and often cleaned and sterilized.

The water-supply pipes for the buildings may be either of lead or or galvanized-iron. Certain waters are apt to have a detrimental action upon galvanized pipes; in other cases, particularly with soft waters, lead pipes are not safe to use. Tin-lined wrought-iron and tin-lined drawn-brass pipes make the best services, but are necessarily expensive. It is important that water should flow at all fixtures in the building under a good pressure, and besides this, the pressure should be always ample to meet the requirements for fire-protection.

In hospital buildings, hot water is required in great abundance, and is generally obtained from closed boiler-iron tanks fitted with brass coils, through which steam is made to circulate; in some cases special hot-water heaters of large heating capacity are used. Wherever water is heated by steam, it is desirable to control its temperature, and for this purpose automatic thermostats are fitted up in connection with the steam-supply to the tanks.

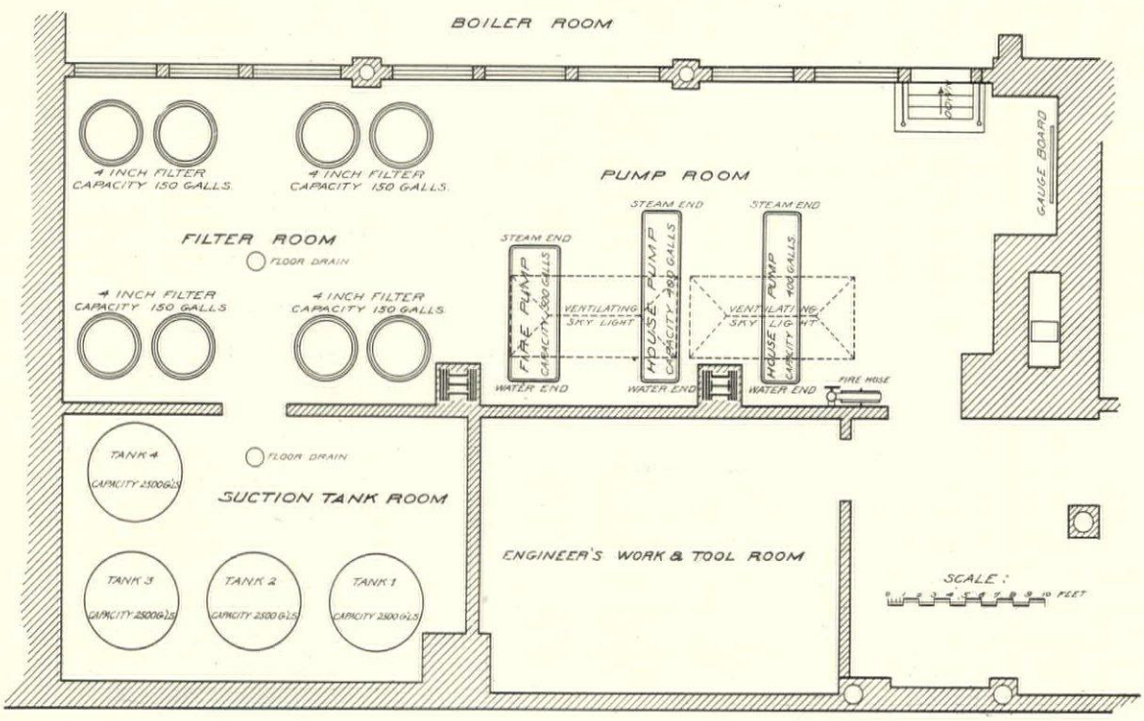

FIG. 1.

In each of the buildings there should be fire stand-pipes with valves and hose. The best practice is to supply these from a special "Underwriter pattern" fire-pump located in the power-house. Inside of the buildings there should be in the corridors or in the stairway, shelves holding a number of fire-pails; there should also be some portable extinguishers on every floor. The outside of a building should receive protection by means of a number of non-freezing fire-hydrants located at close intervals, and hose-carts carrying the necessary rubber-lined hose should be kept in readiness in the power-house, or in the ambulance room.

The plumbing and house-drainage system for a hospital should follow closely the general rules and requirements which are applicable to buildings of all kinds. The arrangement of the plumbing should be simple and direct. The disposition of the toilet-rooms on the various floors should be such that the plumbing is concentrated into a number of vertical groups.

The plumbing for the hospital wards should be, where this is possible, in an annex, cut off from the ward proper by a ventilated corridor. In the case of surgical wards it is of special importance that rooms containing plumbing fixtures should not be in direct connection with the ward. Nor should plumbing pipes connected directly with the sewer system pass through the wards or through the operating-rooms of a hospital.

Where there are several buildings, each building should have its own sewer connection, or several if the building is large (see Plates). The sewer from each building should be trapped by a main house-trap, located either in the cellar or outside in a manhole; this trap should have a large fresh-air inlet on the house side of the water-seal, and this should open outdoors at a point well remote from windows or from the intakes of the heating system.

Soil and waste lines should be extended through the roof, at least, in full size; they should never be made to terminate in brick flues or brick vent-shafts. All offsets in vent lines or extensions of soil-pipes should be made under a steep angle to prevent the clogging up of the pipe by rust. Each plumbing fixture should be separately and safely trapped. All traps should be arranged in such a way that their water-seal cannot be lost or withdrawn by siphonage or other causes. The more simply the system of trapping is arranged the better. The use of non-siphoning traps in place of the "back-aired" S-traps should be encouraged, at least under basins, sinks and bath-tubs. The one-pipe system, as distinguished from the double-pipe system required by the majority of plumbing regulations, should be carried out wherever possible, because it is at least as safe, less expensive and less complicated. Simplicity of arrangement should be the watch-word for all plumbing work. All parts of the system, the traps, the bends and the pipe lines should be read-

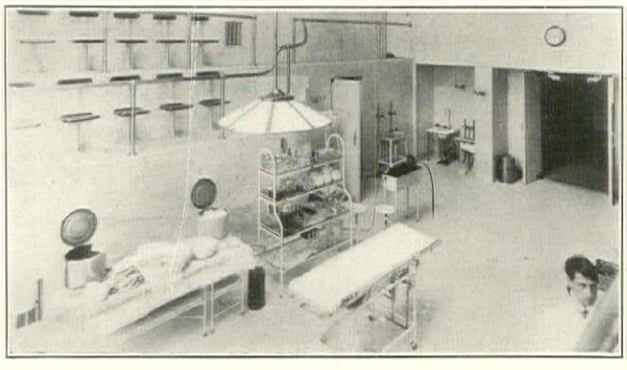

FIG. 2.

ily accessible. All plumbing should be exposed work; pipe casings and wooden enclosures of fixtures should be done away with; supply-pipes should be kept out of walls and carried on the ceilings of minor rooms, rather than placed between the floors, where hidden leaks may cause considerable damage. Elaborate display work and fancy plumbing are out of place in a hospital; all work should be characterized by simplicity and by substantial workmanship. Nickel-plated brass piping is not necessary, and the installation will be just as serviceable if constructed of lead or galvanized pipe, which can be finished with enamel paint or aluminum bronze. The brass work of valves and faucets should likewise not be nickel-plated, as the plating will wear off in a short time by reason of the abuse which it is apt to receive from the hospital employés. It is very much better to use polished steam-metal or red metal unplated, as this metal can be easily kept bright and polished by rubbing.

No earthenware pipes for drainage should be used within the buildings. The soil, waste and vent pipe system should be constructed either of extra-heavy cast-iron pipes with caulked joints, or of heavy screw-jointed wrought-iron pipes. Where the latter system is used, the fittings should not be ordinary steam fittings, but special recessed or drainage fittings.

Soil-pipes should be 4 in. and waste-pipes 2 in. and 3 in. in diameter. Five-inch soil-pipes may be necessary in the case of insane wards, or in hospitals for insane, because of the greater danger of the pipes becoming stopped up by wrong use of the fixtures. Cleanouts should be placed in ample number in the

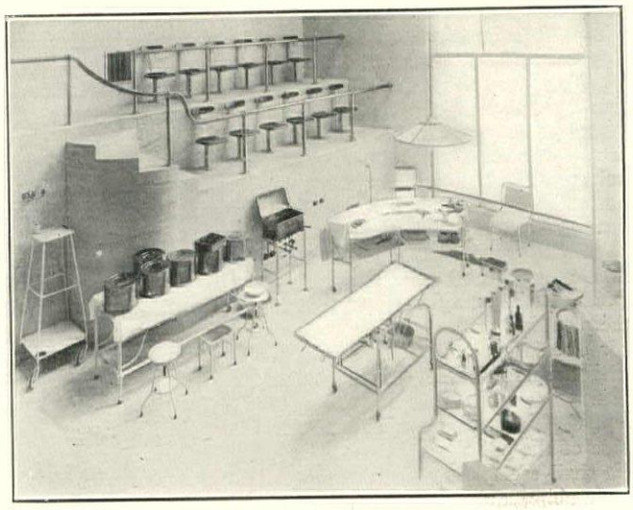

FIG. 3.

line of the house-drains, and should be made accessible. All pipes on the roofs should remain fully exposed and left without return bends, vent-caps or cowls. The pipes projecting from extension roofs should be carried to the main roof in cases where they open too near to windows of living-rooms or of wards.

In the large toilet-rooms, floor drains are sometimes desirable, and if they are put in they should be very securely trapped, and often flushed with water. Local vent-pipes for plumbing fixtures do not seem to be necessary where a good ventilation system for the toilet and bath rooms has been provided. No plumbing pipes of any kind should be run in places where they would be exposed to freezing.

The plumbing system of hospitals should be tested during construction by the water-pressure test, the test being applied before the fixtures are set in place, and by a smoke test after the fixtures are completed and the water has been turned on. Once the building is occupied, it is a wise precaution to have the entire plumbing and drainage work tested by a disinterested and experienced engineer, at least once each year.

The chief sub-divisions of a large hospital comprise offices for the administration; surgical and medical wards; children's wards; isolating wards; rooms for private or pay patients; living and sleeping rooms for the hospital staff; accommodations for the nurses; a dispensary; operating-rooms; kitchen, laundry and power-house; a disinfecting-station; garbage-crematory; ambulance room; a pathological department with autopsy-room, and a dead-house. According to the size and importance of the hospital, these various sub-divisions are provided in separate buildings or else they are suitably distributed through the various parts, wings and floors of one building. Each of the sub-divisions mentioned requires expensive plumbing work, and in many cases special fixtures.

Each hospital ward should have near it a toilet-room; this apartment should contain only the water-closets, the urinals and the slop-sinks. It is advisable to provide separate water-closet accommodation for the nurses and attendants. Sometimes the lavatories and the bath-rooms are made to form a part of the general toilet-room, but this practice does not commend itself, and wherever possible it is much preferable to separate the bath and the lavatory. The number of closets depends on the number of beds in the wards; one closet for about ten patients being the customary provision.

Proper sanitation requires that the toilet-room be well lighted and finished with non-absorbent floor and wall-coverings, also

that all sharp corners in which dust is apt to lodge should be avoided. The walls may be tiled or lined with marble, or finished in hard plaster painted with white enamel. The floors should be tiled and the partitions for the water-closets and the stalls for the urinals should be made of marble, slate, Alberene stone or of opaque glass.

The water-closet fixtures should be of plain white earthenware of a material which will not craze, or else of heavy glazed stoneware. Suitable types are the pedestal washdown and the siphon-jet closets. The seat should be a round open seat with hinges at the back; a new form of seat which recommends itself for use in hospital wards has the front of the seat cut out and the top of the bowl formed with a vertical projection fitting into the slot, which thus acts as a urine shield. Another bowl, well adapted for hospital use, has the top of bowl and seat slanting to the rear (Naturo closet). In the case of hospitals for insane patients a wooden seat is often done away with entirely, and the top of the bowl is instead formed in porcelain to serve as a seat. The flushing arrangement should be from a high tank through a flush-pipe; the various forms of flushing-valve closets, which have sprung up in recent years, do not recommend themselves for hospital use. The cistern should be operated by means of a chain and pull, such arrangements being found to be the simplest and best, even in the case of wards for insane, because the attendants of the patients have in many cases to assist them in the toilet-room.

The best urinal fixtures, in my judgment, are the solid porcelain niche stand urinals with trapped floor-drain and with a flush arranged to wash effectively every portion of the exposed surface in the niche. Next best in order are the modern pedestal urinals with high back, formed somewhat in the shape of the flushing-rim bidet. They have the advantage of not requiring any couplings and lock-nuts to go through the marble back of the stall. Being set at a lower height than the usual one for urinal bowls, they are found to be more cleanly in use and the floor is not continually kept wet.

Slop-sinks in hospitals receive rather severe usage, and while the solid white porcelain fixtures with flushing-rim look, and are, the best from a sanitary point of view, it is sometimes advisable to use a porcelain-enamel slop-sink with a cast-brass flushing-rim. Hospital slop-sinks should always be provided with a flush

FIG. 4.

from a high cistern, the same as the water-closets. Special so-called clinic slop-sinks are manufactured which are intended not only to receive the discharges from bed-pans and glass urinals, but in which special provision is made by an upward or a side jet for the rinsing and washing of these fixtures.

All plumbing fixtures in the toilet-rooms for wards should be of such construction that all foul wastes discharged through them are removed rapidly and completely.

In large hospitals it is sometimes necessary to provide for each ward in a convenient apartment a wash-tub in which the nurses may wash small soiled articles; in this case it is usual to fit up one solid porcelain wash-tub, and perhaps adjoining the same a clinical slop-sink (see Fig. 16).

Each hospital ward should be provided with a bath-room, which must be in convenient reach of the ward, but disconnected from it, so as to exclude all steam vapors. The finish of the bath-room should be the same as in the toilet-room, and care must be taken to have the room sufficiently heated and well ventilated. It is usual to provide one bath-tub for fifteen patients, and where there is a larger number of patients in the ward, the second tub is usually made a portable or hospital bath-tub set on rubber-bound wheels. It is advisable to fit up the fixed bath-tub so as to stand free on all sides, because this enables the nurses to reach the patients more conveniently. The tubs may be porcelain-lined iron tubs, or else solid porcelain tubs. The faucets for the hot and cold supplies should be provided with key valves in charge of the attendant. Each bath-tub should have the supply fittings so arranged as to be suitable for attaching a rubber hand spray.

In hospitals for the insane it is much better to do away with bath-tubs, and to provide instead of these fixtures, a rain or spray bath. This method of bathing insane patients is not only more economical, but it is more effective and sanitary. Good examples of large bath-rooms for the congregate bathing of insane patients may be seen at the Utica and at the Kings Park State Institutions.*

Large municipal hospitals sometimes have a separate bath-house, in which not only the ordinary bathing is done, but where medicated and special forms of bath are given, including Russian and Turkish baths, electrical baths, baths for hydrotherapeutic treatment and the so-called "permanent" water-baths. The plumbing of such establishments is very often quite elaborate and expensive and requires separate and special treatment.

Ward lavatories should be arranged in a separate room adjoining the ward. It is not a sanitary practice to place the lavatories in the toilet-room; they may, however, be placed in the bath-room. One wash-basin is provided for every seven or ten patients. The best hospital lavatories are those made of solid porcelain with rounded edges and corners and set to stand free from the tiled wall. Next in order of merit are the iron lavatories white enameled all over, which are now obtainable in a large variety of useful and pleasing designs. The basin should be quick-emptying, and all secret-waste valves or concealed-overflow pipes should be avoided. The lavatories for insane patients should have detachable key handles for the hot-water faucet to prevent scalding.

WM. PAUL GERHARD.

*See the author's special pamphlets on the subject of rain-baths for insane hospitals.

PROPOSED SCHOOL OF FINE ARTS FOR NEW YORK.

PRESIDENT BUTLER, of Columbia University, has recently addressed to Mr. Frederick Dielman, President of the National Academy of Design, the following very interesting communication:

"Columbia University is ready and willing to bear its part in the creation of a great school of fine arts of the highest grade in the City of New York. It is my hope that such a school can be brought into existence by the co-operation of existing institutions in a manner that will prove most effective and satisfactory. I have in mind co-operation between the University and the Metropolitan Museum of Art, on the one hand, and between the University and the Academy of Design, on the other. I would have the co-operation between the University and the Museum take the form of building up at the Museum collections which shall have educational as well as exhibition value, and that shall be used for educational as well as for exhibition purposes.

"I would have University lectures upon the history of art, both in general and in its special forms, upon archæology, and upon inscriptions, held at the Museum in the presence of the objects themselves, by the best expert teachers and scholars that the University can obtain. I would have the University itself organize carefully and develop its instruction in the principles of æsthetics, in the history of art as an element in civilization, and in all the auxiliary subjects which contribute to the information appropriate to the making of a scholarly artist.

"On the other hand, it seems to me quite clear that the history of art education shows that artists can only be made by artists, and that the personal contact between pupil and master, which was so effective an element in the development of the artists of the Middle Ages, is the secret of the process. To this end I propose the formal co-operation of the University and the Academy of Design, in order that the arts of painting, sculpture and decoration may be taught as University subjects, in a University atmosphere, by the best masters of painting, sculpture and decoration, selected, as they have been by their predecessors in the Academy, because of their achievements and their talent. I have in mind a detailed plan by which it would be possible to effect

this co-operation with but little delay and without interfering in the least with the historical continuity or with the identity of the Academy. . . .

"The University has, after nearly three years of careful study, just announced a plan for the reorganization of its Department of Architecture, which involves the application here on American soil of the atelier system which has proved so successful in Italy and in France. This department of architecture would naturally be included in any school of fine arts that we may build up. Our plans, in their entirety, involve professorships of paintings, of sculpture and of decoration. Where could these be found or provided so appropriately as in the Academy of Design? If such a scheme as I have outlined were approved, and if funds for building were available, the University would be able to go forward with the project at once, and the building suggested would be ready for use at the opening of the academic year in September, 1906."

A somewhat similar communication was sent by President Butler to the Trustees of the Metropolitan Museum of Art, and the President of the Trustees, J. Pierpont Morgan, was authorized to appoint a committee to confer upon the matter with the committee of the Columbia University Trustees, which consists of President Butler, George L. Rives and Seth Low. An outline of the project was submitted to Sir Purdon Clarke when he was recently in New York, and he expressed great satisfaction with it.

If the University's plans in their entirety are carried out, a Fine Arts Building will be erected on South Field, probably on the corner of Broadway and One Hundred and Sixteenth Street, immediately adjoining the Subway station. It is estimated that it will take at least a year after the funds have been procured to erect the building.

THE HARDWOOD SUPPLY IN THE SOUTHWEST.

THE greatest area of hardwood forest and the largest supply of hardwoods in the United States are in the region comprising the Southern Appalachian mountains and the country lying between them and the Mississippi River. For the last two or three years the Bureau of Forestry has been carefully studying this region, which is rich in commercial species, especially yellow poplar, white, red, black and chestnut oak, chestnut, white pine and hemlock. A study was first made of the proportion of each of these species in the various types of forest, their merchantable yield and their rate of growth. Last summer eleven agents of the bureau were assigned to an investigation of the market conditions governing the logging and use of each of these species, and twelve more to a study of the important characteristics of each tree and the possibilities of each under management. The data obtained in this and previous studies are now being formulated for publication. Several bulletins will be issued, one of a general character discussing the conditions of the region as a whole, the others dealing with the several species particularly.

The field study covered more than 400 counties, and included all of Tennessee, Kentucky and West Virginia, the extreme western part of Maryland, the western portions of Virginia and the two Carolinas and the northern parts of Georgia and Alabama. The bureau agents first visited the lumber centers of each county to interview the mill men and lumber dealers. Information was sought especially on these points: The remaining stands of timber and their quality; the annual cut and the uses to which it is put; land and stumpage values, the cost of logging and milling and the prices of the finished product; the methods of logging employed the specifications for timber in common use and how these specifications are changing, and the principal markets for lumber. The object of this preliminary work was to gain a thorough understanding of the market and business conditions prevailing in the hardwood regions. Such knowledge was necessary before the men could go into the woods and work out intelligently the best and most practical methods of handling the forests.

The study of the general forest conditions and the characteristics of each of the important species followed. This study included inquiry into the requirements of each species as to light, soil and moisture, its seeding and reproductive capacity, its form and development in different types of forest and the ways in which the various species affect each other in the competition for place and light; also the present methods of cutting, waste in logging and the effects of logging upon the forest. To determine the chances of natural reproduction under existing logging methods, second growth and culled lands in all stages were carefully studied. The effects of fire and grazing upon the forest were also considered. Until the voluminous data thus obtained have been tabulated and compared absolute figures and conclusions cannot be announced, but sufficient progress has been made to warrant some general statements of conclusions.

For market value and amount of standing timber, yellow poplar and white oak are the two most important trees of the region. These species were formerly found throughout almost the entire region in merchantable quantities, but they have been cut so extensively where there are transportation facilities that it is now usually necessary to go back a long distance into the woods to find first-class stands of either of them. Poplar attains magnificent size in the coves of the mountain districts and in the rich river bottoms of central Tennessee and Kentucky, but its development is reached in the higher mountains of Tennessee and North Carolina. White oak reaches its best development in the river valleys of Tennessee and Kentucky. While poplar always forms a small proportion of the timber of the area, it very often forms a large proportion of the merchantable timber. White oak is present in very much greater numbers than popular over the region as a whole, and occasionally forms over 50 per cent. of the stand.

Lumbering has had a serious effect on the reproduction of both poplar and white oak. When the white oak is cut, as a general rule, it is partially replaced by inferior species, as the red and black oaks. Thus in many cases where the virgin stand contained over 50 per cent. of white oak the second crop contains less than 10 per cent. Often when poplar has been lumbered only the best trees have been cut, and as these were comparatively few in number and occurred at irregular intervals, the forest has not been opened up enough to let in sufficient light to allow young poplars to start growing. In addition poplar seedlings are very easily injured by fire; even slight ground fires kill them. Fires have been very common throughout the region, and thus successful reproduction of poplar has often been greatly hindered.

Hemlock occurs over a small portion of the region, and white pine over a still smaller part; both confine themselves to the mountainous sections. As a rule hemlock has not been considered merchantable because it is generally impossible to log and sell it in Northern markets in competition with hemlock from Michigan and Pennsylvania. The little remaining white pine is lumbered in a few localities on a large scale, and the supply will soon be exhausted.

Chestnut is very abundant. It forms a large proportion of the stand in the mountain districts, but decreases in quantity westward until it practically disappears in western Tennessee and Kentucky. Mature chestnut is damaged more severely by fire than any of the other species of the region. A considerable part of its mature timber is defective for this reason. Much of the timber is also wormy. In the past but little chestnut has been cut for lumber, but the output is now increasing. A new use for chestnut, which has developed very rapidly in the last few years, is for making tannin extract. For this purpose all grades and sizes of chestnut above about five inches in diameter are used. There are a number of factories making the extract, one of which consumes 150 cords of this wood daily. This industry makes possible the utilization of the limbs and tops and the defective chestnut which would otherwise be wasted, and materially assists in conservative management by making this timber more valuable and cleaner logging practicable.

Chestnut oak is abundant in the mountains, its stand decreasing westward. It is confined chiefly to the ridges, and in most sections is short-bodied and of little value for saw-logs. It is usually expensive to lumber because of its inaccessibility. The chief value of chestnut oak in this region has been for tan-bark, for which in some places it has been largely cut.—*Manufacturers' Record.*

LIABILITIES OF ARCHITECTS AND SURVEYORS.

PROFESSIONAL responsibility, as it relates to the duties of the architect and surveyor, must always be more or less a question of fact and evidence, as the legal definitions and decisions by no means determine it. An architect prepares a design and superintends the erection of a house; the client approves the plans; but when it is built certain defects of construction manifest themselves: the walls of basement allow the moisture to percolate, rendering the cellars too damp for the storage of any goods that ought to be kept dry. Is the architect responsible? No doubt he is, if it can be proved there has been the omission of some precaution, like damp-proof courses, subsoil drains, or areas, which the site rendered necessary; or if it can

be shown there has been a dereliction of duty on his part in seeing that proper materials were used. But the difficulty will always be to ascertain and prove these points in certain cases. If the sections or plans do not provide for proper means of drainage or damp-proof courses, and the specification says nothing about them, it may be taken for granted that sufficient skill has not been exercised in their preparation, and the architect could be held liable. But such evidence is not always forthcoming. Even if the drawings do not show the damp-courses, or drains, the specification may have a clause providing them, and it would hardly be fair to charge the architect with want of skill or neglect. The legal definition which applies to all skilled labor is, "that a man who undertakes to perform it also impliedly undertakes to bring to the exercise of it a reasonable degree of care and skill." But how is the word "reasonable" to be defined? It is a term that may vary according to circumstances, for, on certain conditions, as when the architect specified a thing but unavoidably could not see the way it was carried out, he could not be charged with want of reasonable skill; whereas, if he omitted to specify anything of importance, the phrase might be applicable. A want of "reasonable care and skill" might be maintained against an architect for designing an arch with insufficient abutment, thereby causing it to give way; but he could scarcely be held responsible for neglecting to see that the foundations specified were not adequately carried out. "Reasonable care and skill" would also vary in degree with the circumstances of the particular building, as, for example, whether there was a responsible clerk of works, whether the building was near to or far from the architect's place of business; whether the particular work was of an ordinary or highly specialized kind, which an architect could not be expected to understand. Wiles, J., in his definition, says: "There is, on his part (the architect's), an implied warranty that he is of skill reasonably competent for the task he undertakes." But this definition does not bring us nearer to a solution of the difficulty, as the same word "reasonably" occurs, which is ambiguous. Mr. E. Morten, barrister-at-law, in a paper read before the Surveyors' Institution the other day on "Surveyors' Reports and Certificates," to which we may refer, said: "Some test of negligence of general application was desirable, which could be adopted in every case, whatever the circumstances, and he suggested that the decision of Tindal, C. J., afforded such a test. After pointing out that the question whether reasonable and proper care, skill and judgment, had been exercised, was a question of fact, the learned judge went on to say, that this depended on the further inquiry, whether other persons of experience and skill in the same calling or profession would have come to the same conclusion. But Mr. Morten feared that this overlooked the difficulty arising out of the natural repugnance of members of any profession to give evidence against their fellow members, and the liability of their evidence in their favor to be received "with considerable caution." Subject to this, however, he thought "the test appeared to be the only practical one, as entitling the surveyor whose skill was disputed to be judged by members of his own profession." He pointed out, however, that the circumstances of every case must be considered, and it must always be remembered that a surveyor often undertook work which entailed collateral knowledge not required in his ordinary duties, and reasonable skill in such cases involved such knowledge; and the surveyor impliedly warranted that he had it, as without such knowledge he could not undertake the work. Although this remark was intended to apply to the surveyor, it equally appertains to the architect's work. Mr. Morten quoted the case of "Jenkins *v.* Betham" as a good illustration of this ruling. The duty, as was pointed out, of the professional man was a qualified, not an absolute, duty. Absolute accuracy was not guaranteed; but the surveyors undertook that his reports and certificates should be accurate as far as reasonable skill and care could make them. The law does not require expert skill. An authority says: "A professional man does not undertake to use the *highest possible* degree of skill; he does undertake in the practice of his profession to use a fair, reasonable and competent degree of skill. And in any given case involving a charge of negligence or unskilfulness, it will be for the jury to say whether the injury complained of really was occasioned by the want of such care and skill in the defendant." These legal opinions, it must be admitted, are rather conflicting. We certainly think that the evidence of persons of experience and skill in the same profession is necessary to decide points of alleged negligence. The architect, no less than the surveyor, has to bring to the performance of his work collateral knowledge not necessary in his ordinary duties. Thus he must know engineering details sufficiently as to enable him to carry out special designs; mechanical plant and electrical installations have to be understood by him, and "reasonable skill" involves such knowledge. According to this, an architect engaged to carry out a building in which electric lighting is provided ought to be competent to understand the conditions and essentials of this branch of engineering before he can certify that it has been properly done; and so of any other special branch. Though it has been decided the certificate of an architect is final as between builder and building owner, it is not as between architect and building owner, to whom the architect is liable if he negligently fail to exercise proper supervision over builder, or to certify for more than is due to him. No doubt this is a view of the architect's responsibility, which will appear rather exacting for an architect cannot always be able to detect an error in wiring, or some other detail of an installation; and so with other special trades of a technical kind, which may yet be so far complete as to satisfy him that the work is properly done. In such cases he would have to pull up and examine the work everywhere before he gave a certificate. Judge Bayley says: "Skill includes judgment. When a person is employed on a work of skill, the employer buys both his labor and his judgment. He ought not to undertake the work if it cannot succeed, and he should know whether it will or not." These several *dicta* are not conclusive. A great many of the buildings in which the architect is engaged impose upon him special duties which cannot always be measured by terms and phrases more or less ambiguous. The remarks in the paper to which we refer dealt chiefly with the liability of the surveyor in these questions. The importance of the work of the surveyor, the enormous value of landed property with which he has to deal and report upon, in some respects make his liability even heavier than that of the architect. Parliament had entrusted, it was pointed out, to surveyors important duties under the Land Clauses Act of 1845, the Ecclesiastical Dilapidations Act, 1871, and the Trustee Act, 1893, and such work, it is true, carries with it considerable liability.

The surveyor was liable for the accuracy of his reports and certificates. Questions of compensation, of valuation, etc., demanded skill, and often called for collateral knowledge, and if the client suffered owing to want of such special knowledge he would have a cause for action against the surveyor. Absolute accuracy of their reports and certificates was not demanded nor guaranteed; but this qualified duty arose only out of contract, so that the surveyor was not liable for any breach of it except to persons he had contracted with. He was not responsible to persons with whom he had no contractual relations. One important case was cited of interest to the profession, the "Columbus Company *v.* Clowes, 1903." The plaintiff company employed the defendant to prepare plans for a building on a given site. The defendant neglected to measure the site, and believing the dimensions of it were less than they really were, prepared plans accordingly, and had the quantities taken out. Plaintiffs paid defendant, but were unable for lack of funds to erect the building, and parted with their interest in the land. Afterwards they discovered that the plans and quantities were incorrect, and brought an action for the return of money paid, or in the alternative for damages for negligence. Justice Wright held that the plaintiffs were not entitled to the return of their money, and that it was clear, as far as the plans were concerned, they had suffered no real damage, since they could not make use of the plans, and he awarded them 40s. in respect of them. A surveyor's position under a contract was for some purposes that of a quasi-arbitrator, and when this was so he was not liable to his employer for negligence, as he was exercising judicial function, as in the case of "Chambers *v.* Goldthorpe." The question is an important one for both architect and surveyor. In the cases referred to, Lord Justice Collins's judgment and that of his colleagues showed that the architect who, under a contract, has to give a certificate which is to be final and binding on both the employer and other parties to the contract, is placed in "a position in which it is his duty to exercise his judgment impartially as between the parties to the contract. No one disputes that for many purposes the architect is the agent of the building owner, and would therefore be liable to an action for negligence; but it is not inconsistent with that proposition that, for some purposes, he should assume the *rôle* of a quasi-arbitrator, in which case an action will not lie against him for negligence." Under these circumstances, it is pointed out, surveyors would be freed from liability for negligence, and his liability was made to depend not upon his contract with his employer, but on the employer's contract with a third person. As pointed out, the Statute of Limitations, as it referred

to surveyors' liability, began to run from the date of the neglect of breach of duty, and not from the occurrence of actual damage. Of course, a surveyor was held liable for the errors of his clerks on matters of calculations or measurements. "When the surveyor adopted work done for him by others, or acted upon information derived for him by others, he took the risk." The case of "Colls *v.* Hume and Colonial Stores, Ltd.," 1904, was also referred to, in which the House of Lords laid down a rule which will govern questions of ancient lights in future—a principle to which we have before alluded. Claims for compensation in regard to land constitute a large and daily increasing part of the surveyor's duties. Surveyors are called upon to report on the value of strips of land not available for building or other remunerative purpose. The author of the paper said surveyors forget sometimes "that the difference between the value of the whole and that which is left includes the value both of the land taken and of the injury to the rest. To put a substantial value on the land taken first, and then to get at the injury to the part left by saying, for instance, that the property was worth £60 a year, and will in future be worth only £50 a year, and by capitalizing the difference of £10, is to include twice over in the valuation the value of the land taken." It is necessary, in fact, to value separately the land taken, which has a value of its own, and the injury to the land affected. In some cases, however, the land taken depends for its value on the remaining portion, and in these circumstances the mistake mentioned is likely to occur. The responsibility of surveyors called upon to advise trustees was also discussed, and its importance can scarcely be over-estimated; for the law allows a trustee lending money upon the security of land to shift some of his responsibility on to the shoulders of his surveyor. Other cases of interest to the surveyor were mentioned in the paper to which we have referred; but the chief question which concerns us is on what principle the care and skill of the surveyor or architect can be ascertained in varying circumstances. We do not think it possible to discover any one standard of these qualities that would be reasonable in particular cases. "Reasonable care and skill" are only relative terms; for what may be considered reasonable in one case may be quite unreasonable in another, and the only practical method appears to be found in the rule of Tindal before mentioned, of taking the practical evidence of other men in the profession, always supposing that the facts and particular circumstances of each case are considered.—*The Building News.*

ILLUSTRATIONS

MOUNT SINAI HOSPITAL, FIFTH AVE., 101ST ST. AND MADISON AVE., NEW YORK, N. Y. MR. ARNOLD W. BRUNNER, ARCHITECT, NEW YORK, N. Y.

ENTRANCE PAVILION OF THE SAME.

BLOCK PLAN OF THE SAME, SHOWING PIPING SYSTEMS AS LAID OUT BY MR. WM. PAUL GERHARD, CONSULTING ENGINEER, NEW YORK, N. Y.

STABLE OF C. S. HOUGHTON, ESQ., SUFFOLK ROAD, NEWTON, MASS. MESSRS. CHAPMAN AND FRASER, ARCHITECTS, BOSTON, MASS.

STABLE GATEWAY TO THE SAME.

A SKETCH AT PALERMO, SICILY, BY MR. AXEL HAIG.

Although Mr. Haig's superb architecture etchings are well known to most, few know of his earlier work when he was an architectural draughtsman, so THE ARCHITECT is doing a useful thing in publishing as a series of "Continental Sketches," of which this is one, some of the work of his younger days.

RESIDENCE OF EDWARD THAW, ESQ., EAST 89TH ST., NEW YORK, N. Y. MESSRS. ISRAELS AND HOSLER, ARCHITECTS, NEW YORK, N. Y.

DETAILS OF THE SAME.

Additional Illustrations In the International Edition.

GRAND ENTRANCE HALL: METROPOLITAN MUSEUM OF ART, NEW YORK, N. Y. R. M. HUNT, ARCHITECT.

NOTES AND CLIPPINGS.

THE OWNER RESPONSIBLE FOR "GRAFT."—The New York *Times*, commenting on the recommendations of the commission recently appointed to investigate the failure of certain buildings in New York, says: "We do not agree with President Ahearn's Commissioners that the enactment of a law along these lines would secure competent architectural supervision and capable contractors for all classes of buildings. Nothing of the sort would result or has ever resulted from like legislation. For example, no person can practise medicine in New York without as good credentials as would be demanded in the case of an architect; but medical malpractice is not unknown, and fees large enough will pay for crime. Lawyers must pass examinations and be admitted to the bar on good credentials; but these safeguards have not kept out of the profession men who live by practices which disgrace it. To be a plumber a man must be duly registered after examination; but one who wants the kind of work done which makes houses unsafe to live in can get it from these same certified plumbers—or some of them. Often he gets it when he wants and pays for something different. And so it is all along the line. The rules relative to the practise of architecture, contracting and building could not be made so stringent that they would not include a great many in each class who would continue to do just what they are now doing, if owners wanted it done. Finally, if ten times the present number of inspectors was employed at ten times the salaries now paid, the 'graft' would continue to flourish in all that pertains to building operations, and as soon as the trade had adapted itself to the new conditions things would go on as before. The evils which now afflict the building trades of New York will be cured in one of two ways: by an awakening of the public conscience and the erection of new ethical and moral standards in the building trades, or by so amending the laws that owners can be held criminally responsible for deliberate violations of the code enacted for their government in building operations. The former we perhaps cannot hope for; the latter is perfectly possible when the public demands it. They do these things better in Berlin. To attempt to stop the present flood of corruption in building operations in New York without fixing responsibility upon the owner is as futile as to bind Niagara with threads of spool cotton."

A CONCRETE ARCH BRIDGE.—The largest reinforced concrete arch bridge is Gurenwald Bridge over the Isar, near Munich, Bavaria, which was opened for traffic towards the close of last year. It has two main spans constituting three-hinged arches, and a number of small girder spans, all of reinforced concrete. The two main spans are each 230 ft., with a rise of 42 ft. and a width of 26.2 ft. from center to center of hinges. The five girder spans are each 28 ft. in the clear. The roadway is 30 ft. wide. The total length of the bridge is about 720 ft. The structure is a highway bridge, and was designed for a live load of 82 lbs. per sq. ft. uniform, and a 22-ton steam road roller. The hinges of the main arches are of steel castings with a convex-concave rolling surface. The "open spandrel" style of construction has been adopted to reduce the dead load as much as possible. The thickness of the arch ring (which at the crown is only 30 in., at the springing lines 36 in., and at the thickest portion—about the quarter points—but 48 in. deep) defines results which have barely been reached with stone.—*The Builders' Journal.*

THE RINEHART SCHOLARSHIP IN SCULPTURE.—By the will of William H. Rinehart, of Maryland, sculptor, the principal part of his estate was left to W. T. Walters and B. F. Newcomer, of Baltimore, as trustees, to be devoted to the promotion of sculpture. When this fund, under their skilful care, had reached the sum of $100,000, it was transferred to the permanent control of the trustees of the Peabody Institute, of Baltimore. A part of the income is appropriated to a school for the training of young sculptors in the Maryland Institute. Another part of the income is devoted to the maintenance of European scholarships. The Roman scholarship is now again open to competition. In making their plans and in selecting worthy candidates, the Peabody Institute has been favored with the co-operation of five well-known artists, viz.: J. Q. A. Ward, D. C. French, E. H. Blashfield, Charles F. McKim and A. Saint-Gaudens, who have consented to act as committee of award for this year. The Rinehart scholars of previous years have been A. Phimister Proctor, Charles Keck, H. A. MacNeill, Hans Schuler and J. Maxwell Miller. Any inquiries as to the regulations and conditions of the competition may be addressed to the Rinehart Committee, Peabody Institute, Baltimore, Md. The last day upon which examples of work may be received for examination is May 15. From those who submit their work the jury will select three candidates, who will receive $100 each to assist them in further competition. These three candidates will then prepare for the final scrutiny a relief, upon a prescribed subject, to be executed in plaster, and of such dimensions as the jury shall direct. The completed relief must be delivered not later than October 1. For further information the intending competitors should consult the printed circular of regulations issued by the committee.—*Boston Transcript.*

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CONTENTS

WHEN ten thousand employers and eighty-five thousand mechanics through the elected officials of their severally associated bodies agree, as they did last week, that, for a stated time, there shall be neither strike nor lockout, it would look as if the building interests of New York and its vicinity were to enjoy for a while a little whiff of millennial prosperity. But it must ever be kept in mind that the high contracting parties are not archangels but mere human beings who have an unfortunate habit of feeling that their freedom of individual action is not to be made subservient to any joint agreement if their selfish personal interests dictate another course. Still, it is a real relief to know that the Building Trades Employers' Association and the thirty-two unions of building mechanics have at length come to terms and agreed to a plan of arbitrating disputes between them under which operations shall not be interrupted by strike or lockout. Of course, architects will understand, if the public does not, on reading that the employers bind themselves to employ only members of the trade unions within New York territory that the new agreement goes far to establish a very powerful "building trust," which will have completely at its mercy the vast building interests of the metropolis. At any rate, all chance of the "open shop," which we hoped might be the actual outcome of the long struggle and consequent stagnation, must be for the moment allowed to drop. It is the owner, the investor, who is now master of the situation. If he does not choose to build, because of the high price that may be exacted by the trust, the open shop may have a being after all.

A PETITION has just been presented to Mr. Nicholas J. Hayes, Fire Commissioner of New York, by a number of leading building contractors and architects, asking his aid in bringing about the abrogation of that section of the Building Code that allows the use of wood in buildings over one hundred and fifty feet in height only in the case that such wood shall have been "fireproofed" by some process approved by the Department of Buildings. The grounds upon which relief is sought are well chosen and, we believe, sound. It is alleged that there are only three plants engaged in fireproofing wood, the capacity of which is far from being equal to the demand, the consequence being that, in the haste under which the work is done, the wood is only imperfectly treated, and it is even suspected untreated wood is often mixed with treated wood in order to fill a rush order. Next, the petitioners have no great faith in the treated wood at its best, but are satisfied that it deteriorates with time, the chemicals exuding and evaporating, or, in the case of flooring, being gradually washed away by the weekly floor-scrubbings. Added to this the treatment makes the wood hard to work under the tool, brittle, and there is reason to believe that not only is there an initial loss of strength during the actual process but that deterioration continues progressively. It would have been better not to adduce the argument that, since the ordinary combustible contents of stores and offices could generate a very considerable heat, the modern fireproof building would not suffer materially if the finish and doors of untreated wood were allowed to burn at the same time, since their bulk was relatively so insignificant.

IT has always seemed to us that architects put unnecessary importance on the matter of the ownership of drawings, and that, really, the question was of greater academic than practical concern. In only two cases where the architect is concerned is it of importance that the owner should not have the custody of the drawings, first in the case of alterations, where the original designer has a natural preference that he should be allowed to amend or expand his own design, and, second, where the owner desires to duplicate the building—get a double service for a single payment, that is. Apart from other considerations, the architect is the safer, if not more natural custodian of the drawings, as would be found if an owner in possession of the drawings should find them burned up in the fire that had destroyed his building, so causing a delay in the process of rebuilding. If on the other hand fire destroyed the architect's office, it would be found that, if his office were properly equipped, all his clients' drawings were safe in the fireproof vault. But too many architects are forced to occupy offices unprovided with sufficiently capacious fireproof vaults, and a fire occurring in such an office might do very real injury to many clients. It should, therefore, it would seem, be the part of architects so placed to free themselves from the guardianship of drawings which, nine times out of ten, merely cumber otherwise usable space. Clients, on the other hand, who are willing to intrust to their architects the custody of drawings should for their safety exact an understanding that these shall be kept stored in a secure vault. The restless mobility of the American nature has its effect on a consideration of this vexed question. If it were the recognized custom for the owner to be custodian then, in the case of a change of ownership, the plans would be required to pass with the

Entered at the Post Office at New York as second-class matter.

title-deeds. It must be very rarely that the seller of a building takes the trouble to tell the purchaser what architect designed the structure. In such case the new owner desiring to make alterations and finding the building is not "signed," like a picture, naturally gives the job to his favorite architect, who may chance to have an office alongside of the original designer, who, hearing that his building is being meddled with, at once charges interloping and a breach of the code of professional ethics. Suppose, on the other hand, it is the architect who, custodian of the drawings, chooses to move his office to another State or to sink his identity by becoming the unnamed "Co." of a new firm. How shall the client in legitimate need of the original drawings get track of them? It is obvious that the proper place of custody of architectural drawings has its practical aspects, but these are not the ones that one hears of when architects debate the matter with one another.

WE had believed that the interest we have so often expressed in the anopheles mosquito—and we recognize that we ought not to use that term any more than speak of anthracite coal—rested on general sanitary principles. But we find, quite unexpectedly, that those connected with the building interests may be tempted to come forward as protectors of the insect pest, since it seems that just as Joseph found he could not make bricks without straw, so certain New England brickmakers find they cannot make bricks without breeding the anopheles. It appears, from their point of view, that if we are to have bricks we must have malaria, or if we prefer to be healthy then we must do without bricks. The intelligent Board of Health of Belmont, Mass., discovering that the old clay pits of the New England Brick Company in that town were famous breeding-places of the insect pest, and the direct cause of the many cases of malaria in the town, in 1902 passed an ordinance forbidding the opening of clay pits in the town except in the land that had been worked for some sixteen years by the Brick Company. This concern later bought several acres of land adjoining its old property and proceeded to open new pits, whereupon the Board of Health applied for an injunction. Judge Pierce denied the application, but reported the case to the full bench for final adjudication. As we understand it, the authorities do not mean to be unreasonable and are not trying to drive the brickmakers out of town. Apparently they have proof that the industry is a dangerous one to the health of the community and hence must be conducted with proper safeguards, among these being the refilling of the worked-out pits with clean material so that stagnant water may not collect. But as to do this would put the brickmakers to some expense, they, with the selfish obtuseness of business men, decline to obey and apparently the court inclines to uphold them in their refusal. But the anopheles may yet cause a rise in the price of brick thereabouts.

AT one of the "hearings" to fix the height-limit of buildings about Copley Square, Boston, we exhibited a large drawing, specially prepared for the purpose, showing what would be the effect upon the Public Library of not limiting the height of buildings that might be built immediately behind it. The drawing proved a more effective argument than we had hoped, and the matter seemed to be going our way, until the counsel on the other side asked at what height the point-of-sight had been taken; then it came to light that the draughtsman, to make his effects more impressive, had taken the view from the first-story level in place of from the sidewalk—a discovery which rather lessened the impressiveness of the object-lesson. But the evil we apprehended has come into being, and an architect writes complainingly to the Boston *Transcript* because "over the crested roof of the Library looms the hideous top-hamper of the new B. A. A. extension, utterly destroying the former symmetry afforded by the sky-lines of the roof." As the only means of remedying, or obliterating, the evil he suggests that the architects be invited to design some form of glazed monitor roof over the great central court of the Library, the effect of which would be, on the one hand, to hide the unsightly party-walls behind it, and, on the other, to make the court-yard usable and enjoyable in the early spring and late autumn, as well as in mid-summer as now. Although it would tax the designer's skill to produce a screen that would not injuriously affect the proportions of the present building as seen from Copley Square, it might be worth while to make the attempt—on paper.

A RECENT issue of one of the English architectural journals contains the curious information that a certain Chicago architect has asked the Secretary of the Royal Institute of British Architects to put him into confidential connection with some able and well trained young man willing to emigrate to Chicago, and capable of filling there an assistant's berth. The letter is interesting for several reasons: for one thing, it asks for "architectural students, from twenty-five to thirty-five years of age," which seems to indicate that the years of English pupillage extend farther into life than is generally understood. In the second place, it declares that Chicago architects suffer from a scarcity of assistants, particularly those thoroughly trained in England. The complaint, if well founded, might be held to be a reflection on the training given in the American architectural schools; but we fancy that the real explanation lies in the fact that most well trained Americans competent to fill an assistant's place feel it is their right to open their own offices long before they reach the thirty-five year limit, which is here set as the halting point for the student.

ALTHOUGH it is not likely that the people of Boston would allow the present proprietors of King's Chapel to be ousted for any reason, it probably gave these owners an added sense of security when there was found last month, hidden under the planking just behind the pulpit, a small iron box containing, amongst other valuable records, the original deed for the site on which the Chapel stands. One would suppose that during the repairs and alterations the building has undergone the flooring must have been relaid more than once, and the non-discovery of the box at such times is as strange as its recovery just now is curious and interesting.

HOSPITAL SANITATION—II.

I HAVE already mentioned that the practice of providing separate toilets, baths and lavatories for nurses is to be commended. In large hospitals these are often located in a separate building devoted entirely to the housing of the nurses. The bath-rooms for the medical staff, the executive officers and the clerks of the hospital do not differ in any respect from those for ordinary dwelling-houses, hence it is not necessary to discuss them separately.

The operating-rooms of hospitals are nowadays always provided and fitted up with all the refinements of modern aseptic

FIG. 5.

surgery (see Figs. 2, 3, 5, 6, 7 and 8). Such rooms are of particular importance, and require the best and safest plumbing work in order to avoid the possibility of blood-poisoning. The plumbing fixtures in these rooms should not be connected directly with the sewer, but should discharge over a trapped basement or cellar sink in much the same way as is done with refrigerator-wastes. The surgical sinks are nearly always solid porcelain fixtures with glazed roll rim (see Fig. 9). Sometimes the fixture contains in itself a glazed porcelain drain board, in other cases the latter is made of Alberene stone or of glass. The supply fixtures, and sometimes the waste fitting, are arranged to be operated either by pedal valves set on the floor (see Fig. 5),

FIG. 6.

or by a shift lever operated by the knee. The washstands are often glass bowls (see Fig. 5 and Fig. 7) fitted up in connection with glass slabs and with pedal-action fittings. Solid porcelain washstands are also much in use. Sterilizing apparatus must be provided for hot and cold water, besides the sterilizers for surgical instruments and for the surgical dressings and bandages and these require water, gas and steam connections. Conveniently located to the operating-rooms there should be toilet-rooms and wash-rooms for the attending surgeons and for the nurses.

The steward's department of a hospital comprises the kitchen, the scullery, pantry, bakery, store-room and the cold-storage rooms. All these rooms require considerable plumbing and piping. A sufficient number of sinks should be provided for the cooking operations and for the cleaning and scouring of the pots and kettles. The most durable sinks are those of plain cast-iron

FIG. 7.

painted on the outside. Porcelain sinks and the enameled iron sinks are conceded to be more sanitary, but the rough usage to which these fixtures are unavoidably subjected makes it imperative, in the majority of cases, to use less expensive fixtures. To go to the other extreme and provide wooden sinks, which at best last only a few months and then become rotten, leaky and foul smelling is a practice which must be severely condemned. Drain boards for kitchen sinks should be of slate, or of Alberene stone. Besides the cooking apparatus comprising coal and gas ranges, broilers, steam-tables, etc., a large number of special fixtures are required, such as vegetable and soup kettles, tea,

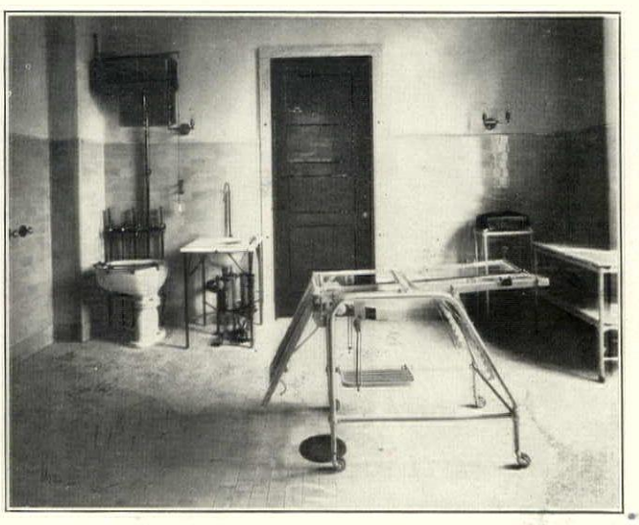

FIG. 8.

coffee and water urns, etc., which also require water, waste, steam and gas connections.

In addition to the sinks large hospitals sometimes have a special dish-washing machine, which effects a considerable saving in labor; this may be run either by steam or by an electrical motor. Pantries require sinks for the washing of the glasses, cups, saucers and plates. The most serviceable sinks are those of a soft metal, such as planished copper, for however cleanly the white porcelain sinks may be, they cause the breakage of too much china and glass to be desirable.

[1]Continued from page 129, No. 1530.

*Figs. 2 to 9 are views of the Mt. Sinai Hospital, taken with permission of the architect by the J. L. Mott Iron Works, who furnished many of the fixtures in the buildings. The author is under obligation to this firm for the use of these photographs.—W. P. G.

Pantries are also provided in each hospital ward and are generally fitted up with a refrigerator, a gas cooker, a steam plate-warmer and a copper sink. The plumbing of the bakery is usually very simple in character. Particular attention should be paid to the proper and sanitary arrangement of the cold-storage rooms and refrigerators. These should never have any direct connection with the sewer or drain.

The laundry should be separated from the hospital wards and

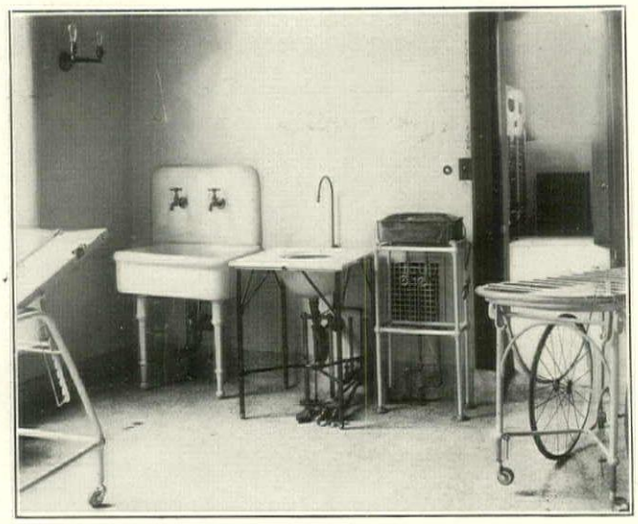

FIG. 9.

also from the kitchen; in large hospitals a special building is usually provided, as the washing operations require a large floor-space and a number of separate rooms. The plumbing comprises a set of wash-tubs, which may be of solid porcelain or of Alberene stone. Wooden wash-tubs are an abomination and should not be tolerated. Other plumbing connections necessary are wastes and supplies for the washing machines, wastes for the centrifugal dryers and sundry connections.

The power-house should contain the boiler installation, storage-rooms for fuel, the dynamos and engines for electric lighting, the house and fire pumps, the suction and pressure tanks, sometimes the hot-water apparatus, and the large water-filters.

The autopsy-room requires a surgical sink and glass slabs, also a dissecting-table (see Fig. 10), which may be of marble, glass or of glazed solid porcelain, and which should have a waste connection as well as supplies. The Pathological Department of a large hospital contains a number of laboratories and requires much special plumbing for the chemical sinks and tables.

The dispensary and drug-store require, according to size, a more or less larger number of sinks, basins, drain boards and

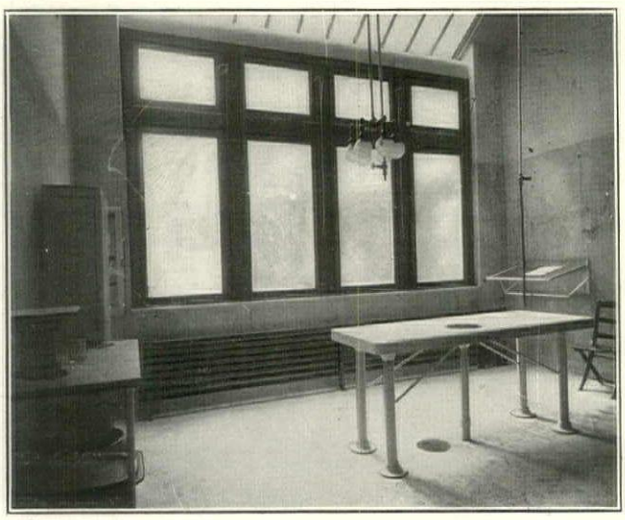

FIG. 10.

shelves. These are usually made of Alberene stone, because this material is non-absorbent and resists efficiently the action of the chemicals. Where there is a public dispensary there should be near the waiting-room separate toilet-rooms for men and women. Larger dispensaries have quite extensive plumbing in the examining and smaller operating rooms (see Fig. 8). Each hospital requires for its management a certain number of male and female help, for whom suitable toilet and lavatory accommodations should be provided. These rooms require the same attention to details in the execution of the work and provision of durable sanitary fixtures as the ward toilet-rooms.

Every modern hospital is provided with a garbage-cremator and also with a disinfecting-station. The latter room requires a sink and also a spray bath for the use of the attendants. In the ward or building for infectious diseases it is sometimes required to make provision for special disinfection of the excreta and the sputum of patients, which disinfection is usually accomplished by steam, often with the addition of chemical disinfectants.

The illustrations accompanying this article show examples of hospital work as actually carried out.

The plan illustrated in our issue for April 22 shows the general layout and arrangement of the group of buildings known as the new Mt. Sinai Hospital, a large modern city hospital in N. Y., for which Mr. A. W. Brunner was the architect, and the writer the consulting sanitary expert. These buildings comprise a five-story Administration Building; a five-story Medical Building;

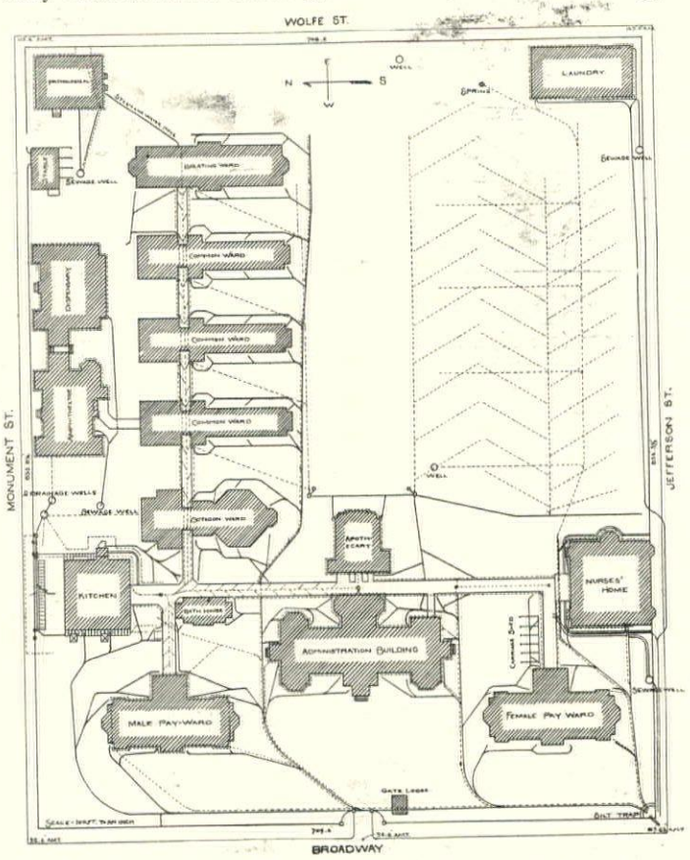

FIG. 11.—JOHNS HOPKINS HOSPITAL, BALTIMORE, MD.

a similar Surgical Building; a large Private Hospital; a special Children's Hospital; a detached Pavilion for infectious diseases; a special Pathological-Laboratory Building; a three-story Dispensary Building; a six-story Nurses' Building; and a Kitchen and Laundry Building, in the basement of which is a part of the power plant, and the upper part of which is occupied by the hospital help. The plan shows the sewer connections, the gas connections and the general arrangement of the water supply. Only the lower floors are supplied from direct street pressure, while the upper floors are fed from two large house reservoirs in the attic of the highest, the Administration, building. The water is pumped to the tanks by means of compound direct-acting steam-pumps and there is also a large Underwriter's fire-pump, capable of supplying three efficient fire streams. The entire water-supply of the hospital is filtered through large mechanical or pressure filters, of which there are four sets, one for each of the four water services.

The large operating theatre of this hospital is shown in two views taken from opposite sides of the room, Figs. 2 and 3. In Fig. 6 is shown a detail of this large operating-room, comprising a "Clinic slop-sink," a glass surgical wash-basin with pedal valves and a surgical glass pan, over which are located special hot and cold water faucets for sterilized water. The room is provided

with several floor drains and the walls and even the ceiling are executed in marble. The entire room can be flushed by means of a hose.

Besides the large or main operating-room there are in the top floor of the Administration Building four other smaller operating-rooms, and a view of one of these is given in Figure 6. The plumbing comprises two glass surgical washstands with pedal-action valves and a Clinic slop-sink.

In the Dispensary Building there is another operating-room, a view of which is shown in Figure 8. The fixtures are similar to those in the rooms previously described. The room has a brass floor drain, and can be washed by means of a hose.

The autopsy room is located in the Pathological Building. A part of this room with the mortuary or dissecting table of marble is shown in Figure 10.

The same building contains several large chemical, bacteriological and physiological laboratories. The tables have shelves and troughs of Alberene stone, numerous gas and water taps, also taps for compressed air, and at the end of each trough a solid porcelain receiving vessel for the chemical wastes. This is provided with a lead waste and lead trap, the same being disconnected from the general plumbing system, and made to discharge like a safe waste over a sink on a lower floor.

Figure 4 illustrates part of the general wash room for ward patients. It also shows the special nurses' Clinic slop-sink and the wash-tub. There are a number of these rooms in the Medical and Surgical Buildings.*

In plan, Figure 12, is shown the general layout and the water supply, sewerage and rain water drainage systems of the New Roper Hospital at Charleston, S. C., now in course of alteration and reconstruction, and of which Mr. Wm. Martin Aiken is the architect.

Figure 1 is a plan drawn to a larger scale of the water-supply plant of the Mt. Sinai Hospital. It shows the location of the four double-cylinder pressure filters, of the four suction tanks and of the pumping apparatus, which comprise two house pumps and one fire pump. The floor of the pump and filter room is tiled, graded and drained by a floor drain.

Figure 11 is a block plan of the Johns Hopkins Hospital at Baltimore, Md., reproduced from a plate of the work describing the hospital. It should be noticed that in this case the group of buildings has a double system of sewerage, one for rain water, shown in full lines, which is connected with the street rain water conduits, and another system for the sewage proper. Inasmuch as the city of Baltimore has no foul-water sewers it became necessary to discharge the sewage into a number of large and deep cesspools (which are called "wells" on the plan). It is admitted that the system is not a desirable one from a sanitary point of view.

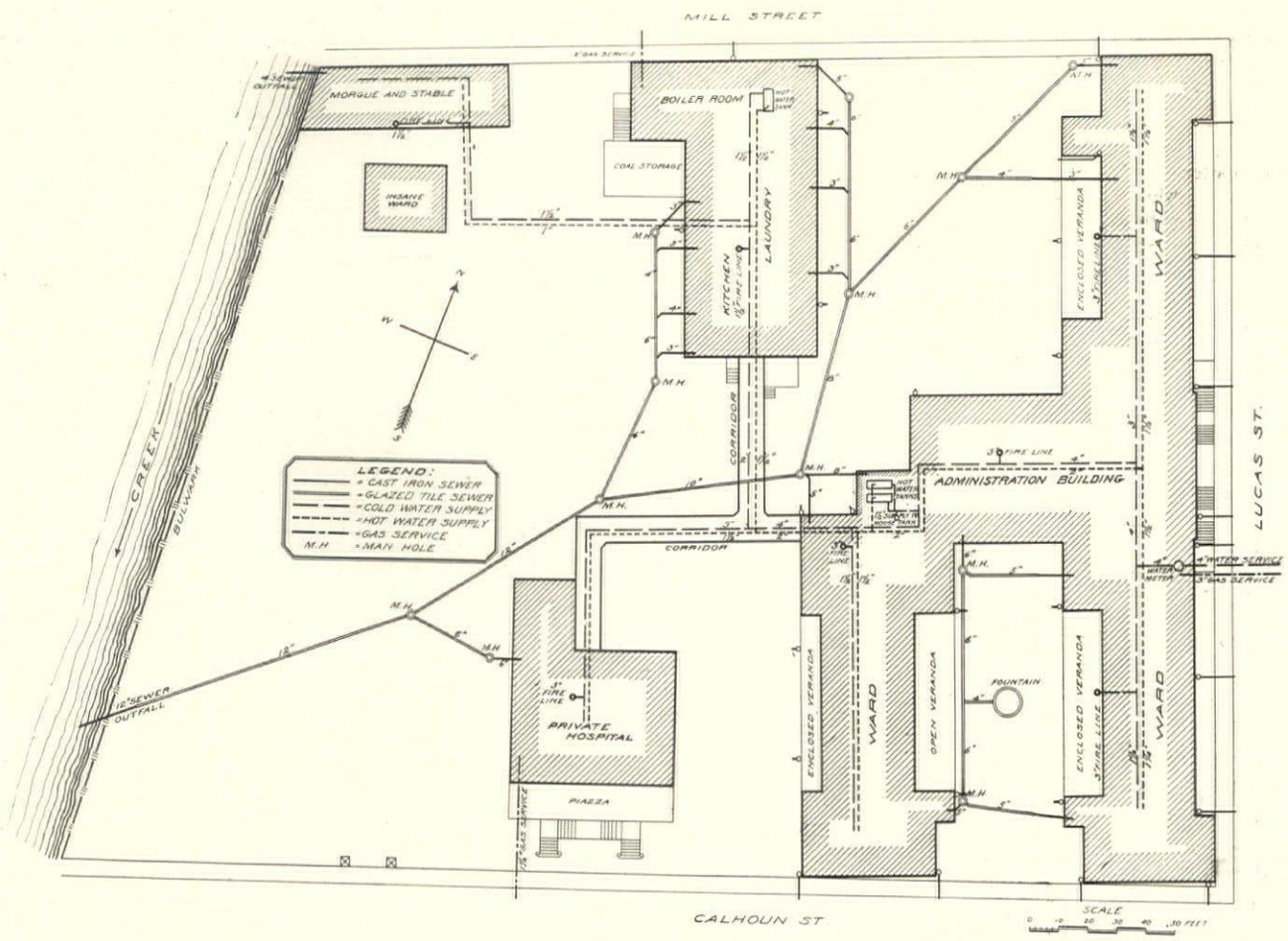

FIG. 12.—ARRANGEMENT OF SEWERAGE, WATER SUPPLY, GAS SERVICE AND FIRE PROTECTION FOR THE ROPER HOSPITAL, CHARLESTON, S. C.

W. M. Aiken, Architect. *W. P. Gebhard, Consulting Engineer.*

Wm. Paul Gerhard.

THE OWNERSHIP OF ARCHITECTS' DRAWINGS.

IN view of the general interest in this matter, it seems worth while to put on record in our own pages not only the fullest abstract we can find of the Court's decision in the case of Gibbon *v.* Pease, but also the editorial comment on the case presented by the leading professional publications in England, *The Builder* and *The Architect.*

[*Editorial from "The Builder" for April* 1.]

The case of Gibbon *v.* Pease has been heard in the Court of Appeal, as reported in our legal column, with the same result as in the original trial. The court ruled that the precedent of Ebdy *v.* McGowan applies in every case, whether the building has been carried out or not, and again refused to hear any evidence from architects who could have thrown some light on a matter on which the learned judges were obviously under much and serious misapprehension.

That Law and Justice are totally distinct things we of course

all know, or ought to know. "I thought your lordship was sitting there to administer justice," exclaimed a disappointed counsel to Lord Ellenborough; and was met by the reply—"Then you ought to know better, sir; I am sitting here to administer the law." And if judges are convinced, on legal grounds, that a particular precedent is the law, and is applicable to the case in hand, they have no choice but to administer the law; they are appointed for that function, and we cannot complain of them for exercising it. But there are one or two things of which we think the architectural profession have a right to complain. One is, that judges who evidently, from their own comments, are entirely unacquainted with the nature of architecture or with the functions of the architect, should nevertheless refuse even to allow those who could explain these things to them to have an opportunity of attempting to do so. It may be said that their explanation would not alter the law. No: but it would put a very different face on the matter. And this consideration is connected with the other complaint which we think architects have a right to make; viz., in regard to the contemptuous spirit in which their claims of this kind are constantly treated in courts of law. A dry report of a law case does not indeed convey this; it is only those who are present in court at cases of this kind who can realize the spirit of ridicule in which English courts will meet claims from architects, the motives and foundation of which the court does not apparently even endeavor to understand. In regard to the Institute, too, over and over again we hear juries told pointedly that they are at liberty to disregard the Institute recommendations as to professional charges. Of course the Institute scale of charges is not law—we all know that; but why are juries almost always encouraged to give no weight to it? Surely they ought to be told the contrary. The Institute of Architects is the representative of a great and honorable profession; its ideas as to a scale of charges represent what the leaders of the profession regard as fair between architect and client, and in that sense they may be considered to be to some extent in the interests of the public also; if they support the architects' claims up to a certain point, they are also a check on exorbitant claims, and have actually, we believe, been appealed to by clients on that ground. Yet they are seldom mentioned in a court of law except to be ridiculed. Why? Surely they form a reasonable presumption on which to assist the judgment of a jury as to what is fair between the parties.

The total misapprehension of judges as to the nature of the architectural profession was even more pointedly illustrated in the appeal case than in the original trial. It seems to be an *idée fixe* with learned judges in this country that an architect is a man who sells drawings, and will not part with them when he has been paid for them. One of the judges in the present case spoke of the drawings as constituting a "chattel," the property in which passed to the building owner when he had paid for it. Another actually cited as a parallel case that of a portrait painted on commission, and said that he supposed if he paid for the portrait it became his property. One learned judge said that he "could not see what interest the architect had in the plans." Well, if the defendants' witnesses had been allowed to give evidence, the judges would perhaps have learned what interest the architect has in them. Then another judge asked "what would happen if the building-owner wished to discover where the drains were laid?" On this point, which was perhaps unexpected, the counsel for the defendant does not seem to have been properly informed, as he merely replied that he supposed the building-owner could ask the architect to let him inspect the plans. There comes again the mischief of not hearing evidence; if the counsel for the defence had had the opportunity to put that question to one of the witnesses for the defence, the court would have learned that it is the usual custom to supply the building-owner with a plan of the drains. But when the judges on the bench hold and express such really absurd misconceptions as to an architect's work and as to the very *raison d'être* of the drawings, and decline any information which might set the matter in its true light, the case is of course hopeless.

We must add, however, that the wording of the Institute document as to professional charges is most unfortunate, and very much increases the difficulty of dealing with the subject. By separately mentioning, in their Clause 5, the drawings and specification as representing the value of half the architect's commission, they have to all appearance, from the legal point of view, implied that which they do not wish to imply, viz., that the architect is paid for making drawings. We know that this was not the intention, but the wording would convey to most people that it was. But this is not the only consequence of that unfortunate piece of drafting. We do not undertake here, of course, to expound the law, but we are informed on good legal authority that if the Professional Charges codex had merely mentioned 5 per cent. on the cost as the proper architect's commission on a building, making the commission "indivisible," without attempting to divide up his work into drawing and superintendence, the legal result would have been that a client who had given a commission to an architect for a building and then abandoned it would have been liable for the whole amount of the commission. No architect, we should hope, would have wished to take advantage of the law to make the whole charge, but he would have had the right to do so, and no question about drawings need have arisen; so that in the drafting of this unfortunate clause the Institute has really been acting against its own interests and those of the profession.

After the experience of the Court of Appeal, it would no doubt be waste of time and money for the defendant in the case to take it to the House of Lords, under present circumstances, at any rate. It now rests with the Institute of Architects to take up the question seriously, and with the determination to see it through, and not to rest until the law is altered. And the first thing for them to do is to thoroughly revise the wording of their document as to professional charges, so as to put it on a more logical footing. After that, they should endeavor to procure legal recognition of it, and get Ebdy *v.* McGowan wiped out. It is that unfortunate precedent, now interpreted in a totally unexpected fashion, which forms the real stumbling-block, and the Institute ought to make up their minds to get it reversed, and not rest till they have done so.

[*Editorial from "The Architect" for March* 31.]

It was remarked by counsel in a case which was heard a few days ago that England was a free country, to which the reply of the judge was, "but subject to law." The words are applicable to architects, and especially when they refer to the retention of plans which are claimed by a building owner. They, like other men, are free to act, and may refuse to part with their plans, but there is no escaping the law on the subject if it should be put into action. It should be remembered that the law takes no special cognizance of architects either as artists or as members of a profession. Surveyors and builders are supposed to have certain duties to perform, but the office of an architect may be said to be unsupported by any Act of Parliament. In that way they resemble the majority of citizens.

One of the consequences is that when a case arises like Gibbon *v.* Pease, which was heard before the Court of Appeal on Friday last, there are few precedents for the guidance of the Court. When first heard by Mr. Justice Ridley, he came to the conclusion that he was bound to follow the decision in the solitary case of Ebdy *v.* McGowan, and decided for the plaintiff. The argument for the defendant on appeal was that the circumstances in Ebdy *v.* McGowan differed from those in Gibbon *v.* Pease. Their lordships, consisting of the Master of the Rolls, Lord Justice Mathew and Lord Justice Cozens-Hardy, also came to the conclusion that the two cases corresponded, and the appeal was dismissed. The inference must therefore be drawn that a building owner never applied to an architect for plans before Mr. McGowan arose, or that architects did not insist on keeping plans until 1870. It may also be added that very few cases of other kinds are to be found which would throw a direct light on the subject. When it is maintained that an important professional privilege is at stake, and that architects are suffering under a grievance which is intolerable, it must be allowed that the records of the courts do not bear out either supposition. As there are only two cases of resistance to a demand for plans, it cannot be said that much suffering has been caused.

The leading case of Ebdy *v.* McGowan, which is likely to become historical, differed from Gibbon *v.* Pease inasmuch as the plaintiff was an architect. The defendant had given him a commission to build a vicarage. Plans and specifications were prepared. Before the contractor's work was undertaken, defendant put an end to the plaintiff's employment as architect. He then requested him to send in his account as well as the plans and specifications. Mr. Ebdy made out his account, but defendant declined to pay unless he received the plans. There was no agreement about the retention of the plans. At the trial plaintiff gave evidence of the custom that in the event of the employment of an architect being stopped he was entitled not only to payment

for the plans but to retain them. Lord Chief Baron Kelly said that if such a custom existed it was not reasonable, and there must be an express stipulation in the contract to that effect in order to make it acceptable in law. According to his lordship, it appeared contrary to reason, good sense and justice that, in the event of a contract being put an end to, the architect should retain the plans for which he was entitled to be paid. Baron Bramwell agreed with the Lord Chief Baron. He said he entertained a very high opinion of architects as a body. But he contended that such a usage as had been pleaded was impossible. He described it in rather unusual language as perfectly suicidal, for as soon as it came into being it cut its throat by its own absurdity. Two or three gentlemen might say there was such a usage, but he would like to see the public in the box and hear what they had to say about it. The result was that the defendant obtained judgment in his favor.

The circumstances in Gibbon *v.* Pease were supposed to be different. The plaintiff claimed the plans prepared for him by the defendant for the conversion of some houses at Bayswater into flats. The work was executed, the architect's fees were paid, and then application was made for the plans and specification. As they were not given up, an action to recover them was brought, and, as we have already said, the trial came before Mr. Justice Ridley. Evidence was given that, according to custom, the plans belonged to the architect. Mr. Justice Ridley would not admit the evidence, believing that the case was governed by Ebdy *v.* McGowan.

When notice of appeal is given after a trial it is generally on the ground that there are other judgments which support a view different from that taken in the case in question. But there is only one to rely on in respect to the ownership of plans. It was, we suppose, contemplated to create a new precedent which would override Ebdy *v.* McGowan. It might easily have been realized that, according to the principles of English law, when an architect receives money for the preparation of documents those documents correspond to other material products and belong to whoever paid for them. Under certain circumstances it may be possible to erect a building without plans. According to Sir George Birdwood, that appears to be a custom in some parts of India. It may also be possible, as was exemplified in Kimberley *v.* Dick, to prepare plans and enter into a contract for a building of a very different kind to that which was executed. But under ordinary circumstances drawings are essential for the carrying out of a contract, and the courts must look on them in the same way as they would on the signatures of witnesses or on the affixing of proper stamps to a deed. Drawings and specifications are the grounds and data upon which the contract is usually founded. The drawings are therefore material things and not metaphysical abstractions.

The appeal in Gibbon *v.* Pease was brought under the auspices of the Royal Institute of British Architects. That body, we suppose, inspired the plea adopted by counsel that a building owner was entitled to the benefit of the lines upon the plans, but that he had no claim on the sheets of double-elephant on which the lines were drawn. So refined an argument was worthy of the Academy of Laputa. It was also said that an architect was entitled to make use of his plans for other clients. That was, perhaps, the more amusing argument of the two. Does the Institute wish the public to imagine that plans or other documents which bear signatures of various kinds can be made the basis of a different contract with other signatures, and that such documents might on all occasions be presented in court if there were law-suits? Or was it a revelation that architects are disposed to repeat their designs without any alteration? The truth is, the appeal stood on grounds which were without strength, and it is no wonder their lordships did not call upon counsel for the plaintiff to reply to the novel arguments.

As might have been anticipated, their lordships had to rely on Ebdy *v.* McGowan because there was no other case available for that purpose. The Court of Exchequer had decided that even if the custom existed it was unreasonable, and that if plans are to be retained by the architect there must be an express stipulation between the parties to that effect. The Court of Appeal on Friday considered that if custom was bad in one instance it must be equally bad in the other, and the appeal was promptly dismissed.

It is remarkable that in both cases no damage could be proved as likely to arise to an architect by surrendering plans to his client. Nor was it stated that either of the building owners would gain any advantage from the possession of them. The litigation in both cases was somewhat academic and might have been carried on by John Doe and Richard Roe if they were allowed to survive. Lord Justice Cozen-Hardy introduced the question of a possibility of damage to one party when he asked was a building owner who was in some difficulty about his drains or flues obliged to enter into a new contract with his architect in order to ascertain the position of those conduits? Hitherto the majority of building owners have been indifferent about plans. Perhaps they could not understand them, but it must now be expected that they will take the suggestion from his lordship. Plans are likely to be regarded as a convenience, and possession of them demanded from architects. It will therefore be evident that no gain has been derived from the proceedings except a further demonstration of the position of architects. What is worse, the public who read the reports of the case may conclude that architects are unreasonable and refuse to accede to the just requests of their clients. Under the circumstances, and especially after the remarks of Lord Justice Cozens-Hardy, it will not be wise to stipulate that a building owner has no claim upon the plans, for it might be interpreted as an endeavor to evade the law of the land.

[*Abstract of the Court Proceedings.*]

Without calling upon counsel for the respondent on the appeal, the Master of the Rolls, in giving judgment, said it seemed to him that this case was clearly governed by the principle laid down in Ebdy *v.* McGowan. The defendant was employed by the plaintiff to do all that was necessary to be done by an architect for designing and carrying out a certain building operation at a remuneration of 5 per cent. on the contract price. It was not disputed that the employment involved the preparation of plans, and it was not disputed that the plans were used for the purpose of carrying out the building operations. The price was paid and the building owner claimed the plans. The architect refused to give them up, and contended that, by the custom of the profession, he was entitled to keep them. The matter came to trial before Mr. Justice Ridley, who at once referred to the case of Ebdy *v.* McGowan. Mr. Kemp then stated to the judge that there was a custom in the profession that the architect was entitled to keep the plans after the work was finished. Mr. Justice Ridley held that if the alleged custom existed it was not a custom which could bind the parties. He was not sure that the learned judge was satisfied as to the existence of the custom; but, at any rate, he held, on the authority of Ebdy *v.* McGowan, that it was so unreasonable that the Court would not give effect to it. It was then said that the case was distinguishable from the present. The principle on which Mr. Shearman vested the right of defendant to keep the plans was that the architect's contract was not a contract for the sale of a chattel, but for work and labor, and that the contract was performed when he had superintended the building of the houses. Was that the principle involved in Ebdy *v.* McGowan? In that case the plaintiff was an architect who had been employed by the defendant to prepare plans and get tenders for a vicarage. The payment was to be 5 per cent. on money expended if the vicarage was completed, if tenders were obtained and work not commenced 3 per cent. on the estimated cost, if no invitations for tenders issued 2½ per cent. The plans were prepared, but the defendant changed his mind, and declined to proceed, and wrote to the plaintiff offering to pay and asking for the plans. The architect declined to give up the plans, but sued for payment, and set up a custom among architects to retain their plans if the work was not proceeded with. It was held by the Court of Exchequer that such custom, even if proved, would be unreasonable, and that the defendant need not pay for the plans unless he got them. In his opinion, a custom which transferred the property in a chattel from the person who paid for it to the person who was paid would be bad. If the custom had been justified in that case it must have been justified on the same contention as that on which it was sought to justify it here. If the custom was bad in the one case it must be equally bad in the other. In the present case the architect had, under his contract, done everything he could be expected to do, and he had been paid everything to which he was entitled. It was clear, therefore, that the plans were the property of the building owner. He thought the contract was to make a chattel, the property in which passed to the building owner who employed the architect to make the chattel and paid him for it. He was of opinion that Mr. Justice Ridley was perfectly right in doing as he had done, and that the case of Ebdy *v.* McGowan was perfectly good law, and ought to be followed. He thought the appeal failed, and ought to be dismissed.

Lord Justice Mathew expressed his entire agreement with the

judgment of the Master of the Rolls. He said that the case had been admirably argued by the learned counsel.

Lord Justice Cozens-Hardy also thought that the appeal ought to be dismissed, being of the opinion that the proposition that the architect was entitled to retain the plans could not be maintained. If the architect were allowed to keep the plans, how was the building owner to know where the drain pipes were placed? He could not find out probably without going and making a fresh contract with the architect. Mr. Shearman had had to admit that there would be some sort of an obligation on the architect for the safe custody of the plans, and that admission put another difficulty in his way. In his view the point involved in this case was covered by the decision in Ebdy *v.* McGowan, and that this Court ought to follow the ruling in that case.

The appeal was accordingly dismissed, with costs.

ILLUSTRATIONS

"THE FAIRMOUNT," SAN FRANCISCO, CAL. MESSRS. REID BROS., ARCHITECTS, SAN FRANCISCO, CAL.

DESIGN FOR TWENTY-TWO ROOM SCHOOL-HOUSE FOR OAKLAND, CAL. MR. B. J. S. CAHILL, ARCHITECT, SAN FRANCISCO, CAL.

ACCEPTED DESIGN FOR HIGH SCHOOL, BEAUMONT, TEX. MR. GLENN ALLEN, ARCHITECT, WACO, TEX.

WAREHOUSE FOR THE M'LENDON HARDWARE CO., WACO, TEX. MR. GLENN ALLEN, ARCHITECT, WACO, TEX.

THE CARROLL PARK BRANCH LIBRARY, BROOKLYN, N. Y. MESSRS. W. B. TUBBY & BRO., ARCHITECTS, NEW YORK, N. Y.

THE HEBER R. BISHOP ROOM: METROPOLITAN MUSEUM OF ART, NEW YORK, N. Y.

NOTES AND CLIPPINGS.

A Quarrying Feat.—An interesting event took place in the island of Portland on March 25 in the famous Kingbarrow Quarries of the Bath Stone Firms, Ltd. From these quarries the stone has been excavated for the erection of the new Government buildings at Whitehall and the new War Office. What is known locally as a "big ream" was most successfully carried out. This in reality is the cleavage method adopted by the quarrymen in splitting the rock and wrenching it from its natural bed as it stands intact. The process adopted was as follows: About forty "pits" were scored in the top of the rock ranging from 18 to 24 inches in length, and into each of these were inserted two "pigs" of iron. Throughout the whole length of the "ream" about 170 large iron wedges were firmly driven between the "pigs" of iron. As soon as all was in readiness, forty-two men, using sledges from 12 to 14 lbs. each in weight, commenced the "battering assault." Striking simultaneously, one man to four wedges, they soon had the satisfaction of seeing the first signs of success in the shape of a very faint crack along the surface. Continuing their exertions, with occasional pauses to reset wedges, etc., they eventually succeeded in attaining their final ambition, and had completely severed the huge rock from its tenacious hold after a laborious task of 4½ hours. The measurement of the piece was 106 feet long by 20 feet wide by 12 feet deep, and is computed to contain 1,600 tons. This is believed to be the largest "ream off" in the history of quarrying operations in the island of Portland.—*The Architect.*

Last of Brooklyn's Cathedral.—The uncompleted Cathedral of the Immaculate Conception, in Clermont Avenue, Brooklyn, originally designed to be one of the most imposing ecclesiastical structures in America, is to be torn down stone by stone, only the Lady Chapel to remain as a memento of the late Bishop Loughlin's plans. The superstructure and several of the stone walls have been decaying for some months. The chapel will be the parish house for the residential part of Williamsburg. The Cathedral was begun early in 1875 by the late Bishop Loughlin, the first Bishop of Brooklyn, and was to have cost an even million dollar. The corner-stone was laid with memorable ceremonies, and for several years the work of erecting the structure went on uninterruptedly. The funds for the completion of the structure, however, came slimly and slowly, the diocese being then only in its infancy, and burdened with the need of things more pressing than an imposing cathedral. When the Lady Chapel was completed it became apparent that the remainder of the structure could not be built for some years, and work was temporarily, and later finally, suspended. The four walls had begun to lift themselves above the foundation, and part of the superstructure of the northeast side was already visible for miles.—*New York Tribune.*

The Disadvantage of Doing Good Work.—Guy B. Waite, the contractor who had charge of the erection of the fireproof floors in the building at 89th street and Central Park West, one of which collapsed on April 5, allowing a workman to fall successively through several floors, speaking of the accident to a New York *Tribune* reporter, said his system of flooring was too strong. Workmen, he said, believed there was no limit to its capacity, and were in the habit of piling on building material at times several thousand pounds in excess of the amount allowed by law. The steel supports were deflected, he said, and the flooring loosened. Pieces of the flooring which broke were tested and the material was found to be thicker and stronger than required by law, he declared.

Port Changes at Antwerp, Belgium.—The execution of the Government's vast scheme for the enlargement of the port of Antwerp, over which the Belgian Government and city have been at loggerheads for years, seems to be assured, the Chamber of Commerce of Antwerp having voted unanimously in favor of it. It is estimated that the work will cost $50,000,000, and that ten years will be occupied in completing the plans, which will give Antwerp a port with an area larger than any other city in the world.—*Exchange.*

New York Fire Department's Record for 1904.—There were 7,549 fires in the boroughs of Manhattan, Bronx and Richmond in 1904. The total loss was $4,530,943, and the average $600.20. This average loss per fire, says Fire Marshal Seery's report, is less than that of any previous year in the history of the Fire Department. During the year 1903 there were 6,787 fires, entailing a loss of $4,246,260, which brought up the average loss of each fire to $625.64. In the year 1902 the average fire loss was $772.56. The average loss per fire in the Borough of Manhattan during the year 1904 was $626.16; the Bronx, $323.83; Richmond, $445.82. —*New York Evening Post.*

Tombs in Churches.—The actual burial-place of the founders of churches or chapels was the porch; for it was formerly the custom for worshippers on entering the sacred edifice to pray for the souls of its founders and benefactors. Thus Leofric, Earl of Mercia, and his celebrated countess, Godiva, were buried in the porch of the abbey church, Coventry, which they had founded. The heads of the religious houses were generally interred in their chapter-houses or their cloisters; and rectors or vicars in the close vicinity of the altar, or in the chancel of the church to which they belonged. Lords of manors and patrons were often interred in the chancel. The most obvious guides to the date of tombs are of course inscriptions. As, however, many of these exist without giving any information regarding the time at which they were cut, consisting simply of an epitaph, the following facts, taken in connection with other evidences presented on the tomb itself, will lead to a near conjecture as to its age. During the first twelve centuries, churchyard epitaphs were all written in Latin, and the first inscribed funeral monuments are those bearing the names of Romanized Britons in Cornwall or Wales. These are written in capital letters, but a small hand was introduced about the seventh century. Lombardic capitals became general on tombstones in the thirteenth century, when epitaphs in the French language began to appear, which continued to be used till the middle of the fourteenth century, generally in German text letters. From that period vernacular English and Roman print have been commonly employed for monumental inscriptions; though the clergy and learned have, as might be expected, always preferred the Latin.—*The Architect.*

A Female Aspirant for the Prix de Rome.—Mlle. Marcelle Rondenay, the first female student of the École des Beaux-Arts to take part in competition for the Grand Prix de Rome for painting passed her thirty-six hours *en loge* last week hard at work on her painting. She is a pupil of Humbert.

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A THORN was removed from the side of the British architect last week through the death, at the age of eighty-nine, of Lord Grimthorpe, a title which always seemed to us most felicitously chosen to hint at the grim and caustic humor which characterized Edmund Beckett Denison, later and better known by everyone as Sir Edmund Beckett. Educated at Eton and Cambridge, Mr. Beckett early made his mark at the bar, and became Queen's Counsel in his thirty-eighth year, his specialties being Parliamentary and ecclesiastical law. Just what it was that made him turn his attention to architecture, we do not know, unless it was certain private building undertakings which, having carried out more or less to his own satisfaction, led him to feel he was an authority who ought to spread abroad, for the benefit of the public, his vast store of information. His *"Book on Building,"* was the result, and in it he lost no chance to "roast" the members of the architectural profession. This was the beginning of the long feud between Sir Edmund and British architects, the hottest battle raging between them over the restoration or non-restoration of St. Alban's Abbey. The abbey-church, being in need of repairs, was put into the hands of Sir Gilbert Scott, who, oddly enough, in this one instance favored the mere repairing of the structure on the then existing lines; but before the work was well under way Sir Gilbert died, and the work fell to his sons to carry on. This did not satisfy Sir Edmund Beckett, chairman of the building-committee, who had become mightily interested in the building, and at length firmly convinced that it ought not to be repaired merely, but thoroughly "restored" to the condition Sir Edmund was convinced must have been intended by the original designer. Sir Edmund declared not only that it ought to be restored, but that it should be, even if he had to pay for the work himself, and the result was finally, after a prolonged fight with the Royal Institute of British Architects, that the building was surrendered to him to work his will on, largely at his own cost, with what success can be seen by those who visit the Abbey.

WHILE the fight was at its height, those officials of the Royal Institute of British Architects who had been most strenuous in opposition to restoration by an amateur, went out of office, and their successors, in the hope of putting a stop to a discussion that was undignified and somewhat scurrilous, in some way succeeded in inducing Sir Edmund to become an Honorary Associate of the Royal Institute of British Architects. What induced the keen lawyer to accept the invitation, we cannot guess, but that he found the position galling can be inferred from the letter of resignation (reprinted in another column) through which a few years later he repudiated the Institute, its members and their works. Another famous case in which Sir Edmund was interested was the libel suit brought against him by the founders of "Big Ben," the great bell in the clock-tower of the Houses of Parliament, a case which we believe he won. Sir Edmund is usually credited with the designing of the clock-work and chimes of this great clock that is so dear to Londoners to-day. In generalities, perhaps in particulars as well, this was true, for his knowledge of clock-making was profound, as is shown by his *"Treatise on Clocks, Watches and Bells,"* and by the fact that he was long president of the Horological Institute. He was a man of great activity of intellect, and was deeply interested in many subjects, as is shown by his published works and the continuous stream of letters in the London *Times*. In 1877 he was appointed Chancellor and Vicar-General of York Province and Diocese, and became greatly interested in church ritual and discipline, a natural sequence flowing from his minute knowledge of ecclesiastical law. In 1886 he was advanced to the peerage as Baron Grimthorpe, a name which in the next quarter century became as closely associated with keen controversial writing as Sir Edmund Beckett's had been. He was a remarkable man, and like men of his type left no heir of his body to perpetuate his mental qualities.

TO many people, Mr. Justice Harlan's suggestion that there should be built at Washington a Presbyterian Cathedral must seem as improper as it is unexpected. Although we know that since the Roman Catholics and the Episcopalians have bishops it is proper that those bishops should have cathedral churches, yet we are not sufficiently instructed in creeds and rituals to appreciate why Presbyterians in America may not have a cathedral with as much propriety as Lutherans in Germany have them. The suggestion, coming from such a source, may lead to action, certainly to discussion. The propriety of the Presbyterians embarking on cathedral building does not concern us, but Justice Harlan's suggestion is of moment as an indication of the present active interest in the erecting of the nation's capital into a beautiful city and the desire of people of all interests and faiths in every part of the country to take active personal part in this development through the erection there of what may be con-

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sidered headquarters buildings for organizations of every description. It is, perhaps, a belated perception of this widespread public interest in the improvement of Washington that induced Mr. Speaker Cannon to allow it to become known, a short time ago, that, after all, he would not oppose the appointment or thwart the operations of the Consultative Board of Architects, which the President desired to establish.

SO much attention has been called to the few high buildings which, as to their external structure, more or less successfully withstood the assaults of the Baltimore conflagration that it is inevitable that these buildings should, for a long time to come, be pointed out as interesting survivors of that mournful event and that divers arguments should be based upon the little evidence they give of their experience. It is well, therefore, to point out that in the case of the Continental Trust Building, whereof the exterior walls seemed, immediately after the fire, to be essentially uninjured, it has been found necessary to take down and entirely relay the brickwork and masonry of the south, east and north walls. Consequently what the eye can hereafter see of this building can hardly with propriety be said to be the building that survived the fire.

WHAT seems to us a hardly desirable precedent has just been established in New York by according to the wife of Bishop Potter permission to improve at her own expense the portion of the parkway lying above the subway that stretches in front of certain property of hers on upper Broadway. The work is undertaken by Mrs. Potter partly through disgust at the backwardness of the proper authorities in restoring the parkway to its former condition, and partly with the hope that, by the aid of the object-lesson she is about to give, a better scheme of landscape treatment may be arrived at for the whole length of what used to be the Boulevard. The danger is not that Mr. Downing Vaux, whom Mrs. Potter entrusts with the work, will not produce a satisfactory, possibly a charming, result, but that the authorities may be tempted to leave the rest of the parkway unrestored in the hope that other weary abutters may at length come forward and improve similar stretches at their private expense, in this way leaving the public funds, which should be used for this properly public work, to be quietly applied to satisfy the private needs of political grafters. Village improvement by individuals or by private associations seems to us to be out of place in the metropolis.

SUPERINTENDENT HOPPER, of the New York Building Bureau, having completed his own enquiry into the collapse of buildings in the Bronx on March 10, finds that conditions and facts were as reported by Borough President Ahearn's special commission, and has at length announced his intention to discharge six of the inspectors employed in his Bureau. We suppose that the men really will be dismissed, for it is understood that Mr. Murphy, the head of Tammany Hall, while willing enough to secure jobs for his adherents, does not propose to make himself obnoxious to the public by attempting to maintain in office men whose incompetence has been proved—men, who have, as it were, been "caught with the goods on."

IN the recent settlement of the dispute between the Quincy granite-cutters and the Granite Manufacturers' Association, a settlement that was really aided by the Massachusetts State Board of Arbitration, there was included one condition, whose acceptance by the unions was very surprising, since it seems to cut through the very tap-root of the theory of trade-unionism. After providing that the minimum wage-rate shall be thirty-seven and a half cents per hour, a method of arriving at a rate for aged and partially disabled workmen is provided, actual test of earning power being made under the observation of a joint committee from the contracting bodies. This logical and fair method of dealing with a delicate union principle seems, strangely enough, to have been advanced by the unions, for the employers would not assent to the condition unless the same method should have application in determining the wage-rate of the "slow man," and the extraordinary thing is that the union should have agreed to such inclusion. As the vital principle of trade-unionism is that one union man is as good as the next, it is not surprising that the workmen now allege that they did not comprehend the condition. The practical outcome, so far as the slow man is concerned, seems to be that in order to keep themselves in good standing in the ranks of Organized Labor, the granite-cutters are now seeking some means to drive the slow man out of town, with the object of bringing back the average rate to true union standard.

SPEAKING of granite, we are reminded to point out that much complaint is made against the practice alleged to be employed by certain dealers in Quincy granite, of "doping" the stone with printers' ink in order to secure a darker stone than the quarry actually affords. Doping is used mainly in tombstone and monumental work, the dope being applied to the dressed surface before polishing begins, and is all the more improper and immoral since a sham of any kind seems particularly out of place in connection with the tomb. Further, as the doped stone is sold not as a sham but as a natural stone, the customer is justifiably aggrieved when he finds that the surface has not weathered and that the startling contrast between background and lettering he so highly valued has finally been subdued to sameness.

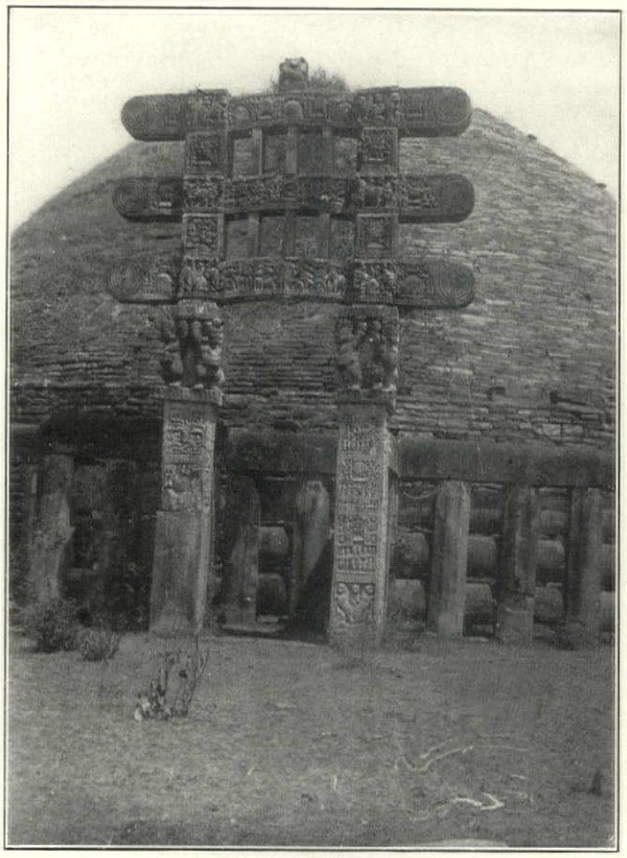
THE Sioux City, Ia., lawyers who secured an injunction against the landlord of the building in which they had an office, restraining him from altering it, to the end that a restaurant might be established therein, had a better knowledge of what constitutes a nuisance than of the resources of those who nowadays undertake to install a modern hotel cooking-plant. The odors given off by boiling cabbages and onions may fairly be classed as nuisances; but those who have dined at the central Établissement Duval, in Paris, with all the cooking going on in the center of the vast dining-hall, know that architects can in such cases so arrange down-draught ventilating ducts, with fan power, that no odor is perceptible even at the nearest tables.

AMONG INDIAN TEMPLES.

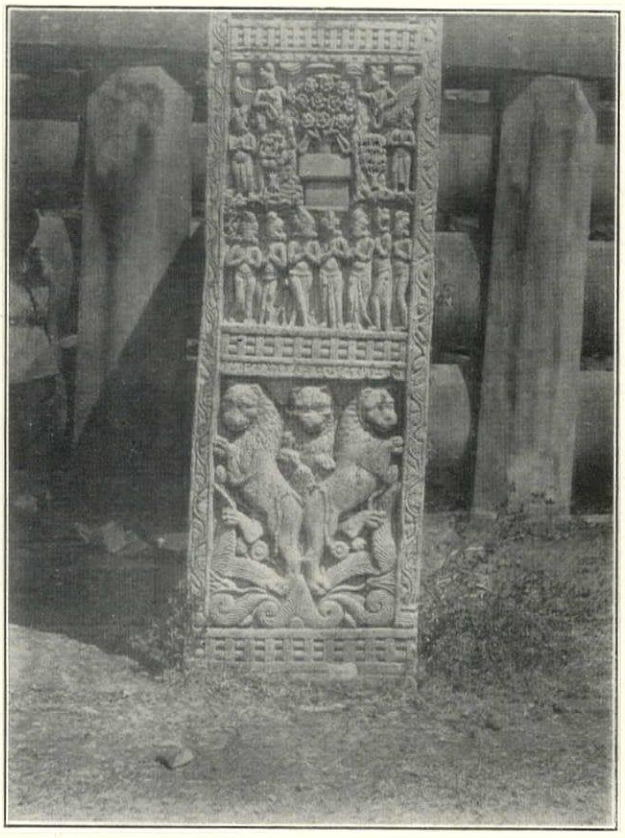
BEFORE going to India for a prolonged stay, we had decided, after much previous study, that the ice temples fashioned by nature and the stone shrines built by man were the subjects that appealed to us most especially for study. But it requires months to accomplish any work really worth doing in the mountains, and many more months to investigate half the interesting shrines of the plains. We spent two winters and part of a third among the temples and left with still a number of interesting places unvisited.

This would seem a foolish waste of time to the globe trotter, who apportions to India but four weeks out of his *tour du monde* journey of eight months. The average traveller going by rail to Agra, Delhi and Lucknow and on over Benares to Calcutta, has perchance seen Taj-Mahal by moonlight and heard all about the seige of Lucknow, but what does he know of the rock-cut caves of the Buddhists, the marble glories of the Jains, the grace and perfection of form of the Chalukyans, the mighty gopuras of the Dravidians and the varied art of the Indo-Aryans? Nothing, and yet vain world-circler, he sails for home having "done" India.

Writing of the temples of India is a difficult task, for it is hard to know where to begin. Of any one interesting region alone, comprising perhaps an area of five miles square, one could write pages that would doubtless tax the patience of one's readers. As, in these days of few words and much action, that would not do, I must pick up a half dozen of my favorite shrines and tell of some of their attractions.



TOPE AND TORAN, SANCHI, BHOPAL, SOUTH INDIA.



DETAIL OF TORAN, SANCHI, SOUTH INDIA.

I will mention that, as a means of travel, wherever roads were to be found in southern, central and northern India, even among the foot-hills of the Himalayas, we adopted bicycles, not because this method was original, or because it was easier, for it often involved very difficult work, but because for years we have found this the most advantageous way of seeing a country.

One of the most interesting spots of South India is the Mahavellipore, or the ancient city of the great Bali. It lies on the sea coast about forty miles south of Madras. To reach it we cycled eight miles to the beginning of the Buckingham Canal. Our Madrassi servant was sent ahead with bedding and provisions in a bullock-cart, for, if one cares for such minor considerations as blankets and food, it is always safe to carry them along in India.

On reaching the canal we put up the cycles and all boarded the low thatched canal-boat, which two boatmen then sculled slowly for ten hours, when we reached a wretched village shaded by regal cocoanut palms. Ten minutes' walk in the quickly falling Indian twilight brought us to the bungalow or inn, which was found, as is usually the case, tightly locked with closed blinds. Where was the *khansamah* or cook, who the authorities in Madras had said would be there to make life cheerful with tea and currie and rice?

Off went the boatman to search for him, while we sat down on our luggage watching the last blood-red glow of day on the distant Indian ocean. By the time it was absolutely dark the boatman returned with a half-clad *chaukidar* or watchman, who proceeded to unlock the hostelry. How well we know them, the ignorant well-meaning savages, who can build a good fire, but seldom can boil an egg!

The bungalow was furnished with tables, chairs, *charpoy* beds and bath-tubs, but that was all. Many amusing incidents of impromptu bungalow life in out-of-the-way India might be related, but I must pass over how our Madrassi bearer made beds, prepared a meal of tinned meats and biscuits to the light of a row of candles standing on a biscuit tin, how the watchman with much sighing filled the pitchers and tubs with water; for these are but sordid preliminaries to a visit to the stone fanes awaiting us outside in the scented tropical night.

One must rise at five o'clock, be indifferent to Indian mid-day sun and be prepared to plod over five or six miles of sandy shore and paths if one would visit Mahavellipore aright. Some distance from the bungalow is a long rocky ridge. Near it a great rock thirty-seven feet high is seen, the face of which is entirely covered with sculptures illustrating incidents from the Mahabhárata, the famous Indian epic, the special subject being in this case, Arjuna's Penance. In a line with this are several fine cave temples, which have been hewn out of solid rock to a depth of forty feet. Handsome columns with carved capitals support the entrances and well executed carvings adorn portions of their interiors.

These are all Brahmanical antiquities and date according to some authorities from 600 A. D., according to others, from 1100. The Tamil inscriptions do not seem to have made the matter absolutely clear, so far as they have as yet been deciphered.

There is also a fine old Hindu temple dedicated to Bali close upon the beach, at times almost washed by the incoming breakers. Among the palms and the low bushes and beach-grass one stumbles upon quaint groups of stone monkeys and many-handed

Hindu gods, and near several of the temples are most life-like colossal stone elephants and less like-life, but very curious lions.

Among the most important temples are the five celebrated "Raths." These monolithic stone-carved structures date from the seventh century A.D. and are particularly curious and interesting from the fact that in form they hand down the shape of the ancient Buddhist *viharas,* or monasteries, which have now practically disappeared from India. These temples are most graceful and attractive in shape and have excited the admiration of archeologists for many years.

TEMPLE OF BUDDH-GAYA, CENTRAL INDIA.

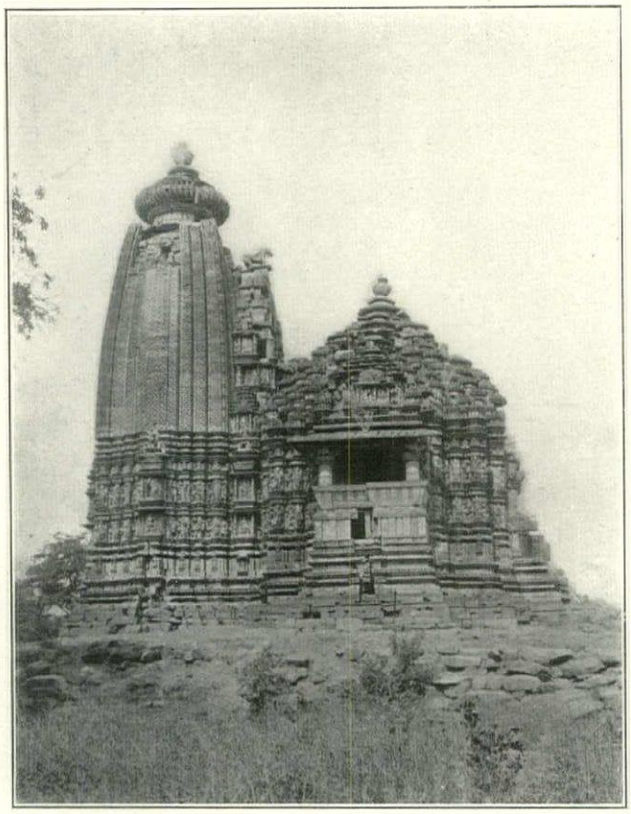
The great Buddhist Tope of Sanchi is in the State of Bhopal, whose native ruler is a woman, the Begum of Bhopal. It is built of bricks laid in mud and is 106 feet in diameter and forty-two feet high. The bricks are covered with dressed stones, over which was a coating of cement, now largely broken up and missing. This outer surface was originally decorated with frescoes, of which to-day no vestige remains. Grass and small bushes grow in the chinks of the broken surface. The Tope at present displays only the form but none of the beauty of former days, and is interesting chiefly from an historical point of view, dating as it does from the Asoka period, 220-250 B. C. It is surrounded by a rail of severe and simple beauty. Facing this rail at four points were four most ornate and beautifully decorated gates or Torans. Between the rail and the mound is a path five feet wide, which was doubtless used by processions of priests and pilgrims when worshipping at the shrine.

to-day in India. The profuse carvings upon them represent scenes from the early life of Buddha, also events supposed to have taken place in the five hundred previous births of Buddha. The sculptures are remarkably preserved, are clean-cut and distinct, having defied resolutely 2,000 years of alternate heat and rain, such as the climate of lower India can offer. I have twice visited Sanchi and found the heat after ten A. M. in February oppressive, and by the end of March nothing less than fiery. The beauty and finish of the carving is seen in the photograph showing a detail of the lower part of the Toran.

Probably the most interesting Buddhist temple in India is the nine-storied pyramidal temple of Buddh-Gaya. Built in 500 A. D. it has been at various times restored, chiefly by deputations of Buddhists from Burma, who have not shown themselves adepts in the art of restoration; still, these restorers have in no way affected the exterior appearance of the tower, which in style is most noble and altogether unique in India.

For those interested in the history and life of Buddha great interest will always be attached to this place. All here was so intimately associated with his life and, as students of Buddhism well know, it was here, under the famed Bo Tree, that he entered the state of complete enlightenment. The peepul, or Bo-tree, which stands before the temple is believed by many devout Bhikkhus of the present time to be the same tree, that played such a role in the life of Buddha. Unfortunately we are most of us too prosaic and sceptical to believe that the small wizened tree seen at Buddh-Gaya is the same that flourished in those sacred precincts in 500 B. C.

Another object of importance is the fine old sculptured rail



VIMANAH AND PORCH, KHARJURAHO, CENTRAL INDIA.

TEMPLE AT KHARJURAHO, BUNDEL RUND, CENTRAL INDIA.

The gates were put up at different times within the two centuries following the building of the Tope. Three are now standing and are the largest and most highly decorated Torans extant

supposed to have been built by order of Asoka at about 250 B. C. A great authority has called it, "the most ancient sculptured monument in India." It is much battered, but the figures and wheels carved on its surface are still perfect examples of the painstaking intelligent art possessed in such a high degree by the stone cutters of that early time.

The temple of Buddh-Gaya has for many years been in the hands of the Hindus, a special sect carrying on their own worship there. The Maha-Bodhi Society of Calcutta, which is doing good and earnest work in its effort to revive pure Buddhism in India, the land of its birth, is trying to raise funds for establishing a Rest House for Buddhist pilgrims at Buddh-Gaya, with a view, in time, to restoring the temple to the Buddhist religion and making this place the center of the Buddhist movement in India.

Kharjuraho in the province of Bundelkund, Central India, is one of the most noted sites for Hindu temples. It lies seventy miles from the nearest railway station, Mahoba. On reaching the place cycles proved most advantageous. Had we gone by bullock-cart across the country the distance could have been reduced to forty miles, but that meant jolting in a springless cart, twelve to fourteen hours for two days and sleeping in it at night. Our route lay over fair roads most of the way, but the last fourteen miles was through the jungle over a mere track. As usual on such trips, and we made many of them in India, we had to give up the comfort of having our servant to carry baggage, and wait on us in the bungalows. Many of the most enchanting temples lie quite away from civilized cities, in deep jungle, or near some wretched native village, in places which, often as late as the 12th and 13th century, were rich and thriving towns ruled over by enlightened rajahs such as those of the Chandel dynasty of Kharjuraho. Leaving our bearer at the Mahaba bungalow, we loaded up our cycles with the necessary clothing and a certain supply of tinned meats. The first night, at the end of a forty-mile run, we expected at Chatterpur, the chief town of that native State, to fare sumptuously, as through the courtesy of the Diwan, the Rajah's minister, the "Guest House" was to be opened for us, but the second night we were to stay in an inspection bungalow and that means, as at Matavellipore, much furniture, a daft chaukidar and no food.

On spinning into Chatterpur the commodious Guest House, with bedrooms, salons and dining-room fitted out in English style, was found ready as well as a white-haired cook and two attendants waiting to serve us. The building had evidently not been used in a long time and its habitual inmates, large rats, had become desperately hungry. I at any rate had no sleep that night for the harmless creatures after chasing one another over my bed for an hour settled down to loudly devouring my candle and a roll of biscuits they discovered in my bicycle satchel. After their meal they began to caper about again madly, and the act of throwing boots at them only increased their merriment.

We had a fine run the following morning and an afternoon of misery at the wayside bungalow, where it took an indefinite period to make the astounded chaukidar fetch water and boil a kettleful for tea. There we were obliged to use our own provisions. The third day, having with much dismounting and walking accomplished our twelve-mile jungle trip we came upon Kharjuraho, an enchanted vision of twenty or more pink sandstone temples, each more wonderfully carved, if possible, than the others.

Not even a broken-down native village marred the ensemble, only an unfurnished Rest House and an empty tent gave evidence that human beings had or ever would inhabit the place. An hour after our arrival a native Tehsildar from a neighboring town arrived, drawn by two snow-white bullocks, and accompanied by thirty natives on foot. He spoke good English and was sent, he said, by order of the Rajah to serve us and make us comfortable during our visit to Kharjuraho. He offered us the Rest House or the tent, which, he assured us, would be furnished during the day. We chose the former. We spent two most delightful and novel days among the sculptured walls and towers, always accompanied in our rambles by the faithful chief and waited upon by his thirty followers.

Our rooms on the second floor of the stone bungalow had no blinds nor glass windows, the floors no carpets and the two *charpoys* put in as beds and the table and chairs were most primitive, but they served the purpose and the climate of Bundelkund in winter is all that can be desired. Our servitors camped in the open, around the Rest House and served our meals of rice, fruit and boiled fowls in earthen pots. The plates were plantain leaves and the knives and forks, two aluminum spoons we had brought with us.

Our first meal, typical of all that followed, afforded us much amusement. My tea-kettle, which in out-of-the-way India I always carry on my bicycle, was produced and filled with boiling water. The cook brought it in, followed by the Tehsildar voluble with apologies for having no cups. We at once consoled him by bringing out our aluminum cups, which also formed a part of the Indian cycling kit.

Next came up a huge earthern chatty filled with rice and half a dozen different vegetables, which the cook shot out of the chatty in large portions on to the great plantain leaves. Presently another servant appeared with a boiled chicken, which was carved with our pocket-knives. Another of the thirty followers brought some snow-white but palatable butter. In quantity, the meal recalled a certain one of cous-cous a mountain chief in Algeria had served us some years before.

When we had shown our appreciation of the repast, the chief came in smiling followed by numerous retainers. Two of them brought a large, round basket, heaped with every fruit and vegetable the State of Chatterpur produced at that season. There were cauliflowers, beans, yams, onions, leeks and tomatoes, besides various native vegetables unknown to us. Mixed with these were oranges, limes, pomegranates, plantains and long pieces of sugar-cane. The latter the Tehsildar cut into pieces for us to chew. The whole was a gift of appreciation of our presence from Kharjuraho, and was intended to be taken away with us—just how that part was to be accomplished we did not see. After this ceremony, the chief took us with his cart and snowy animals for a round of the more distant temples.

The Indo-Aryan temples, all built within a century of each other and by one dynasty of Chandel Rajahs, date from 1100 with the exception of a very fine Jain one, which is placed at about the sixth century A. D. Curiously enough, some are dedicated to the Jain faith, some to the worship of Vishnu and others to that of Siva, a most unusual occurrence even in a country where so many creeds have been and are followed as in Hindustan. Several are in an almost perfect state of preservation, others are falling and crumbling, but in one and all, the exterior and interior sculpture is executed in the most careful and clever manner. The usual form is a pyramidal tower, or *Vimanah* and porch, but so many richly decorated ceilings, columns, capitals and pediments, it would be hard to find in a given area anywhere else. Hundreds of statutes adorn the interiors, of Hindu type and order of course, but of unsurpassed workmanship and full of intense life and action.

The beauty of the curvilinear form of one of the *Vimanahs* may be seen in the illustration, as well as the finely carved bands of stone that cover its exterior. The fact that the Hindus did not use mortar doubtless accounts for the sudden complete destruction of beautiful temples in India, as well as for awkward breaks, such as the falling out of large parts of a façade in an otherwise almost perfect porch or entrance.

So absorbing did the study and photographing of the temples prove, that we quite forgot to be unhappy at eating off plantain plates, and at the absence of more varied cutlery than the aluminum spoons, and it was with real regret that we took leave of the faithful *Tehsildar* and our thirty native servants and turned our cycles toward the jungle, leaving behind us a vista of pale red flowers piercing the dull blue of an Indian dawn.

FANNY BULLOCK WORKMAN, F. R. S. G. S., M. R. A. S.

COMPENSATION FOR INJURIES TO WORKMEN.

THERE has just been issued a memorandum on the laws of foreign countries and of British possessions relating to the rights of workmen to compensation for injuries by accidents occurring in the course of their occupation. This memorandum has been drawn up by Sir Kenelm Digby, as chairman of the Committee on Foreign and Colonial Laws relating to Compensation for Injuries to Workmen. It is hoped that on another occasion space will allow of a more extended reference to this very valuable state paper, but in this issue of the *Journal* note is taken of the law as it stands in the only great country which has not as yet in any form adopted the principle of workmen's compensation for accident without proof of any default, namely, the United States. In all the principal European countries the laws relating to the subject seem to have passed

through similar stages. In the earlier part of the nineteenth century the workman had no special claim to redress from his employer for injury from accident. His right was the same, neither more nor less, as that of anyone else who had the right to claim compensation from a person responsible for causing an injury, that is to say, the workman, in order to recover damages for an injury, had to prove a default on the part of the employer himself, or of some person for whom he was responsible. But the vast advance made during the past century in the magnitude and complication of industrial enterprises, the establishment and extension of railways and of machinery moved by steam-power, and the increase in the number of industrial accidents with which the advance was attended, induced every European government to review its laws providing compensation for injuries by accident, with the object of improving the position of the workman and enabling him to obtain more adequate redress. It is only in the United States that the workman remains where he was in the matter of compensation for injuries by accidents occurring in the course of his employment.

The law varies to a considerable extent in different States of the Union, but in all it is grounded on the English Common Law. The doctrine, however, of "common employment" does not appear to be, says Sir Kenelm Digby, recognized to the same extent as in England. Nor is the view taken of the extent of the doctrine uniform throughout the various States. "While the general law is stated to be that the workman takes upon himself all risks resulting from the negligence of his fellow servants, this rule does not apply to the agents of the employer to whom he has delegated his own authority, and there have been wide differences in the various States as to the persons who are and who are not to be regarded as fellow servants. Several States have adopted modifications of the Common Law in the direction of increasing the liability of the employer for the negligence of a fellow servant, chiefly in the case of employment on railways, and some have passed laws extending similar principles to other industries. But no State has gone the length of enacting any law imposing upon the employer any duty to contribute to the relief of workmen from the consequences of accidents not proved to have been caused by the default of the employer himself, or of some person for whom he is responsible." In this state of things it is surprising to find that the rates of assurance against employers' liability are, in the experience of the leading English companies doing business in America, "very much higher than the rates for liability in this country, both under the Employers' Liability Act of 1880 and the Workmen's Compensation Act of 1897." The explanation is to be found in the heavy verdicts which American juries give in the cases which in fact are brought into the courts.

In 1903 the Governor of Massachusetts appointed a committee to report on the relations of employer and employé, and in their report, dated January, 1904, the committee dealt with the question of workmen's compensation. They referred to the bills bearing on the question, no less than three of which had been introduced into the last State Legislature, and reviewed the State law as to remedies for industrial accidents. The committee dwelt on the dissatisfaction felt with the existing state of the law—both by employers and employed—the employers complaining of the growing burdens of litigation and of the tendency of juries "to increase their burdens by awarding liberal verdicts against them." The workmen complained that under existing conditions injured employés did not receive "a fair and certain compensation for their injuries." They complained also of the delays in the courts; that they were forced to fight "not their employers, but unsympathetic employers' liability insurance companies, with their corps of claim-agents, experts and attorneys." It is further claimed that the injured employé, if after a long time he is successful in recovering damages, receives in the end but a small part of the sum so recovered, owing to the expenses of litigation, and the exorbitant and unreasonable charges of his lawyer and medical adviser." To remedy this state of things the committee drafted a bill closely following the English Compensation Act of 1897—even adopting some of its proved defects—with, however, some important variations. The most important of these is that the proposed interval between the accident and the commencement of the compensation shall be one week and not two. A more effective obligation to elect between the remedies open to the workman is provided, and a careful provision is made, somewhat differing from our law, as to the vexed question of "sub-contracting," and "workshops" are included as well as factories. A measure based upon the report of the Committee was introduced into the Massachusetts Legislature last year, but not carried. It has been again introduced in the present session, but has still to become law. As yet no American State has passed an act of the kind.—*Journal of the Society of Arts.*

A QUESTIONABLE MODEL FOR ONE ABOUT TO RESIGN AN HONOR.

THE following letter, to the Secretary of the Royal Institute of British Architects, in which the late Lord Grimthorpe resigned his position as an Honorable Associate of that body, will serve to inform the reader of this generation how the caustic baronet and able barrister used to make things lively for the profession in England thirty years ago:

"I have for some time observed that your meetings are more and more occupied with discussions about the constitution and supposed professional interests of the R. I. B. A., and less and less with anything tending to advance architecture. According to your own calendar for this year, fifty per cent. more meetings are devoted to what are simply trades-union discussions of your own than to reading and discussing architectural subjects; and those that have been read have been more uninteresting than I remember in any former year. One of your meetings yearly is occupied with utterly unprofitable speechmaking on presenting the medal you obtained from the Queen for the advancement of architecture to some architect whose reputation is already made: the most foolish of all applications of prizes, and quite contrary to the object for which they were intended or adopted in all seats of learning, and even in learned societies. In some of them, indeed, they have declined into mere personal compliments or conflicts, but in none have they so little of their original and proper use as in yours. The pending Government competition has already shown that you have simply wasted all the time that you have spent for years in inventing rules which you expect other people to regard in architectural competitions. 'All rules of any architectural society' have been expressly repudiated by the Government, as they were before by the courts of law, and, of course, that example will be followed by all public bodies who are properly advised. It is singular, too, that the only suggestion of yours that the Government did accidentally adopt, viz., for one or more architects among the judges (which was nothing new) has produced or not prevented a result which some of your usual champions have been condemning strongly. And your declaration in support of that suggestion has not been signed by anything near a quarter of the architects of England, by your own showing. These are not remarkable successes after all the time you have spent in obtaining them. Nor have you been more successful in educating the public up to the point of reversing their unanimous condemnation of the work on which, somehow or other, the Institute has been staking its credit for a long time, and doing all it can to glorify its author, who was your President. You seem unable to furnish the public with criticism, either in the way of praise or blame, in which it will concur the least. In short, the primary object of the Institute is becoming, more and more distinctly, to advance not architecture but architects; at least, if they put your letters after their names, which only a very small proportion of them do. You have a right to do so if you choose, as any other trade or professional society has; but the more you do, the more ought other people to stand aloof, and not to help you by pretending to be members of your body and concurring in your objects, while, in fact, we have nothing at all to do with them. The Honorable Associates are a mere sham for every purpose except contributing about £220 a year to your finances and giving some appearance of weight to your proceedings by their names. Therefore, I, at any rate, shall do so no more, but retire from what has always seemed to me a false position, since I was obliged by well-known circumstances to pay some attention to your proceedings. I am not surprised to see that our numbers are declining. With all personal respect for you and some other members of your body with whom I am acquainted, I remain,

EDMUND BECKETT."

BOOKS AND PAPERS.

OUTSIDE the field of the popular novel, it is an unusually worthy book that calls on its publisher to put out five editions in less than ten years. It was a sufficiently noteworthy event that it should have been found desirable in preparing, in 1901, the fourth edition of the Messrs. Fletcher's *"History of Architecture,"* to issue it not only in a revised form,

but in enlarged format, this latter change entailing the resetting of the entire work. Still more remarkable is it that, in issuing this year the fifth edition, the publisher should have repeated the process, and that the surviving author should not only have added a material bulk of new matter, both text and plates, but should have been to the trouble of practically rewriting the entire book. The outcome is in itself remarkable, for though the new volume[1] contains some two hundred more pages than its predecessor—the new illustrations, plates and cuts numbering some seven hundred—the book itself is lighter by several ounces and less bulky. This is accounted for in part by the use of a slightly lighter paper, but more largely by the fact that in this later edition the backs of the plates are no longer left blank, as in the earlier editions, but are covered with text-matter. So far as we can discern, the added illustrative material is about equally divided between full-page half-tone plates from nature and full-page plates made up of four to a dozen or more admirable outline sketches, generally well grouped and balanced and compacted so as not to waste space. Here is one of the defects of the publication: although the drawings are very well made, the actual size of the reproduction is too small to be acceptable to elderly eyes, and one feels that, in justice to the draughtsman who made the drawings and to the person who is to use the book, the plates should have been given a less reduction by a half at least. In a certain way this defect has been recognized, and it is announced that the publisher is ready to furnish lantern-slides of any of these plates to any one who may desire to make use of them for lecture purposes—for which they are admirably adapted. But, though the book is intended for use in schools as a text-book, there are many others than students who would like to use it for reference, and these hardly care for lantern-slides, while they would appreciate illustrations at a somewhat larger scale. The proximate cause of the success of the work lies in the fact that it has been adopted as a text-book in the leading colleges and technical institutions in Great Britain, Australia and the United States, while the ultimate cause lies in those excellences which justified such adoption.

It is perhaps regrettable that it was Mr. H. Phillips Fletcher, instead of his brother the surviving author of the work, who visited this country last year and later rendered to the Royal Institute of British Architects an interesting account of the Louisiana Purchase Exposition, since, had the author ever visited America, we believe he would have found justification for according to the architecture of this country a closer examination than has actually been given. It seems to us that a single illustration and but two pages of text—which, by the way, bristle with misconception—is hardly proportionate justice, although we do count our deeds by decades, while other countries count theirs by centuries.

THAT should cause any one in these days to write another account of English Architecture, when the library shelves already overflow with them, is not always easy to discover; but while we cannot penetrate the motives that urged Mr. Atkinson to undertake this little book[2] of two hundred duodecimo pages, illuminated by the same number of the author's sketches, we can appreciate the charm of the result. It is avowedly a sketch, and the treatment is somewhat "popular," suggesting that the matter might at first have had the form of a short course of three or four lectures, to be delivered before a mixed but educated audience, during which it was intended to give in connected sequence the entire history of English, not British, architecture, from the time of the Romans to the present day. The story goes so flowingly, the points are so well made, and it is so obvious that the author could, at need, support his statement by further citation of fact and authority, that it must be agreed that the little book is well done, even if there is still some doubt whether there was real need that it should be done. Still, there is generally something to be learned, even from a twice-told tale, for the teller ordinarily has some fresh emphasis to add or some grains of new fact or inference to impart. In this case we discover one very informing novelty, in the shape of the outline map of England, which is used as a frontispiece. On this map appear the names of only a dozen or so chief towns, just enough for one to get his bearings. Then, in place of further geographical information, are legends giving rough indication of the geological structure of the island and how that, naturally, influenced the character of the buildings. Thus, in the north, in Yorkshire, where the formation is largely carboniferous limestone, sandstone and magnesian limestone, with slate and granite too, the architecture is adorned with little sculpture. On the other hand, running from the Humber southeast to Portsmouth is the great backbone of oölitic limestone, and the masonry of buildings in this region is excellent, the churches have stone spires and sculpture is abundant. Again, the chalk downs, which run northeast from London between the fen country and the sea, abound with examples of rich plaster-work and curious flint architecture, while in the southeast and also along the Welsh border, which was well timbered, is the place to look for half-timber work and fine woodwork generally. Again, Mr. Atkinson has compiled a very interesting and curious chronological list of existing buildings, selection being made of typical examples, which run all the way from A.D. 120 to the close of the last century. Another curious, though not very useful, tabulation gives the number of monastic houses suppressed by Henry VIII., their founders, and the habit or uniform that was their habitual wear.

THE eighth volume[3] of the third series of the *Architectural Association Sketch-Book* has just come to hand and, on turning over the plates, one cannot but recognize how much more agreeable is the mere general aspect of the publication than that belonging to the publication in its early years. This is not because the drawings are better in point of draughtsmanship, nor because the subjects selected are more interesting, but sheerly because the "ink-photo" process of Messrs. Sprague & Co. is so admirably adapted for giving a satisfying reproduction of pencil sketches, for, of course, most of the material gathered by wandering architectural students on their vacation trips is in the form of pencil sketches. In doing the work all over again in ink, after enthusiasm had chilled, so that it might be in shape to meet the requirements of the simple lithographic processes of earlier days, it was inevitable that much of the feeling and a good deal of the delicacy of the original sketch must be sacrificed, as the earlier numbers of the publication clearly prove. Another thing tended to make the early numbers of the publication—it has been published, with occasional interruptions, ever since 1867—tedious and uninteresting, and that was the general belief of the day that a student's most important function was to make full-size sections of as many Gothic mouldings as he could discover, and to crowd them onto his sheet, one overlapping the other in inextricable confusion. Nowadays, the student works more from the artistic and less from the archæological standpoint and, so, the output is more interesting, and, probably, more useful as well.

About two-thirds of the seventy-odd plates in this volume are devoted to British subjects, and of the remainder Italy is accorded the larger share; while British scorn for Gallic art is, perhaps, declared by the inclusion of but a single plate of French material.

One of the interesting subjects treated is Craigevar Castle, at Aberdeen, which is fully shown by plan, section and elevation. The interest lies in the floor plans, which show how this little irregular polygon—only forty-three by forty-nine feet in extreme dimensions—cuts up into practically three rooms to a floor and suggests that the modern occupants have to undergo a certain amount of discomfort in their daily lives. After all, though, the routine of their lives must be very like that of the New Yorker living in a small six-story house before the days of elevators.

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[1] "*A History of Architecture on the Comparative Method.*" for the student, craftsman and amateur. By Professor Banister Fletcher, F.R.I.B.A., (formerly Professor of Architecture in King's College, London), and Banister F. Fletcher, F.R.I.B.A. (University Extension Lecturer on Architecture; formerly Lecturer on Architecture, King's College, London; R.I.B.A. "Godwin Busar," 1893; "Tite Prize" Medallist, 1895; Essay Medallist, 1896; Architectural Association Medallist for Design, 1888; Lecturer at the Architectural Association; Hon. Corr. Member of the American Institute of Architects; author of "*Andrea Palladio, His Life and Works*," etc. Fifth Edition, revised and enlarged by Banister F. Fletcher. With two thousand illustrations. London: B. T. Botsford, 94 High Holborn. New York: Charles Scribner's Sons. Price, $6.00.

[2] "*English Architecture.*" By Thomas Durham Atkinson, Architect. With 200 illustrations. London: Methuen & Co. 1904.

ILLUSTRATIONS

MANHASSET APARTMENT-HOUSE, BROADWAY, BETWEEN 108TH AND 109TH STREETS, NEW YORK, N. Y. MESSRS. JOSEPH WOLF AND JANES & LEO, ARCHITECTS, NEW YORK, N. Y.

108TH STREET ENTRANCE TO THE SAME.

PORTICO OF THE NORFOLK COUNTY REGISTRY OF DEEDS, DEDHAM, MASS. MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.

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[3] "*Architectural Association Sketch-Book.*" Third Series. Vol. 8. Edited by William G. B. Lewis and W. A. Pite, Architectural Association, 56 Great Marlborough St., London, W.

A general view of this building was published in our issue for March 11.

HOUSE OF A. F. HYDE, ESQ., MORRISTOWN, N. J. MESSRS. LUDLOW & VALENTINE, ARCHITECTS, NEW YORK, N. Y.

GARDEN FRONT OF THE SAME.

STORE FOR MR. ALAN H. REED, CHESTNUT ST., PHILADELPHIA, PA. MESSRS. PRICE & MC LANAHAN, ARCHITECTS, PHILADELPHIA, PA.

This building is of fireproof construction, column and wall footings, columns, floors and roof being of reinforced concrete made under the Hennebique system. The section of gable roof indicates that the pitch of the roof as shown in the architects' drawings has been changed and the roof lowered by flattening the rear part.

Additional Illustrations, Etc.

MAIN STAIRCASE, FROM GRAND ENTRANCE HALL: METROPOLITAN MUSEUM OF ART, NEW YORK, N. Y. R. M. HUNT, ARCHITECT.

NOTES AND CLIPPINGS.

THE FATE OF AMERICAN "COTTAGES."—What is to become of the palaces of rich Americns in the cities and palaces with regal grounds surrounding in the country when the present owners, or, perhaps, when the first or second generation of the present palace builders pass away? Riches take wings and fly away, we are told, and it is a homely saying that there are only three generations between shirt-sleeves and shirt-sleeves. Who can afford to own and maintain these towers of Babel? The palace projected by the great Chicago editor, Wilbur F. Story, was torn down after his death, and the stones were sold and carted away to be used in more utilitarian structures. So with others The world-famous hotel at Tampa Bay, Fla., on which Plant spent $3,000,000, was sold for $150,000, and it is the intention of the purchaser to tear it down and cut up the vast and beautiful garden and grounds into town lots. When the Vanderbilt estate is divided or dissipated what will become of the Biltmore palace and ducal grounds or domains? Who can afford to own them? Sovereign States that own all the property within their confines are put to it to support schools and colleges. Who will support the mansions of the millionaires when they are gone? Other millionaires? Not so. The man of millions wants to build according to his own taste, to do something to emphasize the fact that he is a man of millions and singular and individual. The mansions of the millionaires that are rearing their heads in so many cities will come to being monuments of folly and evidences of vanity in time.—*Memphis News-Scimitar.*

SCULPTURE FOR THE NEW YORK CUSTOM-HOUSE.—The exterior of the Custom-house will be embellished by a series of heroic statues typifying continents, nations, and cities. Eleven sculptors are at work on the figures. Four chief groups will represent Europe, Asia, Africa and the Americas. These will be by Daniel C. French. Among the twelve statues of nations and cities will be "England," by Charles Grafly; "France," by the same; "Germany," by Albert Jaeger; "Spain," by F. M. L. Tonetti; "Holland," by Louis Saint Gaudens; "Denmark," by Johannes Gelert. Among cities, "Rome" will be done by Elwell, "Venice" by Tonetti. Other work will be done by Carl Bitter, Andrew O'Connor, F. W. Ruckstuhl and A. Lukeman.—*New York Evening Post.*

A MONUMENT FOR PRESIDENT JAMES MONROE.—General Charles W. Darling, of the Oneida (N. Y.) Historical Society, has started a movement for the erection of a monument at Washington in memory of James Monroe. It is intended to bring the matter up at the triennial convention of the General Society, Sons of the Revolution, to be held in Washington on April 19 and 20. A simple slab of marble, about two feet square, lying flat upon the earth in a cemetery in Second Street, near First Avenue, New York City, has inscribed upon it the name of James Monroe and covers the vault where the body of the fifth President of the United States was buried in July, 1831. In 1858, however, the President's remains were transferred to Richmond, Va., and interred in Hollywood Cemetery.

DEATH OF GABRIEL JULES THOMAS, SCULPTOR.—This winter has been a singularly fatal one for French sculpture, no less than three men of note in the art having recently died—Barrias, Guillaume, the venerable head of the French institution in Rome, and, last month, Gabriel Jules Thomas. Paul Dubois a few weeks ago was not expected to live, but at last report was on the way to recovery. Thomas was born in Paris in 1821, and was the son of a sculptor of some merit. He studied in Rome and achieved a notable success with his first Salon offering, an Orpheus, shown in 1857. Other remarkable pieces followed in rapid succession. His "Virgil" (1861) was bought by the Government for the Luxembourg. His portrait of Mlle. Mars of the Theatre Français was a sensation of the moment. Garnier gave him the commission for the figures of "Music" and "Drama" that adorn the façade of the Opera House. He worked with success almost till the last. In the Salon of 1902 there was a charming bronze figure of his entitled "Adolescence" that was bought by the French Government. The sculptor was then more than 80 years old. Thomas received about all the honors that the Government could award—no end of medals and the Legion of Honor cross. He was a member of the Institute and succeeded Barye in the Académie des Beaux-Arts.—*New York Evening Post.*

DALOU'S MODELS TO BE PRESERVED.—The Fine Art Committee of the Paris Municipal Council proposes to purchase the whole of the works left in the atelier of the late great sculptor Dalou. This includes between 350 and 400 works or models in marble, bronze, terra-cotta and plaster, many of which have never been illustrated or published in any form. Some of the slighter sketches show extraordinary force and vigor of conception, especially those for the "Monument aux Travailleurs," which the artist was working on at the time of his death. This collection, which forms a kind of summary of Dalou's artistic life, can be secured for the sum of 30,000 francs; and it is intended that it should find place in the Petit Palais, along with the works of Carriès. It is hoped in future to render the Petit Palais a kind of museum of the works of eminent sculptors, especially of their studies and sketches, which would have a great educational value for artists. —*The Builder.*

THE CHEVALIER DE ST. SAUVEUR MEMORIAL.—On April 28 the Massachusetts Senate Committee on Libraries unanimously reported a resolution setting forth, in effect, that a committee, consisting of the President of the Senate, the Speaker of the House and five citizens to be appointed by the Governor, shall report to the next General Court such action as shall be deemed appropriate to carry out, at least in spirit, the promise implied in a resolution of the General Court of Massachusetts Bay, passed Sept. 16, 1778, respecting a monument and an inscription in memory of Chevalier de St. Sauveur, an officer in the fleet of Count D'Estaing, injured by unknown persons in an affray in Boston, Sept. 8, 1778, and who died there in consequence, Sept. 15, 1778.

TO SECURE COMPETITION IN BUILDING APPLIANCES.—A bill (No. 1069) has been introduced by Mr. G. B. Agnew and passed by both houses of the New York State Legislature, "to amend the Greater New York Charter in relation to the use of patented articles." The interesting clause of the bill is that "No officer of the city government shall order any householder or freeholder to use any patented article on any building or in any public street or place, except under such circumstances that there can be a fair and reasonable opportunity for competition, the conditions to secure which shall be prescribed by the Board of Estimate and Apportionment."

MEMORIAL OF THE BATTLE OF LEIPSIC.—A gigantic monument, said to be the largest in the world, is now under construction at Leipsic, Germany, to mark the site where Napoleon was defeated by the allied European armies, October 18, 1813. Work on the monument was started during the spring of 1900, and it is planned to be finished in 1913. The base covers 6,300 square meters, while the extreme height, when finished, will be 362 feet. The monument is built on a hill in the neighborhood of the city of Leipsic, which rises to an altitude of about 175 feet above the ground level of the city, and, therefore, will be visible from a great distance. The steps leading to the first terrace are of German granite; a relief, 210 feet in length and fifty-two feet high, adorns the front of the structure. When completed the main figure of the monument will show the Archangel Michael, the patron saint of the Germans, standing on a gigantic war chariot; around lie the bodies of the soldiers who fought the battle of Leipsic. In Gothic letters the relief bears the inscription "Gott Mit Uns" (God with us). The monument will cost several million marks, the entire amount having been already collected. Professor Bruno Schmitz, the German architect and sculptor, is in charge of the work.—*Monumental News.*

The American Architect and Building News

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CONTENTS

THE matter of architectural education in this part of the country has drifted into a condition which is not a little confused and confusing, there seem to be so many possible outcomes of the complications. One thing alone seems to be plain, and that is that a very real and widespread interest is being taken, both within the profession which is a healthy sign, and without it, which in turn is most gratifying, since, whatever be the outcome, more money for salaries, equipment and endowment will certainly be needed, and this can be had in sufficient quantity only from interested outsiders. The situation in Boston cannot be cleared up until the larger question of an effective alliance between Harvard and the Institute of Technology is decided, pro or con, and even if a satisfactory basis of co-operation between the parent institutions is at length found, it is by no means certain that the respective departments of architecture may not, as we have already stated, be specifically excluded from the coalition, a result which we cannot but feel would be regrettable.

In New York the situation is still more complex, as there are equally active and still more antagonistic influences at work, and the unfortunate thing is that the material they work upon is the immature adolescent mind. The very attractive proposal to create a School of Fine Arts and transfer to it the present architectural department of Columbia University injects a new though possibly a clarifying element into the problem, and the favorable manner in which the suggestion has been received by the community and later by the officials of the National Academy of Design presage not only that the coalition is likely to be effected, but that it will be satisfactorily supported. But the developments attending this larger scheme will be slow in declaring themselves and, after all, they may not have the important consequences that are sure to attend the change of method which has already been adopted by the Columbia School of Architecture in embarking upon the "atelier system" in the teaching of architectural design. Our readers are already aware that this change was to be made, and the announcement, last week, that Mr. Charles F. McKim and Mr. Thomas Hastings had been appointed professors to preside over the two *ateliers externes* is merely public confirmation of a consummation that was privately understood from the outset. But whether this departure in method is to prove a benefit to the School itself, whether the official atelier presided over by the former staff of the department can hold its own with these *ateliers externes*, each under the guidance of an acknowledged leader in the world of practising architects, remains to be seen and will be determined largely by the rules adopted for admission and government. There is no question but that the chance of benefiting by the advice and criticism of two such men as the new professors will be gladly availed of, and their ateliers will doubtless always be well filled; but can the same be promised for the one on Bloomingdale Heights, and, if elective freedom is in any way checked, will the jealousies ensuing be beneficial to the parent school itself?

This change of method and the establishment of the atelier system is largely due to a pretty general expression of dissatisfaction on the part of the practising members of the profession on finding that the graduate of the architectural schools was not instantly available for full service as an office draughtsman, but had to be broken in to the details of office routine, the mysteries of merchant sizes and so on. Even so sane a man as Henry Van Brunt allowed himself to make public criticism of the schools, only to make equally public retraction later, after having informed himself more accurately as to what the schools actually were doing. The mistake that these critics have made lies in the assumption that it is the aim of the schools to turn out merely finished *draughtsmen*, whereas it is their real aim to teach their students how, with the least waste of time through misguided personal effort, to prepare to become architects endowed with the benefits of a fairly liberal education. It is worth while to point out here that the Massachusetts Institute of Technology, which originally aimed to graduate pupils fully equipped with practical knowledge and ready to take places as effective workers in the ranks of the every-day toiler without an hour's loss in breaking-in, long since found it was needful to broaden its base and include in its curriculum studies not originally contemplated. Further, the best friends of the Institute to-day point out that, in the event that a coalition is not effected between itself and Harvard, it must, if it is to hold its place against this Lawrence Scientific School, still further liberalize its curriculum.

No, the touchstone to apply to the architectural schools is not to ask whether, on graduation, their students are finished practical draughtsmen, but whether they have later become successful and honored practising architects. To this last question there can be but one answer. But, it may be objected, a good many graduates of the American schools feel it necessary to go later to the École des Beaux-Arts. That is very true

Entered at the Post Office at New York as second-class matter.

and, measurably, they would be fools if they did not —ways and means being propitious. And so, too, will students as favorably circumstanced who may be graduated under the atelier system, for it will be many a long year before this new undertaking can acquire the characteristics—to ape them can be speedily accomplished—and the atmosphere of those grimy Paris workshops. The new professors may play the rôle of critic and adviser as efficiently as any *patron* in Paris, and yet there will still be something lacking to the perfect flavor of a real atelier and that is the mysterious influence of *les anciens,* whether they be actually present or represented by tradition only. But, it will be argued, in a few years the new American ateliers also will have their "old ones," and will be accumulating tradition. Such a hope is, we believe, delusive, and the delusiveness rests on the differences between the sensitive Gallic nature and the merely nervous American temperament. The real value of the atelier system lies in the influence of these volunteer pupil-teachers, who, through their longer experience with and observation of the justice of the patron's recommendations, appreciate at once what the lower-class man should do with his problem and have not only the power of putting their recommendations forcibly into the vernacular of the atelier, but are also willing to spend time on argument and debate with a disbeliever, a course which a patron's dignity would not allow him to enter into, even if the student's awe of his master allowed him to be audacious enough to question his conclusions.

We believe that the chance of reproducing in this country the influence of *les anciens* in architectural education is small, and there are two significant facts that tend to support this conclusion. In the first place, it is a matter of observation that, while an American Second-class man will slave eagerly and untiringly for a Frenchman of the First Class, he is quite unwilling to *faire le nègre* for a compatriot. The second fact explains the first: it is part of the American doctrine, it is ingrained in the American nature, that one man is as good as, possibly rather better than, his neighbor, even if the latter has the advantage of a year or two in age. Consequently while American students are quite willing to believe what a Frenchman says—for, somehow, they appreciate the more subtile quality of a Frenchman's perceptions—they are quite sure that their American elder is merely "talking through his hat," as it were.

Now, into the stream of architectural education, which is eddying about, seeking for its proper channel, is discharged a new and very disturbing current which finds expression in the educational undertakings of the Society of Beaux-Arts Architects, who, purely by accident, have become a force seriously to be reckoned with, unless they are to be allowed to become the real masters of the situation.

The American belief in the École des Beaux-Arts and its methods has subsisted too many years to be dislodged by any argument or circumstance. The heads of the various American schools, one and all, we believe, urge the best of their graduates to continue their studies, if they have time and money at command, by spending a couple of years at least at the Paris School. Now, generous as is the French Government in the matter of opening its schools to foreigners, it has of late years perceived the necessity of limiting the number of foreigners to whom it is willing to give free education, and, in the case of architecture, has fixed the number of foreign admissions at sixteen, we believe, so that even if Americans could, year after year, capture every available place only sixteen could be provided for each year, and naturally whatever course is most likely to secure one of these coveted opportunities is the course that will be followed by most students. Until now all aspirants have had to enter the Second Class and win their way into the First Class by passing the stated examinations and acquiring the required number of *valeurs* in architectural design, the average time required to win entry to the First Class approximating very closely to two years. In the case of the well-drilled American graduate, the examinations are mere bagatelles and though he does, of course, profit largely by the practice on the Second Class *projets,* still the time spent in the Second Class is largely wasted. In other words, the graduate of the American school, although pretty well fitted to enter direct into the First Class, has been prevented from so doing by the regulations which are applied equally to every one. The difficulty has long been perceived and regretted, but it was supposed that nothing could be done to change the situation. This year, however, Mr. Lloyd Warren, of New York, a former *élève* of the École, succeeded in securing a change in the law of *admissibilité* which has a very vital effect on architectural education in America. As our readers are already informed, the French Ministry of Fine Arts have, on Mr. Warren's representation, passed a law to the effect that any society consisting of one hundred or more former pupils of the École des Beaux-Arts and engaged in the work of giving instruction in architecture is entitled to secure admission to the First Class, and without examination, for its "Paris Prize" man, if furnished with the required certificate showing that the recipient has earned the proper number of the "values" in which the society deals.

It follows very clearly from this that, if it is the hope of the most promising of our architectural students to enter the Paris School—as it certainly is now and as it surely will be for a long time to come—our architectural students will, as soon as their eyes are opened to the fact, adopt that line of effort that will be most likely to lead them to the goal of their ambition, and save waste of valuable time. The result inevitably will be, not that they will be faithful followers of the curricula provided by the established and well-equipped architectural schools, but ardent supporters of and believers in the theories of the Society of Beaux-Arts Architects—the only body in the world that at this time meets the new requirements of the French Ministry of Fine Arts,—and ready to spend all their time, if needful, over the competitions held by the Society, since the necessity of winning the Society's "values" will be, in their eyes, paramount over all else.

Because of this accidental effect of what had the air of being a very felicitous concession on the part of the French authorities, it really seems as if there were a possibility that the established schools of architecture, on the one hand, and the Society of Beaux-Arts Architects,

on the other, might find themselves gradually forced into a position of veiled hostility, with the odds in favor of the Society. Should this actually be the case the Society becomes the arbiter of taste, and American architecture, which has had its hopeful aspects of national individualization, seems likely to degenerate rapidly and be represented everywhere by the same sort of bastard copies of schoolboy fads of the moment, as they appear in the pages of the *Croquis* of the Intime Club, that make the streets of New York such disheartening spectacles nowadays. Not that these street façades, overloaded with ill-balanced features in the latest "Beaux-Arts" style, as is supposed, and merely grotesque in their coarse exaggeration, are the work of members of the Society: they are, of course, in the main due to the ingenuous enthusiasm of the designers employed by the speculating builder who have been carried away by the exhortations and very active propaganda of the Society. It is rather unfair that the Society should have to bear the responsibility for these atrocities and yet, if there is a responsibility, it should be theirs, since their exhortations have been so vehement, their propaganda so active.

The danger of the situation is this: the educational efforts of the Society are carried on by committees, constantly changing in membership, the work being done largely by the youngest and least experienced members, the men that are most recently returned from Paris and retaining the liveliest impressions of the sentiment of the hour there, men convinced, enthused, arrogant in the belief that theirs is the only true viewpoint. If these men stayed on the committees long enough to be able to watch the effect of their advice on succeeding generations of students and, in consequence, to correct and revise their own beliefs, then their influence and effect would be comparable with that exerted by the teaching staffs of the regular schools who do have just this opportunity to revise theories so as better to adapt them to practice. But the Society's committees are constantly changing through the infusion of "new blood," the older men, who, by experience have gradually acquired some of the more desirable pedagogic attributes, being compelled by the demands of private business to withdraw from the work; and so the influence exerted is that of the pupil-teacher mainly, but a pupil-teacher who during a short stay in a foreign land may have absorbed into himself and cultivated, not the true essence of the subject he had been studying, but the more obvious and possibly most vicious externals.

This method is an admirable one, if it is the aim to keep American practice as close to the vogue of the hour in Paris as possible. It is, practically, the system adopted by our *marchandes de robes et manteaux*, but isn't it reducing American architecture a little too sheerly to a mere matter of trimmings?

JUST what circumstances induced Mr. James Stillman, a New York banker, to offer, through the French Ambassador at Washington, to the École des Beaux-Arts for the establishing of sundry prizes the sum of one hundred thousand dollars, we do not know; but the information cannot but be gratifying to every American, who, in his own youth, has had the chance to avail of the extraordinary liberality of the French Government in opening its schools to foreigners under practically no restrictions that are not imposed equally on the native-born Frenchman. Neither do we know whether the prizes are to be for painters, sculptors or architects, or for all three equally, but we hope that he has been well enough advised to couple with his gift the stipulation that the winning of one of these Stillman prizes, or however else they may be called, shall count as so many "values" to the credit of the winner in entitling him to enter *en loge* for a Prix de Rome competition. It is, of course, Mr. Stillman's object to be helpful and he would hardly consider that his end had been accomplished should he find that students had to be urged to compete for these prizes because, through oversight or ignorance, he had not made it a condition that they should count towards the Prix de Rome. The "Prix de Reconnaissance des Architectes Américans" has not accomplished what its founders hoped, that is kept largely and generally in the minds of the French students of the hour—who now and then grumble, *parceque il y a tant de ces sacrés étrangers* under their feet—the fact that their quondam fellow-pupils were and always will be profoundly grateful to the French nation. This failure is due simply to the fact that the winning of the American prize does not help along the path to Rome. We have had a body of American beneficiaries express their gratitude to France, and now we have a private individual expressing a similar feeling on behalf of himself and other similarly enlightened citizens. Perhaps some time the nation itself may awake to the proprieties, and as a nation express its gratitude to a sister nation for benefits long enjoyed. It would be too un-Republican to ask the abolition of the tariff on French art, but a well-paid place or two for a short term of years in the designing-room of the Supervising Architect might be made to do duty till something better could be devised.

WHEN we last referred to the matter of the Wisconsin State-house competition, we supposed that the watch-dogs of the State Treasury and the upholders of State pride had finally won the day, and that, through a technicality, Mr. Gilbert and the other prize-winners were to be denied the prizes the Capitol Commissioners had awarded to them. But it appeared that the audacity of the foreign interloper, Mr. Gilbert, could not be punished without bringing the same affliction upon his fellow prizemen—good citizens and innocent children of the great State of Wisconsin. So a special bill was brought in, authorizing the commissioners to draw sufficient to discharge the obligations to the prize-winners from the special appropriation of ten thousand dollars that had been made, once upon a time, to procure plans for the alteration and enlargement of the old State-house before that was destroyed by fire. Although the opponents of the St. Paul architect succeeded in causing this bill to be referred back to the committee, it seems to us likely that it will emerge from its seclusion before the end of the session, as it may be taken for granted that the Wisconsin men at any rate will not be kept out of their money.

LETTER FROM CHICAGO.

EXHIBITION OF THE ARCHITECTURAL SKETCH CLUB.—THE LAKE FRONT REGION.—THE ALLEGED PERFECTIONS OF THE THOMAS ORCHESTRA HALL.—THE COUNTY COURT HOUSE COMPETITION.—THE FERGUSON ENDOWMENT FOR SCULPTURE.—THE TEAMSTERS' STRIKE.

THE Architectural Sketch Club has been for the last few weeks holding its usual annual exhibition at the Art Institute. Taken as a whole, the exhibit is not as interesting as it has been in some previous years. It fills three galleries and with the Twyman Memorial Room and the exhibition of the Alumni Association of Decorative Designers occupies a dignified space. The public has for several years shown a growing interest in these exhibits, but an intelligent understanding of the present exhibition seems to be somewhat lacking, owing to the fact that the catalogue appears to be an edition de luxe, valued at the high price of seventy-five cents a copy, an amount which the average visitor, with no vital interest in the exhibition scarcely feels like expending. These precious, though not priceless, volumes are not left on the attendant's desk, but are kept by the guards under lock and key in a little cabinet in the corridor, for fear some profane eye may light upon them. One never sees a visitor with catalogue in hand, enjoying the exhibits. It is certainly to be questioned, if this is not poor policy, as one of the many objects of these exhibitions is to educate the general public and to awaken interest through them in architectural matters. It is hard to understand why this should be so either, as money is collected by the Club to defray the expense of the catalogues.

In the first large gallery there are the greatest number of attractive exhibits. On two of the walls there are some charming water-colors and photographs of good work done in Chicago and its vicinity. Here centers the greatest interest of the exhibition. On another wall is made the usual perennial display of huge water-colors from the office of D. H. Burnham & Co. of possible improvements on the Lake Front. The sketches are too much in the nature of bird's-eye views, devoid of details to afford much satisfaction to the beholder. Near these are sketches and photographs of the Henry Reubens place at Glencove, on the North Shore, by George Maher. They are an astonishing piece, or collection of pieces rather, of architecture, which one must see in the reality to actually appreciate. Near them are very large sketches by Mr. Weber of the improvements, theatre, casino, stadium etc., at Ravinia Park, another North Shore location. These sketches do not do justice to the actual buildings, which are very charming and deserve to be spoken of more at length than there is room for in this present letter. The sketches themselves are not especially interesting as they display too much woodland scenery to the number of square inches of architecture used.

One little black-and-white sketch which has attracted a good deal of interest is that of the Memorial Church, now being erected in Winnetka by Mr. William H. Hoyt, to his daughter and grand-children, victims of the Iroquois fire. The church, it is expected, will be one of the most unique little buildings in this part of the country. It is very English in feeling and the treatment of the stonework, unusual in this district, will add much to the picturesqueness and beauty of the church. The actual building is not far enough along to receive either condemnation or praise, though the drawing would lead one to expect something quite charming.

In this same room are exhibited plaster casts of the bronze doors of the Boston Public Library, by Daniel Chester French, like all of Mr. French's work, delightfully strong and refined.

In the last large gallery a good many school drawings are exhibited, exceptionally uninteresting in character. Here also are full-size drawings for stained-glass windows, designs for tiles and the tiles themselves, fireplace furnishings, etc. In one of the rooms there are some attractive little plaster casts of architectural work, one a delightful little pergola, very realistic in treatment, even to the little artificial grape vines, growing over it.

As exhibitions which harmonize with that of the Architectural Sketch Club, an adjacent gallery is used for the display of the work of the Alumni Association of Decorative Designers, while a room which is made a Memorial to Mr. Twyman, an old Chicago decorator, recently deceased, contains nothing but his work.

The setting of the gallery of the Alumni Association is entirely unique. The room is treated more like a summer garden-house: a lattice-work ceiling covers the room, from which hangs artificial wistaria vines in full flower. The color of the walls and woodwork is all of brownish gray, the woodwork given a smooth wax finish. Some cotton cloth in broad plaits covers the wall, a good neutral background for the colored sketches on it, while a darker brownish cloth forms the dado in closer plaits. The front of the gallery from each of the side doors is treated like a balustrade, all of the same quiet neutral-tinted wood. On the top of the balustrade, in boxes with curious copper plates for their only ornament, grow orange tulips. The whole color scheme is very charming, yet all is made of the cheapest of material Some clever lanterns, containing electric lights, are hung from the roof trellis. These are square affairs, cut out of the ordinary straw board in some rather "L'art Nouveau" designs, lined with white tracing-paper.

The Twyman room is interesting historically, one might almost say. Many of the objects are now such matters of everyday use, that they hardly excite a comment, but when they were designed by Mr. Twyman, he brought them as a pioneer brings his first implements to a country where such things were not known. There is much to-day to excell these examples, but they only show not that Mr. Twyman did his work less well, but that we have all profited by his and other men's efforts to rise to a higher standard.

In visiting the Art Institute one gets into a neighborhood which takes us away from the sordid, smoke-laden atmosphere, which seems to be actual Chicago. Here, where the clear atmosphere of the Lake prevails, a different moral atmosphere seems to exist and this section of a few blocks along the Lake Front is fast becoming a district as charming to frequent as Copley Square in Boston, for instance.

It is really attractive and one feels the influence of the surroundings, the Public Library, the Art Institute, the Fine Arts Building with its many studios and artistic interests, the shops for attractive furniture, old jewelry, glass, etc., the new Music Hall, where much of the best musical interest of the city centers, and the Auditorium, both the hotel and assembly-hall, where at times vast gatherings are held. Even the crowds on the street have a different mien, flocks of children being taken by teachers to the Art Institute, crowds going to some great musical treat at Music Hall, and well-dressed women hurrying either to the Fortnightly or Woman's Club, both of which have their homes in this vicinity; occasionally there is the "distinguished visitor," foreign or domestic, mingling in the procession, for all good visitors are apt to tarry at the Auditorium Hotel. Then there are the frequenters of the Studebaker or Auditorium passing on to some musical or dramatic occasion. It is getting to be an artistic center, this district, and when the new Field Museum stands out on the made-land east of the Illinois Central tracks, and the new Crerar Library is allowed to be deposited somewhere in this district, it will certainly form a group of interesting buildings, with a setting of lake in the background, of which Chicago or any other city could well be proud.

With all the discussion there has been about the Field Museum it is gratifying to know from some of the Museum people, that plans are well under way, and that it is now settled that the building will be one of this group.

According to published reports the building of the great Crerar Library will be settled this fall, though the public generally does not know on what exact spot it is to be located. The public has certainly to thank Montgomery Ward & Co., and some of the other abutting property owners, that they have remained steadfast to the injunctions and have not permitted indiscriminate building on this breathing space. The same firm will also see to it, that the temporary Federal building is demolished and not allowed to be used for other purposes after the Post Office authorities give it up for their new home.

While we are in this neighborhood, apropos of the new Music Hall, it may be amusing to note, in view of the fact that so much has been said by the promoters of the place of the perfection of the internal arrangements of the Hall, that at the present writing season-tickets can not be obtained for next Winter, owing to the announcement at the box-office that "some slight alterations are to be made in the seating-arrangement." It will take a genius to make slight alterations and make the seating-arrangements other than they are in this uncomfortably steep-pitched, crowded assembly hall. Possibly the large foyer in the front of the building is going to add its generous, unused proportions to the too small auditorium. It is perilous to make any remarks, however, for any one in Chicago is promptly squelched in his heresy that this is not the most perfect, comfortable and beautiful building ever planned and built. You are not to think that the boxes are glaring when lighted, or dark when unlighted, or that you

are cramped and uncomfortable as to the surrounding house. When you have seats in the gallery you are not to quake, because a false step down the steep-pitched aisles would be fatal and land you in the parquette, many feet below. You are not to mind that your feet and legs get asleep at a concert, because the rows of seats are too near together. You are not to get nervous, because the aisle from your section happens to be a very narrow one with more generous ones leading into it. You are not to notice that you are an interminable length of time getting out and at all events in case of fire, you are not to remember the Iroquois and get panicky. If you sit downstairs under the gallery (which you are very likely to do, if you sit downstairs at all), you are not to feel oppressed by the low balcony hanging over you, or object to having every thing seem dark and "stuffy." If you sit in some of the back seats you are not to mind a cold draught on the back of your head and neck, for there is plenty of circulation back there, through the entrance and vestibule doors directly opposite to one another. If you are so unfortunate as not to possess a season-ticket, and take one of the front seats in the parquette for an evening you are not to mind if you can only see a few of the musicians by tipping your head backwards at a right angle to your body. All these things you must not mind, or if you do you must not mention them, if you do not want to have the building-committee called together and be told by it, or the directors of the Thomas Orchestra, that you only show your ignorance by such criticism, and that every thing is absolutely perfect, for Mr. Norman Fay and Mr. Bryan Lathrop congratulated Mr. Philo Otis and some dozen or so other gentlemen on the absolute perfection of the arrangement of the whole house when it was completed. All these things, if you live in Chicago, and want to be considered a person of "sense and sensibility" by our "best families," to quote from Miss Jane Austin and Mr. Roswell Field, you must not do.

We are told that the Post Office will be finished in September, so we shall not have to worry over that many more years, and after we have given it a good critical overhauling in the fall we shall be done with it and ready to center our thoughts on the new Court House which is to be.

The County Board has made all arrangements for a competition. It has adopted articles governing the competition which are based on the constitution and by-laws of the American Institute of Architects. Seven firms have been invited to compete, they being guaranteed one thousand dollars for the expenses of drawings. These firms are D. W. Burnham & Co., Chicago; Carrère & Hastings, New York; Shepley, Rutan & Coolidge, of Boston and Chicago; Holabrid & Roche, Chicago; George B. Post & Son, New York; Frost & Granger, Chicago; Huehl & Schmidt, Chicago. The judges are Stanford White, of McKim, Mead & White, the New York architects, and Graeme Stewart, John M. Ewen, Harry G. Selfridge and William McLaren, all prominent Chicago business men. At the outset it looks as if the competition were to be conducted on entirely straight lines, but it cannot be told till later how much politics may creep in. Aside from the firms invited to participate, any architect, or firm of architects, may enter the competition under certain conditions. All applications to enter the competition must be sent to William McLaren, Superintendent of Public Service of Cook County, and must be delivered at his office, 202 Court House, Chicago, Ill., by May 15, 1905. The first, second and third prizes in the competition for design and plan are respectively $5,000, $2,500 and $1,000. The cost of the building, exclusive of furnishings, is to be $3,500,000. The successful competing architect will receive five per cent. on the first million of the cost, four on the second million and three per cent. on the remainder. The site is the site of the present Court House "ruin," the Court House square being 378 ft. by 160 ft. Plans are to be so drawn that when a new city hall shall be built, the two divisions will unite into a harmonious whole.

Certain rules of the competition are as follows:

"All competitors shall furnish the following plans, elevations and sections, which shall be drawn to a scale of one-eighth inch to the foot, and all elevations and perspectives shall be drawn in ink and shall not be shaded or colored, the plans and sections to have solid sectional parts indicated by black filling between the lines, but no other color or shading shall be used on the surface to indicate the materials or to emphasize the mouldings, ornaments or projections."

A. Plan of first story.

B. Plan of three stories or more.

C. Elevation of Clark St. front.

D. Elevation of Washington St. front.

E. Longitudinal section from north to south.

F. Transverse section from east to west.

G. Perspective from a point 500 ft. from building, showing Clark and Washington St. fronts at an angle of 60 degrees from the line of Clark St.

H. One sheet of details showing points of construction or detail which the competitor may desire to emphasize. All drawings must be in by August 15, 1905.

It is to be hoped that before many years the present eye-sore of the county and city buildings will be removed. With a reputable county and city hall, we shall not feel disgraced by putting into Chicago the monuments which the will of the late Benjamin Furgerson has made possible. This most interesting and unusual bequest consists, as every one knows at this time, of a million dollars to the city of Chicago, the interest from which shall be used in the purchase of fountains, statues or monuments which shall be commemorative of America's great men or women, or some important historical event. Such wealth makes one fairly smack one's lips and as the trustees of the fund are the trustees of the Art Institute, it is sure to be well expended. It is too early now to tell anything definite of the plan, but with so large a gift which is to continue for years indefinitely, the only wise course would be to consider the matter in a large way. It is not a question at present of buying a statue for this place or some monument for that place, but to start out with some fine scheme along whose lines work could be carried on for years. It is a matter that the technical journals might interest themselves in, this scheme for some sort of decorative feature in some park of the city (presumably at first this portion which has just been spoken of near the Art Institute) where some square could be laid out similar to Trafalgar Square in London, or the Place de la Concorde in Paris. By such a scheme some fitting background could be arranged for the really fine works of art, which in the future, near and distant, can be ours. It gives us Chicagoans a queer feeling, as if we had been assured that we should never lack the luxuries for our old age, as well as the more frivolous ornaments for our youth. With Mr. Charles L. Hutchinson and Mr. Martin A. Ryerson at the head of the committee, we feel that the right thing will be done. They not only are men of good taste and judgment, but are much in touch with matters artistic all over the world, and if they are not sure what will be the best thing themselves, they will call for advice from those best fitted to help them.

Chicago is at present, as all the world knows, facing other problems than those of art. The great labor interests on one side and that of capital on the other are arrayed against each other in what looks like a death struggle. All talk of peace is pushed aside by both parties at the present time of writing. To the unprejudiced lookers-on there would seem to be but one outcome, but before that outcome is reached what misery and suffering may have been endured.

At the present writing the building interests have not been affected. In the face of the great strike of the teamsters, which is going on, it is curious to note that among building trades the conditions prevailing are unusually peaceful. Never since 1886 has a May-day dawned when there was so little discord between employer and employed. Thirty thousand workers began work then under new agreements, some with slightly higher wages, but on the other hand with some concessions in working conditions. Some trouble has been experienced in the new Marshall Field building, teamsters refusing to haul lumber for that especial firm.

HEATING AND VENTILATION.—VI.

SCHOOL-HOUSES (*Continued*).

THE indirect gravity system of steam heating comes next in cost of installation. This is adapted to larger buildings than furnace heating because a stack or heater may be placed at the base of each flue and a single boiler made to supply them all, thus doing away with the necessity of carrying several fires.

Heating or aspirating coils may be used instead of stoves in the vent flues, thus simplifying the system still more.

The gravity system has the fault of not supplying a uniform quantity of air under all conditions of outside temperature, the same as a furnace, but when properly arranged may be made to give satisfactory results for the greater part of the heating season.

The greatest care should be taken to provide an abundant sup-

ply of cold air to the heaters, and ducts should be arranged for taking it from at least two sides of the building, or, if possible, from all four sides. When it is taken from four sides, each inlet should be made large enough to supply one-half the amount, or, in other words, any two should give the total quantity required.

It is often possible to arrange the flues in groups so that all of the heating stacks may be placed in two or more cold-air chambers, depending upon the size of the building. A cold-air trunk-line may be run through the center of the building, connecting with the outside on all four sides, and having branches supplying each cold-air chamber. Sometimes the stacks may be placed as shown in Figure 30, each cold-air room having an outside inlet window and, in addition, a cross-connection with the air-chamber upon the opposite side of the building.

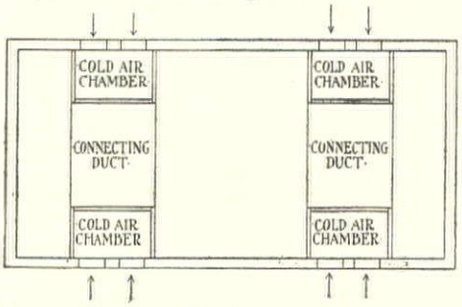

FIG. 30.

The inlet to each cold-air chamber should be of sufficient size to supply both stacks. Figure 31 shows a typical arrangement for a cold-air chamber with heaters supplying four rooms. The cold air is admitted through inlet windows as shown in Figure 32. The sashes are hinged at the top and close against frames set at a slight angle from the vertical, so that their weight will cause them to shut tightly without the use of levers or weights. A galvanized-iron casing with cloth air-checks should be provided to prevent back-draughts from carrying the air from the chamber out of doors. The sashes may be operated by chain-and-pulley attachments as shown. Mixing-dampers are arranged in the flues as indicated, and are operated from the rooms with which

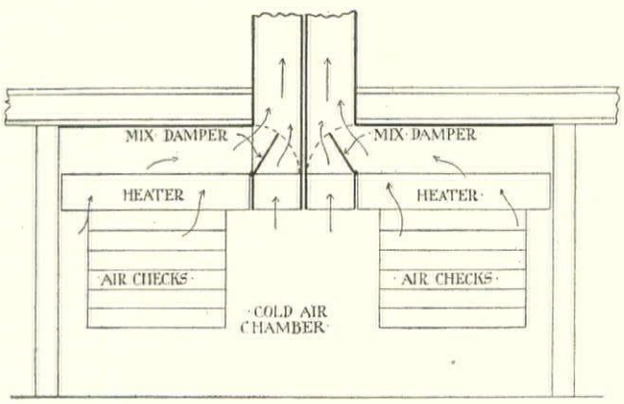

FIG. 31.

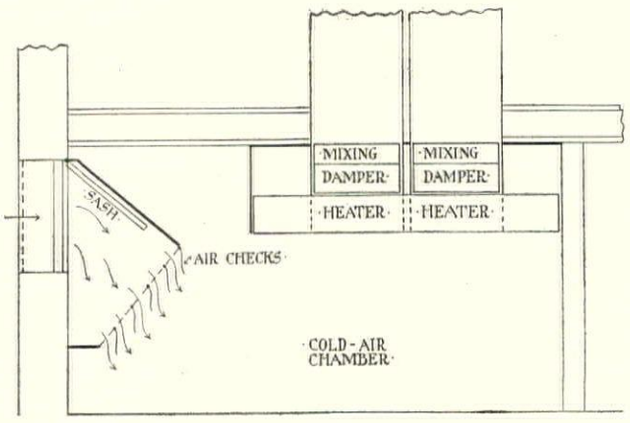

FIG. 32.

the flues connect. The chains should be of good size and run over full guarded pulleys not less than 3 inches in diameter. They should pass into the rooms 3 or 4 feet above the floor through catch plates marked to indicate their use. Regulating-dampers should be placed in the flues at some point above the mixing-dampers, for regulating the flow of air to the different rooms. Special care should be taken to make the mixing-dampers tight-closing, and they should be stiffened with light angle or tee iron in order to hold them in shape.

The opening into the flue from the hot-air space over the heater should be practically the full size of the flue.

It has been stated in a previous article that one of the principal objections to a mixing-damper is its failure to thoroughly mix the currents of hot and cold air before they reach the register. In the case of school-house work the height of the flues, even to the first floor, is sufficient to overcome this to a considerable extent, especially if the dampers are arranged so that the cold air ascends at the back of the flue and is delivered at the top of the register. In this case the warm air entering at the bottom of the register tends to rise, and the cold air at the top to fall, thus mixing the two currents as they are delivered into the room. The flues may be made either of galvanized-iron or of brick; the former is preferable on account of its smooth surface, but if brick flues are smoothly plastered they may be made to give satisfactory results, and are somewhat more durable than iron.

Cast-iron pin-radiators are particularly adapted to this class of work. The "School Pin," having a section about 10 inches in depth and rated at 15 square feet of heating surface is used quite extensively by some engineers. The "Utica Pin" has been found to be one of the most satisfactory patterns, in the experience of the writer. The sections are connected at alternate ends so that the flow of steam is positive through each section of the entire stack. The sections are rated at 12 square feet of heating-surface each, and are about 7 inches in depth. The free air-space between the sections of each pattern is a little over 60 square inches. The quantity of air passing through a heater surface that a much higher efficiency may be obtained than in used for school-house work is so large compared with the heating-the case of dwelling-house work. An efficiency of 800 B. T. U. may be safely counted upon in zero weather with radiators of the above form. A standard corner class-room, seating 50 pupils and having the usual proportion of glass surface, requires from 20,000 to 30,000 B. T. U. per hour for warming, and about 150,000 B. T. U. for ventilating purposes in zero weather, making a total of 180,000 B. T. U., and $180{,}000 \div 800 = 225$ square feet of heating-surface required. Stacks containing from 220 to 240 square feet of surface for southerly rooms and from 240 to 260 for those having a northerly exposure have been found ample for ordinary conditions in zero weather. The stack for each room should be divided into two groups in the proportion of 1 to 2, with valves in the supply and return so that the surface may be partly proportioned to the outside temperature. More accurate adjustment may be obtained by the use of the mixing-damper which is under the control of the teacher.

Where mixing-dampers are employed it is well to hang dial thermometers at the center of the inlet grilles to indicate the temperature of the entering air. A little experience will then enable one to tell what temperature of air is necessary to warm the room under different outside conditions. Without this, the damper is very apt to be thrown wide open for either hot or cold air as the immediate requirements may indicate, with the result of either overheating the room on the one hand, or of producing draughts and reducing the air-supply below the normal, on the other. For the best results, a mixing-damper should be set in an intermediate position, so that the mixture of warm and cool air will be in the right proportion to maintain an even temperature within the room. The vent-flues should be provided with steam coils for use in mild weather and also in cool weather until an outward flow is well established. It has been found by experience that an efficient coil having from 30 to 40 square feet of heating-surface is sufficient for the vent of an ordinary sized school-room. One of the best forms of heater for this purpose is made up of Nason tubes screwed into a cast-iron base and placed in an inclined position within the flue just above the vent opening from the room. The height of the tubes should be about twice the depth of the flue, so that the over-all area of the heater shall be twice the sectional area of the flue, in order not to reduce its effective area. Each heater should have a separate supply and return pipe running up from the basement; these are usually placed upon a separate line of piping so that they may be run when the rest of the building is shut off.

A separate boiler of small size for supplying these heaters is often provided for use in spring and fall before the large heating-boiler is fired up. Especial care must be taken to locate the air-

valves upon the vent-flue heaters at points where they can be reached for adjustment. A good arrangement is to bring down a small pipe from each heater and place the air-valves just back of the grille in such a manner that they may be easily reached by means of a screw-driver or key. In any system of indirect heating, provision should be made for air rotation by doors opening from the basement into the cold-air chambers. At night or when school is not in session the outside cold-air windows should be closed and the rotation doors opened. Doors from class-rooms into corridors, and from corridors into basement stairways, should also be opened to allow a complete rotation of air through the heaters for warming without ventilation.

Foot-warmers, so called, should be placed under the first-floor corridor near the entrances. These consist of indirect stacks containing from 80 to 1000 square feet of heating-surface placed at the basement ceiling with large registers above them. A long narrow register, from 12 to 18 inches in width, will accommodate more pupils at the same time than one of the same area more nearly square.

These heaters are sometimes made to take their air directly from the basement through large openings in the bottoms of the casings, but it is better to connect them with the outside air-supply and thus furnish fresh air to the corridors. Small rooms, such as teachers' rooms, toilet and coat rooms, are best heated by direct radiation, but should be provided with vent-flues. The radiator sizes may be computed by the methods already given. In basement rooms it is usually necessary to place the heating coils near the ceiling in order to bring them above the water-line of the boiler. When this is done it is necessary to increase the surface from 30 to 50 per cent. above that computed, as coils placed in this position are less efficient than when near the floor.

One of the disadvantages of indirect heating for school-house work is the delivery of all the heat to the room from a single point, and this not always in a position to give the best results. The outer walls are thus left unwarmed, except as the heat is diffused throughout the room by air currents. When there is considerable glass surface, as in most of our modern school-rooms, draughts and currents of cold air are frequently found along the outside walls. A better arrangement, although somewhat more costly, is the use of indirect heaters for warming the air needed for ventilation, and the placing of direct radiation in the rooms for heating purposes. The general construction of the indirect stacks and flues may be the same, but the heating-surface can be reduced, as the air in this case must be raised only to 70° or 75° in zero weather; the heat to offset that lost by conduction through walls, etc., being provided by the direct surface. The mixing-dampers may be omitted, if desired, and the temperature of the rooms regulated by opening or closing the steam-valves on the direct coils, which may be done either by hand or automatically.

The indirect stacks, when used for ventilation only, should contain about 200 square feet of heating-surface for each room. If we assume 50 pupils per room, with an air-supply of 40 cubic feet per minute each, we shall have $50\times40\times60=120{,}000$ cubic feet per hour, and $120{,}000\times\frac{70}{55}=152{,}000$ B. T. U. in round numbers,

$152{,}000\div800=190$ square feet of heating-surface required.

It is evident that for much of the time this amount of heating-surface will be sufficient for both warming and ventilating and, if mixing-dampers are provided, the direct surface will be needed only in the coldest weather and may be operated by hand. Where the first-cost must be kept as low as possible, this arrangement may be used, but if the most satisfactory results are desired at an increased cost of about $40 per room, the mixing-dampers may be omitted and automatic control applied to the direct coils. If this is done the indirect stacks should be divided into sections and valved as already described.

The direct surface may be computed by the methods previously given or by a simple rule which has been found to give satisfactory results in a large number of buildings of this class:

RULE.—*Divide the outside wall surface by* 12, *and the glass surface by* 5; *add the quotients, and the result will be the square feet of heating-surface required for wall coils. If cast-iron radiators are to be used in any of the rooms the surface computed by the above rule should be multiplied by* 1.3.

These sizes are for rooms having a southern exposure; for other exposures, multiply by the factors already given for this purpose. If the building has a cold attic, the heating-surface in rooms on the upper floor should be increased about 20 per cent. Where a building is in a very exposed location, or where the temperature frequently drops below zero, the factors 10 and 4 may be used in place of 12 and 5. The direct radiation is best made up in the form of circulation coils and placed along the outer walls beneath the windows. This supplies the heat where most needed, and does away with the tendency to draughts. Where direct radiation is used, the quantity of heat supplied is not affected by varying wind conditions, as is the case in indirect heating. Although the air-supply may be reduced at times, the heat quantity is not changed. Circulation coils are usually made up of 1¼-inch pipe screwed into branch tees and supported upon hook-plates attached to the wall. It is common in school-house work to run the pipes around the two outside walls in corner rooms, making the steam connection at one end and the return at the other. Coils of this form should have a grade of about 1 inch in 20 feet toward the return end in order to secure proper drainage and quietness of operation.

As the class-rooms are regularly superposed on the different floors, supply risers may be carried up and the coils on each floor supplied from the same riser. The returns are sometimes connected with a common return in a similar manner. Where this is done they should be dropped through the floor and the connection made with the vertical drop at the ceiling of the room below. A check-valve should be placed in each connection to prevent the steam from one coil backing into another through return when it is first turned on. This method of connection and the proper location of air-valve are shown in Figure 33. A better arrangement is to carry a separate ¾-inch return from each coil to the basement, and connect with the main horizontal return below the water-line of the boiler; this seals each connection and makes each coil independent of the others. When the connections are made in this manner, the air-valves may be placed in the return drops just below the basement ceiling instead of on the coil.

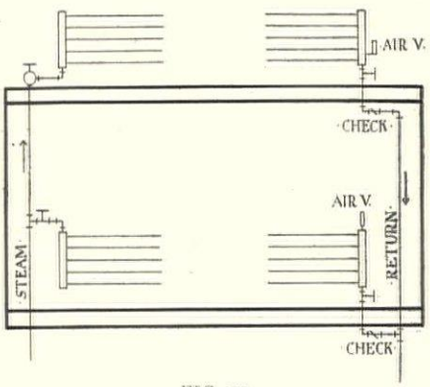

FIG. 33.

Sometimes the rooms are so arranged that the heating-surface must all be placed upon a single wall. In this case a "return bend" or "trombone" coil should be used instead of a branch coil, to allow for the expansion of the pipes. Overhead coils in basement rooms are usually of the "miter" form laid on the side and suspended about a foot below the ceiling; they are less efficient than when placed nearer the floor, as the warm air stays at the ceiling and the lower part of the room is likely to remain cold. They are only used when wall-coils or radiators would be in the way of fixtures, or when they would come below the water-line of the boiler if placed near the floor. The pipe-sizes for both supply and return may be taken from the tables already given.

CHAS. L. HUBBARD.

COMMUNICATIONS.

AN UNAUTHORIZED USE OF NAMES.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sirs.—The programme for a competition for the proposed Court House for Cook County, Illinois, has been issued by the Board of Commissioners of Cook County, in which the names of several architects or architectural firms are given as having been invited to compete, and having accepted this invitation, our name appearing among others.

We were not aware that this competition was to take place. We had never been asked to compete, nor had we signified our willingness to do so. The first knowledge we had of the matter was obtained upon the receipt of the programme with a letter inviting us to compete. We could not approve of the terms of the competition, and have, therefore, declined the invitation.

You will oblige us by publishing this letter in the next issue of your paper. Yours very truly,

CARRÈRE & HASTINGS.

THE ARCHITECTS OF THE MANHASSET.

To the Editors of The American Architect.

Dear Sirs.—Your publication of May 6th, 1905, contains photographs of the building on the west side of Broadway, covering the block between 108th and 109th Streets. You mention the architects as being myself and Messrs. Janes & Leo. Fearing that this might tend to the supposition that an association existed between myself and the above firm, I respectfully request that you publish my explanation.

The building was originally built by William Noble, an operator who has since failed and died, and the building, which was then eight stories high, was erected from my plans and under my supervision. Before the completion of the building, however, the property was foreclosed by the mortgagee, Jacob Butler, for whom I believe Janes & Leo were the architects, and three additional stories were added to the building as originally designed by me.

By kindly giving this publication in your paper you will very much oblige,

Yours very truly,

Joseph Wolf, Architect.

ILLUSTRATIONS

THE NEW YORK HIPPODROME. SIXTH AVENUE, BETWEEN 43D AND 44TH STREETS, NEW YORK, N. Y. MR. FREDERIC THOMPSON, ARCHITECT.

The largest, and in many ways the most interesting, "amusement building" ever undertaken in this country was the great "Spectatorium," 400 ft. x 500 ft., intended to be one of the "outside" attractions of the Chicago World's Fair, whose many misfortunes during its partial erection involved its promoter, Steele Mackaye, and his backers in grave financial loss.

Although a smaller building (200 ft. x 240 ft.), the New York Hippodrome, opened to the public a few weeks ago, is quite as unusual and fully as interesting mechanically and constructively as the larger Chicago building ever could have been. Like its aborted foregoer, it, as its name suggests, is designed for the production of spectacular plays of the largest size, in which circus performers, bipedal as well as quadrupedal, take the leading parts.

The test of use shows that the designers have been unusually successful in all that concerns provisions for the comfort and safety of the audience. The ventilation is good, the auditorium empties itself freely and rapidly, and there is hardly a "poor seat" in the house. Further, the decorative treatment of the auditorium is unusually simple and quiet, so that the interest properly centers on the gorgeous stage effects. The auditorium seats 5,300, and occupies practically about half the area, while in the Chicago building, which was to have seated about the same number, only about one-fifth of the area was given to the auditorium. In spite of this difference of comparative distribution of space, the New York stage is unusually large, about one-half of its area projecting as a so-called "apron" in front of the procenium-arch. In this apron is constructed a large elliptical tank, filled and emptied by powerful centrifugal pumps, and useful in the production of many unusual effects. The portion of the stage floor, 48 ft. by 92 ft., that covers this tank, is supported by hydraulic pistons, and is sunk beneath the water, when the tank, 12 ft. deep, is filled for use. As the pumps discharge 8,000 gallons per minute very little time is consumed in either filling or emptying the tank. Not only is hydraulic pressure used for manipulating the tank covering, but a section of the stage, 50 ft. by 100 ft., behind the line of the proscenium, can also be elevated eight feet by another set of hydraulic plungers. The proscenium-opening is 40 ft. by 96 ft., and is believed to be the largest in the world. The depth of the stage from the front of the apron to the rear wall is 110 ft., and has an effective width of nearly 200 ft., since, practically speaking, there are no flys, the scenery being set on the inside of the curved walls that enclose the auditorium, hung from overhead tracks and rolled into position as used.

Mr. Frederic Thompson, of the theatrical firm of Thompson & Dundy, the owners and managers of the enterprise, acted as his own architect, the contractors being the George A. Fuller Company.

LONGITUDINAL SECTION OF THE SAME.

FIRST FLOOR AND UPPER GALLERY OF THE SAME.

THE BALTIMORE STOCK EXCHANGE, BALTIMORE, MD. MESSRS. HOWELLS & STOKES, ARCHITECTS, NEW YORK, N. Y.

THE EAST BRANCH: BROOKLYN PUBLIC LIBRARY. MESSRS. WALKER & MORRIS, ARCHITECTS, NEW YORK, N. Y.

Additional Illustrations In the International Edition.

THE BALL-ROOM: HOTEL ASTOR, BROADWAY, BETWEEN 44TH AND 45TH STS., NEW YORK, N. Y., MESSRS. CLINTON & RUSSELL, ARCHITECTS, NEW YORK, N. Y.

DOORWAY IN THE SAME ROOM.

NOTES AND CLIPPINGS.

The Area of American Cities.—The growth in area of American cities is going on pretty steadily, and is not always reflected by the growth in population. Ten years ago New Orleans was a city of 60 square miles area; its present area is 196 square miles. Cincinnati in the same period has increased from 24 to 43 square miles, Denver from 43 to 59, Indianapolis from 20 to 29, Louisville from 14 to 20, Boston from 37 to 42, San Francisco from 42 to 46, Atlanta from 9 to 12, Duluth from 62 to 67, New Haven from 9 to 20, Portland, Me., from 3 to 22; Fall River from 41 to 43, Little Rock from 8 to 11, Newark from 18 to 22, and Holyoke from 6 to 16. The city which has made the largest gain in area is New York, which ten years ago covered 61 square miles and now covers 326, the extension of its boundaries to include Brooklyn, Long Island City and Staten Island, having taken place in the meanwhile. Four American cities, all of first importance, have gained little or nothing in area during the last ten years. They are Chicago, with an area of 190 square miles (it was 189 ten years ago), Boston with 42, St. Louis with 61 and Baltimore with 31. A majority of the cities of the country are larger territorially than they were twenty years ago, nearly one-half are larger territorially than they were ten years ago, and the increase of population in American cities has been general. But New York has made the greatest growth both in size and numbers.—*New York Sun.*

How the Builders of Zimbabwe Quarried their Stone.—In a lecture before the Society of Arts, Mr. Richard N. Hall, F.R.G.S., says: "The building material employed at Zimbabwe is local granite in blocks, with faces averaging nine by seven inches. Many of the blocks have been rudely squared by the use of diorite hammers, some having been cut with metal tools. One might ask how the ancients obtained the enormous quantity of building material. Was it by quarrying in the local hills? I am of opinion that no quarrying, in the ordinary sense in which the word is employed, was carried on by the ancients. All the evidences are strongly to the contrary. Caves occupied by the ancients could have been considerably enlarged and their accommodation greatly increased by simple quarrying operations, but the caves remain in their natural state. Rock protuberances in the floors of some of the ruins have not been removed, but permitted to remain, even to the extent of inconveniencing the occupiers. The hills in the Zimbabwe district show no signs of any quarrying operations on the part of the ancients. The hills and cliffs which abound round the Zimbabwe valleys are granite. These are mainly whaleback in shape, and layers of granite in some stage of decomposition cover the faces of these hills, and whaleback cliffs with gigantic scales, the layers being about six to nine inches in thickness. At the bases of these hills and cliffs are hundreds of tons of scale rocks or slabs, broken fairly square by their fall from great heights. These are flat top and bottom, and only require slight trimming, if any, on their sides to make them fit closely together, and so form the ordinary block of granite as seen in the walls. These gigantic scales from the faces of the cliffs are always falling, especially after long rains; the roar and crash of these falling masses of slabs can at times be heard from our camp in several directions. No doubt the ancients, finding so conveniently situated these extensive masses of fallen scales of rock, almost suiting their purpose without much labor except for their transport for two or three miles only, used these blocks in building, trimming their sides when necessary. Possibly they assisted to loosen these slabs from their original position on the cliffs, in order to increase the supply of materials."

The American Architect and Building News

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CONTENTS

IT is the fate of urban parks and parkways to exist subject to the perpetual risk of encroachment and loss through the operation of selfish interests. Most people of sense and sensibility breathed more freely when, in 1890, it was decided that New York would not surrender its Central Park to the destructive exigencies of a Columbian celebration. Since that time several minor assaults on the Park have been fended off, but none of these attacks have had less to commend them than the most recent one, through which it is sought to materially widen Fifth Avenue, which is already practically wide enough both for use and for effect, by throwing into it a strip the whole length of the Park, and in width somewhere between forty and two hundred feet. The obvious fact that there are improvements far better worth making elsewhere in the city, and costing less than the millions that this piece of needless road-making and parking would cost, does not have a deterring influence on the activity of those who are promoting this most recent assault on the Park. Concurrently with this suggestion, Mr. Ernest Flagg comes forward with another one, more ambitious, less locally selfish, and in many ways attractive, not the least of its effects being the vast influence which its carrying out would have on the building industries which most concern us. Mr. Flagg starts out with, what we believe to be, the mistaken premise that, provided the parked area remains the same it is equally beneficial to the health of a community however it may be distributed, whether massed as now in Central Park or extended over a long and narrow parkway. He accordingly proposes to construct a parkway of the general nature of the Avenue des Champs Elysées in Paris, but one thousand feet wide, running north from Christopher Street to the Park, and from the north of the Park on to the Harlem River, through practically the center of the island, between Sixth and Seventh Avenues. Mr. Flagg finds that the assessed value of the land he would expropriate and the improvements thereon is, by the records, about two hundred and thirty million dollars—but this is merely the assessed value and probably does not bear much relation to what the city would actually have to pay. To provide this rather largish sum he proposes to take from either side of Central Park an equivalent area and sell it to the highest bidders, as sites for the erection, under proper restrictions, of dwellings of the best character and highest cost, and he figures that these favored lots could be sold for nearly two hundred and fifty million dollars. In other words, the operation could be made to carry itself.

AS an academic problem in city planning wherein the interests of art, the pleasure of the cultivated amateur of art and the well-being of those connected with the building interests need alone to be considered, the treatment suggested by Mr. Flagg is admirable, even if it should increase the artificiality of life in the metropolis. But what is a drive worth through the Champs Elysées without the more rural beauties of the Bois de Boulogne at the end of it by way of compensation? And could a straight-away drive ten miles long, such as Mr. Flagg suggests, ever give as much pleasure to even the most devout believer in artificiality as he or she now experiences while winding through the drives of Central Park as it is? As the policing of a parkway only a thousand feet wide would be simple, what latitude would the patrolmen be likely to give to bands of children who might wander into it from the tenement districts on the east and west sides, but who now are swallowed up in the mazes and playgrounds of the present park, to their own satisfaction and enjoyment, while not detracting from the pleasures of the more fortunate who roll by in their carriages? A central parkway might be, in the way suggested, constructed without large final cost to the city; it might be made satisfactorily beautiful, even magnificent, but it could be only at the sacrifice of the rights at present enjoyed by the masses, who would rightfully complain and would demand, with reason, that what had been lost to them should be made good in the way of new and large—not small—parks in their own riverside quarters, where they could have the benefit and joy of seeing natural effects in mass. The cost of these compensating parks would add materially to the cost of Mr. Flagg's scheme.

THE many friends of Major W. L. B. Jenney will be interested to learn that, at the age of nearly seventy-three, he has retired from the active practice of architecture and has gone to seek relaxation and rest at Los Angeles. We like to recall his military title—though it did not quite seem to fit his rather unsoldierly figure—for it was well deserved. Taking his diploma at the École Centrale des Arts et Manufactures in 1856, he had but just begun practice as an architect in Cincinnati, after some desultory engineering work in Central America, when the Civil War broke out, and in August of its first year he was appointed captain on the staff of General Grant and, so, saw duty at Fort Henry, Fort Donelson, and at Corinth. Then he was transferred to General Sherman's staff and served as chief-engineer of the Army of the Tennessee, being brevetted major in 1864. He

Entered at the Post Office at New York as second-class matter.

resigned from the army in May, 1866, and, after a rest, opened his office as architect in Chicago in 1868. The strenuous life he had led in the army, under the necessity at times of using "any old thing" to accomplish the engineering ends his duty imposed on him, was just the sort of career to sharpen his wits and fit him to become one of the important factors in the creation of what is to-day Chicago, architecturally and structurally speaking. The same readiness to devise ways and means of doing things exhibited as an army engineer showed itself over and over again in private life as, for example, when he devised means for altering, enlarging and reconstructing the great department-store known as "The Fair" in Chicago. His claim to a permanent place in the history of the profession rests on the fact that he originated, while preparing to build the Home Insurance Building in Chicago, what is now generally known as the steel-skeleton system of building. It is true that this claim—a claim advanced by others in his behalf rather than by himself—has been disputed, but all obtainable evidence has been carefully and dispassionately examined by architectural and engineering societies, who have agreed that the pretensions advanced by other claimants are less valid than his. Mr. Jenney's practice has been a large and important one, and during the last part of his career he had as partner, for a short time, Mr. W. A. Otis, while since 1890 he has been associated with Mr. W. B. Mundie, one of the early works of the latter partnership being the very successful Horticultural Building of the Chicago World's Fair.

IT is interesting in this connection to learn that just at this time the "Tower Building," on lower Broadway, New York, the structure upon which Mr. Bradford L. Gilbert rests his claim to be considered the deviser of the modern steel-skeleton method of construction, is about to be taken down to make way for a large office building to be erected on an enlarged site. The Tower Building was erected only seventeen years ago, and so nothing more is likely to be learned by an examination of its metal frame as to the probable longevity of buildings of its class than was learned at the dismantling of the Pabst Building, an even less aged building, a couple of years ago. The practically perfect condition of the metalwork in that case did much to assure architects that precautions could be taken which would make the skeleton method of building deserving of unlimited credit in the matter of endurance.

THE Continental Insurance Company has just issued an interesting tabulation giving its analysis of the causes of the ten thousand fires during the year 1904 in consequence of which it was called on to adjust losses, and the exhibit allows some unexpected deductions: thus, the intoxicated man or woman appears to be one of the least blameworthy of incendiary agents, the charge against these unfortunates being but three-hundredths of one per cent. of the total fires, and yet we had supposed that the gentle pastime indulged in by an intoxicated husband of playfully throwing a lighted lamp at his wife was quite a common cause of fire. Kerosene, on the other hand, is named as the cause of nearly five per cent. of the total fires, so that lamp-throwing must be less indulged in than the "yellow" newspapers would have us believe. But the kerosene loss-rate for the year is less than the average rate for the preceding five years by nearly four-tenths of one per cent., while the rate for loss due to electric lighting has increased during the same period by one-tenth of one per cent. Rapid as is the introduction of electric lighting, it is not displacing kerosene at a rate that will account for this discrepancy, so it seems to us that the record here presented is not flatter- to the skill and faithfulness of those who have charge of electric installation and wiring. The tabulation shows further that various forms of lighting are the cause of about thirteen and a quarter per cent. of fires, while fires due to defects of heating appliances and their adjuncts run up to over twenty-two per cent. forming, thus, the largest subdivision of the classification, our well-known and occult friend the "defective flue" being the greatest sinner; but his sins are but half as numerous as those of the ubiquitous match which, as a cause, heads the entire list, with a handsome margin to spare. There is obviously a crying need for a universal law that shall forbid the sale or manufacture of the explosive match.

THE interdependency of material interests is nowadays so well understood that it does not cause surprise that there should arise from an unexpected quarter an outcry against the suppression of the religious houses throughout France and the secularization of churches. This remonstrance comes from the representatives of a body of skilled workmen who, numbering not less than a quarter of a million have until now made a living through purveying to the needs of the faithful in the matter of church ornaments and other ecclesiastical furnishings. They protest that the already accomplished suppressions and the projected alienations will deprive them of fifty-five thousand customers, which, being practically all that they have, means the total extinguishment of their own industries, a consequent commercial loss to the community and a fiscal loss to the government. The particulars they give of the magnitude of their several industries is interesting, and when it is said that four cities alone provide annually over twelve million dollars' worth of silks for ecclesiastical embroideries and so on, it is easy to see that an economic problem is presented that is deserving of careful study. The manner in which the Church cares for the minds of its children, as compared with their souls, may be inferred from the fact that Paris prints annually about four million dollars' worth of religious books, while it manufactures two and a half million dollars' worth of rosaries and medals of divers kind. If to the latter amount is added the five million of dollars expended on ecclesiastical statuary, it seems clear that, as is generally believed, the Church seeks to save souls through the use of physical mechanisms rather than by an appeal to the intellects of those it would save. Paris also sells a million dollars' worth of bells and almost as much stained-glass, while the sales of organs runs to nearly double the amount. From these figures, which do not cover all the trades likely to be affected, it is clear that the present anti-clerical policy of the government is likely to cause grave commercial losses to many manufacturers and tradesmen, men whom, logically, the radicals should be disposed to favor rather than injure.

METHODS OF DESIGN EMPLOYED IN MOHAMMEDAN ART.—I[1].

THE most striking peculiarity of Mohammedan or Saracenic art is the employment of extremely complicated geometrical patterns. The actual methods by which these patterns were drawn and designed, are, so far as I am aware, unknown to modern artists, either in Europe, in India, or in Egypt. The works of Prisse D'Avesnes, of Bourgoin, or of Gayet, dealing with Arabian art, are equally destitute of any satisfactory explanation of the matter. Some years ago I commenced to study the subject in India. At length, by a lucky chance, I discovered a clue in a small room in one of the palaces of Akbar, the great Mogul Emperor. Here, nearly hidden by dust and dirt, I found the actual construction lines used by the artist some four and a half centuries ago in producing an arabesque pattern. By means of the clue thus obtained, it became easy to draw the more complicated of the patterns. The clues to the simpler classes of patterns were obtained for the most part by observation and measurement.

The methods that I have to describe to-night, are not simply methods of draughtsmanship. They may be described as methods of design, as by their means it is possible and easy not only to copy old patterns, but also to design new ones in conformity with the rules of geometrical art.

It may be advisable to explain that the patterns themselves, as I shall exhibit them to you, thrown on the screen as black lines on a white ground, are not necessarily or essentially beautiful. They are merely skeletons of beautiful objects. An artist's skill is required to clothe with flesh, the dry bones of geometric design to produce from them artistic creations that impress the feelings and that exist as living triumphs of Saracenic art in the frescos and tiled dados of the Alhambra, in the mosaics, pulpits and mosques of Cairo, and in the deserted palaces of Akbar at Futteypur-Sikri.

Geometrical patterns may be divided into the following four classes: (1) square, (2) hexagonal (3) octagonal, and (4) arabesques.

In the first class the space to be decorated is divided into squares. Parts of these squares go to form the pattern. This class will be found described in any elementary text-book of design, and includes various chequers, the fylfots, the Greek fret, rectangular lattices, etc.

The method of drawing the second class of patterns, the hexagonal, is also widely known and calls for no special description. Lines are drawn across each other, not at right angles, as in the square patterns, but at angles of sixty degrees, thus dividing the space to be decorated into equilateral triangles. An example of this pattern is given in Fig. 1, which represents a design found carved in plaster in the Doctor's Turkish Bath at Futteypur-Sikri. In this case some only of the pattern lines are identical with the construction lines. Others of the lines of the pattern are drawn crossing the construction triangles from one apex to another.

The third class of patterns consists of, or is derived from, octagons. Simple examples of this class are shown in Fig 2, at A, B, C and D. Of these A, B and C may be found used in stone pavements in the garden of the Taj at Agra. D is frequently employed for the perforated stone balustrades on buildings in the Taj garden. I have grounds for believing that in drawing octagonal patterns an octagon was cut out of talc or paper or some other suitable material and used as a template. In the case of Fig. 2, D, the octagons shown on the right of the figure are so accurately drawn (as a rule) as to suggest the use of a template, while the remaining lines are so inaccurately drawn as to suggest that they were filled in by hand. Whether or not a draughtsman should use templates in the actual employment of these patterns, may be described as a matter of individual taste and habit. But that templates are useful in the designing of these patterns will be admitted on consideration of the facts contained in the following paragraphs. Indeed it is difficult to see how the more complicated of the octagonal patterns could have been designed without the use of templates.

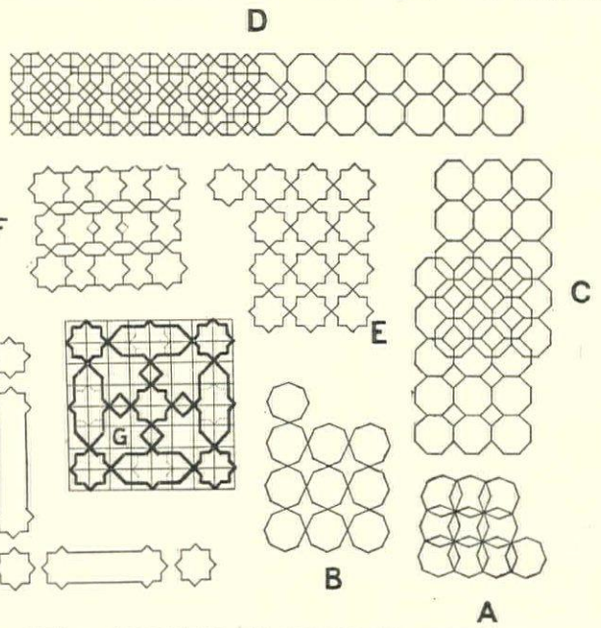


FIG. 2.—EXAMPLES OF OCTAGONAL PATTERNS.

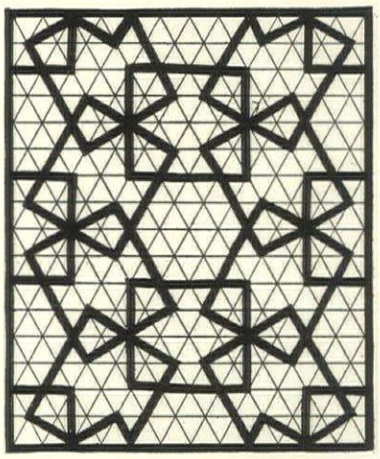


FIG. 1.—HEXAGONAL PATTERN FROM HAKIM'S BATH AT FUTTEYPUR-SIKRI.

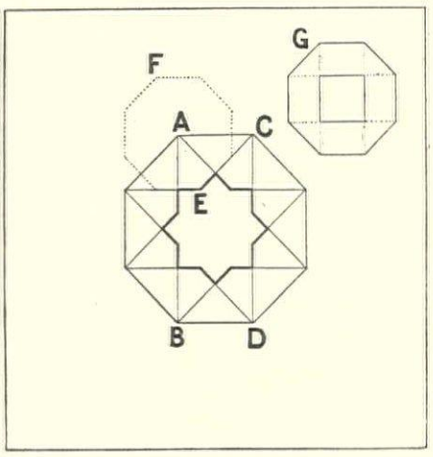


FIG. 3.—DERIVATION OF SMALL OCTAGON FROM LARGE OCTAGON; ALSO OF EIGHT-POINTED STAR.

These three figures form the basis of most octagonal patterns.

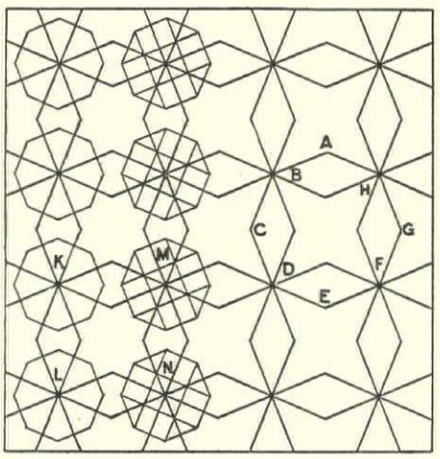


FIG. 4.—CONSTRUCTION OF PATTERN SHOWN IN FIG. 5.

The ground is covered with large octagons overlapping by two sides. The letters A to E indicate the outline of one of these octagons. Small octagons, as at K, L, M, N, are drawn round alternate angles of the large octagons.

The complicated octagonal patterns usually contain octagons of two sizes, which, so far as my experience goes, may always be regarded as derived one from the other by the following very simple construction. In Fig. 3, an octagon is drawn in which opposite angles are shown joined in pairs by lines such as AB, and CD. The result of drawing these lines is to leave an eight-pointed star (shown by thicker lines) in the center of the octagon. Taking the point A as center describe another octagon

[1] A paper by Mr. E. H. Hankin, M.A., Fellow of Allahabad University, read before the Society of Arts and published in the *Journal* of the Society.

(shown by dotted lines) of such a size that one of its angles fits into the angle E of the eight-pointed star. This octagon is shown drawn separately at G. Thus we have a large octagon, a small octagon, and an eight-pointed star. These three figures combined in different ways go to form the majority of octagonal patterns. For drawing the patterns it will be found convenient to cut out these three outlines as templates.

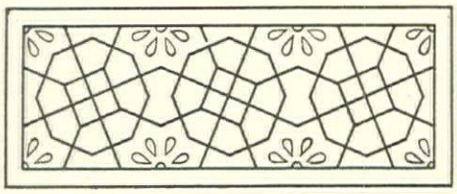


FIG. 5.—PATTERN FROM A PILASTER IN BIRBUL'S HOUSE, FUTTEYPUR-SIKRI.

The method of construction of a pattern of this nature is shown in Fig. 4. The large octagon template is first employed to cover the ground with large octagons overlapping by two of their sides, as shown on the right-hand side of the figure. For the sake of clearness the letters A, B, C, D, E, F, G and H, have been inserted to indicate the extent of one of these octagons. The small octagon template must now be used. By its means small octagons are drawn whose centers coincide with alternate angles of the large octagon as shown on the left-hand side of the figure. But this does not produce a graceful pattern. The numerous lines crossing at a point, as occur at K and L, like the spokes of a cart-wheel, do not form a pleasing feature. Nor is the case much altered for the better when a square is drawn in the small octagon, as shown at M and N. But when certain of the lines are omitted, as illustrated in Fig. 5, we have a pattern of remarkable gracefulness in spite of its apparent simplicity. This pattern occurs carved in low relief in a panel of red sandstone in Birbul's House, Futteypur-Sikri.

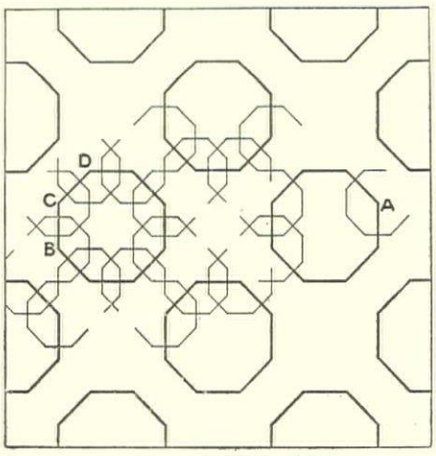


FIG. 6.—CONSTRUCTION OF OCTAGONAL PATTERN SHOWN COMPLETE IN FIG. 7.

As shown at A, six sides of a small octagon are drawn round the angle of a large octagon. This is repeated round all the other angles (as B, C, D) of the large octagons. The few lines required to complete the pattern may be found by inspection of Fig. 7.

It may be asserted that in this pattern the size of the octagon is well proportioned to the size of the panel, and the size of the square to that of the octagon. It is difficult to imagine that this result would have been obtained so successfully had the design been formed without the help of a rational geometrical method.

The construction of another octagonal pattern is shown in Fig. 6. In this case the large octagons are drawn, not in contact, but at some distance from each other. The distance is such that the space between any four adjacent octagons could just be filled by another large octagon. The small octagon template is now brought into use. As shown on the right-hand side of the figure, it is placed with its center coinciding with the angle of a large octagon. Six sides of the small octagon are drawn in. The operation is repeated round each of the other angles of the large octagon. Thereby the eight-pointed star is found to have been described in the large octagon. The other large octagons are similarly treated. A few other lines are required to complete the pattern. These are so simply placed as to require no explanation. The complete design is shown in Fig. 7. It occurs in inlaid marble in the tomb of Itimad Ud Daula at Agra.

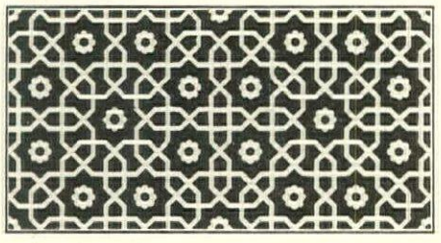


FIG. 7.—OCTAGONAL PATTERN OCCURRING IN INLAID MARBLE IN THE TOMB OF ITIMAD-UD-DAULA AT AGRA.

The eight-pointed star alone, without the help of any octagons, may also be used to form patterns. Examples of this are shown at E, F, G and H in Fig. 2. In E eight-pointed stars are placed in contact. This is the pattern of the pavement of the interior of the Taj. F is the basis of a pattern that occurs in a dado in the vestibule of Akbar's tomb at Sekundra. In this case some of the eight-pointed stars are drawn complete. Others are overlapped by their neighbors. Pattern G is obviously formed from eight-pointed stars. A very beautiful example of the use of this pattern will be found in the work of Owen Jones on the Alhambra. H is a common border pattern formed from eight-pointed stars.

We now have to consider the most complicated class to which the term "arabesque" may be appropriately reserved, as these patterns are practically peculiar to Mohammedan art, and both in their complexity and in their æsthetic effect stand on a higher plane than the pattern hitherto considered.

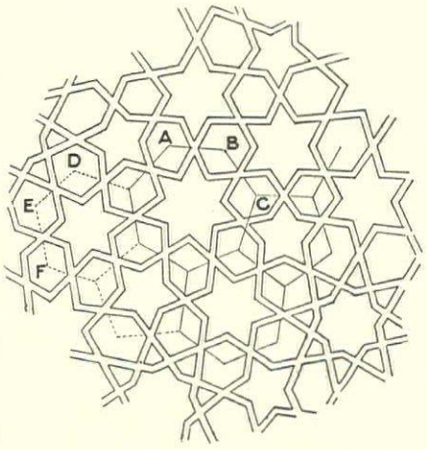


FIG. 8.—DIAGRAMMATIC SKETCH OF PART OF PATTERN OF A DOME IN THE TURKISH BATH IN THE JODH BAI'S PALACE AT FUTTEYPUR-SIKRI.

The lines A, B, C are some of the original construction lines by means of which the pattern was drawn. Examples of the use of this clue are given in the following figures.

In most square, hexagonal and octagonal patterns, the pattern lines run in two, three or four directions, respectively. In arabesque patterns the lines run in a much larger number of directions, suggesting that some unusual method was employed in their construction.

In Fig. 8 is represented diagrammatically part of an arabesque pattern that occurs in a dome in the Turkish bath attached to the Jodh Bai Palace, Futteypur-Sikri. It was this pattern that

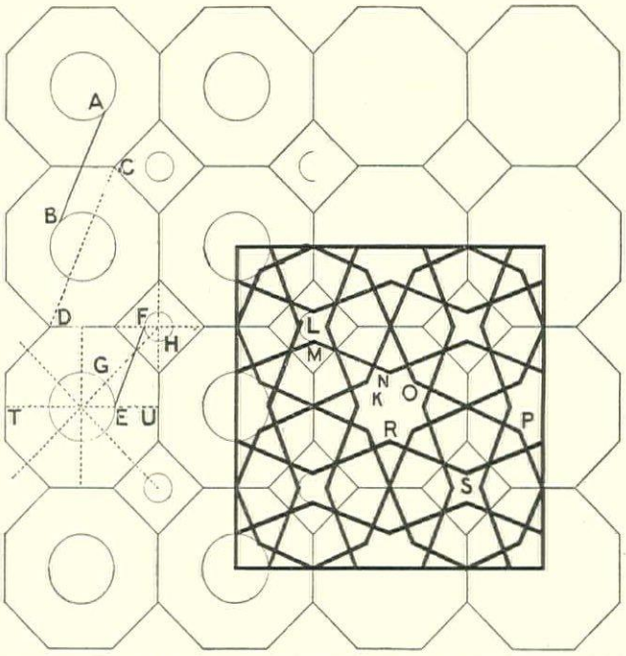


FIG. 9.—METHOD OF CONSTRUCTION OF A SIMPLE ARABESQUE PATTERN.

The ground is first covered with octagons in contact. To form the pattern, two lines have to be drawn through each center of each side of the octagons.

furnished the clue to the method of construction of arabesque designs. Beside the thick pattern lines incised in the plaster covering the interior of the dome, I noticed some faint scratches indicated by the lines A B, and B C. On closer examination, I found that these scratches were parts of polygons that, if completed as shown at D, E, F, would surround the five, six, seven and eight-rayed stars of which the pattern was composed. It at once occurred to me that these polygons were the construction lines used in producing the pattern. It was obvious that polygons in contact were easy to draw. Having drawn them, pairs of lines

had to be drawn passing through the centers of each of the sides of the polygons. These pairs of lines crossed the side of the polygon at nearly the same angle in each case. Each line was prolonged until it met a similar line that crossed the center of another side of a polygon. When this had been done all over the surface that had to be decorated, nothing more remained to be done, for the pattern was completed.

A few examples will show how simple is the method here indicated for drawing and designing of arabesque patterns.

In Fig. 9 the space is first covered with octagons in contact, which may be easily drawn by means of an octagon template. The resulting lines may be called the primary construction lines. Two pattern lines have to be drawn through the centers of each of the primary construction lines. The first question is at what angle or in what direction are they to be drawn? Within certain limits the exact angle does not matter, provided this angle is the same in all cases. But the best result is obtained if each pattern line is drawn parallel to a diagonal of an octagon.

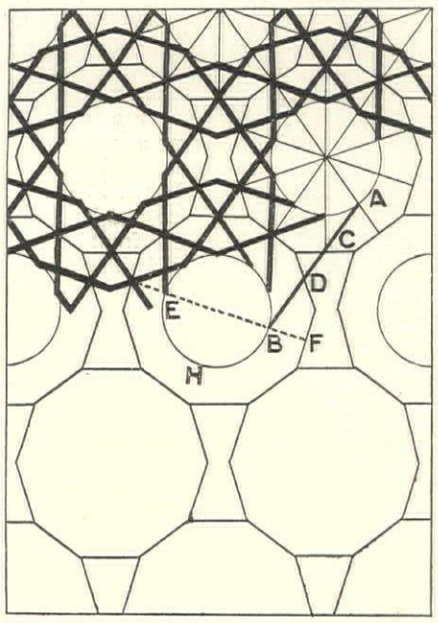


FIG. 10.—ARABESQUE BASED ON DECAGONS IN CONTACT.

Two lines are drawn passing through the center of each side of the decagon. Each of these lines is continued until it meets another similar line, thus completing the pattern.

For instance, the pattern line A B is drawn parallel to the diagonal C D. But in practice it will be found easier to draw lines such as T U, which pass through the center of the octagon and join the centers of its opposite sides. A pattern line is then drawn such as E F. This of course is drawn parallel to the neighboring diagonal of the octagon. It cuts T U in the point E. From the center of the octagon describe a circle G, which passes through the point E. All other pattern lines pass from points similar to E on the circumference of the circle. A guiding circle may similarly be drawn in the squares, as shown at H. These circles and interradii form the secondary construction lines.

In the portion of the pattern shown completed, it may be noticed that the pattern line M N is nearly but not quite in a straight line with the pattern line O P. This line O P is nearly but not quite parallel to the pattern line R S. A draughtsman not knowing the method now described would probably have drawn M N and O P in a straight line with one another. He would also probably have made O P and R S exactly parallel. So doing would have given the pattern an appearance of stiffness which is avoided by the present method of construction. This pattern is one of the commonest of arabesque designs.

Another arabesque V is shown in Fig. 10. Here the primary construction lines are decagons in contact. As before, two pattern lines have to be drawn through the centers of each of the primary construction lines, and it is necessary to commence by finding out the direction in which these lines have to be drawn. C and D are centers of construction lines. A pattern line A B must be drawn through these two points. This pattern line is continued until it meets an interradius of the decagon at B. From the center of the decagon a circle H is described that cuts B. Other pattern lines meet this circle at places where it cuts the interradii. This is the most frequent method of finding the position of the secondary construction lines.

In this pattern each decagon of the construction line leads to a ten-pointed star of the pattern surrounded by pentagons. These pentagons are regular if the pattern has been correctly drawn. Other similar arabesques exist in which the primary construction lines are dodecagons and octagons, or dodecagons combined with regular nine-sided polygons. In these cases the resulting star-shaped spaces in the pattern are twelve, eight and nine-pointed, as the case may be, and the pentagons are not completely symmetrical.

We now pass on to consider an arabesque of a slightly higher degree of complexity. In Fig. 11 its primary construction lines are drawn as thick lines, and its secondary construction lines are drawn thin. The primary construction lines consist of regular decagons, regular pentagons and irregular hexagons. The templates for this pattern consist of a decagon and a pentagon. Or more conveniently a decagon may be drawn with a pentagon attached to each of eight of its sides. This may be cut out of paper as one template. Such points as are required that are not on its periphery may be pricked through on to the drawing paper by means of a fine needle. The irregular hexagon requires no template. It is merely the space left where there is no room for pentagons.

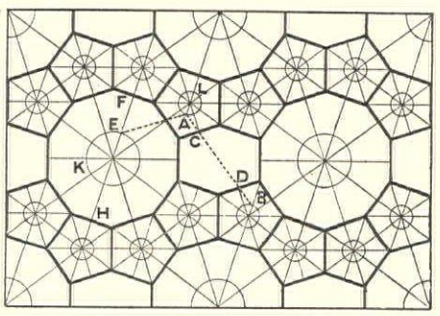


FIG. 11.—CONSTRUCTION OF ARABESQUE BASED ON DECAGONS AND PENTAGONS IN CONTACT.

The first pattern line is drawn through centers C and D till it meets a radius of the pentagon at A. The second pattern line is drawn from A through the center of the side of the pentagon, till it meets an interradius of the decagon at E. These two pattern lines give the size of the circles K and L. All remaining pattern lines pass in pairs through centers of sides of a polygon until they reach a circle. The completed pattern is shown in Fig. 12.

In this pattern the secondary construction lines are found by the following easy method: The first pattern line A B is drawn through the centers of two construction lines at C and D. It is continued till it meets radii of the pentagons at each end, as at A and B. A circle L is described in the pentagon cutting the point A. A second pattern line A E is now drawn. This starts from the point A and passes through the center of the side of the pentagon. It is continued until it meets the interradius F H of the decagon in the point E. A circle K is now drawn in the decagon that cuts E. All the pattern lines have to be drawn starting from analogous points on the circles K and L, or from similar circles drawn in the other polygons.

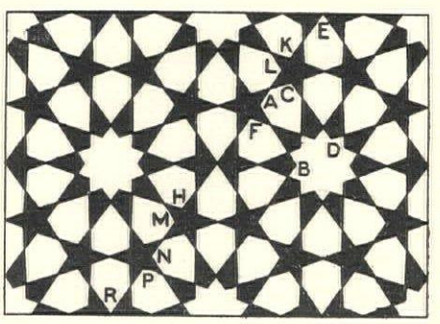


FIG. 12.—ARABESQUE BASED ON DECAGONS AND PENTAGONS IN CONTACT.

Notice the lines A B and C. D, and similarly placed pairs of lines, are not quite parallel. If hey had been drawn parallel the pattern would have more stiff and less pleasing. The lines E K, L A, F H, M N, P R, are nearly, but not quite, in the same straight line with one another. This also prevents stiffness and supplies an additional proof of the advantage of the method of construction explained in this paper.

The completed pattern is shown in Fig. 12. For the sake of making the pattern easier to comprehend, alternate spaces are tinted, as might be the case if it was used in a mosaic pavement. It is well to notice that, as here drawn, the lines E K, L A, F H, M N and P R, are not quite in a straight line with one another. An artist not knowing the correct method of drawing the pattern would, with little doubt, have made of these lines a hard straight line running through the design, like a line in the pattern of a cane-bottomed chair. He would have added to this resulting and unnecessary stiffness, by making the rays of the ten-pointed star of parallel lines, which is equally a mistake, for A B and C D are nearly but not quite parallel.

(*To be continued.*)

WHISTLER, WATTS AND THE INDÉPENDANTS.

WHAT will be Whistler's place in the art world of, say, 1970? That is an interesting query, impossible to answer. Many opinions, somewhat disparaging to the genius of Watts, have been passed upon these two great artists, and the newspaper men have argued that because people have swarmed to the New Gallery in thousands or tens of thousands, therefore,

curiosity which went to see, stayed to admire, and the public has at last become appreciative. On the other hand, Watts whose portraits and such idyllic works as "Love and Death," "Paolo and Francesca," are of such consummate knowledge and grandeur, is out of fashion, and is "nowhere" in reference to Whistler. Yet some of us are inclined to prophesy, in spite of the proverbial foolishness thereof, that fifty or a hundred years hence, the best of Watt's pictures will find a place by the side of Rembrandt's and Titian's.

That Whistler was a great landscape painter and a still greater etcher, no one can deny. That he also was a great colorist, his "Symphony in White, No. 3," proves beyond contradiction the subtility of the gradations of white, the variety of the tones, the modeling of the figure under the drapery, all this is masterly, the perfection of art. Then why did he at times elect to paint his portraits enveloped in London fog? Sarasate looks as if he were standing in a dark closet. The face is full of expression, but the white shirt is a far more conspicuous object. Again, do not these portrait figures give one the impression of being only half the person; cut down the middle and glued to the background? There is no roundness. Surely such a portrait as Watts's "Walter Crane" or his "Cardinal Manning," or "George Meredith," is a more living thing both as regards color and texture.

Whistler had great imitative talent. One sees Mytens in Philip II of Spain; one is reminded of Boutet de Monvel in some of the women's and children's portraits. But the "Nocturnes" are as original as they are beautiful. Fine, too, are the "Battersea" and "Westminster" Bridges, although in the former (and other works) the love of eccentricity forces us to see two pictures in one frame. It would be impossible to see the horizon and the foreground of the Battersea Bridge without moving one's head—an arrangement which may be tolerated in Japanese art, but which spoils the work of a European, even though he be called "the master" and "the greatest painter of the 19th century." Some of his admirers make him the "equal of Velasquez"; but where in the modern painter's work do we see the exquisite, clean, pearly grays, the superb pinks?

Possibly had Whistler gained a reputation early in life the eccentricities would have died in infancy, and we should have had a painter like many others, plus genius. An artist must starve, or he must throw dust in the eyes of the public. If he passes in the crowd, he may, some fifty years after death, be dug up by a dealer and made a somebody—but more probably even a genius will stagnate in the waters of oblivion. Which will be Whistler's fate in the future, it is impossible to predict; but that his drawings and etchings will be placed amongst the finest specimens of those arts, there can be no doubt. The Whistler Memorial Exhibition is an example of the truism that the best work of an artist is that which he never shows. If he makes a reputation, his sketch-books are turned out, and their contents are duly mounted and framed. If he dies unappreciated, slight "notes" are burnt or thrown upon the rubbish heap, possibly a few may find their way to the butterman's shop, and, like ledgers and account-books, become useful as envelopes for penny worths of margarine or cheese. The public is too stupid to "see anything" in a sketch unless the artist has been well trumpeted.

It is curious that the "Carlyle" and his mother's portrait should meet with such universal admiration, seeing that both of them have the effect of being only half flat figures gummed to the wall—there is no other side. If it be a true representation of Carlyle he must have been a very shaggy, dirty old man. The "Mother" has a beautiful face, both as regards color and expression, but it is so difficult to overcome one's aversion to the Archaic pose and composition. The law of composition followed by Whistler was one made by himself; hence we see a series of horizontal lines in the piano picture, with two sugar-loaf triangles, but turned into woman and child. But setting aside the eccentricity, the effort to be peculiar or nothing, the dirty color, the wooden arms, there is an immense amount of work which is exquisite and of the greatest value to art students. Unfortunately, very little can be seen after the exhibition closes, most of the etchings and lithographs being hidden away in the portfolios of private collections.

How different is the work of Mr. Sargent. What power in his seemingly aimless washes of water-color. And yet how admirably the splotches of vivid color drop into place and chaos becomes the "Doge's Palace" or "the Bridge of Sighs." It would be difficult to find so masterly a study as the Colleoni Statue executed in so simple and faultless a manner. A full brush, now cobalt blue, now emerald green, the two colors running into one another, the modeling done at the same time—there stand the bronze horse and man, the result of the most consummate knowledge.

Passing through Paris the other day, I spent a franc and some valuable time upon a show which is really an impertinent farce. The last idea of painting of some of the Indépendants is a species of mosaic, unless the framed pictures are designs for pavements or wall decoration. But even at a distance of thirty feet it was quite impossible to read the meaning of "*Calme et Volupté*," whether the figures were man, woman or beast. In the sky apparently some submarines were disporting themselves. A few pictures were fairly reasonable; but the curious thing is that the exhibition was composed of the most old-fashioned work—such as was perpetrated in the forties—as well as the most modern eccentricities, and these latter, without the merit of originality with which the earlier Indépendants and Impressionists might be credited. One sees among the moderns works by Beardsley, Raffaélle, Puvis de Chavannes, Segantine, Whistler, Rodin, Carrière, Moreau, and a host of other well-known painters and sculptors, but with strange names attached instead of the well-known ones.

On the other hand, some of the work is absolutely childish, ignorant, imbecile. It would be foolish to mention names, as it might create curiosity and attract attention to the pictures and the vanity of the painters must be sufficiently strong already, unless their cynical object is to see how much dust can be thrown into the eyes of the much suffering public. On the *Vernissage* all Paris went to the glass houses by the Seine and laughed—it was as good as a Palais Royal farce to pass in front of thousands of ill-drawn, ill-painted canvases. Possibly the painters meant it all as a joke—a very poor one; but if they are really serious, and imagine they see in the manner in which they work, Heaven help them, for their minds must be very sick!

Some statuettes by Meunier, beautiful and sane, redeemed the exhibition from complete foolishness.

PENGUIN.

FIRE-SHUTTERS.

DURING an address delivered at the annual banquet of the National Board of Fire Underwriters, Mr. John R. Freeman, of Providence, R. I., a consulting engineer, said:

"A point which interested me exceedingly, in studying the Baltimore ruins, was to see whether thin wrought iron or steel plate, such as is used for covering fire-shutters, had at any point been heated to a point where its power of resistance was seriously impaired. The ordinary Underwriters' fire-shutter depends for its strength and its resistance upon its thin covering of very soft mild steel, coated with tin. I examined thin sheet-steel lamp-shades, thin bands for pipe coverings, tin boxes, filing-cases, and dozens of shutters themselves. In no place did I find any indication that metal of that quality had been so softened or had reached such a heat that it would be seriously impaired for the purpose of fire-shutters, and one of the great lessons that I brought away from the Baltimore fire was that our standard tin covering for the Underwriters' shutter is all right, and that this covering material has sufficient power of resistance to withstand the fiercest heat of a great conflagration, but that we do need to find some better material than pine wood to fill it with. I also made careful examinations of copper in flashings, cornices, etc., to see if it had melted. In a few small spots in rare instances fusion had begun, but in general I found it had ample resistance to fusion, so that it can prudently be used for covering fire-shutters, where something more ornamental or weather-proof than tinned plate is desired and expense is no bar.

"The Standard Underwriter Shutter of wood covered with tin did not give a very good account of itself in the Baltimore fire, and I think it can be said, without fear of serious contradiction, that the endurance of the ordinary Underwriters' shutter of tin-clad wood is limited to not more than about half an hour's endurance of a temperature of 1,500 degrees, and that this limit is often passed in the heat of an ordinary conflagration, and that in many of the cases where single doors or shutters have shown up so well there has happened to be an incoming air current that has helped to cool the shutter.

"The limitations of the tin-clad wooden shutter were shown at one corner of the burned district in Baltimore. A large shirt factory, whose windows were protected by wooden fire-shutters, had a very close call. By heroic efforts, with private pump and hose streams, the employés saved the factory. I took particular

interest in examining those shutters, and although this was not at the hottest part of the fire, I found, in parts of the shutters at the hottest exposure, that the pine wood was charred entirely through and all gone.

"This matter of better shutters is one on which we should set some of our best talent at work in the experimental way. In your excellent laboratory in Chicago there is excellent apparatus for the needed tests. Although the present shutter and the present approved form of fire-door is all right nine-tenths of the time, and perhaps nineteen-twentieths of the time, it is not all that we need in a great conflagration.

"I have said that buildings can be made fireproof against bad exposures. The possibility of making them so is found largely in the development of a superior thin form of fire-shutter, and in educating the architects and owners of buildings toward building a shape of window that is easily protected by the fire-shutter, and a neat window-jamb formed to receive this shutter when folded back *inside the window.*

"Windows of suitable size for all ordinary office purposes can easily be so designed that they can be protected by fire-shutters, and then the shutters when open and folded back on the inside will not be obtrusive or unsightly. When a bad exposure fire comes, the ruin of the sash and glazing can be paid for cheerfully, if the contents of the building are saved."

CRUSHING STRENGTH OF PIERS.

ONE of the most interesting exhibits at the St. Louis Exposition, says Mr. George J. M. Ashby, in the *Clay Worker*, was that of the Watertown Arsenal tests, shown at the west end of the Government Building. The exhibit contained all the information on the face of it. There were twelve columns of equal dimensions. The rods on the outside of the brick and concrete columns served the purpose of holding the columns, which had been subjected to the crushing test, together. Signs told that these columns were "specimens of constructive timber, brick and concrete pillars and columns tested at the Watertown Aresenal Testing Laboratory, Watertown, Mass."

Reading from left to right, the first five columns were timber, the first of these was Douglas fir or Oregon pine; the crushing strength was 732,000 pounds, or 6,360 pounds per square inch, moisture 11.3 per cent. The next was long-leaf pine, crushing strength 616,300 pounds, or 4,400 pounds per square inch, moisture 26.9 per cent. The third was short-leaf pine, crushing strength 504,000 pounds, or 3,780 pounds per square inch, moisture 30.7 per cent. Next was spruce, 392,000 pounds, or 2,780 pounds per square inch, moisture 42.2 per cent. The last timber was basket oak, showing a resistance to crushing of 431,000 pounds, or 2,950 pounds per square inch, moisture 35.8 per cent.

Next in order we had three concrete columns. The first of these was composed of Portland cement 1, sand 2, pebbles 4, and was reinforced with eight twisted steel bars. The age at time of testing was three months fifteen days; the crushing strength was 497,000 pounds, or 3,160 pounds per square inch. The second concrete column had a composition similar to the first, but was not reinforced. The age at testing was three months and seventeen days, the crushing strength was 272,000 pounds, or 1,710 pounds per square inch. The third concrete column, having a similar composition of cement, sand and pebbles was reinforced with four corrugated bars, the age was three months sixteen days, the crushing strength 349,100 pounds, or 2,180 pounds per square inch.

The center of the exhibit was occupied by three portions of columns, showing the method of reinforcing with steel bars.

The last four columns were brick. The first of these was labeled "hard brick," laid in neat cement, age one month. The crushing strength of this was 623,600 pounds, or 4,700 pounds per square inch. The next "light hard brick." This was laid in lime mortar, lime 1, sand 3, age 24 days. The crushing strength was 69,200 pounds, or 465 pounds per square inch. The third column was "wire cut brick." This is a side-cut brick, laid in cement mortar, of cement 1, sand 2, age 25 days. The crushing strength was 342,000 pounds, or 2,410 pounds per square inch. The last column was "dry pressed brick," laid in neat cement; age one month. The crushing strength of this was 402,000 pounds, or 2,880 pounds per square inch.

By this we see that the vitrified brick, laid in neat cement has the greatest strength of any of the incombustible and otherwise indestructible materials. It was a very instructive and interesting exhibit, although the government test merely gives a perfectly impartial statement of one set of comparative facts.

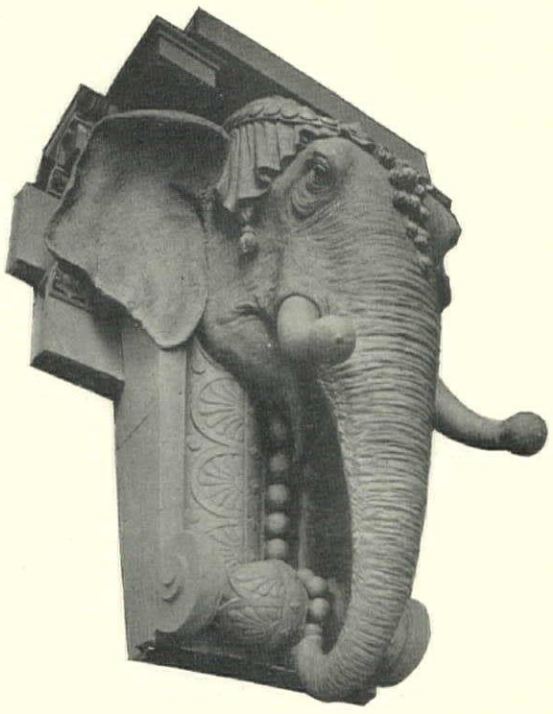
ILLUSTRATIONS

TRANSVERSE SECTION AND CEILING PLAN: NEW YORK HIPPODROME, NEW YORK, N. Y. MR. FREDERIC THOMPSON, ARCHITECT.

One of the interesting features of the building is the successful treatment of the ceiling of the auditorium, which consists of a very flat dome apparently supported by the four piers—which are the only constructive elements that show in the auditorium—but in reality hung from the roof trusses above. These trusses, of which there are four main ones, whose construction and position are sufficiently indicated in the plans and sections, are exceptionally large and heavy, each of them weighing fifty tons. Outside of the low central dome, the ceiling is flat, being suspended direct from the lower members of the auxiliary roof trusses. This variation in treatment of the ceiling has not been prejudicial to the good acoustic properties of the hall.

One of the curious features of the building is the surrounding of the "promenade," on its outer side, with a range of cages for the exhibition of wild animals, the object being to afford interesting distraction to the promenaders during the intermissions. Lest those whose sense of smell is acute should think that the odor of wild animals would be an undesirable ingredient to mingle with the perfumes exhaling from ladies' toilets, it should be understood that these cages are, on the side toward the promenade, tightly glazed with heavy plate glass, and that each cage is kept free from taint by the agency of forced ventilation; moreover, the cages are occupied only during the performance, the animals living and sleeping in another part of the building.

Although a building of this especial character offers tempting opportunities to indulge in lavish and eccentric decoration, almost nothing of the kind has been undertaken; on the contrary, what has been done is rather simple, and some of it is exceptionally good. Among the features that are good must be counted the treatment of the keystone of the great central arch. Many



attempts have been made to adapt elephantine peculiarities to architectural ends, but never very satisfactorily; indeed, the elephant heads introduced in the decoration of the main lobby of this very building are not particularly satisfactory, but the use of the great pachyderm's head, an inverted pyramid in general form, as an appropriate decoration for a great keystone was a happy thought, and has been most felicitously carried out by the modeler.

BASEMENT AND BALCONY PLANS OF THE SAME BUILDING.

DETAILS OF A BLOCK OF HOUSES ON WEST END AVENUE, BETWEEN EIGHTY-FOURTH AND EIGHTY-FIFTH STREETS, NEW YORK, N. Y.

As this group of houses was built a dozen years or so ago, we have not found it possible to ascertain the name of the architect to whom credit for the work should be given. We trust that this

statement will be enough to bring us from some source the desired information in time to publish the fact in connection with further views.

UNITED STATES POST OFFICE, PEKIN, ILL., MR. JAMES KNOX TAYLOR, SUPERVISING ARCHITECT, WASHINGTON, D. C.

ENTRANCE DETAIL OF THE SAME.

GENERAL DETAIL OF THE SAME.

Additional Illustrations in the International Edition.

THE NEW YORK HIPPODROME, SIXTH AVE., NEW YORK, N. Y. MR. FREDERIC THOMPSON, ARCHITECT.

MAIN ENTRANCE TO THE SAME.

AUDITORIUM OF THE SAME.

NOTES AND CLIPPINGS.

ANOTHER BIT OF OLD PARIS THREATENED.—After nearly a century's delay it has been decided to continue, though not yet to complete, the Boulevard Raspail, which passes in an almost straight line from the Lion de Belfort, at the eastern extremity of the city, to the Boulevard St. Germain. At least, it does theoretically, but in actual practice it is broken at three points by masses of old houses. These, in the space comprised between the Boulevard Montparnasse and the Rue de Rennes, are now to disappear. With them will go much that was beautiful, a little that was artistically interesting, and more than one curious monument of the past.

In the first place, there are the fine old trees which shaded the stately gardens at the back of the Rue Notre Dame des Champs and the Rue de Fleurus. Few people suspected that this wealth of verdure existed, hidden as it was by the tall façades of the houses. In Spring, however, the luxuriant bloom of the chestnuts perfumed the neighborhood, and later in the year the thick leaves formed a popular playground for mosquitos, to such an extent, in fact, that the sanitary authorities were called upon last year to deal with the plague. These trees were among the oldest in Paris and formed part of the vast park of an ancient Cistercian monastery, out of which Marie de Médici's Italian horticulturists constructed the garden of the Luxembourg. It is to be feared that most of them will have to be cut down.

In several of the houses, which are already nothing more than a mass of ruins, were found remarkable specimens of stone carving, chiefly mantelpieces of the Louis XV. period. These have been carefully removed and photographed by the Commission of Old Paris. The house doors were nearly all provided with the old-fashioned heavy knockers of wrought iron, the use of which in Paris has gone entirely out since the days of Louis Philippe. The balconies were furnished with wrought-iron rampes, or balustrades, of simple but very perfect design. The portion of the Rue de Fleurus which is in process of demolition includes the old vacherie, or cowhouse, where Valles, the Communist leader, and before him Gerard de Nerval, the unfortunate Romanticist poet, were accustomed to quench their burning thirsts at unconscionably early hours of the morning after nights spent in political or artistic discussion.

But the most famous house of all which is hidden away in the angle which the Rue de Fleurus makes with the Rue Notre Dame des Champs is that which Victor Hugo occupied in the heyday of his literary fame. For a moment this was threatened, and more than one French paper raised a sorrowful dirge over its impending demolition. But the Boulevard Raspail will merely skirt its ancient gray walls. It was on the first floor that Victor lived during the first brilliant period of his career, and it was there that he wrote "Hernani" and "Ruy Blas" and "Angelo," which Mme. Sarah Bernhardt is playing to-day. And there he surrounded himself with a band of enthusiastic young poets and painters, who recognized him as the master and constituted the advanced guard of the Romantic movement, ever ready to wage war against "les classiques," the old "perruques," as they contemptuously called them, who still upheld the traditions of Corneille and Racine.

It so happened that the proprietor of the house was a "classique," holding the "romantiques" in horror. It enraged him to think that every Sunday a kind of mass meeting of his bitterest intellectual foes was held in the house which he owned, and in which Victor Hugo was but a tenant. So he gave the poet notice to quit, and when he refused to go he served him with a writ of expulsion. The concierge who was the executioner of this tyrannical decree is still alive, and such is the irony of things he now cuts his beard à la Victor Hugo!—*R. S. in the N. Y. Times.*

FRANCE'S VAST ART TREASURES.—The French prefects have received instructions to make inventories of the art treasures of all the prefectures. The exact value of these is unknown, but it is immense, and has been computed at $400,000,000, reckoning only the reliquaries, pictures, tapestries and things of like kind. If the statues, altars, stained-glass windows, etc., are included, it is estimated that the figure will reach $1,200,000,000. The treasures in one small church in the Department of Aveyron, which were on view at the Exposition of 1900, drew an offer of $6,200,000 from a syndicate. At Beauvais the tapestry in one room in the Bishop's palace is worth $60,000. The Rheims Cathedral has one reliquary worth $40,000. The present Duke of Norfolk's father offered $800,000 for the chasuble and stole of Becket, which are preserved in Paris.—*New York Sun.*

THE WHISPERING ECHOES IN THE "HALL OF STATUES," WASHINGTON.—In a recent issue of the *Scientific American,* Professor Wallace C. Sabine, of Harvard University, draws attention to the fact that in a note on "Whispering Galleries," written for the *"American Dictionary of Architecture,"* before the old Hall of Representatives, now the Hall of Statues, was altered, he wrote of the interesting acoustic effects of this room as follows:

"The ceiling, painted so that it appears deeply paneled, is smooth. Had the ceiling been paneled, the reflection would have been irregular, and the effect very much reduced. The most accurate form for a whispering gallery is that in which the reflecting surface is a very considerable portion of the surface of an ellipsoid, that has for its foci the two points between which there is to be communication."

The above, written before any changes were contemplated, says Professor Sabine, exactly covers the case. The new ceiling differs from the old in two respects. Instead of being of wood it is of plaster on iron supports. This alone would produce no deterioration in the whispering gallery, for plaster on iron is an even better reflector than wood. But plaster as now handled admits of an architectural treatment to which it did not forferly so readily lend itself, and the coffering which was but painted on the old ceiling is copied in relief on the new, with the result that it ceases to be in any way a remarkable whispering gallery. So far from being a disproof of the possibility of prediction in architectural acoustics, it is, as far as a single case can be, a confirmation of its reasonable accuracy, and in this particular case of its entire accuracy.

It is not difficult to explain the basis for the prediction that coffering the ceiling would have this effect. The focusing of the sound by the concave ceiling is in every respect similar to the focusing of light by a concave mirror. Just as scratching the mirror dims the image of light, so paneling the reflecting wall dims the focused whisper, for a panel, a pilaster, or a column on a wall surface is to sound what a scratch on the surface of a mirror is to light. That in the case of light the scratches may be so fine, while in the other cases the "scratches" must be of the dimension of columns and pilasters, is because of the relative wave lengths of light and sound. The wave length, that which corresponds to the distance from crest to crest in a water wave, is in the case of light about one fifty-thousandth part of an inch, while in the case of sound it is for the ordinary tones of a man's voice several feet. For this reason a column or a pilaster of vast magnitude bears to the sound of a man's voice the same relation that the merest scratch bears to light. We thus have the great acoustical mirror of the Hall of Statues now dimmed by the coffering which breaks the formerly smooth surface. To this argument it may be, in fact it has been, objected that while the waves of sound of a man's voice are several feet in length this coffering is of but a few inches in depth, and therefore insignificant. The answer to this is that while the full rounded tones of a man's voice and for that matter, though to a less degree, of a woman's voice, are of long wave length, a whisper by either man or woman is of a very different character. The component tones of a whisper are very high and of very short wave length, so that irregularities that would not disturb the focusing of the full tones of the voice will utterly ruin a whispering gallery.

The loss of the whispering gallery is of course only the loss of an architectural curiosity. It was, however, remarkably perfect, and so interesting and even famous as to be well worth the well-intentioned but misdirected efforts for its preservation.

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CONTENTS

THE protest of sundry New York architects and builders against the compulsory use of so-called "fireproof wood" in buildings over one hundred and fifty feet high has naturally excited the indignation of the friends of those interested in the manufacture and also of some interests which believe that the law is a good one. In the latter class is to be found our usually well-informed contemporary *Fire and Water Engineering*, which, in spite of its advocacy of the law and its belief in the merits of fireproof wood, is fair-minded enough to publish a letter from Mr. Edward Atkinson, written in his capacity as an official of the Insurance Engineering Experiment-Station in Boston, in which he says: "I have been seeking for fire-resistant wood throughout my practice in the prevention of loss by fire, and I have failed to find anything that possesses any considerable merit. I greatly desire that this builder [one mentioned by *Fire and Water Engineering*] shall supply us with examples of the kinds to which he gives approval for a judicial test and full report. Kindly make this a public call for the submission of any kind of fire or heat resistant wood that is now offered." This request he follows with the very significant statement: "Of course, if the makers fail to meet this call for a test, the conclusion will be obvious." We are glad to give this request such further publicity as we can.

IT is is just possible that the Society of Beaux-Arts Architects, when at its last meeting it unanimously adopted a resolution that there ought to be established by the Government at Washington a Department of Fine Arts, forgot for the moment just what a "Department" at Washington really is, how its personnel is provided and what they ordinarily do after being installed in place. We know how things are now and how they have been, but many people do not realize how nearly the control of everything which in any way depends on matters political is on the point of passing from the hands of the reasonably thoughtful people into those of the wholly thoughtless. Even if the present political fabric is not shattered by the assault which will surely be made on it by the gathering forces of trade-unionism before many years elapse, some might be disposed to question the real usefulness of a Department manned, say, by half-trained amateurs, the favorites of political leaders, the semi-official architects of political clubs, and such city and State architects as most of us can call to mind. We do not feel that we are quite ready to accept as wholly desirable, in this new country where so many experiments are being tried, that "official" art in which the Society of Beaux-Arts Architects believes, but we are quite sure that we do not believe at all in the official art that would be encouraged by the only sort of Department our political institutions would allow to be established. A new law, we understand, denies to the National Government the privilege of being served by unpaid servants, so the character and status of the proposed Department could not be established and maintained at a proper level by providing that, as in the case of some municipal art commissions, the officials shall serve without pay, but for the love of art alone. "Official art was unknown in the great epochs of artistic development.

THE notorious "Westminster Chambers" case has progressed another step, encountered a fresh obstacle and been forced to another halt. The last the public heard of the case was in the shape of the report of the auditor, Mr. C. W. Clifford, to the court which appointed him to asssess the damages undergone by the owners of the unfortunate building and the contractors who erected it. Mr. Clifford reported that, under the law as passed by the Massachusetts Legislature and later confirmed by the courts, the owners of the building were entitled to collect from the city of Boston for the usufruct of the two stories of which the law deprived them, the sum of $292,716, with interest from May, 1898, when the law was passed, and that in like manner the city should pay to the contractors the sum of $49,898, likewise with interest. Although the courts have declared the action of the legislature entirely constitutional, the city has been indisposed to pay the awards, and the claimants have had no other course than to bring suit against the city to recover the damages which the Court's auditor has awarded them. Although the case was called last week, the city managed to secure a postponement, so that the plaintiffs are not much nearer the end than before. What would be their actual status and the value of their claim in case the city should successfully defend its contention, no layman and not many lawyers could declare.

WE have not seen the text of *la loi sur la séparation* which just now is being so anxiously debated by the Chambre des Deputés in Paris, but it is evident that, if finally passed, this outgrowth of the radical movement which has brought about the suppression of religious houses throughout France cannot but have most serious consequences, many of which were not foreseen when the idea was first brought under consideration. Although conducted for an ostensibly different end, there is a good deal of similarity between Henry VIII's raid on Church property three hundred and seventy years ago

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and that which is going on now, while the latter may have architectural effects even more grievous in their nature. Even yesterday the traveler's sympathies were wounded when he came upon some lovely bit of ecclesiastical architecture surrendered to secular uses and in place of echoing to the chant of choir-boys merely vibrating with the lowing of cattle. Those were merely minor buildings; but how will it be to-morrow when the great churches, even the cathedrals, classed though they be as "*monuments historiques,*" are left to fall into disrepair through the withdrawal of State aid and the dismissal of the government architects now charged with watching over their every structural need? Even if the income-bearing property of the Church is not confiscated, this new harrying of the faithful will put such an increased strain on the exchecquer, merely to provide for the needs of human sons and daughters, that but little can be applied to keep the church fabric in order. We cannot believe that even the most atheistic of governments could be so purblind as not to make provision for the upkeep of the glories of architecture which now bring so much foreign money into the country.

IN France, the privilege of wearing in one's button-hole a tiny scrap of red ribbon is held to be good pay for much service, ample requital for the expenditure of many dollars. Foreigners as well as natives covet the right to parade this decoration, and, such are the peculiarities of human nature, it is within the range of possibilities that Mr. James Stillman would have as willingly accepted the order of the Legion of Honor for his personal wearing as see his name carved upon the façade of the École des Beaux-Arts at Paris, where, by vote of the Conseil Supérieur d'Instruction, it is to be engraved in perpetual recognition of the generous endowment he has just bestowed upon the school. There is no impropriety in speaking of this inscription as likely to be perpetual, for, fond as Frenchmen are of changing the inscriptions upon their buildings with every change of the form of government, it is not possible to believe that a monarchical or imperial minister would feel impelled to efface the record of a gift made to a republic by a citizen of another republic. And yet officials do very petty things. It is only recently that the movement that a proper monument to Baron Haussmann should be erected by the Paris Municipality has been turned down by the authorities, on the plea that the projector of modern Paris was an obnoxious adherent of Napoleon III. It is even proposed that the Boulevard Haussmann shall be renamed. The fact that a monument was erected not many years ago to M. Alphand, who was Haussmann's right-hand man, seems to suggest a certain inconsistency, as Alphand's status as an official under the Second Empire might well outweigh his deserts as director of the Exposition of 1889.

M. PAUL DUBOIS, for more than a quarter of a century the Director of the École des Beaux-Arts, died this week in Paris at the age of seventy-six, leaving behind him a reputation as one of the leading sculptors of his time, and a legacy to posterity in the shape of many notable pieces of sculpture. His fine monument to General Lamoricière at Nantes, with its groups of accessory figures, most noteworthy of which is the "Military Courage," would be by itself alone enough to attest his merit as a sculptor. It is curious that, although the occupation of the sculptor is not a little laborious, and though much of it has to be carried on under not particularly health-preserving conditions, so many sculptors not only live to advanced age, but also do some of their best work after they are really aged men. Thus Watts was at the time of his death engaged in modeling his great equestrian group "Physical Force," for South Africa, and Dubois modeled his equestrian statue of Joan of Arc, for Rheims, when he was well past the age of fifty. Besides this equestrian group, Dubois modeled at least one more, the statue of Anne de Montmorenci, Constable of France, at Chantilly. Besides being a sculptor of the highest rank, M. Dubois was a painter of more than ordinary merit.

IN every large community there are amongst the leading builders and contractors a few who are something more than good constructors and honest men of business, a few who are men of ideas and principles. Boston has just lost one of these men in the person of E. Noyes Whitcomb, who, though not yet sixty-two years of age, had for a long time been favorably known to the community and had held its respect. The fact that he was one of the Commission of three appointed by Governor Greenhalge to control the building of the Massachusetts State-house extension—his co-commissioners being ex-Governor John D. Long and Mr. William Endicott—is testimony to his standing with the general public, while the fact that he had held office as president of the Master Builders' Association and of the Massachusetts Charitable Mechanic Association, is equally good proof that he had the esteem of the men of his own calling.

A RECENT issue of *The Architect* (London) contains this item: "An American Court of Appeal has decided that a city engineer is not compelled to hand over to his successor books containing field notes made by him in surveying lots of individual owners upon their application, under their employment and at their expense, but such books are his private property." It does not appear whether this decision was rendered by a State or Federal Court, but it may be worth while for the proper officials of architectural bodies to look up the case, since it seems to us possible to make use of it in support of the contention that architects are properly the owners of the drawings they make. The court here declares that the field notes—and by inference, drawings and diagrams—are the "private property" of the maker of the same. To be sure, the claimant in this case was not the owner but a third party, who imagined he had an interest in the material. But the court could have non-suited the claimant by declaring that the notes were the property of the owner, if that had been their real status, and so since this was not declared, but, on the contrary, they were said to be the private property of their maker, the decision may be available in the next "ownership of drawings" case that may be brought in this country.

METHODS OF DESIGN EMPLOYED IN MOHAMMEDAN ART.—II.[1]

A STILL more complicated pattern is shown in Fig. 13. Though the effect of the pattern, as here drawn, is surprising rather than pleasing, in the original, as it exists in a dado of colored tiles in the Alhambra, it is a very beautiful object. An illustration of it may be found in the work of Owen Jones on the Alhambra. My drawing only represents a quarter of the panel, the point A being the center. The method of construction though tedious, is by no means difficult. Round the center A describe a dodecagon, of which one quarter is shown at E F H. Touching this dodecagon at the point F, another dodecagon of the same size has to be drawn. It is lettered F K L Y and shown drawn round the center N. Touching the dodecagon round N at the point Y, is drawn a third similar dodecagon, whose center is at O. Touching this latter at Z is drawn a forth dodecagon whose center is at R. Inside each of these large dodecagons are to be drawn smaller dodecagons. Their size is found as follows: Join E K. On a radius of dodecagon A mark off E B equal to E K. Then A B is the radius of the small dodecagon required. This is shown drawn and lettered B C D in dodecagon A. A similar small-dodecagon has to be drawn in each of the other large dodecagons. A remaining feature of the primary construction lines is seen as an irregular octagon at P. This is merely the space left between the four large dodecagons A, N, O, and the fellow of N, which would have been drawn had the adjoining quarter of the panel been represented. Half of this irregular octagon is shown at E K L M. This space is repeated at P, and elsewhere in the pattern. The radii of this octagon must be drawn in as shown at X. No further description is needed of the primary construction lines.

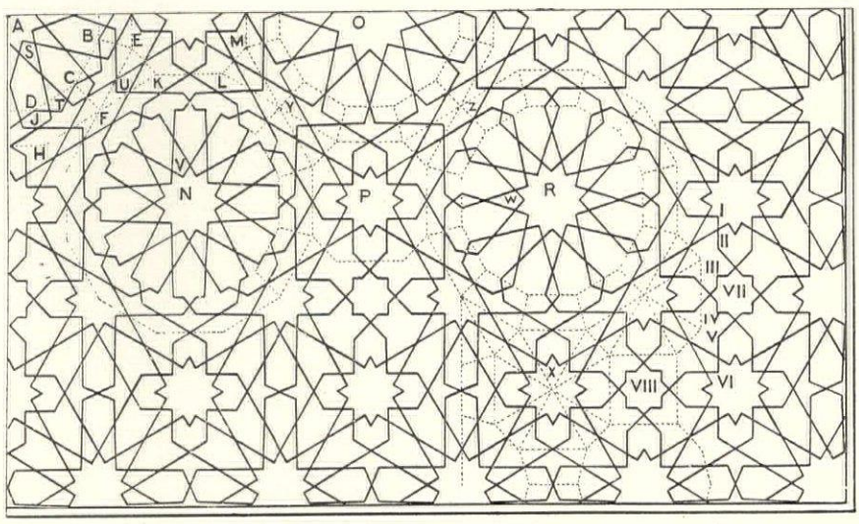

FIG. 13.—METHOD OF CONSTRUCTION OF AN ARABESQUE BASED ON DODECAGONS, FOUR-SIDED FIGURES AND TRIANGLES.

From a tiled dado in the Alhambra. One-quarter only of the repeat is shown.

The secondary construction lines are very simple. As may be seen by inspection, a number of the pattern lines are drawn, simply passing through the centers of two or more construction lines without any further guidance being required. In dodecagon O is drawn a twelve-pointed star of normal type. The twelve-pointed stars drawn round A, N and R are modified to give further variety to the pattern. It may be well to state that in solving the method of construction of this pattern, I had at my disposal only a very rough tracing of the not altogether accurate drawing in the work of Owen Jones. Consequently I had to rely to some extent on my general knowledge of the subject. The twelve-pointed star drawn round A has been made of such a size that the spaces S and T are equal to each other, and also equal to the space U. The space J is made as far as possible symmetrical. The twelve-pointed star drawn round N is made of such a size that the space V is equal to U. A similar consideration governed the size of the space N in the star drawn round R. The irregular octagon P is adapted to produce an irregular eight-pointed star. This would be a blemish in the pattern. Consequently alternate points have been thrown back, as shown at X, which has been done in such a way as to produce a symmetrical twelve-pointed star similar to those present in other parts of the design.

At VII and VIII (in Fig. 13) an eight-pointed star is shown. The primary construction outline for this star is a square, shown round VIII. The exact size of the eight-pointed star is a matter of taste. I have drawn it in such a way that the pattern lines I, II, III-IV, V-VI, are all in a straight line with one another. The original drawing is not sufficiently accurate to determine this point.

In Fig. 14 is represented a panel from the side of a stone pulpit in Cairo, copied (with some modification) from Stanley Lane Poole's work on Saracenic art.

For drawing this pattern two templates are required. One is a regular sixteen-sided polygon. The other is a regular heptagon, the length of whose side is the same as the length of the side of the sixteen-sided polygon. Perhaps for convenience of description I may be allowed to refer to the latter as the "16-gon."

With the 16-gon template draw the outline B shown in Fig. 15. Place the heptagon template with one side touching B at K H. By this means draw in the heptagon D E F G H K L. Two sides of this heptagon, F G and H G, are indicated merely as dotted lines, as they are not further required. The center of this heptagon is at N. A second similarly situated heptagon is now drawn in having its center at P. The 16-gon template is now placed touching the sides E F O of the twinned heptagons, and a 16-gon is thereby drawn shown at A. Twinned heptagons are similarly drawn at symmetrical intervals round the original 16-gon B, and on one side the twinned heptagons indicate the position of another 16-gon which is shown in the figure drawn round C.

Between the 16-gons, A, B and C, is left a space which is filled up by a dodecagon R. Similar spaces are filled up by similar dodecagons at S and I, and also (partly drawn) at the three corners of the panel. These dodecagons are not quite symmetrical, but must be drawn as regular as the space available permits.

In each of the twinned heptagons smaller heptagons have now to be drawn, such as those shown with centers at N and P. Each of these heptagons has its center identical with the center of its larger surrounding heptagon, and is drawn of such a size that one of its sides touches, or is the same as, the side of its fellow.

The primary construction lines have now been completed. The secondary construction lines consist of the radii of the different polygons, and of one or two circles drawn in each of the polygons. Within limits the exact sizes of these circles do not matter. By trial and error a suitable size can easily be found.

In the previously described arabesques, the pattern lines were drawn through the centers of the construction lines. In the arabesque now under consideration this is not the case. Each primary construction line, that is to say, each side of a polygon, is to be divided by two dots into three equal parts. The pattern lines are drawn through the dots. Some of the pattern lines have been drawn in as dotted lines in part of the figure. These will serve as a guide to enable the student to complete the pattern with facility.

Supposing it is required to discover the construction lines of any given arabesque, proceed as follows: Mark the centers of all the larger spaces included in the pattern, excepting, as a rule, the star-shaped spaces. Join these centers. The polygons thus produced are the primary construction lines. Supposing it is required to copy an arabesque that exists on a ceiling, or in some other inaccessible position, a similar method will suffice. On looking at the pattern, it is easy to imagine lines joining the centers of the larger spaces, which lines describe polygons. A rough sketch may be made of these imagined polygons. From this, at leisure, an accurate drawing may be made. In doing so, it is necessary to make the different polygons as symmetrical as possible, and, so far as possible, having their sides all of equal length. Guided by this rule, and after a little practice, any complicated arabesque pattern can usually be solved in ten minutes. On the other hand, I personally have failed to solve some of the apparently more simple patterns, despite a more extended study.

It will be advisable to conclude with a few remarks on some of the rules observed in Mohammedan decorative art.

One of the objects of decoration is to prevent the eye being displeased by monotony. A geometrical pattern, however elaborate, if used too much, will produce that effect of monotony that

it was intended to prevent. It will then become as tedious to the eye as a Greek fret was to Ruskin, or as a cheap floral wall-paper may be to anyone else. In some of the best buildings in Futteypur-Sikri, the artist has nearly worked up to the standard of discarding each pattern as soon as he had used it once. In Birbul's house, for instance, a number of richly-decorated pilasters are present in the different rooms. Each pilaster has, on its face fronting the room, three carved panels. On each pilaster the upper and lower of the three panels bear the same pattern, but the middle panel always carries a different pattern, and the patterns used on one pilaster, so far as I am aware, do not occur on any other. These patterns are nearly all geometrical, but a few are floral, thus further preventing any impression of monotony. One of these pilaster patterns is shown in Fig. 5.

That the pattern should be adapted to the space it has to

FIG. 14.—PATTERN FROM PANEL OF A FOURTEENTH CENTURY STONE PULPIT IN CAIRO.
(Modified from Stanley Lane Poole.)

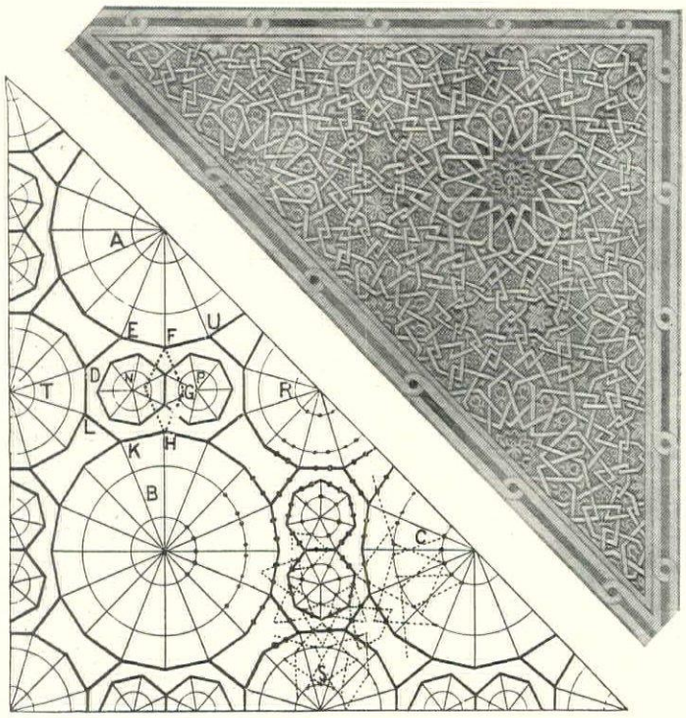

FIG. 15.—METHOD OF CONSTRUCTION OF PATTERN SHOWN IN FIG. 14.
As shown in lower part of the drawing, each side of a polygon is divided into three equal parts by two dots. The pattern lines are drawn through these dots.

occupy is a truism observed in almost every system of art. In the case of geometrical patterns, this truism admits of a simple geometrical expression, which, with rare exceptions, is adhered to by Mohammedan artists, and ignored by European artists when copying Mohammedan designs. In all the patterns used to illustrate this paper, star-shaped spaces occur at regular intervals. The rule very generally observed in Mohammedan art in India is that each corner of the panel is occupied by a quarter of one of these star-shaped spaces. If several repeats of the pattern occur in the panel, half stars will occur along the sides, besides quarter stars in the corners. The panel always contains a whole number of repeats. If the pattern contains eight-pointed stars, the space included in the stars may be filled up by fylfots (or outlines of that nature), and then adherence to the rule is only to be discerned on studying the construction of the pattern. In some of the perforated stone balustrades that form so pleasing a feature of the buildings in the garden of the Taj at Agra, the pattern has been visibly and greatly distorted to ensure compliance with this rule in the space available. The tomb of Itimyad Ud Daula in Agra, offers a striking illustration of the observance of this convention. Worked into its marble mosaic are hexagonal, octagonal, decagonal and dodecagonal patterns, in the greatest profusion, but in every panel, whatever its size and shape, quarter stars are always to be found in each of its four corners. The difficulty of designing the building must have been greatly added to by the observance of this rule. One is tempted to suspect that the building was designed to fit the patterns.

In Mohammedan art as it occurs in Egypt and Spain this method of adaptation to the space is sometimes followed. At other times a different plan is adopted, an example of which may be found in Fig. 13. As already explained, this drawing represents only a quarter of the complete panel. The border is therefore only shown on two sides, indicated by double lines. Had the pattern been used by a Mohammedan in India, the corner would have been occupied exactly by a quarter of a star, and half stars would have occurred along the sides. But the Moorish artist has put more than a quarter of a star in the corner, and more than half stars along the sides. The arrangement is such that the rays of the stars along the sides form a sort of inner border which is accentuated by the coloring adopted in the original design.

Owing to observance of this rule a panel of given shape is not suitable for the reception of any and every pattern. If the panel is a square, or if it is made up of a whole number of squares, it may be decorated by an octagonal pattern, or by those octagonal and dodecagonal arabesques whose repeat is a square. The repeat of an hexagonal pattern is usually a rectangle whose diagonal forms an angle of 60 degrees with the base. Such patterns are, therefore, not applicable to square panels, but only to panels that are rectangles of this proportion, or to panels that may be regarded as made up of such rectangles. The repeat of arabesques whose primary construction lines include decagons is usually a rectangle, whose diagonal forms an angle of 36 degrees. In "*Les Elements de L'Art Arabe*," by Bourgoine, may be found a large collection of arabesque patterns. In some of these patterns that contain fourteen-rayed stars, the unit of pattern is a rectangle whose diagonal forms an angle of about 38 degrees. With sufficient knowledge a pattern may be found to suit a rectangle of almost any shape.

A few words may be added as to the amount of accuracy needed and advisable in drawing geometrical patterns. In elementary text books of design, it is commonly asserted that pattern outlines look better when drawn in by hand than when drawn in by compass and rule. The truth of this statement may be admitted without reserve so far as the simplest pattern shapes and outlines are concerned. With regard to less simple patterns, however, some reservation is necessary. If an hexagonal pattern is made with the aid of construction lines that have not been drawn at exactly the correct angle, every hexagon in the pattern will be distorted. If lopsidedness occurred in a single hexagon it perhaps would not matter. But when every hexagon is lopsided to the same extent, and in the same direction, the effect is cumulative and unpleasant. The suggestion that the artist was trying to draw hexagons and failed because he didn't know how to do so, is a suggestion that obviously should be avoided. If, however, the construction lines of a hexagonal pattern are drawn in with accuracy, the pattern may well be drawn in by hand.

Arabesques are usually found drawn accurately. In the case of the more complicated arabesques, this would seem to be necessary to produce their full æsthetic effect. But a relatively simple arabesque, such as that shown in Fig. 12, may be distorted in order to make it fit the space; that is to say, to get exactly quarter stars in each of the corners of the panel. In order to do this it is necessary to draw first the construction lines, modified or adapted to the space, and then on these lines to draw the pattern.

By observing which patterns were placed in prominent positions and which were placed where they could not attract much notice, it is possible to arrive at some ideas as to what features of a pattern were considered good by Mohammedan artists. A pattern containing several lines crossing at one point like the spokes of a wheel, as already mentioned, is not much used. The best patterns are those in which all the constituent spaces have either a radial or a bilateral symmetry, that is to say, are free from lopsidedness. A pattern is bad if it contains spaces of the same shape but differing slightly in size. If a construction leads to such a result, the pattern must be modified so that the spaces become either identical in size or else widely different. Cases have been mentioned in this paper in which gracefulness in a pattern is obtained by drawing it in conformity with some geometrical rule. Cases may also be found, though rarely, in which the geometrical method leads to a clumsy result, that can be remedied by free-hand drawing.

DISCUSSION.

THE chairman, Sir George Birdwood, in opening the discussion, said in part that the "Arabesque" style of decoration, the essential feature of Saracenic art, was not an invention of the Arabs. It was known to the Greeks and to the

Romans, and the Buddhists; it was greatly developed in the Byzantine [*i. e.*, the Græco-Romano-Perso-Buddhistic] period, and is seen in as complex elaboration in the "Palace of Nero," and the original cornice of St. Sophia—with the Buddhistic goose recurrent all along its flowing scrolls—as in the Alhambra, or at Futehpur Sikri. Finally in regard to the technical methods of Saracenic art, and concentrating attention solely on its method of planning out ornamentation, *i. e.*, on its "arabesques," which is the question raised by Mr. Hankin's most interesting and suggestive discovery, it would appear that the Greeks habitually applied geometry to the perfection of decorative design. Decoration must, ultimately have a geometrical basis; and must be controlled by geometrical law, however unconscious the decorator may be of its operation. More than that, where decoration is attempted in conscious violation of geometry it rapidly lapses into indecorum and fatuity; furthermore there is good decoration that to the inartistic eye appears to be geometrical outlining pure and simple, but which really is entirely of artistic inception and draughtsmanship. And no doubt the Oriental craftsman of Saracenic art, including the Indian, kept up the tradition of the Greek use of geometry in the skeleton lines of their schemes of ornamentation; and we have indeed an obvious proof of this in Mr. Hankin's discovery. All this may be granted, and it cannot be gainsaid. Nevertheless, he [Sir George Birdwood] was convinced that the inspirations of artistic decoration came directly all from animated nature; and that the most inspired of the inventors of the decorative types derived from this ever springing fountain of artistic impulses and imagery, never had a thought of geometrical proportion in their minds. Much of what passes for geometrical ornamentation is due to the form imposed on it by the material used for its production, such, for instance, as matting, wherein the graceful undulations of a snake worked out in a crude "key pattern." The gradual conventionalism of a design leads also to its gradually taking on more and more of a geometrical aspect; and again the decay of artistic inspiration, or of technical dexterity, will conduce to the deterioration of an ornament to the baldest of geometrical formulas. The women of the fisher folk in India universally mark their arms with a representation of four little fish smelling at each other's heads, and wagging their tails, by the right, to the four points of the heavens. E. S. W. and N. But in many parts of India this charming caste mark has become atrophied to four straight lines, arranged as an equal-armed cross, with a four-rayed star at their point of intersection, this star being formed by the meeting of the short reflex lines meant to figure the heads of the four little fishes. Even where a decorative scheme is deliberately designed on a geometrical basis, it must not be conceived in a geometrical spirit or drafted with geometrical implements. It must be inspired by artistic passion, and drawn with the fervid touch of the artist's own hand. All the geometrical ornament of the Mosque of Ibn Tulun is cut in the plaster with the hand; at the Alhambra the florid arabesques are in many places cast from moulds, and only the rare coloring of the Alhambra, and the grace of its cypriform pillars and arches, and its picturesque perspectives serve to veil the mechanical monotony—as compared with free-hand geometrical decorations of the Mosque of Ibn Tulun—of its "arabesques." The life-giving touch of the artist's hand is everything in decoration, just as it is in painting and sculpture—in the domain of "fine art" as it is clumsily phrased; and for his (the chairman's) part, he did not care to palter with that cardinal fact in art for any commercial consideration or advantage. The Code of Manu says that "the craftsman's hand is always pure." The artist craftsman's hand is in truth divine, for it is the hand of a Creator, and its work cannot be done by a rule and compasses, although it should be able to bear the test of the most searching—short of Procrustean stretching and docking—geometrical analysis and "registration."

Mr. Lewis Day said he would like to express his appreciation of the admirable way in which the author had shown the complicated designs side by side with the other designs; the manner in which the paper had been illustrated was an object-lesson in how such a paper should be delivered. Mr. Hankin had shown very plainly how the patterns might have been done, but whether they were always done in that way was quite another matter. The author had spoken as a mathematician and not as a designer. He (Mr. Day) could not imagine a designer always going to work in the manner described. There were so many ways in which the elaborate patterns which had been shown could be constructed. In demonstrating to students the construction of pattern, he had often discovered half a dozen plans on which a given drab design might with equal reason have been built, and it would be a bold man who would venture to say which was the actual way in which it was really done. In one particular case in which the author had explained how a particular pattern was made, he (the speaker) had discovered for himself many ways in which the same result could be arrived at, and the one shown was not one of them. There could be no possible doubt, however, as to the ingenuity of the author's explanations. The way in which Mr. Hankin built up sundry patterns from circles was not the way a designer would set to work. He had shown a cusped arch in which the cusping was supposed to be got out of circles; he did not believe any designer ever cusped an arch in that mechanical way. All patterns repeated on the geometrical basis, and geometric patterns exhibited the basis on which they were made. If all the elaborate lattice work on which intricate designs were set out were drawn on paper, it would be found that it was so complex that anybody—except perhaps the author, would get lost in the mist of lines; they must, therefore, look for some other way in which the patterns were formed. He had always felt very strongly that the simpler Arab patterns found in the Opus Alexandrium were built up of little triangles, etc., that was more likely the way in which the more elaborate work was done, and not by means of templates. The patterns, by the way, which the author had stated could be built up by putting together dodecagons could equally be arrived at by striking circles, and at the intersection of those circles drawing straight lines from intersection to intersection. It had to be remembered that when a designer drew those elaborate patterns he did not have the whole area of lines, etc., in front of him; he designed a little piece which he could keep in his mental grasp. He had only to keep that small unit in his mind; he knew what the effect of repeating the unit would be. Speaking as a practical designer of geometric pattern, Mr. Day was conscious that the way in which the geometric designs exhibited were built up must have been in some more simple manner than the author had described; but, nevertheless, he was delighted at the ingenuity with which Mr. Hankin had pointed out how the things could be done and he had shown him, as a student of the basis of design, different ways of arriving at the same results he had himself reached by another way. He proposed a cordial vote of thanks to Mr. Hankin for his intensely interesting lecture.

A week later, Sir George Birdwood wrote:

"In the brief interval between the reading of Mr. Hankin's paper on Wednesday last and the report of it in our *Journal* of this evening [the 17th of March] I forgot to add many of my remarks on his brilliant paper to the "proof" received by me; and I would like to make good some of these omissions in the present memorandum. In expressing my personal opinion that Mr. Hankin pushed his ingenious theory too far, I stated that, while in India, I had employed all classes of craftsmen, under my own eyes, and that on whatever work I employed them, they never used any kind of design whatever. The "designs" in jeweller's books were mere advertisements for the attraction of Europeans, were never worked from. It was fatal to success to tell Indian craftsmen to work from a previous masterpiece of their own, if you told them to reproduce it exactly; for in duplicating it with mechanical exactitude they destroyed all its artistry, the beauty, and the life the artist's thought and sleight had given to it. The only way to possess yourself of your desire was to say: "May God help you to devise another thing of beauty ["sparkling," "dancing," or "prancing" thing] like this you did for me before, of the same weight and size, and equally alive and exquisite ["sparkling," etc. over again], and equally to my delight and your honor, *and you know I shall not haggle over the price.*" Then you get all you desire, *and better.* It was always in that way I consulted and dealt with these craftsmen. I would never accept trash, and, without any bargaining, I always paid in cash; and for myself and friends I always secured the best "Sidonia wares" of my day in Bombay. Never haggle about prices and you will always get the best value for money in India, as well as everywhere else in the world. The ivory and wood carvers would execute the most intricate "Arabesque" designs in wood and ivory, not only without a trace of geometrical or even mechanical planning, but seated on the floor, crumpled up on their haunches, and using their knees as the only support of the strip of ivory or wood they held with the left hand, and worked with the right. They would work on like that all day, with no more thought of the geometry or the anatomy of ornament, than have the bees in moulding their wonderful hexagonal cells by the rotation of their little heads. All the time I was in India I never saw a "template" or a stencil of any kind used; and I said at Mr. Hankin's lecture that I was sure he had not, and

he at once acknowledged that he had not. I was observant also of a great deal of house building in Bombay, nearly all of European design and under European superintendence. The only exception was a little mosque in the northeast quarter of the Island, near the sea shore, under Chinchpoogly Hill. It was built by a small body of stonemasons; and from first to last not only without a draughted plan, but without measurements. I have often cited the case in opposition to my distinguished friend Sir Caspar Purdon-Clark's contention that no one could build a house without a plan. I was *officiously* with these masons daily, and only occasionally would they have an aside consultation over some hitch in the construction or some point of decoration, which was nearly all in the proportion of the construction, and then they would trace out their casual "plannings" in the dust on the ground, with their forefingers, or I would help them with my walking-stick. I do not know how it is done—by instinct, by rote or by divine inspiration (*i. e.*, genius). I only know that the thought of "Glory to God" works wonders by the hands of these men, Hindus and Muslims, and that honest payment, as God's blessing on their work, fills them with devout gratitude, and enthusiastic gratification in it."

HEATING AND VENTILATION—VII.

School buildings of sufficient size to call for steam heating systems usually require a larger boiler capacity than can well be furnished by the usual form of cast-iron sectional boiler, although some manufacturers make special sizes for this purpose, running up to 30 horse-power or more. In large grammar and high schools the boiler-power required often runs up to 200 horse-power or more, so that resort must be had to the usual forms of power-boilers. Probably more horizontal tubular-boilers are used for this purpose than any other, although the most dangerous in case of explosion.

A well-designed and well-cared for tubular-boiler, when running under the low pressures employed in heating and ventilating work, may be considered practically as safe as a sectional-boiler, although there is a wide difference in opinion upon the matter among engineers and others. Boilers for low-pressure work should be designed for carrying a load of 100 pounds per square inch with a factor-of-safety of 6, which gives a wide margin of safety under the actual working conditions.

The first-cost of a tubular-boiler is considerably less than that of a water-tube boiler, and as they contain a much larger body of water the fluctuation of the water-line is less rapid. They are simple in construction and all parts are easily accessible for cleaning. The capacity of this type of boiler is usually stated in *horse-power*, and the method of determining the size is different from that of house-heating boilers. A standard boiler horse-power is the ability to evaporate 34½ pounds of water per hour from a temperature of 212° into steam at atmospheric pressure.

In doing this, 33,330 B. T. U. are absorbed, which are given out again when the steam is condensed in the radiators.

Hence, to find the boiler-horse-power required for warming any given building, we have only to compute the total heat-loss per hour by the methods already given and divide the result by 33,330. It is now common to divide by 33,000, which gives a slightly larger boiler and is on the side of safety. The ratio of heating to grate surface in this type of boiler ranges from 30 to 40, and therefore allows a combustion of from 8 to 10 pounds of coal per square foot of grate per hour. This is easily obtained with a good chimney draught and careful firing.

In the case of heating-boilers it is customary to consider 15 square feet of fire or heating surface as equivalent to one horse-power, although boiler-makers frequently rate them on a basis of only 11 or 12 square feet per horse-power. In computing the heating-surface of a boiler it is customary to take one-half the shell, one head, less the tube-area, and the inside surface of all the tubes. In practice, the longer the boiler the more important the plant usually, and the greater the care and skill bestowed upon it; so that we may generally count upon a higher rate of combustion and a greater efficiency as the size of the boiler increases.

The following table, based upon 15 square feet of heating-surface per horse-power will be found useful in determining the size of boiler required under different conditions. A large number of tubes are often crowded into a boiler in order to increase its capacity. This should never be done beyond a certain limit as they impede the circulation of water within the boiler and greatly reduce its efficiency for a given amount of heating-surface. The number and size of tubes given for boilers of different diameters have been found by experience to give the most satisfactory results and should not be much exceeded. The grate-area is computed for an evaporation of 8 pounds of steam per pound of coal, which corresponds to an efficiency of about 60 per cent. and is about the average obtained in practice for heating-boilers. The areas of uptake and smoke pipe are figured on a basis of 1 square foot to 7 square feet of grate area, and the results given in round numbers. In the smaller sizes the relative size of smokepipe is made larger. The rate of combustion runs from 6 pounds in the smaller sizes to 11½ in the larger. Boilers of the proportions given in the table correspond well with those used in actual practice and may be relied upon to give good results under ordinary conditions.

Diameter of shell, in inches.	Number of tubes.	Diameter of tubes, in inches.	Length of tubes, in feet.	Horse-power.	Size of grate, in inches.	Size of uptake, in inches.	Size of smoke-pipe, in sq. inches.
30	28	2½	6	8.5	24 x 36	10 x 14	140
			7	9.9	24 x 36	10 x 14	140
			8	11.2	24 x 36	10 x 14	140
			9	12.6	24 x 42	10 x 14	140
			10	14.0	24 x 42	10 x 14	140
36	34	2½	8	13.6	30 x 36	10 x 16	160
			9	15.3	30 x 42	10 x 18	180
			10	16.9	30 x 42	10 x 18	180
			11	18.6	30 x 48	10 x 20	200
			12	20.9	30 x 48	10 x 20	200
42	34	3	9	18.5	36 x 42	10 x 20	200
			10	20.5	36 x 42	10 x 20	200
			11	22.5	36 x 48	10 x 25	250
			12	24.5	36 x 48	10 x 25	250
			13	26.5	36 x 48	10 x 28	280
			14	28.5	36 x 54	10 x 28	280
48	44	3	10	30.4	42 x 48	10 x 28	280
			11	33.2	42 x 48	10 x 28	280
			12	35.7	42 x 54	10 x 32	320
			13	38.3	42 x 54	10 x 32	320
			14	40.8	42 x 60	10 x 36	360
			15	43.4	42 x 60	10 x 36	360
			16	45.9	42 x 60	10 x 36	360
54	54	3	11	34.6	48 x 54	10 x 38	380
			12	37.7	48 x 54	10 x 38	380
			13	40.8	48 x 54	10 x 38	380
			14	43.9	48 x 54	10 x 38	380
			15	47.0	48 x 60	10 x 40	400
			16	50.1	48 x 60	10 x 40	400
	46	3½	17	53.0	48 x 60	10 x 40	400
60	72	3	12	48.4	54 x 60	12 x 40	460
			13	52.4	54 x 60	12 x 40	460
			14	56.4	54 x 60	12 x 40	460
			15	60.4	54 x 66	12 x 42	500
			16	64.4	54 x 66	12 x 42	500
	64	3½	17	71.4	54 x 72	12 x 48	550
			18	75.6	54 x 72	12 x 48	550
66	90	3	14	70.1	60 x 66	12 x 48	500
			15	75.0	60 x 72	12 x 52	620
			16	80.0	60 x 72	12 x 52	620
	78	3½	17	86.0	60 x 78	12 x 56	670
			18	91.1	60 x 78	12 x 56	670
			19	96.2	60 x 78	12 x 56	670
	62	4	20	93.1	60 x 78	12 x 56	670
72	114	3	14	87.4	66 x 72	12 x 56	670
			15	93.6	66 x 72	12 x 56	670
			16	99.7	66 x 78	12 x 62	740
	98	3½	17	106.4	66 x 78	12 x 62	740
			18	112.6	66 x 84	12 x 66	790
			19	118.8	66 x 84	12 x 66	790
	72	4	20	107.3	66 x 84	12 x 66	790

The boiler foundation and setting are important matters which should receive careful attention.

The foundation is usually made of stone laid in cement or of a good quality of concrete. Where there is a firm earth footing, the foundations may be made 12 inches deep for boilers 30 and 36 inches in diameter, 16 inches for 42 and 48-inch, 20 inches for 54 and 60-inch, and 24 inches for 66 and 72-inch boilers. The width of the foundation walls should be from 16 to 20 inches wider than the walls of the setting which they support. In the Hartford setting, so called, it is customary to make the width of the grate or furnace 6 inches less than the diameter of the boiler. For heating purposes the following wall construction may be used for boilers of different diameters. The brackets which support a boiler usually have a projection of 10 inches for boilers up to and including 42 inches in diameter, and a projection of 12 inches for larger sizes. This determines the distance they must be placed from each other when set in battery and consequently the thickness of the division wall.

Diameter of boiler.	Outside walls. Inner wall.	Air space.	Outer wall.	Rear wall. Inner wall.	Air space.	Outer wall.	Front wall.	Division wall.
30	8	2	8	8	2	8	9	26
36	8	2	8	8	2	8	9	26
42	12	2	8	8	2	8	9	26
48	12	2	8	8	2	8	9	30
54	12	2	8	12	2	8	9	30
60	12	2	8	12	2	8	9	30
66	12	2	12	12	2	12	9	30
72	12	2	12	12	2	12	9	30

All dimensions in the above table are in inches. The following one giving the over-all dimensions for boilers of different diameters, after setting, will be found useful in laying out boiler-rooms. The length of setting is equal to the length of the boiler tubes, plus the thickness of the rear wall, plus 2 feet.

In planning a boiler-room, space should always be left in front of the boilers for drawing the tubes and for using a tube-cleaner. This space should be at least one foot greater than the length of the tubes. Sometimes it is impossible to provide this amount of space on account of the building construction. In this case, windows or openings with removable covers may be provided in front of the boilers.

TOTAL WIDTH OF SETTING.

Diameter of boiler.	One boiler.	Two boilers.	Three boilers.
30″	5′ 4″	9′ 6″	13′ 8″
36″	5′ 10″	10′ 6″	15′ 2″
42″	6′ 4″	11′ 10″	17′ 6″
48″	7′ 2″	13′ 2″	19′ 2″
54″	7′ 8″	14′ 2″	21′ 6″
60″	8′ 2″	15′ 2″	22′ 2″
66″	9′ 4″	16′ 10″	24′ 4″
72″	9′ 10″	18′ 0″	25′ 10″

The boiler-setting should be composed of bricks of good quality, laid in cement mortar. Inside bricks may be light-hard; all outside or exposed bricks should be best quality hard-burned. The furnace, bridge-wall and arch over combustion-chamber at the rear, should be lined with fire-brick laid in pure cement or a mixture of fire-clay and ground fire-brick, with very close joints. An accessible cleanout-door should connect with the combustion-chamber of each boiler. The smoke connections are usually made of No. 10 or 12 black iron. If rectangular in form the corners should be stiffened by riveting to strips of angle-iron. A balanced damper turning on roller-bearing and closing at an angle of 45° should be placed in the main smoke-pipe, and there should be adjustable dampers for hand regulation in the uptake from each boiler. The balanced damper should be connected with an automatic damper-regulator of standard make. Cleanout-doors should be placed in the smoke-pipe so that all points of the interior may be accessible.

Each boiler should be provided with a pressure-gauge, water-glass, gauge-cocks and pop safety-valve, the latter having a chain-and-pulley attachment for opening the valve at frequent intervals for testing. Where two or more boilers are set in battery each should have its separate valved steam and return connections with the mains, so it can be shut off at any time independently of the others.

Valved equalizing pipes of the same size as the steam connections should connect all of the boilers which are running at the same time. Unless these pipes are provided, one boiler is apt to steam faster at times and force the water from one to another through the return connections.

The steam connection should be made with the rear nozzle, as the boiling of the water is less violent at this point and dryer steam will be obtained. The shut-off valve should be placed in such a position that pockets for the accumulation of the results of condensation will be avoided. The return connection is made through the blow-off pipe and should be so arranged that the boiler can be blown off without draining the returns. A check-valve should be placed in the main return and a plug cock in the blow-off pipe with gate-valves on the boiler side of each. Fig. 34 shows in plan a good arrangement of these connections for a single boiler. When there are two or more boilers a single check should be placed in the main return instead of a separate one in the branch to each boiler. This is contrary to common practice, but when separate checks are used they will not all open with the same ease, consequently the return condensation will all enter one boiler at the expense of the other, making it necessary to blow off one to the sewer at frequent intervals, and at the same time fill the others with cold water. The objection to a single check is the tendency of the water to back from one boiler to the other. When equalizing pipes are used there is no danger from this, and the arrangement is approved by the leading boiler-insurance companies.

When the blow-off pipe connects with a sewer, some means must be provided for cooling the water, or the expansion and contraction caused by the hot water flowing through the drain pipes will start the joints and cause leaks. For this reason it is customary to pass the water through a blow-off tank. A cast or wrought iron tank is commonly used and ordinarily stands nearly full of cold water. The pipe from the boiler enters above the water line and the sewer connection leads from near the bottom and passes out on a line above the surface of the water. A vapor pipe is carried from the top of the tank to a point above the roof of the building. When water from the boiler is blown into the tank, cold water from the bottom is forced out and flows into the sewer. As only a part of the water is blown out of a boiler at one time, the tank can be of a comparatively small size. A tank 24 by 48 inches should be large enough for boilers up to 48 inches indiameter, and one 36 by 72 inches should call for a boiler 72 inches in diameter. If smaller quantities of water are blown off at one time smaller tanks can be used. The sizes given are large enough for batteries of two or more boilers, as one can be blown off and allowed to cool before a second one is blown off. Cast-iron tanks are usually sunken in the ground while those of wrought iron are supported on cast-iron cradles or brick piers.

COMMUNICATIONS.

THE TARIFF ON ARCHITECTS' DRAWINGS.

To the Editors of the American Architect:

Dear Sirs.—Would you kindly inform me through your magazine what the tariff is on plans prepared abroad and imported into the United States? Thanking you in anticipation, I beg to remain

Yours, etc.

Jonas C. Barter.

[The Board of United States General Appraisers has ruled that architects are "artists," for tariff purposes, and hence that architectural drawings are dutiable at twenty per cent. ad valorem, in the same class with "paintings in oil and water-colors, pastels, pen-and-ink drawings and statuary, not specially provided for." We presume that the proper thing is to present the drawings at the Custom House with a manifest setting forth the cost price of the drawings, un'ess the shipper chooses to pay a larger tax by putting upon them a valuation as "works of art."—Eds. American Architect.]

MR. FLETCHER'S "HISTORY OF ARCHITECTURE."

No. 7 Warren St., New York, May 13, 1905.

To the Editors of the American Architect:

Dear Sirs.—In your review of Mr. Fletcher's "*History of Architecture,*" published in your issue of May 6, you express a regret that he had never visited America. Mr. Banister F. Fletcher performed the same service for the Royal Institute of British Architects toward the Chicago Exhibition in 1893 that his brother, Mr. H. Phillips Fletcher did toward the St. Louis Exposition of 1903. While I try to be as much alive as possible to the merits of contemporary American architecture, I doubt if it calls for much space in a history of architecture as a whole. Mr. Fletcher might, undoubtedly, have given more space to American subjects in his very admirable and useful book, but it would hardly have been possible to do so in the very narrow limits that each country and period must have in a general history.

Yours very truly,

Barr Ferree.

[Nevertheless, and in spite of Mr. Fletcher's visit to Chicago in 1893, his book gives distinct proof that this western hemisphere is to him, architecturally, *terra incognita.* A bare twenty lines devoted to "Ancient American Architecture," when so much might be said and shown of the architecture of the Incas, the Mayas, the Aztecs, and the communal northern tribes, indicates a very restricted and insular point of view. Surely, in connection with the reasonably important space devoted to Spanish Renaissance architecture, a few words would have been added, by anyone who knew his subject thoroughly, about the remarkably interesting buildings of the Spanish-American type that exist on both continents. Before another edition passes through the press we hope the author may find time to visit Mexico, at least, and perhaps by that time "contemporary American Architecture" may develop enough to deserve his further consideration.—Eds. American Architect.]

ILLUSTRATIONS

THE UNION TRUST BUILDING, BALTIMORE, MD. MESSRS. PARKER & THOMAS, ARCHITECTS, BALTIMORE, MD.

A week or two ago we spoke of the nature and amount of the reconstruction to which the Continental Trust Building, a survivor of the Baltimore fire, had had to submit, and we must now point out that this building, also a "survivor," has had to undergo very serious repairs.

The street fronts and interiors were destroyed by the fire, the building being subjected to intense heat. On being stripped, the structural steel was found to be in excellent condition. The floor arches were apparently in bad shape, the bottom flanges being broken off throughout the greater part of the building. The blocks were of the end-construction type, 10 inches thick. Exhaustive tests showed them to be sufficiently strong to carry safely any loading that would be required of them, and they were allowed to remain. In every part of the building a 250 pound iron roller was pushed over the floor, i.e., on the top of the bar arch, and where the arches were evidently most damaged loads to over 600 pounds per square foot were applied—without failure.

The lower flanges of the beams were protected with wire lath and cement, and then a hung ceiling was placed below all.

The original building was designed by Messrs. Winslow & Wetherell, of Boston.

ACCEPTED DESIGN FOR THE MARYLAND INSTITUTE, BALTIMORE, MD., MESSRS. CORBETT & PELL, ARCHITECTS, NEW YORK, N. Y.

PREMIATED COMPETITIVE DESIGNS FOR THE MARYLAND INSTITUTE, BALTIMORE, MD. SUBMITTED BY MESSRS. OWEN & SISCO (A. TEN EYCK BROWN, ASSOCIATED); MARTIN C. MILLER; BALDWIN & PENNINGTON, BALTIMORE, MD.; DAVIS & DAVIS; RANKIN, KELLOGG & CRANE, PHILADELPHIA, PA.

This competition was made necessary, we believe, through the destruction during the conflagration a year ago of the Institute's old building on Baltimore street. As the old site was not too well adapted to educational ends, owing to the encroachment of business, a new site has been procured at Mount Royal avenue and Lanvale Street, amid quieter and more open surroundings.

As the Principal of the Schools of Art and Design, Prof. Otto Fuchs, provided with the programme a set of skeleton floor plans, which the competitors were required to adhere to, the competition was really merely one for the procurement of an architectural treatment of façades under conditions fixed with some precision, so the designs actually submitted do not offer as much variety of treatment as is generally the case. The building is to cost about $350,000.

THE SEXTON BUILDING, BALTIMORE, MD. MESSRS. SPERRY, YORK & SAWYER, ARCHITECTS, BALTIMORE, MD.

This warehouse and office building, of a modified mill-construction, is rather typical of a large class of warehouses that have been erected throughout the "burnt district."

DOORWAY TO HOUSE OF JULIUS N. JAROS, ESQ., WEST END AVENUE, NEW YORK, N. Y. MR. R. L. DAUS, ARCHITECT, NEW YORK, N. Y.

ENTRANCE FEATURES, NO. 284 MADISON AVENUE, NEW YORK, N. Y. MR. N. C. MELLEN, ARCHITECT, NEW YORK, N. Y.

Additional Illustrations In the International Edition.

ENTRANCE HALL: HOTEL ASTOR, BROADWAY, 44TH AND 45TH STREETS, NEW YORK, N. Y. MESSRS. CLINTON & RUSSELL, ARCHITECTS, NEW YORK, N. Y.

NOTES AND CLIPPINGS.

DISINTERRING THE SPHINX.—The scheme for clearing the bases of the Sphinx from the sand in which they are buried is beginning to assume practical shape. The committee already formed is to meet in a few days to discuss ways and means. It is thought that the Prisons Department will provide 200 laborers from among the male inmates of prison establishments. The workmen will receive a small wage from the excavation committee. By carrying the trench from the paws of the Sphinx in a southeasterly direction, instead of due east, neither cultivation nor personal property will be molested, and the cost will therefore be enormously lessened.—*The Architect.*

MISUSE OF THE INCANDESCENT LAMP DANGEROUS.—"The real danger of an incandescent lamp as a foot-warmer," says the *Electrical Review*, "is not from fire set by a broken lamp. There would be little danger of fire from such an accident. The real period is before the lamp is broken. A thirty-two candle-power incandescent lamp absorbs about 100 watts. Placed under the bed-covers, all this energy is converted into heat, and as the lamp is comparatively small, and the covers good heat insulators, it does not take long for a high temperature to be attained. This supply of energy at the rate of 100 watts is equivalent to 5.7 British thermal units per minute, which would be sufficient to raise one pint of water about 57 degrees in ten minutes. When the lamp is closely surrounded by a non-conducting material it does not take long for the latter to be heated to a dangerous point. One can test this easily for himself by wrapping a thick cloth about an incandescent lamp when it is lighted. In a few minutes the cloth will be smouldering, and possibly break into flame. When such a condition is not merely likely, but almost certain to occur, there is no necessity of dwelling upon the inadvisability of obtaining a comfortable night's rest by the means suggested. It is a fact that possibly the greatest danger of fire from an incandescent lamp arises from this cause, because many persons who should know better seem to forget that it gives off heat, and therefore provision should be made for dissipating this. In other words, the lamp should not be placed in an enclosed position, unless it is surrounded by fireproof material, and it should not come in contact with anything combustible. This is one of the requirements of the fire underwriters, and it is something that should be known by every one."

THE VENICE ART CONGRESS.—The international committee under the patronage of which the International Art Congress at Venice will be held in September, has been appointed. The American representatives on the committee are Bernhard Berenson, of Florence, Italy, and Lorado Taft, of Chicago.

DETAILLE'S MURAL PAINTING FOR THE PANTHÉON.—Henry Martin has that true feeling for decoration which seems to be so generally lacking in French mural painting of to-day, and passing from his panel to the huge mural design by Edouard Detaille, at this year's *Salon*, the fact is forcibly brought home that this last is a decoration in name only and is in reality nothing but an enlarged easel picture. "La chevauchée de la Glorie," as this work is entitled, is in the first gallery, directly opposite the entrance from the grand stairway, and its conspicuous position, its space area of 1,500 square feet at the very least, together with the fact that it is destined for the adornment of the Panthéon, all combine to invest it with an interest which is out of all proportion to its artistic worth. Though divided into a triptych by two fluted pilasters the space is treated as one and the whirling mass of riders passes behind the pilasters from left to right. There is some very spirited drawing in the horses and their riders and the general sense of movement is excellent, but the color is decidedly monotonous, and one can't help feeling that another opportunity for a splendid mural decoration has been allowed to go to waste.—*Boston Transcript.*

LONDON'S GRANDEST MANSION.—The Duke of Sutherland's London home is certainly the most beautiful palace, not merely of the British metropolis, but of most European capitals. Disraeli in one of his novels described it as "not unworthy of Vicenza at its best," Empress Eugènie was so taken with it that she wanted Napoleon III to build for her an exact copy of it in Paris, and Queen Victoria, when she used to drive from Buckingham Palace to visit her great friend, Duchess Harriet of Sutherland, grandmother of the present duke, was wont to greet her with the remark: "Well, dear, I'm coming from my house to visit you in your palace." It is a noble pile, looking upon Green Park and upon Birdcage Walk, and was built less than one hundred years ago for the Duke of York, second son of King George III, on money borrowed from the then Marquis of Stafford. The duke died before his wonderful new house could be finished, and the Marquis of Stafford, who had meanwhile become the first Duke of Sutherland, took possession of the building and secured the land on which it stood on a crown lease. He spent no end of money on its completion, under the direction of Sir Charles Barry, the designer of the houses of Parliament. According to the terms of the lease, the building as it now stands, with the fixtures, though not with the other contents, will in a few years come into the possession of the ground landlord—that is to say the crown—without any compensation to the duke or his heirs, and there is no doubt that then the palace—for it is impossible to describe it by any other name—will be assigned to one of the members of the reigning family as a metropolitan residence. Like Trentham, it is crowded from garret to cellar with art treasures, including two of the most famous Murillos in existence, a number of Van Dykes, Rubenses and Raphaels. Between the immense reception hall and the carriage entrance stand a large pair of glass doors, which are never opened except for royalty or for a departing bride.—*Marquise de Fontenoy in N. Y. Tribune.*

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CONTENTS

A VERY interesting and unusual piece of architectural work, one which might have been planned equally well by Penelope or Sisyphus, has recently been carried out in a South American city with such ingenuity and cleverness that, unless the work may actually have been carried out by North American contractors, the Chilenos are in some danger of having wrested from them by the inhabitants of the Argentine Republic their sobriquet of "the Yankees of South America." The Casino on the Rua Maipu at Buenos Ayres was the scene of operations, and the problem presented for solution was nothing less than its entire reconstruction and considerable enlargement without occasioning the slightest break in the continuity of the nightly theatrical representations. As the change in plan of the stage and auditorium involved not only a certain enlargement but a considerable change in orientation, the main axis being revolved through forty-five degrees, it can be seen that the building operations, which involved galleries as well as the parquet, must not only have been of considerable extent, but occasioned situations where most contractors would have been glad to leave scaffolding undisturbed for days at a time. Actually, however, all building operations in the auditorium and stage had to stop at about three o'clock in the afternoon, the time between that hour and the rising of the curtain each evening being needed for the replacing of chairs, stalls, boxes, carpets and hangings, and the strengthening of all walls and supports, so as to be able to pass the official examination of the building-inspectors, who each night gave a written permit for the use of the building as a theatre for that one night. As the building was entirely rebuilt inside and out, of course much of the exterior work could go on uninterruptedly through the usual working hours, but so far as the auditorium and most of the internal work was concerned, the hours between midnight and two o'clock the following afternoon had to suffice.

THAT work of such extent—the building since its enlargement has contained audiences of four thousand persons—could be accomplished at all under such unusual conditions, was made possible by the most precise of plannings, and the most skilful of execution, and only then because of the present advanced condition of the art of metal construction and the possibility of bringing framework, and so on, to the job in unusually short sections that required a minimum of field-work in their installation. As the climate is not severe in Buenos Ayres and the building is often used for hippic performances of one kind or another, the roof over the auditorium is made to roll forward over the flat roof of the front portion of the building, thus opening the auditorium to full air. This movable roof and its electric installation were made in the United States. The floor of the parquet is centrally supported on pivoted bascule trusses, and this makes it possible to incline the floor towards the stage and place thereon the chairs *en gredin* in ordinary theatre fashion or tilt the floor up to a level so that, after the chairs are removed, it may afford a good dancing-floor for public balls. As the circus-ring is below the level of this tilting floor, it is necessary to dismantle and remove the whole structure whenever equestrian performances, horse-shows and so on are to take place; at such times the seating capacity lost in the parquet is more than made good by the now uncovered seats in the basement that surround the ring. The architect and contractor clever enough to conceive and carry out this interesting piece of alteration were MM. Charles Séguin and A. Prunières.

A RATHER interesting case has been before the courts of the State of Washington that involved the vexed matter of extras, amongst other things, and led to the formulation of a very ingenious answer to the hackneyed disclaimer so often put forward by public authorities in similar cases. Mr. W. A. Ritchie, of Spokane, was employed by the State Capital Commission, under a written contract, to act as architect for the remodeling of the Capitol and the building of an annex to it, payment to be made at five per cent., according to established custom. During the progress of the work certain changes were made, which entitled the contractors to put in a claim for extras, and the architect later presented his claim for five per cent. commission on the cost of these extras. Owing to political pressure the Capitol Commission was unwilling to approve the claim, and the architect therefore was obliged to sue, but was confronted with the defense that the legislative act authorizing the work on the Capitol declared that "no contract for any sum in excess of five hundred dollars will be legal and binding on the State unless notice for proposals had first been advertised and a contract in writing duly executed with the accepted bidder" thereon. The defense alleged that the architect's commission on the extras amounted to a sum much in excess of five hundred dollars, that no attempt to procure an architect for the extra work by advertisement had been made, and that he could exhibit no written contract for this special extra work. The plaintiff pointed out that by the words of the act and the terms of his original contract of employment he was an employé of the Commission's, in the same sense as was the Commission's secretary, both being removable for cause at the pleasure of the Commission, and that hence all services rendered were rendered by him as an em-

Entered at the Post Office at New York as second-class matter.

ployé—not at all as a contractor—and dischargeable under the terms of the original contract of employment. The Superior Court of Thurston County, however, gave judgment against the architect. Strong in the belief that his claim was just, Mr. Ritchie carried his case before a higher court, and we are glad to learn that the Supreme Court has reversed the decision and granted the architect a new trial, ruling, first that the act requiring the public advertising for proposals had relation solely to matters of construction and material, and not to such service as an architect renders; and, second, that the jury should have had a chance to consider whether the architect's service was rendered under the original contract or under a new but not written one.

MR. RITCHIE included as a second count in his suit a claim for ten per cent. on designs made by him for the new furniture for the building, a claim which rests on more debatable, though not less interesting, grounds. The original appropriation made no provision whatever for furniture, but at a certain point the Commission, foreseeing the desirability, called in the architect and contractors, frankly explained the situation and asked them if they would not be willing, the one to design and the others to provide the requisite furniture so that it might be in place in time for the opening of the session of 1903, on the understanding that the Commission could not bind the State to pay either architect or contractors; all that it could and would do was to promise to attempt to procure the needed supplementary appropriation as soon as the Legislature convened, and that, provided this attempt should not meet with success within thirty days of the opening of the session, the contractors would then be free to take possession of the furniture and dispose of it as best they could. Naturally, Mr. Ritchie objected to this aleatory arrangement and said that, if he could be paid out of the then small unexpended balance of the original appropriation, he would prepare the designs for five per cent. in place of the [minimum] ten per cent. usually charged for such work. As the Commission was unwilling to do this, the architect and contractors finally accepted the proposal as made to them. The Commission was as good as its word—its good-will being unaffected by the fact that although the furniture was ready for the opening session, the building was not—and finally succeeded in securing money enough to pay the contractors for the furniture, but was not equally lucky in getting money to pay the architect for designing it, the item covering what was due him being stricken out before enactment, owing to the fact that he had acquired the ill-will of certain politicians, through, as we understand it, having defeated an attempt to collect certain large extras from which the politicians evidently expected pickings for themselves. The lesson to be drawn from this incident is too obvious to require enforcing.

IT is probable that a certain paint-making firm which has recently sent out letters offering a commission of "five dollars per barrel" to architects who would specify the material have already had explained to them by more than one offended architect that the offer, though possibly honestly made as a mere "business discount," could only be construed as an insulting attempt at bribery. If the offer was made in all innocence, there would be injustice in publishing the name of the firm, while, if it was made with dishonest intent they would probably regard the publication as so much extra free advertising from which they would be sure to derive a benefit through, in this way, being made known to the uninformed younger men or the crooked older men in the profession who would yield to the temptation of an unusually liberal bribe. It is worth while now and then to draw attention to the "illicit-commission" evil, and point out that it is a thing that no honest architect can afford to touch. As the American Institute of Architects sedulously avoids the publication of its rules and regulations, except at rare intervals, we cannot turn to its precept on this subject, so we will quote from the "*Kalendar*" of the R. I. B. A., where such information is always to be found, the clause from the "declaration" which has to be signed on election by every Fellow or Associate of that body, which declares, point blank, that "I promise and agree that I will not accept any trade or other discounts or illicit or surreptitious commissions or allowances in connection with any works, the execution of which I may be engaged to superintend." It may also be well to point out that States which issue licenses to architects are empowered to revoke such licenses for "dishonest practices," and that by the common law there is no more dishonest practice than taking a commission upon the same transaction from the buyer (the client) and from the seller (the material-man).

ANOTHER incident has been added to the already varied history of the New York Hall of Records, which will seemingly go a good way toward making this building a worthy companion for its neighbor over the way, the County Court House. Most people, we fancy, have been expecting to learn that at last Mr. Thomas's successors had brought their labors to an end, that the building was at length finished and ready for occupancy, and were all agog with desire to inspect the architectural glories that had been evolved in such devious ways. But their hearts are now sickened with deferred hopes through the advertisement for proposals for alterations in practically every story of the building, for which an appropriation of half a million dollars has been secured. Apparently, now that the building is approximately completed, the present heads of the departments that are to occupy this building have been called in and invited to advise how the rooms and their equipment could be improved for their greater pleasure, and perhaps for the sake of gains in other ways. Possibly, on the cards of invitation issued by the architects appeared the familiar commercial legend "if you don't see what you want, ask for it," and later it may have been asked: What "between friends," is a little matter of substituting a mosaic for a wooden floor, mahogany for maple or throwing two large private offices into one larger one, with the entailed necessity of finding a place somewhere else to build a substitute for the abolished room? At the normal rate of progress, the half million now provided will be expended about the time that new incumbents will take charge of the departments, and as the architects can hardly be less considerate of the comfort and taste of these new friends than in the case of the present officials, it seems possible that the building may be kept permanently in the hands of contractors who have new appropriations to consume.

THE MONUMENTAL TREATMENT OF BRONZE.[1]

SEVENTEEN years ago I had the honor of addressing this Society on the subject of "The Monumental Uses of Bronze." I then confined myself to illustrations of sepulchral monuments. Not many weeks since, my friend, Mr. Marion H. Spielmann, also read here a paper on Royal monuments, describing those erected and in process of erection to the memory of our great Queen Victoria and her mighty contemporaries, the Emperor William and King Victor Emanuel, all three builders of empires. There remains, however, a vast field to which not one but many meetings of this Society might be usefully devoted. Commemorative monuments, indeed, may be classified into five great groups: Religious, Sepulchral, Allegorical, Historical, Iconographic, each a subject for separate treatment.

Those designed to honor divinities, lest unseen their awful power should be forgotten, are the earliest of which we have any knowledge. These were visible symbols if not actual habitations of the gods, or temples set apart for their cult. Later, temples were erected with more mixed motives, but always with the dominant, if unexpressed, idea of bettering the life to come. Associated with religious beliefs, they took the practical form of providing places of worship for the people and domiciles for the priesthood. The few other religious monuments, as fountains dedicated to the Virgin, or isolated statues of saints, are exceptions of slight importance.

Another group marks the burial-place and perpetuates the memory of illustrious dead. These sepulchral monuments assumed at times vast proportions, like the Pyramids, the Mausoleum, the Castle of St. Angelo, the Taj Mehal, the Medici Chapel, the Cenotaph of Maximilian, and the Chapel of Henry VII. Like the Wellington Monument in St. Paul's, and the Royal Mausoleum at Windsor, they denote the actual places of interment.

Another more fanciful and poetic group consists of impersonations of the forces of Nature, of the Attributes, Passions, the Past and the Future, as well as concrete things, such as rivers, and people, by means of symbolic or allegorical imagery. The Greeks and Romans delighted in these, and they continue to appeal to the multitude even at the present day. With us no symbols are more popular than Britannia, the British Lion, and John Bull. The series of seated statues of the cities of France around the Place de la Concorde, in Paris, erected with no such motive, serve in no small degree to keep green the memory of the losses of the Franco-German war.

An equally imaginative group is the Historical, commemorating auspicious or important national events. These are for the most part set up in public places and take varied forms, the most usual being arches, columns, obelisks, cairns, and allegoric statuary. These monuments, so important among nations of antiquity, had fallen into disuse in Europe until revived by Charles V. and Louis XIV. The Columns of July and Napoleon, our own Monument, the Arcs de Triomphe and du Carousel, and the Portes St. Denis and St. Martin are conspicuous examples.

The last and by far the most numerous group is Iconographic, or erected to commemorate the deeds, virtues, and appearance of famous personages. These were equally familiar in ancient Greece and Rome, but forgotten later until the classic revival in the Italian Renaissance led to the production of monuments resembling those of antiquity. Our Nelson and Duke of York columns and Albert Memorial are familiar examples, but such memorials more commonly take the less ambitious form of simple portrait statues.

We in England have shown little interest hitherto in monuments commemorating past events, however important, and few are of historic value unless sepulchral. The commemoration of our monarchs and greatest men in bronze or marble was never a national concern until late in the seventeenth century. The men themselves, or their immediate heirs, erected the monuments that exist, as well as countless others that have perished through fire and decay. Had the customs of Greece or Rome by good fortune been maintained, statues would have been set up to most popular heroes of the day, and the likenesses of hosts of interesting personalities preserved and now be familiar to us.

Setting aside sepulchral monuments, with which I do not propose to deal, the most ancient and the most touching is the series of stone crosses erected to mark the resting-places of the bier of the beloved Queen Eleanor, of whom we have fortunately a splendid portrait in bronze in Westminster Abbey. For the most part the crosses have long since crumbled away and been removed, but one especially is perpetuated for ever in the name "Charing Cross." The sentiment that dictated the erection of these and its mode of expression have remained unique. A long interval elapsed before any other commemorative monument was set up in London, and then it needed nothing less than the appalling destruction of the entire city proper, with all its churches and historic buildings, to awake in the English mind a sentiment that had been so predominant in ancient Greece and Rome. "The Monument," so called because there was no other, remains practically unique in England, and except in the naming of Waterloo Bridge and Trafalgar Square, there is no visible sign that the nation cares to perpetuate the great events which have built up its history. But for the Guards' Monument there is nothing publicly commemorating the Crimean war; there is no sign of any national monument in remembrance of our struggles for supremacy in South Africa; and even the arrival of "Cleopatra's Needle" failed to make us realize that in it we possess the most fitting memorial of our occupation of Egypt. Monuments of stirring national events should provide history written large and artistic object-lessons for the people. To ancient historic monuments we are indebted for our sole accurate knowledge of the actual arms and appearance of such mighty historic nations as the Egyptians, Assyrians, Medes, Persians, Dacians, Scythians, Greeks, Romans, Gauls; indeed, of every nation that has made up the world's history. A Roman triumphal arch affords the only actual representation of the mystic seven-branched candelabrum of the Jewish Temple, while Trajan's column presents a minutely accurate representation of the chain-mail and weapons that proved as fatal to Crassus, as to the English at Hastings a thousand years later. Our neighbors across the Channel show a thorough appreciation of the value of grand commemorative monuments. The columns of July and Napoleon, their triumphal arches, the Trocadéro, the bridges, and names of streets and places keep alive the national glories and checkered career of the great nation. Already most of these monuments are mellowing into historic value, just as in time to come even our indifferent Guards' Monument will serve not only to preserve the memory of our first great struggle with our secular enemy, but will record the exact costume of those who fought the battles. How valuable contemporary monuments in bronze would be to us of the heroes and rank and file who won our historic victories. Our pride in our Empire should surely induce us to hand down the presentment of those of us who fight our country's battles, and also of their gallant foes, whether Zulus, Afghans, or others. With no very earnest or successful antiquaries among our living sculptors, it is perhaps unwise to attempt to construct monuments commemorating anything but the immediate past and present, for certainly Boadicea, in her scythed chariot, and the warrior waving a sword in Palace Yard, with bronze bas-reliefs on the pedestal, do not appeal to us as historically accurate; but the great events of our own day, the Union of the British Isles, the Federation of the Colonies, and the Consolidation of the Indian Empire, our political freedom, and that of the press, might be treated seriously, if competitions were open to all British subjects. An Alfred Stevens may exist among us, or some scenic artist or poetic dreamer might give birth to ideas for the professional architect and sculptor to realize. My own experience is that the power to design and the power to execute do not necessarily or invariably occupy one cranium. The dearth of reasonable presentments of our historic worthies in the public spaces of our metropolis has only been lessened of late by the portrait in bronze of Cromwell; and the Achilles in Hyde Park still remains our only symbolic statue, against the scores set up in other capitals.

Contrasted with those of Paris, our monumental efforts appear insignificant indeed. Emerging a few days since from the Louvre onto the Place du Carrousel, I was at once faced by a series of superb monuments, including that to Gambetta. A few steps west led by the triumphal arch, with its bronze quadriga, to the Tuileries gardens, where I was confronted

[1] A paper by Mr. J. Starkie Gardner, F.S.A., read before the Society of Arts and published in the *Journal* of the Society.

with a galaxy of statues and groups, comprising two fine groups of lions, and rhinoceros and tigers, in bronze. Continuing to the Place de la Concorde, I found myself in the presence of the great Luxor Obelisk and two splendid fountains, around which are placed in solemn dignity the great statues emblematic of the noblest cities of France. Beyond, again, are other monuments, including the Marly Horses, the vista being closed by the great Arc de l'Étoile. Grand monuments meet the eye in every part of Paris, and, unlike ours, are effectively placed, and appear to be purposely designed to occupy the positions in which they are seen, frequently amidst trees and flowers. Our monuments, on the contrary, are generally designed before any position is allotted to them.

In our vast metropolis—laid out for the most part to accommodate the high number of inhabitants by the great landowners, who parcel out the largest part of its area—there are fewer magnificent sites for monuments than in cities laid out by monarchs or powerful corporations. Most of the open places of London are enclosed squares and gardens closed to the public, each of which in Paris would be laid out with palms, plantains and flowers, and seats around some central fountain or artistic monument. At some not far distant time the happiness of the many may be regarded as more worthy and pleasing than the solitudes of which so few make use. Meanwhile, several fine sites for monuments are available. A new and splendid façade to the National Gallery, with loggias and statues, and Trafalgar Square remodeled as a broad approach to it, could commemorate the federation of the Empire. Parliament Square, with its majestic surroundings, would also provide a matchless site for a noble commemorative monument. There are other less important sites, though it is unfortunate that the few commanding spaces at the intersections of main thoroughfares, created by our municipal councils, fit for the reception of beautiful objects, have been seized upon by the sanitary department for underground conveniences which a refined taste would have gladly relegated to equally accessible but less prominent situations.

It must be quite obvious that monuments that "tell" in London are not the ordinary portrait statues in garments which do not lend themselves to artistic treatment, and on which so many thousands of pounds have been expended without adding one touch of beauty to the town. Monuments to be telling in London must either comprise more than a single figure, or be of larger size than the heroic size sanctioned by tradition, or, best of all, be equestrian. A rider on his steed assumes a dignity of pose embodying mastery of an animal many times more powerful than himself, which is most gratifying to humanity. Monuments might assume grander proportions were kindred spirits to be commemorated, associated in groups, or as parts of a whole. Britannia and some of her statesmen might symbolize the union of the British Isles; Neptune, with seamen and navigators, our vast maritime power; Victory and warriors a victorious reign. Allegories of Commerce, Science, Peace, Prosperity, Wealth, Fortitude, Charity, Justice, Mercy, Truth, are all capable of artistic treatment, and would elevate the thoughts of the gazer and passer-by, which I take to be the chief reason for setting up monuments, which are not erected merely for pomp and vainglory. Such might take the form of groups, or combine with columns, triumphal arches, fountains, or bridges—which will perhaps provide the most important sites we are likely to acquire in the near future under existing régimes. Mediæval bridges with their defensive gates, chapels and figures of guardian saints were picturesque objects. In the cases of Blackfriars and Westminster, we have realized the difficulty of decorating bridges not designed for the purpose of receiving statuary; while visitors to the Paris Exhibition realized, on the other hand, the surprising possibilities afforded by bridges when designed to be commemorative. Instead of the commonplace pannier-like widening of London Bridge, it might have been converted into a glorious monument to the British Navy; while the new bridge at Vauxhall might have been fitly made to commemorate the services of the Household Brigade in Egypt and South Africa; the purely utilitarian expenses being defrayed as heretofore, and the monumental features by subscription.

I fear I have trespassed on your time by this discursive preface. But the loss, all too recent, of a beloved and one of the greatest monarchs of our history, and the losses incidental to the far-reaching struggle in South Africa, have turned the thoughts of all towards the subject of memorials. The spirit of Empire, too, seems in the air, beginning to stir the pulse of the nation, and perhaps ideas now sown may, like grains of mustard, produce large results in the future.

I shall now proceed to exhibit a very few examples of monuments of the past, limiting them to those of bronze, which, in our climate, is the only material suitable for sculpture exposed to the elements. In the short time at our disposal these must obviously be limited to one or two minor groups. Objections and difficulties notwithstanding, it is unlikely that committees who manage these things will set aside the full-length portrait statue. We have no recognized embodiments of the powers of nature, like the Greeks had, Zeus, Athena, or Apollo, to represent and idealize, neither do we commemorate victorious athletes in the nude, nor is the general attitude of the populace encouraging as yet. In ancient times it was one of eager expectancy, and general acclaim rewarded the sculptor when one of his triumphs was set up. This was so in the halcyon days of Greece, Rome, Italy, and it is still seen, to some extent, in France, as we saw at Bordeaux a few days since, when the unveiling of the Gambetta monument amounted to a national fête. Even Germany and other countries contrast favorably with the utter apathy of the English, who seem collectively to have lost touch with everything truly artistic. Added to this is the difficulty of modern costume, which proves an almost insurmountable and always distressing problem to the modern sculptor. If those he habitually commemorated were champion swimmers, oarsmen, football, or tennis men, the matter would be otherwise; but, unhappily for art, those deserving of statues are great statesmen, like Joseph Chamberlain, scientists, benefactors, and so on, and the costume in which we know them best, the tall hat and eyeglass, the immaculate frock-coat and well-stretched trousers, the starched waistcoat and stiff collar, must make artists despair, however well-knit and alert the original may actually be. Only the few can be portrayed in majestic draperies, like kings and German emperors.

With animals, the sculptor is on safe ground; they present their natural grace and beauty unspoiled by art. The most venerable bronze in existence, still resisting the ravages, not of centuries, but of millenniums, and yet retaining its ancient position in the hippodrome at Constantinople, where it was set up as a trophy when Christianity was in infancy, is the ancient Pythian tripod from the temple of Delphi. It is formed of intertwining snakes, now headless, and the monument is now sunk in a deep pit, a witness to the change in the level of the ground brought about during the centuries it has stood erect at Constantinople.

Once in near association with this, and no less venerable, are the four bronze horses[1] of St. Mark's, removed from the hippodrome by Doge Dandolo in 1204. They originated in Greece, probably in the fifth century B. C., and after adorning several triumphal arches in Rome, were transferred by Constantine to his new capital, whence they found their way to their present position over the porch of St. Mark's Cathedral in Venice. They formed part of a quadriga, and were formerly gilt, and are said to be of pure copper cast extremely thin, hardly one-sixth of an inch in thickness, and are thus triumphs of the founder's skill, unless they are hammered work. The head and neck were cast separately, the junction being hidden by the collar. Parts of the horses, being ungilt, show where the trappings formerly existed, and there are holes for its attachment. Their frequent removals have caused injuries to the lower parts of the legs, and some of the gilt trappings and ornaments disappeared after the French had taken them to Paris and been compelled to restore them. The bodies are round, the necks short and muscular, and the heads superb. A bronze horse of the same date, but mutilated, is in the Conservatorio at Rome. The Marcus Aurelius[2] is also of venerable antiquity, and by far the most ancient bronze equestrian portrait statue in existence. It stands in the Piazza del Campidoglio at Rome, and was placed on its present pedestal by Michael Angelo in 1538. The figure is that of Marcus Aurelius, bareheaded and in simple drapery, seated in an easy attitude upon a saddle-cloth or saddle of singular construction.

[1] See The American Architect for Aug. 11, 1888.
[2] See The American Architect for July 28, 1888.

There is a long interval between this and the next equestrian statue, which is said to be of iron, and not bronze. This is the St. George and Dragon[1] in the Cathedral square at Prague, made by Martin and George Clussenbach in 1373, and shows armor partly scaled and partly of plate. It was partially restored in 1562. There is a cast of it in the Victoria and Albert Museum.

There is mention of a cast of an equestrian statue of St. George being in England in the time of Richard II.

Equestrian statues were produced in Italy during the Rènaissance, the earliest being that of Gattamelata,[2] by Donatello, in the Piazza in front of the great church at Padua. This celebrated commander of the Venetian Army in 1438 is in the armor of the period, truncheon in hand. He is bareheaded, with curly hair and a slight beard. An enormous cross-hilted sword is slung at his side, and he wears the long-roweled spurs of the fifteenth century. The horse is short-necked, and extremely powerful, the tail being twisted into a knot.

An even finer statue is that of Bartolomeo Colleoni,[3] another Captain-General of the Venetian forces, who died in 1475, and was one of the first to use field cannon in war. He is sheathed in richly decorated armor, and wears the Venetian salade and short-roweled spurs. The horse, like that by Donatello, resembles those of St. Mark's, but with more vigorous action. The saddle is high, back and front, and richly decorated like the harness; the feet are in stirrups. The statue stands in front of the church of SS. Giovanni e Paolo, in Venice. It was modeled by Andrea Verrocchio, who, however, died in 1488, leaving it to be cast by Alessandro Leopardi, who completed it in 1496. This is probably the finest equestrian statue in existence, the pose is superb, and horse and rider present an irresistible force.

Passing over the French equestrian portrait statues, most of which were destroyed in the Revolution, we come to those of our own country. The only one still remaining of the seventeenth century is that of Charles I.[4] at Charing Cross, by Hubert le Soeur, a French pupil of John of Bologna. It was cast in London in 1633, at the expense of the Howard family, and saved from destruction during the Rebellion by John Rich, a brasier, who presented it to Charles II., in whose reign it was re-erected in 1674. This graceful and commanding bronze statue has been erroneously described as of lead. The same artist commemorated James I. by a bust over the principal entrance to the Banqueting House, and both James I. and Charles I. by statues now on each side of the choir at Winchester Cathedral. An equestrian portrait of Charles II. was set up in the Stocks' Market by Sir Robert Vyner in 1672, which had a similar fate to the George II., of lead, brought from Canons, the seat of the Chandos family, and set up in Leicester Square in 1754. The statue of George III.[5] in Cockspur Street was not erected until 1837, and is by Matthew Wyatt, and the George IV.[6] in Trafalgar Square was not completed till after the artist's (Sir Francis Chantrey) death in 1843. It would be easy to produce faithful representations of at least Elizabeth, Cromwell, William III., and Marlborough, and who would all form splendid subjects for commemoration in this manner.

Statuary was formerly rendered realistic by coloring, and the material chosen mainly for texture, more than one material being used for producing a single figure. Ivory for the flesh and golden drapery was most favored, but Parian, Naxian, and Pentelic marble, probably left white for the flesh, with colored hair, eyes, etc., and drapery, were most often used for female figures. Sometimes the head and limbs only would be marble and the rest of porous stone filled in with stucco and strongly colored. There can be little doubt as to bronze having been chosen to represent athletes and demigods from its color resembling the sunburnt bodies of these, and probably the original color was carefully maintained. Otherwise the pallor of death given to Jocasta by alloying with silver, and the red blush of shame to Athamas, by iron, as Pliny says, would have disappeared under the ordinary patina, ever under Grecian skies, after a few days' exposure. We are accustomed to admire bronze for its patina, and to take pleasure in the varying shades of rich browns and greens it assumes everywhere away from our fuliginous cities, and cannot understand the obvious admiration of the ancients for the natural golden glint of the well-scoured metal, often replaced by actual gilding. But then we are equally unable to realize their love for polychromatic statuary, the idea of painting or staining marble being repugnant to us. We even dislike, or are slow to replace, the gorgeous blue, scarlet and gold decoration of the carved stone interiors of our Perpendicular churches and screens.

Admitting that art bronzes are to be patinated, the question of the best means of controlling and producing the tones becomes of interest. The Japanese excel in this. Our own empiric methods range from inhumation in a dung-heap, to suspension up a smoky chimney—preferably where wood or peat fires are burned, besides acids and alkalis and trade solutions, the components of which are secrets. The exhaustive researches on the cooling of bronze alloys carried on within the past few years shows that the metals remain separate and crystalline, but present structures as diverse as those of the porphyries, gneisses, and granites, according to the rate at which they are cooled. The tones of the more delicate natural patinas would be considerably affected by the internal structure of the alloy. The chemicals useful for the purpose will be found chiefly among the muriates, ammoniates, and sulphides.

(*To be continued.*)

[1] See The American Architect for Dec. 26, 1891.
[2] See The American Architect for June 8, 1889.
[3] See The American Architect for June 8, 1889.
[4] See The American Architect for Oct. 4, 1890.
[5] See The American Architect for Nov. 22, 1890.
[6] See The American Architect for Nov. 22, 1890.

ESSENTIALS OF SCHOOL SANITATION.

THE terms "school hygiene" and "school sanitation" are not synonymous. School hygiene deals with every aspect of school life which may affect the health of school children; it includes the periods of study, the care of the eyes of the pupils, the posture of children in school, the curricula of studies, methods of teaching, school discipline, medical inspection and school diseases. School sanitation deals with the building only, with its location, plan and construction, its safety from fire, its sanitary features and mechanical equipment.

Whatever pertains to dwelling-house sanitation is applicable to school sanitation, but in the latter case the object to be attained is to provide for children whose bodies are in a process of growth and development and for this reason are much more susceptible to outside influences affecting health. Defects in the construction, sanitation or equipment of school-houses may injure children for a long time, in some cases even for life. This has been recognized in recent years and the value of sanitary school buildings for the bodily and mental improvement of children is nowadays fully appreciated. The largest city school-houses, designed for from 1,000 to 3,000 children, present difficult and important hygienic and mechanical problems.

Location and Site. The choice of a site is particularly important. All possible disadvantages should *a priori* be discussed and anticipated. The site for a school-house should be elevated and reasonably level, but with sufficient slope in one or more directions to faciliate good drainage. It should be open, airy and dry. The lot should be of sufficient size to accommodate a building of the required size, to allow it to stand back from the street in order to secure better lighting of the class rooms, and to include plenty of space for outside playgrounds. The standard size usually adopted is thirty square feet for each pupil.

Soil. The soil should be porous, either sand or gravel; it should be well under-drained and free from organic matter. Filled-in lots or swampy lands are out of the question. Healthfulness is of so much importance that ordinary real estate considerations should under no circumstances govern the choice of a site and School Boards would do well to seek in each case the expert advice of a practical sanitarian.

Surroundings. The examination of a site should always include an inspection of the surroundings. Noisy places and noxious manufactures should be avoided. A school building should stand in a central location but away from noise, dust, soot, smoke or polluted air. The principal thoroughfares, industrial establishments, stables, hotels, military barracks, fire-engine houses, railroad-depots and freight-yards should be avoided. High buildings in cities rob their lower neighbors of much necessary light, therefore schools should not be placed near them; noisy pavements, filthy neighborhoods and open yards draining to the school grounds are not desirable. A proper choice of site is readily made in the country or in the smaller towns, but in large cities it is very much restricted, and sanitary requirements are in many cases satisfied with difficulty. For country schools proper water-supply and drainage form important considerations in determining upon the location.

Aspect. The school building should be so placed as to secure some sunlight for all class-rooms. Sunless rooms are apt to be damp and cheerless. A western aspect is not considered desirable and is admissible only in schools where no teaching is done in the afternoon. A northerly aspect avoids the glaring sunlight during school hours, and while it is in winter cold and bleak, it is excellent for the lighting of the rooms ,and particularly desirable for drawing-rooms. An easterly, southerly, or southeasterly exposure is usually the best.

Trees. Trees should not be planted too near to the building; but at a distance they are advantageous because they afford shelter from the sun on the playgrounds. In cities, school grounds are generally small and do not permit of the planting of trees, but suburban and country schools should have their grounds carefully laid out with grass-plots, flower-beds and shade-trees.

Playgrounds. These should be placed on the sunny side of the building, and should be dry and sheltered from the winds. The yards should be well drained and the walks cemented, while the rest of the grounds should be filled with soft gravel or cinders. City schools may have their play grounds arranged on the roofs of the buildings.

THE SCHOOL BUILDING.

Exterior. The exteriors of buildings devoted to educational purposes should be dignified but plain, all meaningless ornamentation should be left out, yet the outside should express the character of the building. Available money should be spent on the inside finish and for the grounds rather than upon the exterior.

Interior. The general requirements for the interior of a school building are: adequate floor-space, good construction, suitable equipment, chaste, appropriate, and inexpensive decoration, and perfect sanitation, ventilation, heating, lighting and cleanliness.

School-houses should always be built of the most durable materials and of thorough and substantial workmanship. There is such wear and tear in this class of buildings, that good construction will in the end prove economical. Security against fire should be one of the chief considerations, both in the planning and in construction. The danger of fire or panic, ever present where there are so many children congregated, must be suitably guarded against. City school-houses should be built of brick and other fire-resisting materials, while isolated one or two-story country schools may be built of frame construction made slow-burning.

The school-house should always have a high basement in which should be located the boiler and coal room, the play-rooms, lavatories, toilet-rooms and school baths. The floor of the basement should be free from dampness and made waterproof by asphalting.

Walls of class-rooms should have the lower part finished in hard plaster. Inside walls of corridors, toilet-rooms, cloak-rooms, etc., may be finished with enameled brick or tile. It is important that all cornices should be well rounded and that there should be no mouldings or ledges to catch the dust.

The ceilings and floors should be strong, fireproof and sound-proof. The floors should be either painted or well oiled. Wooden floors for basement rooms should be laid on sleepers bedded in cement.

Entrances. These should have covers or large protected vestibules for those children who arrive before the opening of the school-house. Exposed entrance steps should be avoided as they become dangerous when covered with ice. The entrance doors should be large and open outward.

Stairs. The stairs should be fireproof, strong and safe, and be well lighted. Stairs enclosed by fire-walls are safer than open-well stairs. There should be no winding steps and a long flight of stairs should be interrupted by landings. The stairs should be provided with rails on both sides and very wide stairs should also have a center rail. In large buildings there should be at least two staircases.

Corridors. The corridors should not be too narrow, particularly if the wardrobes are located in them. A desirable width is from 10 to 12 feet. The floors should be of wood, covered with linoleum, or else the floors should be tiled. All corridors should be properly heated and well lighted. Where the class-rooms are placed on both sides of the corridor, there should be windows at each end of the hall.

The corridors, stairs, exit doors and exits should be planned so ample as to permit of the entire emptying of the school in from 3 to 4 minutes.

Planning and Disposition of Rooms. In general, a symmetrical plan will be the best and there should be a corridor running the length of the building with the class-rooms located at one or both sides of the same. There should be at least two independent ways of exit, and these should be placed not near the center, but near the ends of the corridors.

Number of Floors. This depends upon the number of pupils and class-rooms. Buildings of more than three stories are not recommended, for stair climbing is injurious, and many floors increase the danger to life in case of panic or fire. In suburban and country schools it is best to limit the number of floors to two or three, in which case the important class-rooms are located in the lower stories, whereas the top floor is used for the assembly-hall, gymnasium, or for classes in manual or physical training.

There should be a well-constructed basement with windows half above the grade line. This can be made as sanitary as any other part of the building .

Fire Escapes. In buildings of more than two stories outside fire-stairs—not mere fire-ladders—should be provided in addition to the inside staircases; these should be properly designed and constructed, and should always be covered-in from the weather, so that they can be used by the children in times of danger.

Sewerage and Plumbing. The sewerage of the building should be perfect and proof against escape of sewer-air. In cities the school-house should be connected with the street sewer, and school buildings in the country, not within reach of a sewer, should be provided with safe and sanitary methods of disposal. All plumbing in the school should be the best obtainable, both in workmanship, and in the character of the materials, fixtures and fittings. Its general arrangement should follow the same rules of house drainage as are used for other classes of buildings. Special plumbing is required for the chemical and physical laboratories of the higher schools, and the lecture and demonstration tables, as well as the laboratory tables must be piped for gas, steam, water, compressed-air, and waste.

Wardrobes or Cloak Rooms. For the preservation of order, it is necessary to provide wardrobes or coat-rooms for the class-rooms. The best arrangement is to provide a separate cloak-room for each class. This may be placed in the class-room, or else in the corridor, or finally in separate closets adjoining the class-room, which latter forms the best method. It is not advisable to provide only one general large congregate wardrobe for the entire school, placed in the basement. The cloak-rooms should be lighted, warmed and well ventilated. Its walls should be finished with some non-absorbent material suitable for cleaning and disinfection.

Decoration. Appropriate, simple, but refined decorations should be used to adorn the class-rooms and the principal corridors. Framed pictures, photographs, colored prints or photogravures of objects relating to history, fine arts, the natural sciences or to landscapes should be hung on the walls. There should be some good topographical or physical wall-maps of the principal countries of the world, also a fair-sized globe. A few plaster casts of well-known sculptures, some vases or flower-pots, a book case with choice books of reference, histories and cyclopædias help to embellish the school interior.

Carpets, upholstered furniture, lace curtains, draperies and heavy portieres are entirely out of place in a school, and objectionable from a sanitary point of view, because they harbor and retain dust.

THE SCHOOL ROOM.

The school-room constitutes the unit in the planning of a school building much as the ward is the unit in every hospital plan. The *best shape* and *proper dimensions* of the school-room must first be determined, and knowing the number of class-rooms required, the size of the building can then be definitely fixed. The *size* necessarily depends upon a number of considerations, such as lighting, ventilation and heating, and also upon physical prerequisites of children and teachers.

Class-rooms should be oblong rather than square, and the latter shape is only permissible for a smaller number of scholars. To maintain proper discipline it is desirable to limit the size of class-rooms to from 40 to 48 pupils.

The length of a school-room is limited by the distance at which the teacher's voice can be clearly heard, also by the distance at which ordinary blackboard writing can be seen by the children, and this distance is usually taken to be from 28 to 32 feet. The width or depth of the room depends primarily upon the height of the window tops. If light comes from the left side only, German rules require that the depth should not exceed 2½ times the height of the window top above the plane of the desks. The limit of width is placed at from 20 to 28 feet. A good proportion between length and width of a room is as three to two. A certain

minimum height is necessary in the interest of good ventilation and good lighting, and this in the United States averages from 13 to 13½ feet.

Two other important considerations pertaining to the proper ventilation and the avoidance of overcrowding of class-rooms are the floor-space and the cubic space allotted to each pupil. A good minimum rule is to provide fifteen square feet of floor-space, and 200 cubic feet of air-space per pupil. With a room, 30 feet long, 25 feet wide, and 13 feet high, this would limit the number of pupils to from 48 to 50. The best United States school-houses provide 16 square feet floor, and 216 cubic feet air, space for each pupil.

The sanitary requirements of the *floors, walls* and *ceilings* of the class-room are that the floors should be free from dust, non-absorbent and good non-conductors of heat and sound. Hard-wood floors are the best, but they are expensive, and ordinarily pine or spruce floors are used, finished smoothly and stained or oiled. Walls should be of a light color in order to reflect light without causing any disagreeable glare. A light shade of blue, grey or green paint is recommended. The ceiling should be finished in a slightly lighter color than the walls. Plastered walls should be painted with oil-colors at least to a height of six feet.

All doors of class-rooms should be hung so as to swing outward, and transoms should be provided over the same.

The *windows* of class-rooms should reach as nearly as possible to the ceiling and should have square tops. The light should come principally from the left side of the pupils. It is best to provide windows on one side of a class-room, but some well-lighted school-rooms have windows on two sides at right angles. Windows on opposite sides of a room are always bad. A good rule is to provide at least 1½ square feet of window surface for each pupil, but some school hygienists require much more than this, namely from 300 to 350 square inches of window-glass for each pupil. A different rule frequently quoted is that the windows of a class-room should aggregate in area from ¼ to ⅙ of the floor-space of the room. Windows should be wide, with large panes and with glass of good quality. While some recommend spacing the windows close together with large piers at the end of the room, others prefer an even distribution with narrow piers. The window-sills should be placed from 3½ to 5 feet from the floor. The proper lighting of a class-room depends to a great extent upon the width of the street and the height of buildings opposite to it.

The question of the proper daylight illumination of school-rooms is one of great importance, but space forbids to go further into details. Wall-maps, drawings and charts should be so hung that they may be visible from every seat in the class. Children with defective vision should be given front seats. Reading and writing during twilight or on dark days is injurious to the eye-sight. All lessons which require much use of the eyes should be given during the lightest hours of the day.

Shades. Windows should be provided with curtains or shades to moderate the direct strong sunlight. Roller shades are best if arranged so as to roll both from the top down and from the bottom up. The color of the shades should not be too dark, and a cream or light buff color seems to be the most desirable.

Blackboards. These should have a perfectly black dull surface without any gloss whatever, and they must be located where a good light falls upon them.

Desks and Seats. The proper seating of the children is of prime importance. Numerous types of hygienic school desks and seats have been advocated. The ill effects of a bad posture are well-known, and many permanent injuries to children are the result. Single desks and seats are the best, but cannot always be provided for lack of space or lack of funds. All school desks should be so designed that they may be readily cleaned.

WM. PAUL GERHARD.

(To be continued.)

BOOKS AND PAPERS

Mr. G. A. T. Middleton, a prolific contributor to the British technical press and author of several volumes of merit, has just produced another book,[1] which is properly described as a "text-book for students." Further, in his preface, Mr. Middleton speaks of the "extreme difficulty which many students found in obtaining reliable and recent information" as one of the inciting causes that led to the preparation of the book. Again, he says: "Personally I have learned a great deal during the preparation of this book," a most enlightening statement, since, throughout, the book has rather the air of having been written that the author might feel sure that he himself understood his subject. This quite falls in with the common belief that there is no better way to make sure of understanding a subject than to seriously undertake to teach it to others either by word of mouth or through the agency of lecture or text-book. It is unfortunately the fact that many people do not discover that they are unable to teach their selected subject until after their text-book has been written and published—and not always then. This, however, is not the case with Mr. Middleton and his latest book.

The book does not undertake to describe the use and application of building materials, but confines itself distinctly to a discussion of the general properties of the chief building materials, stones, clays, metals, woods, cements and paints, and the methods by which they are prepared for marketable distribution to manufacturers and builders for working up for the job. It has, therefore, not overmuch value for the practising architect and builder who, generally speaking, may safely accept the guaranty of the dealer in gross supplies that the article supplied is of the desired quality and grade. For example, unless an architect intends to design his own wall-paper and oversee the printing, it is not particularly useful, although it is certainly interesting and instructive, to know how a printing-press for the purpose is arranged and manipulated.

Like all English text-books dealing with building materials, a large part of this volume is quite valueless to Americans, for the reason that it is devoted to minute descriptions of materials that are to be found only in the English market, and this applies not only to general products, as stone and timber, but to some special preparations in the way of cement and paints, which are accorded very generous treatment by the author.

The book is clearly written and printed, and illustrated in an admirable manner.

[1] *"Building Materials,"* their Nature, Properties and Manufacture. A text-book for students and others. By G. A. T. Middleton, A.R.I.B.A., author of *"Stresses and Thrusts," "The Drainage of Town and Country Houses," "Surveying and Surveying Instruments," "The Principles of Architectural Perspective,"* etc. Illustrated with 197 diagrams and 12 plates from photographs. London: B. T. Batsford, 94 High Holborn, 1905. New York: W. T. Comstock. Price, $4.00.

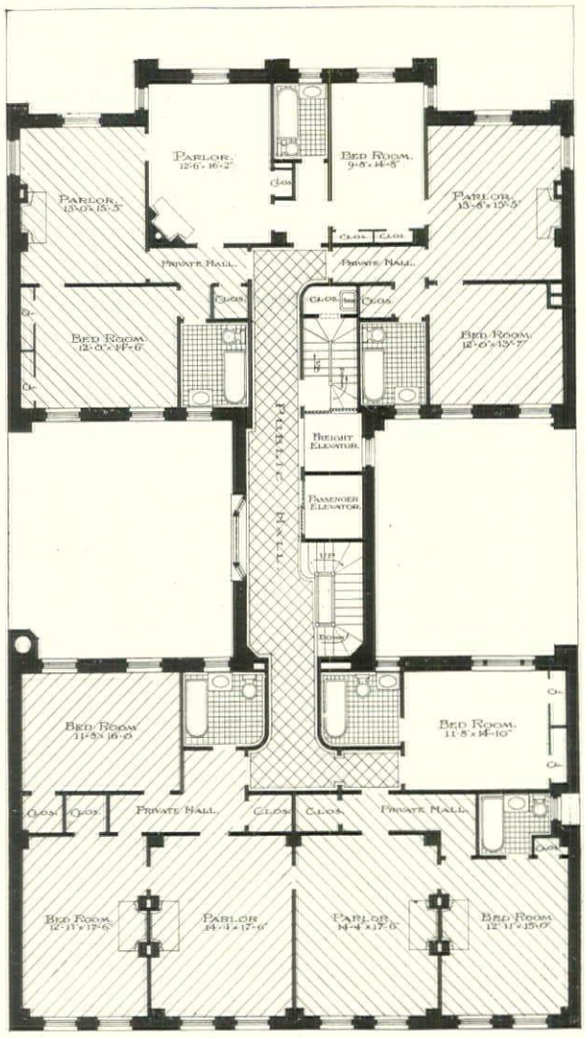
ILLUSTRATIONS

THE "TIMES" BUILDING, LONGACRE SQUARE, NEW YORK, N. Y. MR. C. L. W. EIDLITZ, ARCHITECT, NEW YORK, N. Y.

THERE is good reason to believe that the general outline of this building was suggested to the architect by the outline of the group of buildings which it replaces, the nine stories of the Pabst Hotel standing for the present tower with its twenty-five stories, while the group of four-story houses behind it took the place of the present main building with its sixteen stories. At any rate, the grouping, however suggested, has resulted very happily, as the general effect of the building is good, and it is only when the detail is considered that there is much cause for regretting that the *Times* Building is built with such care and attention to stress and strain that for very many years it is likely to stand as an expression of the architectural attainment of its epoch.

Above ground there is nothing in the way of planning and construction that might not, practically, be found in a number of buildings in the city, unless it is that in all the fittings and equipments the same thoroughness devoted to the construction has equally been bestowed upon all those features which count toward making a building comfortable for those who rent space in it. Below ground, however, besides the difficulties ordinarily met with in providing the deep foundation-work for a modern high building, one very unusual and perplexing condition had to be coped with, and had it not been that the excavation for the Subway was going on at the time when that for the building was under way, it might not have proved possible to find a practicable solution. The difficulty was due to the fact that at this spot the Subway passes, on a curve, under the northeastern portion of the building and above the level of the building's sub-basement floor, below which lies the story—stretching from curb-line to curb-line on all sides of the site—in which were to be installed the great printing-presses. It was, therefore, necessary not only to support the walls of the building on a series of piers carried down to bed-rock and so spaced as not to interfere with the tracks and running-space of the Subway, but these tracks, and the entire roadbed as well, had to be supported on steel piers which had, in their turn, to be carried down to bed-rock, passing through the lower basement story of the building

and so spaced as not to interfere with the location and operation of the presses. Moreover, the several structures had to be kept wholly independent of one another, so that the inevitable vibration due to the movement of heavy and rapidly-running trains might have no injurious affect on the building, or, in their turn, the vibration of the heavy presses prove prejudicial to the stability of the railroad structure and the street surface above it. Thanks to the happy synchronizing of the two operations, a successful solution was reached and the *Times* Building at this point is carried on seven piers about 43 feet high, while the north wall of the building rests on an unusually heavy plate-girder supported by two of these piers. This girder, which is some 60 feet long, weighs about 30 tons and sustains over 1,500 tons of masonry, is, however, not in the same class as the 82-ton box-girders, 70 feet long, used over the auditorium of the Colonial Theatre in Boston to carry the superjacent stories. The *Times* Building is in many respects an interesting and unusual building, the least impressive of its merits being that, for the moment, it is the highest structure in the city, as it measures 362 feet 7 inches from the curb to the top of the observatory upon the tower.



TYPICAL PLAN: APARTMENT HOTEL, 70 WEST 55TH STREET.

APARTMENT HOTEL, 70 WEST FIFTY-FIFTH STREET, NEW YORK, N. Y. MESSRS. ISRAELS & HARDER, ARCHITECTS, NEW YORK, N. Y.

DETAILS OF THE SAME.

LOWER STORIES OF THE SAME.

ENTRANCE TO THE SAME.

REAR VIEW: STAFFORD-LITTLE HALL, PRINCETON UNIVERSITY, PRINCETON, N. J. MESSRS. COPE & STEWARDSON, ARCHITECTS; PHILADELPHIA, PA.

A VIEW OVER THE CAMPUS: PRINCETON UNIVERSITY, PRINCETON, N. J.

THE BUTTES-CHAUMONT, PARIS, FRANCE.

These views give a good idea of the very unusual character of the park that, in the northeastern part of the city, has been brought into being from abandoned quarry workings for the benefit of the artisan classes that occupy that section of the city.

Additional Illustrations In the International Edition.

INTERIOR OF ALEXANDER HALL: PRINCETON UNIVERSITY, PRINCETON, N. J. MR. W. A. POTTER, ARCHITECT, NEW YORK, N. Y.

NOTES AND CLIPPINGS.

THE ROMAN STATUE OF VICTOR EMMANUEL.—The equestrian monument to Victor Emmanuel I. at Rome is to be paid for over again and made by somebody else. Chiaradia had received for it $46,000 when he died, and left the finishing of the work to Gallori, who has made the Garibaldi Monument on the Janiculum. The architect, Count Cacconi, has notified Gallori that he will not accept the figure. The heirs of Chiaradia are to get $34,000 more, and another sculptor, as yet unnamed, will be employed to make the equestrian figure for $80,000, the sum of $50,000 being allowed for casting and gilding the bronze.—*New York Times.*

ST. MICHAEL'S, HILDESHEIM.—The basilica of St. Michael, in Hildesheim, is one of the most interesting examples of German Romanesque. It is one of those selected by Fergusson as an example of the style. It was founded by Bishop Bernward, who is renowned as an architect, painter and metal-worker, and was consecrated in 1033. It consists of a nave, two aisles and double transepts. The ceiling is flat, and on it are paintings of prophets and saints which are supposed to date from the end of the twelfth century. Fergusson remarks on "the elegance, both in proportion and detail, of the pier arches which separate the nave from the aisles; the proportion of the pillars is excellent, their capitals rich and beautiful, and every third pillar being replaced by a pier gives a variety and apparent stability which is extremely pleasing." This noble church is now said to be in a dangerous condition. In order to obtain funds to insure its safety a society has been formed, and probably the money will be collected without delay. A building which has such a history should, however, be protected by the State.—*The Architect.*

THE TOMB RECENTLY DISCOVERED AT LUXOR.—Full details as to the tomb in the Valley of the Kings' Tombs at Luxor, discovered by Mr. Theodore M. Davis in February last, have now reached England. On Feb. 12 the workmen of Mr. Davis laid bare a pavement at the head of a flight of steps leading down to a buried tomb between the famous sepulchres of Rameses IV. and Rameses XII., and came at last upon a door, barricaded with heavy stones. The tomb was formally opened on the following day in the presence of the Duke of Connaught and his party, and a treasure laid bare which exceeds all that has previously been won from Egypt's past. The tomb itself is a chamber some 30 ft. by 15 ft., with a rock ceiling 8 ft. high. The sarcophagi, great wooden chests of conventional shape, were on the left of the entry, and within them the mummy cases, containing the remains of a man and a woman. These cases were double, and profusely lacquered with gold and silver. One of the mummies had a mask of gold; but there was drawn over it a veil of material similar to crape, which has not been encountered before in Egypt. The usual scarabs and toys had been buried with the corpses, and the copious inscriptions made it clear who the occupants of the tomb had been. They were Yua and Thua, the bourgeois parents of the famous Queen Teie, wife of Amenhotep III., of the Tenth Dynasty, and mother of the "heretic Pharaoh," Amenhotep IV. They had no rank entitling them to burial on the scale revealed by Mr. Davis' discovery; but Queen Teie, having failed to establish her parents as nobles in the face of the opposition of the aristocracy of Egypt, gave them a royal funeral at their death. There are inscriptions that bear out the theory of the Assyriologists that Queen Teie was of Mesopotamian descent, but nothing to indicate the family or parentage of her father and mother. Beyond the coffins, the chamber was crowded with relics of dead ages. Sealed jars of wine and oil, caskets of food, papyrus, leather sandals, wands of office, vases, a clothes chest, chairs, stools, toilet gear and wigs were scattered about, and among them stood a chariot.—*Building News.*

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CONTENTS

"ENGINEERING NEWS," we are rather surprised to note, expresses fear lest, at the rate at which certificated engineers are being turned out by the technical schools nowadays, the engineering profession shall become overcrowded beyond all relative proportion similar wails arise. The idea of any imminent real overwith other professions, from which every now and then crowding in the ranks of this particular profession, in view of the vast size, the magnitude of the undeveloped resources and the commercial needs of this country, with its thin sprinkling of inhabitants, which yet is thickening up so rapidly, seems at first sight wildly preposterous, and, if it were the object of our contemporary to excite merely a general and aimless alarm, it would give us much pleasure to attempt to show that it was grossly misled by its fears. But as its aim really is one which appeals to our ideas of far-sighted commonsense, we will not attempt to refute its line of argument but will rather commend it for the sake of the conclusion reached. This conclusion is that the technical schools will show wisdom and an enlightened humanity if one and all shall take steps to broaden their curricula, to the end that their graduates may find themselves reasonably well qualified to enter upon some other calling in case they do not find it possible to secure an opening in the ranks of the profession they have tried to fit themselves for. We are very far from believing that the evidence contained in the biographical notes of graduates often found in the catalogues of technical schools, showing that a considerable percentage of them have abandoned their calling and taken up other means of livelihood, is really to be taken as a proof that this change of front was enforced, and that the profession was too crowded. It must be remembered that technical schools are different from the medical and legal schools with which our contemporary compares them, since, whereas the majority of students in these latter schools are men grown and generally already graduates from colleges of various degrees of educational standing, the majority of the students of the technical schools enter them as mere school-boys, a large proportion of them pursuing their studies there not by their own choice and volition, but merely because their perplexed fathers, not knowing what else to do with their offspring, accidentally selected a technical rather than a liberal education for their offspring. It is not unreasonable then that, as soon as the appointed tasks have been accomplished, and the individual, now a man, finds himself free to make his own selection, he should decide that some other field than engineering is really the one that suits him best.

THE fact that seems to have disconcerted our contemporary is that the present rate of graduation adds to the ranks of the engineering profession annually from ten to twelve per cent. of the already practising members in the shape of new recruits, all pushing for place, work and an income, while to the ranks of the legal and medical professions, for a long time commonly believed to be at least well filled, is added only between three and four per cent. each year. *Engineering News* assumes that an increase of three per cent. is what the growth of population justifies, and that two per cent. more is needed to make good the mortuary loss, and that as the engineering increment is more than double this percentage, the sitution is not properly balanced, and those in charge of technical schools would do well to minimize the impending mischief by at least adding to their curricula certain courses on business law, estimating, cost-keeping and other commercial processes which are more or less available as a serviceable equipment in many walks of life.

HARD as it is for the young lawyer and doctor to "get a start," they are more fortunate than the young architect and engineer, since they have a chance to hold as patient or client through life the first customer that happens to come to them, while the architect's customers are almost always single-job men, and the engineer's very frequently so. Consequently, for the majority of the members of both of these professions, life is a series of ups and downs, a continuous search for a new customer, since the old one had but one job to give and will never have another. Similar as their lot is, yet in one respect the engineer has the better of it, since the engineer, or a very considerable percentage of the entire profession, can sooner or later find with some municipality, railroad, mine or corporation a life position at a living wage. For the architect, however, ninety-nine times out of the hundred there is no such opening. From the beginning he must look not for permanent clients, not for a permanent berth, but simply to so build up his reputation by individual and often widely scattered works that the sum of them may bring him one more job before he and his are forced to starve. The engineer who is not so lucky as to secure a permanent salaried position is in one respect even worse off: it is the nature of his work that it should serve groups of men rather than individuals, and obviously there can be fewer groups than there are individuals who compose them, and by so much, were it not for the boundless engineering opportunities of this undeveloped country, his lot would be the least reassuring of the two.

Entered at the Post Office at New York as second-class matter.

THE temptation, then, to both architect and engineer, to forget, under stress of circumstances, that they are members of professions, and as such bound to observe the ethics of professional procedure, and to yield to the pecuniary temptation to practise their calling as a trade and not as a profession, is possibly greater than many of their fellows imagine. But, even amongst those who follow their calling as a trade, we hope there are not many who are willing to forget that the world believes they are, as their sign-boards allege, members of a liberal profession, and prove themselves willing to employ methods that would shame a Bowery "puller-in," as witness the following letter which reaches us from an irritated architect whose amused client sends it to him:

Dear Sir:

I am told you will soon build, and it occurred to me that possibly you had not selected your architect, in which event I would be pleased to do your work on terms which I feel quite certain you will find reasonable for high-class work.

If you would care to place your order at this time I will do your work for 3½ per cent. on cost of building, and will guarantee that my commission will not exceed a certain sum, based on an estimated cost that we will agree upon beforehand.

For the nominal cost of 3½ per cent. on cost of your building it would pay you anyway to put "two heads" to work on this important building project of yours, even if you did not care to finally build from my plans. My ideas alone are worth 3½ per cent.

Your local architect's ideas may be only 70 per cent. to 80 per cent. right, may be only 60 per cent., but even if 90 per cent. right, which is a high average, you would still be 5½ per cent. ahead by ordering plans of this office at 3½ per cent., which I guarantee to be 100 per cent. right.

As a consulting architect I am often called upon for my nominal fee of 1 per cent. to completely revise and redraw plans. Owners can readily realize that 1 per cent. for an expert's services is nominal for reducing a 30 to 40 percentage of error, in bad plan arrangement, design and construction and general waste of material.

If for 1 per cent. I found your plans perfect, it would be worth this nominal sum to know that you are right. Yet this is seldom if ever the case. In each instance I have been obliged to completely redraw plans and rewrite the specifications. If I can not convince you of a considerable saving by such service, there will be no charge whatever.

Awaiting your valued commands, I remain,

Yours very truly, ————.

QUITE recently the Royal Institute of British Architects has been discussing certain proposed amendments to its by-laws and formulated regulations, and in the latter category was a proposition that the Institute should declare that the proper minimum fee for an "assessor" in a competition should be held to be "thirty guineas, plus one-half of one per cent. of the estimated cost of the projected building." As the custom of employing an assessor—expert adviser we call the official in this country—is on the increase in this country as well as in England, an authoritative expression of opinion as to what fee he deserves is much to be desired. Another thing to be desired is a clear understanding as to what an assessor's or expert's powers and functions really are, and it is most desirable that architects themselves should have a clearer conception of them, as they are very generally misunderstood by the competitors themselves. It is because of this misunderstanding that expert advisers have so often been favored with public or private verbal castigations at the hands of competitors who have felt that the experts had showed a lamentable lack of backbone and inflexibility of purpose and opinion. The fact is, simply, that, except by special and precise agreement, the expert adviser never is the very thing that competitors almost always believe him to be, that is an "arbiter" empowered to make an "award" from which there is no appeal. In reality the expert adviser's proper function is precisely that of the judge on the bench in a jury trial; he is there to expound the laws of procedure and practice to the jury and see that they have a clear understanding of the case before them; he rules out testimony that is inadmissable, and when the evidence is imperfectly presented, by a timely question to the witness he clears up a befogged situation. Then, when the evidence is all in, he charges the jury—the building-committee, that is—presents both sides of the case fairly, and expresses an opinion as to the merits of the case, leaning more or less pronouncedly to one side or the other. But he does not formulate the verdict, and he cannot set aside the one that the jury or building-committee actually does formulate. The powers and the rights are theirs, not his.

SINCE it is the function of the expert adviser to hold the scales of justice, it ought to be made sure that he does not lay them down too soon; but the history to competition, clearly shows that this need is often lost sight of, and the expert disappears from the scene as soon as he has rendered his report. It is not altogether unusual in the case of limited competitions, when the competitors are within reach, for the building-committee to allow or even to invite the competitors to come before them, one after another, and make verbal explanations of the merits and peculiarities of their designs in elaboration of the formal descriptions submitted with their designs. This step is of doubtful fairness and propriety, and whenever it is taken, care should always be had that the expert adviser also should be present at every such audience. It is a too common incident of competitions, particularly important ones, that immediately on the announcement of the decision protests are received from one or more defeated competitors, impugning the verdict and demanding a hearing. Where such hearings are granted the attendance of the expert adviser should be compulsory. If, in the case of a recent limited but important competition, the adviser had been present at one of these hearings, he would have caused to be stricken from the records one of the most astounding charges ever made by one architect against another. One of the disappointed competitors allowed himself to say that, though he had known the winner for a score of years and had a high personal regard for him, he knew that he would always "overreach" anybody and everybody to attain his ends. To have made such a statement privately in the heat of *viva voce* argument would have been bad enough, but deliberately to read it from a written brief, and later to let it appear in printed pamphlet form after having read proof of the same, marks the incident as the very acme of blind folly, for no jury that ever sat in a box would fail to give the libelled victor whatever punitory damages he might have demanded. Fortunately the libellee—a man of such high standing in the profession that the charge against him would be laughed down by everyone who knew him and his career—took a generous view of the affair and contented himself with securing the publication of an apology and the public withdrawal of the insult. But the insult could not have appeared on the record, if the expert adviser had been present.

ESSENTIALS OF SCHOOL SANITATION.[1]—II.

HEATING and Ventilation. The system adopted for warming a school-house depends upon the number of rooms to be heated and upon considerations of convenience and economy. The local system of heating by means of stoves placed in the class-rooms is practically carried out only in the case of the smallest country school-houses having but few rooms. In such buildings the method is economical because the first cost of a few stoves is much less than the outlay required for a central plant. There are, however, a number of drawbacks, such as the attendance required by the fires, the trouble connected with bringing in the fuel and the incidental disturbance of the lessons, the space required by the stoves, the dirt incident to the carrying out of ashes, and the difficulty of introducing pure outdoor air.

Heating by gas-stoves has been tried to a considerable extent, particularly in Germany; it is cleanly and convenient and has few of the disadvantages of solid-fuel stoves, but it necessrily costs from 40 to 50 per cent more in fuel than heating by wood or coal.

In large school buildings a central heating system is always preferred, because there is only one fire or boiler to be attended to, and also because the concentration of the heating-apparatus means less danger from fire. For buildings having from four to eight rooms warm-air furnaces are usually installed. This is a cheap system which can be made sanitary if a proper air-supply and properly located cold-air box are provided, and if attention is given to the degree of humidity in the air. The furnace should be large enough not to overheat the air and thus render it dry and unbreathable. In the better systems special mixing-dampers are provided so that the air can be tempered at will from the class-rooms in case of mild weather without cutting off the fresh-air supply entirely. Warm air will not travel horizontally for long distances, and during windy weather an unequal distribution of heat results, hence for large buildings warm-air heating is superseded by steam heating.

Where a school-house contains more than eight rooms a steam-heating apparatus is preferred. The heating is accomplished by low-pressure steam and preferably by indirect radiation. The heating stacks are placed at the bottom of the warm-air flues in the cellar, and fresh air conduits are provided with branches to the stacks, drawing their air-supply from an uncontaminated outdoor source. The admission of steam to the heating stacks is controlled automatically by thermostats in the more elaborate systems. Such indirect low-pressure steam-heating systems, if well designed, have proved very satisfactory. Indirect hot-water heating is a very excellent system, but it costs more to instal than steam-heating and is not used to the same extent, though it has some advantages over steam heat.

The heating-apparatus for a large school should always be designed by an expert engineer, and the steam-boiler plant should be managed by a trained engineer assisted by experienced firemen.

Ventilation of the class-rooms is a sanitary problem of prime importance. Being so closely connected with heating, it is usually carried out by heating engineers. Ventilation is accomplished either by natural or by artificial methods. Whether a special ventilating system is provided or not, it is always desirable that each room should be flushed both summer and winter with pure air just before the school commences and also during recess. During the recitations and lectures, windows must be kept closed to exclude the street noise and to prevent dangerous draughts on the pupils.

During school hours the air of each class-room should be changed several times per hour. In this respect the requirements of sanitation often conflict with economy in construction, and in management of the heating-apparatus. The air supply required is considerable, amounting to 2,000 cubic feet per pupil per hour; the Massachusetts law requires an hourly supply of 1,800 cubic feet. This large volume of air must be taken from a pure source out-of-doors and never from the cellar. It must be suitably warmed in winter and must be distributed uniformly throughout the class-rooms without causing perceptible draughts.

It is important, to secure efficient ventilation, that all sources of air contamination within the class-rooms should be either avoided or removed. Without this measure of precaution the best ventilating system will be a failure. This constitutes one reason for placing the pupils' wardrobes outside of the class-rooms. In speaking, farther on, of school baths, I shall have occasion to point out that unclean bodies and unwashed undergarments are recognized sources of bad air, and that nothing will help more to secure ventilation than the opportunity given the children to bathe.

The removal of the foul air from class-rooms is accomplished either by natural forces, such as the difference of temperature between that of the exhaust flues and that of the outer atmosphere, or else by means of mechanical appliances, such as exhaust fans, etc. Ventilation by mechanical means is quite expensive, though it doubtless insures the best results, but in the majority of school houses a quite satisfactory ventilation is accomplished by means of ventilating flues artificially heated to insure a constant outward draught.

The thorough ventilation of the large toilet-rooms is of particular importance. Here the exhaust draught should be sufficiently strong to insure that the air from the water-closet and urinal fixtures will at no time pass into other parts of the building.

Where class-rooms are heated by a central heating-apparatus, provision should be made for adding a certain percentage of moisture to the air before it is conducted into the rooms. Where a thermostatic system of temperature control is not provided for, it is necessary that each school room should have a reliable thermometer. This should be arranged so as to be read from the corridor as well as from the class-room, so that the janitor will not disturb the classes in making his temperature observations.

Lighting. It is not possible in schools to get along entirely without artificial light, for it may be required not only in winter time, but also on dark, cloudy or foggy days and other seasons. Hence all city school buildings must be piped for gas and wired for electric lighting.

Among the chief requirements for artificial illumination are the following: each desk or table should have ample light; there should not be any injurious or disturbing shadows; the light should not flicker; it should not be blinding to the eyes; it should not give off too much heat and it should not perceptibly vitiate the air of the room.

The best artificial light is the electric light, and in particular the indirect, reflected incandescent light. The incandescent light does not give off injurious products of combustion as is the case with gas, oil-lamps or candles. It may be shaded by opaque or frosted globes in order not to be too trying to the eyes. It is much safer as regards danger from fire than any of the open-flame lights.

Where gas must be burnt it is advisable to use the ordinary flat flame burners only in the halls and stairways. For the class-rooms the round burners with chimneys and globes are better, but preferable to these are the now well known incandescent gas-lights, such as the Welsbach and others, which give a better light, give off less heat and save gas. It is found to be advantageous to surround these with suitable glass globes, such as the well known and scientifically constructed Holophane gas globes.

Lighting by means of oil-lamps or by candles is out of the question for a modern school-house, and can be considered only in the case of the smaller rural schools, or for emergency lighting when the electric current or the gas-supply is temporarily cut off.

Fire Protection. Outbreaks of fires in schools are a frequent occurrence. It is therefore quite important that in the construction of the building no point should be overlooked which would tend to increase the safety of the structure. Provision should likewise be made in the school equipment for some good fire-fighting apparatus, and the janitor should be held responsible for maintaining the same in working order. At frequent intervals the school principal should make an inspection of the appliances to satisfy himself that they are really kept in readiness.

There should be fire standpipes with fire valves and hose in the corridors of every floor, including the basement. In addition the equipment should include some portable fire-extinguishers and fire-pails. The school house should be provided with a fire-alarm gong and with telephonic communication between the principal's office and the nearest fire-engine station. There should also be telephonic communication between the principal's office and the janitor's workroom.

The teachers should instruct all children how to behave in case of a fire-alarm, and fire-drills should be instituted by the principal at frequent intervals. This matter of fire-drills is one to which too much importance cannot be attached, for numerous outbreaks of fire in schools have sufficiently demonstrated their usefulness and value in saving life, and in many actual occurrences the safe escape of the children from the building could not have been accomplished if they had not been regularly drilled.

Above all, it is imperative to provide plenty of safe exits,

[1]Continued from page 179, No. 1536.

doors which open outward, and at least two independent well-lighted stairs with strong balusters and with center rail, where the width of the stairs exceeds four feet.

Sanitary Conveniences. The question of the best location of the toilet-rooms or "sanitaries" for the pupils is one of great importance. Shall the toilet-rooms be located *within* or *outside* of the school-house? If located inside of the building, shall the toilet-rooms of a large school be placed in the basement, or shall there be one or several toilet-rooms on each of the principal floors?

Some authorities on school sanitation assert that the toilet-rooms for the children should never be placed in the basement and argue in favor of a detached pavilion, connected with the main building by a covered passageway. While, doubtless, this recommendation is made with the best intention from a sanitary point of view, the writer cannot agree with the proposition. There are several objections to outside toilet-pavilions. They are difficult to heat in winter, and the ventilation of the apartments as well as the soil-pipe ventilation through the roofs of such one-story structures is much more difficult to accomplish. Given a good and dry basement, with proper facilities for water-supply and sewerage, the writer cannot find any valid objection to the placing of the toilet-rooms directly in the basement of the school. The only condition is that there must be a good and positive ventilation of the apartments where the water-closets and urinal fixtures are placed. Where the toilet-rooms are so located it is absolutely essential that the plumbing should be sanitary and safe, but this in the present state of the art of draining buildings can be attained without question. One more condition attaches to the use of the basement for toilet-rooms, namely that the water-closet fixtures should be single or individual closet bowls, either short hoppers, pedestal wash-down closets or siphon-jet closets, with the best of flushing arrangements. The so-called "range closets" or latrines should never be used in the basement of a school. To consider such latrines superior to individual closets, as I find asserted by some authorities on school-house sanitation is, in my judgment, a grave mistake. In the same way I maintain that the use of dry earth or "dry" closets, which is rendered necessary where there is no sewer available or else no system of water-supply, should be restricted to outside pavilions.

In the largest school-houses the best and most desirable plan is to provide on each floor toilet-room conveniences, located in separate well-ventilated wings or towers. This means much saving of time otherwise unnecessarily wasted by the pupils in going to the basement. Ease of access and complete isolation are the two principal requirements regarding the location.

In all school-houses there should be on each floor at least one toilet-room for teachers' use. Sometimes this is placed within the large pupils' toilet-room with the advantage that the apartment is kept under better and more constant control of the teachers.

What number of seats should be provided for boys and girls? It is usual to have one water-closet for 25 boys and one seat for 15 girls. The water-closet apparatus should be durable and strong in construction, and simple and positive in action, for such appliances are liable to unintelligent use or even abuse. The flush is sometimes arranged to work automatically, but this always involves a large waste of water, and it is much better to provide individual-pull flushing devices. For the accommodation of the younger children it is quite common now to install closets with lower bowls and seats.

The floors of toilet-rooms should always be made water-proof and provided with one or more floor drains to permit the washing of the floor by means of a hose. Small unglazed white tiles make an excellent floor. The walls should be either tiled, or built with enamel face-brick, or be of common brick, enamel painted. The toilet partitions should not be of wood, but of either soapstone, slate or opaque glass. On the boys' side doors may be omitted to the stalls, but on the girls' side there should be light screen-doors hung with reverse hinges, and cut off about ten inches above the floor.

In an outside water-closet pavilion the water-closets may be enameled iron or solid porcelain combination ranges with automatic flush. These fixtures are somewhat cheaper than individual water-closet bowls. Some of these are good, while a great many are bad, and all are very wasteful of water. To go to the opposite extreme of having the fixtures flushed out at rare intervals by the janitor would be an unwise proceeding. All trough closets with continuous bowl and intermittent-flush cause more or less pollution of the air of the apartment, and for this reason those trough closets appear to be much preferable which have separate bowls attached to a common bottom conduit. If dry closets are used in outside pavilions the arrangements for drying the excreta and the ventilation of the closets should under no circumstances be in any way connected with that of the class-rooms. This is mentioned, although it may appear self-understood, owing to the fact that some years ago many Boards of Education allowed themselves to be misled by adopting a system of dry closets with the objectionable feature mentioned above.

Country schools sometimes have dry closets or privies which become very offensive in use, hence they should be frequently disinfected. Such common outhouses should never be located closer than 50 feet to the main building. They should be made inconspicuous, but should be connected with the school be a protected walk. Good lighting is essential for outdoor conveniences no less than for basement toilets.

Urinals. The sanitary equipment of schools includes the boys' urinals, which are important from a sanitary point of view, because they are difficult to maintain in a good sanitary condition. The number of stalls is determined by allowing one stall for 15 boys. The stalls should be constructed and arranged with the greatest attention to details. The width of each stall should be from 18 to 20 inches, and the depth of the stall partitions should be about 15 or 18 inches. Partitions are sometimes omitted, though this is not advisable; if provided they should not reach down to the floor.

All materials which corrode, disintegrate or are absorbent are quite unfit for urinals. Wooden partitions and wooden slatted platforms should never be used. Marble as well as cement are absorbent and metals, with the one exception of white enameled iron, are objectionable. From a sanitary point preference should be given to slate, Alberene stone, hammered glass and solid glazed porcelain ware.

In my judgment the floor-gutter urinals are vastly better than trough urinals and also preferable in schools to the individual-bowl urinals. The entire back wall of the urinal stall should receive a thorough flushing by means of a perforated brass pipe supplied from an intermittent flushing-tank. The modern solid white porcelain niche urinals supplied with abundant flush are probably the best kinds to use, but they are somewhat expensive and for this reason slate or Alberene stone fixtures must often be adopted. The floor in front of the fixture should slope well back to the gutter. Special local ventilation arranged at the back of the urinal and connected with a special aspirating shaft is much to be recommended. It is likewise essential that these fixtures be cleaned daily after school hours by the janitor. In fact, he should take care of all fixtures and be responsible for maintaining them in a clean and decent condition. The use of disinfectants in the fixtures should not be encouraged, for where a good type of water-closet and urinal are used, and where a well-devised sewerage system is available, such disinfection is not ordinarily required.

Lavatories and Drinking Fountains. Drinking-water should be provided for the school children in ample quantity and, what is of much more importance, of good quality. For city schools the supply is usually taken from the public or street supply, but where there is any suspicion as to the character of the water, it should be filtered or boiled before use. For country schools a driven or tubular well should be provided, which is preferable to a dug shallow well. The water of the well should be analyzed periodically both as to its chemical properties and as to the number of bacteria in the water. Water-buckets provided with drinking-cups which are dipped into the bucket are an abomination. The common drinking-cup often constitutes the vehicle for transmitting disease, such as tonsilitis or diphtheria. Where running water is available, the modern hygienic fountain with flowing jet is much to be preferred.

In every school there should be provided some wash-basins or sinks placed adjoining to the toilet-rooms, but not in the same. The use of these encourages habits of cleanliness and decency in the children.

School Baths. The advantages of school baths are so apparent that the movement towards providing them, which originated in Germany not many years ago, soon spread to this country, and now in many of our large cities they form a very important addition to the sanitary school equipment.

Swimming-pools intended largely for physical exercise and health improvement are expensive to construct and maintain, and require preliminary cleansing baths in the form of showers to guard against the now recognized danger of transmission of disease. Common tub-baths have many well known objections and hence the only form which has merit for schools is the modern rain-bath. This form of bath is the cheapest in first cost and also

in maintenance; it is the one best adapted for schools because it requires very little room to fit up and uses only a limited quantity of water. Besides, it is without doubt the most sanitary form of bath.

School baths tend to educate children in bodily cleanliness and their favorable influence usually extends beyond the sphere of school life. One very important advantage derived from school baths is the much better ventilation secured in the class-rooms, because the once so prevalent so-called "school smell," arising from uncleanliness of body and clothing, is done away with. Children of public schools should be encouraged to take these baths, as experience shows that they interfere but little with the course of studies.

The construction and fitting up of the baths should be simple, but unusually strong and of well-wearing materials. The bath compartments may be arranged singly, or a room may be fitted up for the congregate bathing of a number of children. Where enclosures are used, partitions are constructed of slate, Alberene stone, marble or white opaque glass. The best form of douche is not the ring douche but the one which stands inclined under an angle so that the bather will not wet his head, except he places it purposely under the douche. The baths are usually located in the basement near the play or recreation rooms. This subject is discussed by the writer more in detail in a paper entitled "A Plea for Rain Baths in the Public Schools," presented at a meeting of the American Social Science Association, published in the *Journal of Social Science* for 1900.

Sewerage and Sewage Disposal. The quick removal of sewage from a school building and its subsequent disposal are of the greatest importance. In city schools, located on a sewered street, there is, as a rule, no difficulty in providing efficient sewerage, for unlike the modern tall office or hotel building, the school house need not have its cellar floor extend downward below the level of the sewer. There is hence no necessity of introducing complicated sewage pumping lifting machinery. The standard well-established rules on house drainage hold good for school plumbing and drainage and it does not seem necessary to go into the details.

For country schools the disposition of the sewage sometimes presents difficult problems. Two good general rules to follow are that common privy-vaults and leaching cesspools should be entirely prohibited, and that the use of any kind of cesspool should be avoided where possible. If no better system for the disposal of liquid wastes is available a water-tight cesspool built in two compartments and located in the farthest corner of the school lot may be adopted. In the case of smaller country school buildings it is advisable to restrict the inside plumbing work to a few wash-basins or sinks, and to provide outside detached pavilions with earth-closets. These should be closely watched in order to maintain them in a sanitary condition. Wherever plenty of grounds are available about the school-house the necessity of adopting the cesspool system rarely exists and better systems of sewage disposal are available. A purification system by surface disposal may often be successfully installed, but this should never be done at a distance less than 300 feet from a building. In other cases, sewage may be disposed of by the well-known "sub-surface irrigation" system. Finally, sewage may be purified and rendered innocuous by means of bacterial action, in septic tanks, in contact filter-beds, or preferably by a combination of the two systems. The use of these systems will render the sewage so well purified that the outflow from the filter-beds may be discharged into a ravine or into some available water-course without annoyance to sight or smell or without any appreciable contamination of the stream.

Maintenance of Cleanliness. The care of a school building is a matter of considerable sanitary importance. The class-rooms, the corridors, stairs and entrances and the toilet-rooms must be kept at all times scrupulously clean. This cleaning is generally entrusted to the school janitor, therefore the selection of an individual for the post of custodian of the school should be made with great care. Many so-called "janitors" lack the proper qualifications for their position, and be the school ever so well planned, constructed and equipped, its proper maintenance may suffer by reason of his incompetency. The work of the school janitor should always be directed by and be under the control of the school principal. The janitor should not be so burdened with duties that he cannot find sufficient time to attend to the cleaning of the school-house. In a large school the work of looking after the heating apparatus, the school baths, the toilet-rooms, the ventilating-plant and the general cleaning requires the time of more than one individual, and therefore sufficient help should be allowed to the janitor.

A school building requires daily cleaning and also a further, more extended periodical cleaning. The entrances, staircases, corridors and cloak-rooms receive a great amount of outside dirt brought in by the pupils and therefore they should be scrubbed and swept daily. The class-rooms likewise should receive a daily cleaning at the close of the school day. All windows in class-rooms should be opened for the airing of the rooms while the floors are swept. Dry sweeping and dusting is unsanitary and should never be permitted. Floors should be sprinkled with wet sawdust, or similar damp material, or swept with a wet broom or with rags or mops moistened in a disinfecting solution. The dusting of the school furniture, the desks and seats should be done with a damp dust-cloth. The toilet-rooms should be looked after and where their walls and floors are made of impervious and smooth materials, they should be washed each day with a hose.

The dust and dirt which accumulates in a school-house, and in particular in the class-rooms, may be the means of propagating contagious diseases. For this reason a periodical cleaning carried out more thoroughly is required in addition to the daily cleaning. At least once a week it is desirable to wash and clean the walls as well as the window-sills and the picture mouldings. The black boards also should receive attention and windows should be washed at least once a month and oftener if required.

During vacation time a much more thorough cleaning of the entire building should be arranged and it should comprise not only the cleaning and washing of walls and floors with hot water and soap, but also a disinfection of the premises. This disinfection should include the class-rooms and the warm-air flues of the heating apparatus, also the cold-air receiving chamber and the air-filtering room. The books and the pencils used in class-rooms should be disinfected at least four times a year by means of formaline disinfection, and the floors and baseboards, desks and seats should be also washed with a disinfecting solution. The wardrobes which accumulate considerable outside dirt should receive due attention. Some of this dirt may be prevented by providing near the entrances shoe-scrapers for the cleaning of the shoes. Teachers should always strictly enforce the rule that no spitting on the floors should be permitted.

Sanitary Inspections and Tests of Plumbing. The plumbing of a school, even when confined to the toilet-rooms, should be absolutely tight, and there should be at no time any escape of sewer-air. To make sure of this it is necessary that the building be tested and inspected periodically by disinterested professional advisers. The form of inspection and the tests applied do not vary from those used in the sanitary examination of other classes of buildings. It is well, however, to emphasize the fact that a sanitary inspection should include not only the plumbing and sewerage, but also the condition of cleanliness maintained in the class-rooms, cloak-rooms, basement and in the school yards.

WM. PAUL GERHARD.

THE MONUMENTAL TREATMENT OF BRONZE.[1]—II

THE time remaining at my disposal must be given up to a form of monument which was practically never known in England, and the high symbolic import of which is even yet scarcely appreciated.

When not only palaces and pleasaunces, but every edifice, sacred or lay, and every city, was closed with defensible and well-night impregnable gates, the question as to whether these would be found open or shut must have been of the most momentous. The hope of the night's shelter, warmth, and food hung upon the contingency, and oft the traveler must have been met with the stern rebuke, "Too late, too late; you cannot enter now." Inevitably the imagination fenced in the places to be desired in a future life with gates, inexorably closed except to the favored few. The keys of the gates of Heaven or Paradise were committed to St. Peter, rarely to be opened to any one without intercession, but the gates of Hell and Purgatory gaped wide. Open or shut, gates were the focus of interest, and could not be approached in primitive days without awe, curiosity, or emotion. It is hence not surprising that they were sumptuously and magnificently decorated. The Roman triumphal arch was only the apotheosis of the gate, recalling difficulties gloriously overcome. The question, figuratively, of the open or closed

[1] A paper by Mr. J. Starkie Gardner, F.S.A., read before the Society of Arts and published in the *Journal* of the Society.

door to commerce is almost the only one about which civilized nations might still go to war.

In the days when iron was little used, the massive wooden doors were sheathed, for protection from fire and for strength, in bronze, and revolved upon massive bronze hinges. Upon these were sometimes pictured the mighty deeds of the monarch of the country. The bronze portions of two pairs of enormous doors were found many years since by Mr. Harmuzd Rassam in excavating at Balawat in Assyria. The city contained a palace standing in a long rectangular enclosure, with four entrances, near two of which the remains of the doors were found. The larger were about 22 ft. high, 6 ft. wide, and 3 inches thick, each leaf being attached to a cylindrical post, about 18 inches in diameter, to which strong bronze pivots were fixed, working in stone sockets. Across each door seven or eight plates of bronze 11 inches wide were fixed by nails at regular intervals, these plates lapping round the post. On each of these plates are representations of the Assyrian army on its war-path, and other events of the first nine years of the reign of Shalmaneser II. These are in two bands of repoussé work, executed with great fidelity and spirit, and much freedom of drawing. Between embossed bands narrow spaces are left, relieved at regular intervals with the rosettes through which the nails are passed that fixed the plates to the woodwork of the doors. The "brazen gates" of antiquity were probably of this kind, and we are singularly fortunate in the possession of these splendid examples by our national museum.

Of the Roman period, there are several bronze doors, but of a different type and not depending on wood for their construction, still preserved in Rome itself. These are the large central doors of St. John Lateran, decorated with foliage, and brought from the Æmilian Temple in the Forum, and of about the date of Our Lord. Another pair, brought from the Baths of Caracalla, and of about the third century, close the oratory of St. John the Baptist, in the church of S. Giovanni in Fonte, the ancient baptistery in Rome. The vast bronze doors of the Pantheon remain in their original position, dating possibly from the time of Agrippa, 31 B. C. The doorway of marble, 39 feet high and 19 feet wide, contains their massive framing, consisting of two bronze pilasters, to which the doors are hinged, and the lintel over them is a pierced bronze scale-pattern grille. The doors themselves are not decorated in relief, but are of severe and dignified simplicity.

Next in point of antiquity are the Byzantine gates which revert to the partly wood construction of the East. Examples of these still exist in Constantinople, but the best known are the bronze doors to the vestibule of St. Mark's, in Venice. Some of these were brought from Constantinople, it is supposed from S. Sophia, after its reconstruction by Justinian, and may date back to the sixth century. Three of the oldest are divided into four panels of double arches with crosses and foliage rising out of vases under each arch. The other two are in the later Byzantine style, the central one, of early eleventh century, divided into forty-two framed panels inlaid with figures of saints in silver, the heads of some in relief, and a lower row of six panels decorated with bosses only. The frames are broad and studded with bossed nails, and twisted pillars separate each row of panels vertically. The remaining door is treated similarly, but divided into twenty-eight panels with figures, and is older, since the inscriptions are in Greek characters. The framing of the panels are richly decorated with geometric and florid designs, and there is a central row of six lions' heads among the bosses. In the large central doors these are replaced by a row of eight lions' heads with rings, and the inscriptions identifying the prophets and saints are in Roman characters.

Next in age are the principal doors from the venerable Abbey Church of Monte Cassino, executed by order of Abbot Desiderio, later Pope Vittorio III., 1088. They also are inlaid with silver curiously reciting a list of the properties held by the Abbey in 1066. The crosses at the base are like those of the earlier doors of St. Mark's. The Cathedral at Amalfi has doors similarly ornamented; and the doors of the Cathedral at Salerno, erected by Robert Guiscard, are also inlaid with silver, and were executed at Constantinople in 1099. Other examples exist.

The central doors of the Cathedral of Benevento[1] are divided into seventy-two panels, filled with bas-reliefs, except four containing lions' heads with ring handles. Those above represent scriptural scenes crowded with figures, and below are single saints under simple canopies. The framing is made of egg-and-tongue moulding, with large rosettes at the intersections. They are supposed to have been made in Constantinople in 1150.

There are exceedingly interesting bronze doors at Canosa closing the Mausoleum of Boemond, the son of Robert Guiscard: portions of the cathedral doors of Susa, of Byzantine eleventh century work, are preserved in the treasury of that cathedral.

Bronze doors of Italian make first appear in the twelfth century, the earliest artist of whom we have definite records being Barisano da Trani. The bronze doors to Trani cathedral, made in 1160, are his work, and are divided into thirty-two panels of subjects in relief with rich scrolled borderings, and mounted on hard wood. The side doors of Monreale[1] are by the same artist, but somewhat later, divided into twenty-eight panels with reliefs and excessively rich borderings. Even finer are the doors of the Cathedral of St. Pantaleone, at Ravello, by the same artist, and produced in 1179. The figures are very varied and of some merit, considering the date, and constitute a landmark in the history of Italian art. Equally celebrated for bronze work is Bonanno da Pisa, who produced the great central doors of Monreale[1] in 1186. The entrance is arched and richly sculptured, and the doors are divided into forty small panels, with scriptural subjects in relief, and in plain frames studded with rosettes, and separated vertically by bands of acanthus foliage treated conventionally. At the base are two lions and two griffins, and above are enthroned the Savior and the Madonna with angels. To the same artist we owe the doors of the Baptistery[1] at Pisa, less important as to size, but more delicate in design and workmanship. To the last year of the thirteenth century belong the well-known open-work scale-pattern doors of St. Mark's, Venice, inscribed "MCCC + Magister Bertucius Aurifex Venetus me fecit +." The details of these are noteworthy.

The doors of St. Zeno Maggiore[1] at Verona are in the Italian style, but have been assigned to an unknown German artist, who produced them in 1178. They comprise forty-eight panels with scriptural subjects in relief and two with large heads, serving as knockers or closing rings. They betray a slight tendency to the grotesque, but the architectural details seen in the panels are of great interest, suggesting an Italian source.

With the appearance of Andrea Pisano in the fourteenth century, we reach more familiar ground. He was commissioned in 1311 to make the doors[1] to the baptistery of the cathedral in Florence, designed by Giotto, being regarded as the best artist for the purpose to be found in all Italy. They occupied 22 years, notwithstanding the assistance of his son and two fellow artists, Lippo Dini and Piero di Jacopo, and were cast in Venice by Master Leonardo del Avanzo, and finally gilded by fire in 1339. They were shifted from the northern entrance to make way for the gates by Ghiberti, and re-erected at the south. They consist of twenty-eight panels with scenes from the life of the Baptist in relief, placed in barbed quatrefoils with rectangular moulded framing, studded with bosses and lion heads in relief. When they were set up the Signory came in solemn state to applaud the artist and confer on him the dignity of citizenship. The architrave was added by Ghiberti, who made a corresponding pair of doors, for the northern entrance, in 1403, when he was but 22. These occupied 21 years, though many assistants were employed, including his father-in-law, Bartoluccio, a great silversmith. They weighed 34,000 pounds, and cost 16,204 florins. Founded on the work of Andrea Pisano, they nevertheless show marked progress in Italian art. In 1425 the same Lorenzo Ghiberti was commissioned to execute the central doors,[1] spoken of by Michael Angelo as worthy to be the gates of Paradise. They mark an entirely new departure, a striving for pictorial effects, to an extent never before attempted. Ghiberti has left on record that he "strove to imitate nature to the utmost, and by investigating her methods of work to see how nearly I could approach her. I sought to understand how forms strike upon the eye, and how the theoretic part of sculptural and pictorial

[1] See The American Architect for Dec. 13, 1902.

art should be managed. Working with the utmost diligence and care, I introduced into some of my compositions as many as a hundred figures, which I modeled upon different planes, so that those nearest the eye might appear larger, and those more remote smaller in proportion." Perhaps the novelty led to the somewhat exaggerated praise. The founding was commenced in 1440 and completed in 1452 at a total expense of 14,594 florins. They thus occupied 27 years, or, according to Vasari, 40! The scenes are from the Old Testament, and fill the ten panels. The framing comprises twenty statuettes in niches and four recumbent figures, and twenty-four heads in the highest relief, among them one of the sculptor himself. The framing of the doorway, also of bronze, comprises foliage, fruit, flowers, and numerous animals and birds, all in high relief.

Florence also boasts two small pairs of doors by Donatello for the sacristies of the Church of S. Lorenzo, with ten panels in relief of saints and martyrs. These were produced in about 1457, eleven years before his death. There are also bronze doors to the sacristy of the cathedral by Luca della Robbia, executed in 1464, comprising ten panels of subjects in high relief, which have almost the finish of silverwork, and were highly commended by Vasari.

A pair of magnificent bronze doors were cast for the Triumphal Arch of the Castel Nuovo at Naples, erected by Pietro di Martino for Alfonzo of Aragon to commemorate his entry into the city in 1443. They occupied 19 years, not being finished until after his death—a grief to a prince known as the Magnanimous, and a great patron of art. Guglielmo lo Monaco of Umbria completed the work in 1465. They are divided into six large panels, the two uppermost forming segments of an arch, all crowded with figures of mounted men-at-arms in battle array, with citadels in perspective in the background.

The art of bronze-founding had, no doubt, attained its zenith in Italy in the fifteenth century, yet to the sixteenth belongs the superb door to the sacristy of St. Mark's, Venice, by Jacopo Sansovino, produced about 1529, when he was appointed architect and sculptor to the Venetian Republic. It is divided into two panels, with scenes from the life of Christ, bordered in the manner of the later Ghiberti gates, the portraits being, however, of great interest, since they are those of himself, Titian, Aretino, Paul Veronese, Giorgione, and Tintoretto.

The front of the cathedral at Loreto has three pairs of most sumptuous doors, the central by Girolamo Lombardi, of Ferrara, and his sons, who worked on them from 1534 to 1560. They comprise six large and eight smaller panels, illustrating the story of Adam and Eve, with richly worked borders. The left-hand doors are by Tiburzio Verzelli da Camerino, of somewhat later date, but corresponding generally in design, and those on the right by Antonio Calcagni, each having employed several assistants.

The seventeenth century produced the three magnificent doors[1] to the Cathedral at Pisa, by John of Bologna, executed in 1602, evidently inspired by the later door of Ghiberti in Florence. The principal panels represent scenes from the life of the Virgin, and the borders comprise branches of laurel and of orange, roses, figures, etc., with a considerable tendency to realism. He employed several assistants.

The bronze gates of the Campanile Loggia in Venice, to our taste, perhaps, want repose, but comprise some fine modeling. Gates of this sort are almost confined to Italy, and few exist anywhere wholly of bronze, unless closing an arch or entrance. Little appears to be known of the artist—Antonio Gai.

It may have been noticed that the doors were originally modeled on the lines of the strongest form of wooden doors known, and the interspaces occupied by the panels are therefore necessarily reduced to very small dimensions. Ghiberti was the first to abandon the strongly constructional form and introduce larger panels, and these were generally adopted, until in the doors at Naples there are only three panels to each leaf.

In England we have rarely since mediaeval days, when splendid iron-work was laced over doors to give them strength, been conscious of the decorative value of metal for doors, though the Italian artists had for centuries lavished their finest work upon them, and many were famous chefs d'oeuvre. The oldest bronze gates we have close the entrance to Blenheim Palace. In London there are bronze gates closing both the Marble and Wellington arches, and there is a pair in the central arch to Buckingham Palace. Those for the Marble Arch cost 3,000 guineas.

There are many occasions when relatively small sums are available for commemoration, and many sites where beautiful gates, whether of iron or bronze, would add greatly to the importance and dignity of the scene. Memorial gates can be and are produced at from £60 to several hundred pounds, in iron, and I have plans before me for bronze gates running into thousands. When these are executed it may be interesting to describe the process of manufacture from the commencement. A very fine pair of bronze doors for a Liverpool bank is illustrated in the "Encyclopaedia Britannica," under Art Metal Work.

A FEW REMARKS ON FOUNDATIONS.[1]

In studying foundations for heavy concentrated loads, the writer has observed the effects of such loads upon existing structures. In such cases, where defects soon appeared, one could easily trace their causes. Where such defects arise from the use of poor stone or mortar, they are not worth considering; but there are many cases, where such defects appear, in which both stone and mortar seem to be excellent. In such cases it is evident that the question of distribution must be examined.

Sometimes a heavy and heavily loaded column is found resting on a foot-box made up of plates riveted to the bottom of the columns with angles riveted to the lower edges of these plates, and then a horizontal plate having an area of seven or eight times the area of the cross-section of the column, and supposed to distribute the pressure over the area covered by the plate. This is an extreme case, and does not occur as often of late years as it did earlier; but there have been cases, within a few years, where a heavily loaded column rested on a casting so shallow that it could not nearly distribute its load over the whole area of the base of the casting.

The writer has in mind one case in which a heavy column rested on a casting, and the casting rested on a large nest of rollers. The outer ends of all the rollers and the outer rollers at each end of the bed were not borne upon at all. It is not easy to distribute enormous concentration of weight over a sufficiently large area to give the proper unit pressure over the whole area; but this should be done, and it requires geater height in proportion to the base of the bed than is in many cases given.

Having properly proportioned the foot of the column, attention must next be given to the masonry pedestal on which it is to rest. Supposing the bed-plate to distribute practically its whole load over its entire area equally. The question will arise as to how far outside of the bed-plate the stone of the pedestal can project (not only advantageously, but with safety), in the top course, below the coping, and how far it can go without absolute detriment to the work. If it is extended more than about 2 inches per foot of thickness of the course, no perceptible advantage will be gained. Of course, it must project sufficiently to keep the pressure per square foot within proper limits, including the weight of the masonry, and the wind pressure, and, if it is to rest on concrete, to keep the pressure on the concrete within proper limits.

The difficulty, with trying to extend the masonry too far beyond the bed-plate, is that the stone may crack, and, if so, it will start under the edge of the bed-plate, and the crack may incline still further under the bed-plate at the bottom of the course. Moreover, with too large a mass of masonry, there is a tendency to put the best masonry outside, and a poorer quality within. In this case the poorest masonry sustains the load. This is similar to making the pedestal of a bag filled with sand. In this case the bag will be pretty sure to burst, whether made of cloth or masonry.

Fig. 1 represents two courses made of cut stone, with ½-inch joints. This form secures excellent bonds, and from it the writer has obtained excellent results.

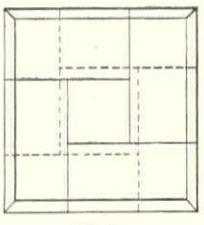

FIG. 1.

Where four or more heavily laden columns rest on one foundation, the writer thinks it is best to have the center of pressure on each column so nearly placed that the distance between each pair of columns, each way, shall be about equal to the sum of the distances of the extension of the masonry outside of the columns, and then build the pier in such a manner that there shall be a pedestal of first-class masonry under each column,

[1] A paper by Mr. L. L. Buck, M. Am. Soc. C. E., presented May 3, 1905, and published in the *Journal* of the Society.

similar to that of the single-column foundation. But the pedestals must be bonded to whatever masonry is outside of or between these pedestals.

In some cases, where the load on one column is very great, a casting, in order to distribute its load properly over the whole area of its base, must either be as high as the length of the base, or the casting must be in several pieces bolted together for convenience in handling. In this case the bottom length of the column can be given such a taper that its lower end will cover a space equal to half the area of the base of the casting, when the casting will require only about half the height required in the other case. Of course, the casting, in both cases, must be thoroughly ribbed. There are other ways of accomplishing this result, but it is doubtful if, on the score of economy, they are any better.

In the case of heavy walls having frequent window openings, one will sometimes find them showing disagreeable cracks, similar to those indicated in Fig. 2.

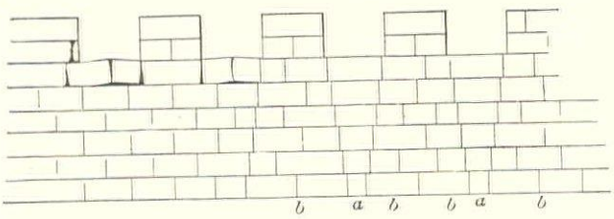

FIG. 2.

This trouble might have been avoided by a form of construction similar to the right-hand portion of the diagram. Construct the area of *b* so that the area of its base, in proportion to that of *a* shall be equal to that of the weights they respectively sustain.

The whole idea is to use the pedestal form, and not to project the stones under the heavily loaded portions more than the transverse strength of the stone will safely sustain.

ILLUSTRATIONS

FLUSHING BRANCH: QUEEN'S BOROUGH PUBLIC LIBRARY, FLUSHING, LONG ISLAND, N. Y. MESSRS. LORD & HEWLETT, ARCHITECTS, NEW YORK, N. Y.

INTERIOR OF THE CHURCH OF ST. PATRICK, ELVEDEN, ENGLAND. MR. W. D. CAROE, ARCHITECT.

This drawing, which is here reproduced from the *British Architect,* was hung at this year's Royal Academy Exhibition.

AMERICAN SECURITY AND TRUST BUILDING, FIFTEENTH STREET AND PENNSYLVANIA AVE., WASHINGTON, D. C. MESSRS. YORK & SAWYER, ARCHITECTS, NEW YORK, N. Y.

MAIN FLOOR PLAN OF THE SAME.

BASEMENT FLOOR PLAN OF THE SAME.

DETAILS OF THE SAME.

LONGITUDINAL SECTION OF THE SAME.

Additional Illustrations In the International Edition.

MURRAY-DODGE HALL: PRINCETON UNIVERSITY, PRINCETON, N. J. MESSRS. PARISH & SCHROEDER, ARCHITECTS, NEW YORK, N. Y.

NOTES AND CLIPPINGS.

FAILURES IN HOUSE-LIGHTING.—Although much progress has been made in recent years in the development of various types of electric lamps, the art of electric lighting, says the *Electrical Magazine,* in so far as this art applies to the proper amount and distribution of light for the illumination of interiors, has not kept pace wth the development of the lamps themselves. The electric engineer may be skilled in designing electric-light plants, but when it comes to laying out the detailed lighting scheme of a house, he is apt to fall short for the reason that his training does not, as a rule, qualify him to obtain the best results in this particular field. As a matter of fact, it is often the architect, rather than the electrical engineer, who decides the lighting problem and prescribes the location of outlets for lamps. Sometimes the decorator may be called upon to arrange the lighting scheme, and even the fixture manufacturer often has a hand in the matter. Lastly, the owner himself may suggest certain arrangements, which though ridiculously extravagant are carried out because no one in particular has direct charge of the whole question of illumination. This condition of affairs accounts for the glaring defects in lighting which are noticeable in most residences at the present time. Unshaded or inadequately shaded lamps, hung low in the rooms, are the rule rather than the exception. Lights so hung are exceedingly trying on the eyes, and are directly responsible for many a case of nervous headache arising from irritation of the eyes. On the other hand, one often sees just the other extreme—that is to say, lamps so densely shaded that only a very small percentage of the light is useful. Sometimes this shading is done for æsthetic reasons, but in many cases it is done at the cost of both art and illumination. The question of electric illumination has grown too broad to be properly handled by the electrical engineer as such, or by the architect. The problems that present themselves for solution are numerous and more or less complex, and demand the attention of a specialist in illumination—the illuminating engineer, for whom the field is growing year by year.

CALCIUM CARBIDE AS AN EXPLOSIVE.—According to M. P. S. Guédras (*Comptes Rendus, 1904*), calcium carbide is introduced into a metallic cartridge, separated by a diaphragm from the necessary water for its decomposition; the cartridge also contains an air-space and a cavity having the detonator. The cartridge is introduced into the bore-hole, which is tamped with a wooden plug, and by striking a projecting rod the diaphragm is pierced. After five minutes the cartridge is exploded by firing the detonator. The rock is shattered, but not projected, and can be easily hewn with a pick. The charge of carbide is 50 grammes.

NEW AZTEC FINDS IN THE CITY OF MEXICO.—Laborers, excavating trenches for the underground cable system of the telephone company near Cinco de Mayo-st., have, this month, uncovered a number of clay utensils, concrete foundations of temples, and pottery covered with hieroglyphs, also Spanish coins, whose dates are undecipherable, but induce the supposition that the antiquities belong to periods of the conquest, when Cortez razed every building in the Aztec capital. A wall uncovered shows evidence of having been built on the ruins of another city lower down. The wall is covered with hieroglyphs which were partly effaced by the drilling of conduit holes through the solid mass. Professor Batres is eager to obtain governmental permission to excavate below the present level for older remains, which, he is satisfied, exist underneath.—*N. Y. Tribune.*

COMPLETION OF THE BRONZE DOORS OF THE U. S. CAPITOL.—The great bronze doors which are to be placed at the entrance to the House wing of the Capitol at Washington have at last been completed in the workshop of M. H. Mosman, at Chicopee, Mass., after a delay of many years. They will be shipped to Washington in a couple of weeks. Work on the doors was first begun by Thomas Crawford, who designed them, in 1858. The modeling was finished by William H. Rinehart in 1862, and the models were shipped to the Treasury Department in Washington, where they remained until two years ago, when the contract for casting them was placed with Mr. Mosman. The cost of casting is $45,000. Mr. Crawford, who began the designing of the doors in Rome, as soon as he had completed the models for the Senate doors, is perhaps best known for his statue of "The Genius of America," which is of colossal size and is placed on the dome of the Capitol. He died before he could complete the designs for the House doors, and his work was carried out by Mr. Rinehart, another American sculptor working in Rome. The doors are fourteen feet high and weigh two tons. With the frame in which they hang they weigh seven tons. Each door is divided into five panels, the upper one in each being a grille, and the four others in each representing in bas-relief design different scenes of the struggle for American independence. The upper historical panel in the left-hand door represents the massacre of Wyoming. The next shows the battle or Lexington. The third represents the presentation of a flag to Colonel William Moultrie. The lowest depicts the death of General Richard Montgomery and the New Year's Eve attack on Quebec in 1775. The topmost historical panel on the right-hand door is the Crawford-Rinehart conception of the Treaty of Paris, with Benjamin Franklin in the foreground seated at a table, and in the background John Jay and English representatives. The next represents Washington's farewell to his generals, and the lowest is a representation of Benjamin Franklin with a manuscript, a book and a miniature printing-press.—*N. Y. Tribune.*

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AMONGST the advantages of our free institutions should be counted the fact that the schedule of charges of the American Institute of Architects is not mandatory, but recommendatory; hence, non-observance of its recommendations cannot be followed by disciplinary measures against their infringer, and it is this fact, as much as any other, that differentiates the Institute from a trade union. In spite of this indisputable fact, there seems to be a growing tendency on the part of the more prosperous members of the profession to lead the public to understand that the situation as to charges is quite different, and that their membership in the Institute will not allow them to accept payment in any other form or at any other rate than that named in the schedule. In reality the situation is quite otherwise, for, besides being merely recommendatory, the scale of rates named is put forward as the *minimum* rate, and this clearly suggests, if it does not distinctly advise, that, circumstances permitting, the charges should be greater than those recommended. The very permissiveness of the suggestion points to an implied logical antithesis, which, circumstances not permitting, should allow of a charge less than the recommended minimum rate. It is a recent case where the "circumstances did not permit" that leads us to make these remarks. As our readers know, the architect's commission for the proposed Cook County Court-house in Chicago, was to be fixed on a sliding scale—five per cent. for the first million; four per cent. for the second million, and three per cent. on the remainder of the building's cost.

THIS arrangement was not acceptable to certain of the invited competitors, who are alleged to have accompanied their protests with the statement that they could not, as members of the American Institute of Architects, work for less than five per cent. on the entire cost. If this allegation is true, we feel they have done an ill turn to the Institute, and have helped to make people feel it is but a mere trade union. To decline to enter the competition for the reason that experience had shown them that the work could not be properly done on the terms proposed, and yet leave a fair net return to the architect, would have been proper and enough, as would a statement that the reputation, the personal dignity and the professional standing of the competitor stood in the way of his accepting the offered terms; but to put forward as an excuse a plea not supported by the facts was a blunder and likely to work ill to the Institute by still further prejudicing lawyers and judges against the "schedule of charges." After long discussion, the Board of County Commissioners has decided that it cannot meet the wishes of its invited competitors and increase to five per cent. flat the commission of the successful architect. It has therefore regretfully accepted the declinations of three of the competitors, and in their place invited three others, two of whom, be it observed, are also members of the Institute.

THE five per cent. rule is to be commended for its simplicity and general equitableness, but, even in the profession, there has been a disposition to question how far it should be observed in building operations of unusual magnitude, and, also, in the case of certain mercantile structures—the high office-building, for instance, where the midmost stories are mere repetends of an original unit. The sliding scale adopted for the Chicago Court-house may not have been a fair one, but the principle on which it was based is not unreasonable, and in the professional practice of Germany, Sweden and France the sliding scale, under certain circumstances, is conceded to be permissible. Thus, since 1902, the city of Paris has used such a scale for all architectural work done for the municipality, the city paying an even five per cent. only on work costing between eighty and one hundred and twenty thousand dollars, while it pays four and a half per cent. when the cost falls between the latter figure and one hundred and sixty thousand dollars, and only four per cent. when the cost exceeds the last-named sum. *Per contra*, the city pays six per cent. when the cost falls below forty thousand dollars, and five and a half per cent. when it falls between forty and eighty thousand.

THE New York Supreme Court has decided that Signor Ernesto Biondi cannot recover from the Metropolitan Museum of Art two hundred thousand dollars, which the sculptor claimed from it as damages for not having exhibited his great bronze group known as the "Saturnalia," according to the agreement made with General Cesnola, the director of the museum. The Court decides that there was no enforceable contract between the sculptor and the museum, since the trustees of that institution had never divested themselves of the right to execute or approve all contracts made on behalf of the museum, and could prove they never had ratified the agreement in question. Moreover, this agreement lacked certain essential qualities of a formal contract. The sculptor gains by his suit a certain notoriety for the group which may possibly aid him in finding a purchaser for it, and also has presented to him the choice of having the bronze delivered to him free of charge in Italy by the mu-

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seum, which must then forfeit to the government its bond for some eighteen thousand dollars, or else he may take possession of the group here, in which case it is he who must make good to the museum the bond given to the government. If the late Dr. Cogswell were alive, the sculptor might be able to dispose of the group to him for use as a "temperance fountain."

AS each scene closes in the protracted legal drama of "The Westminster Chambers," we find ourselves left with a freshened sense of gratification that Massachusetts, at least, is a State whose citizens are determined that the laws they enact shall be observed, not only by the lowly individual, but by the wealthy and also by the most powerful municipality. Instead of being merely an argument on the justice or injustice of making the city of Boston responsible in damages to the owners and contractors of the building and the confirming or rejecting of the auditor's award, the Superior Court and its jury has had all the testimony in the case and the full arguments of both sides laid before it during sessions that have occupied some three weeks. In spite of all the care the city's legal advisers could give and all the expert testimony they could produce in the attempt to minimize the damages, if such must eventually have to be paid, the jury has rendered a verdict in favor of the owners and contractors—or, in other words, has added final confirmation to the original law which compelled the cutting down of the building to the ninety-foot height, but yet granted to the owners the privilege of recovering damages, if they could, from the city which, through its citizens at large, was to benefit by the operation. The award now made by the jury is slightly larger both for the owners and for the contractors than the sums reported a year ago by the auditor. As claims against public bodies are often contested to the limit of possibilities, it is not improbable that the case may be carried before the Supreme Court on exceptions, so it may be a long time yet before the owners, for whom we have no sympathy, and the contractors, for whom we have much, are able to touch the money just awarded them. As the case has been so long in contention that our readers may have forgotten its details, we print in another column a *précis* of the case taken from the Boston *Herald*.

IT looks very much as if our objections to the various laws requiring architects to take out licenses to practise their calling, which hitherto we had rested mainly on sentimental considerations, had a more reasonable and legal foundation. The New York Court of Appeals has just handed down a decision, in the case Schnaier *vs.* Navarre Hotel and Improvement Company, that the plumbers' registration law is unconstitutional, in so far as it would require both members of a firm to take out a license, thereby compelling an unlicensed plumber desiring to form a partnership with a licensed one to take out for himself a license as a prerequisite to the formation of such partnership. The Court, seemingly, holds that such compulsion put upon the unlicensed member interferes with his inalienable constitutional right "to follow any lawful pursuit," or, in this special instance, to exercise his preference for going into business with this particular friend. Assuming that the opinion stands unreversed, it would appear that there is nothing to prevent an architect—for we suppose the ruling cannot be restricted to plumbing licenses alone—who has sentimental objections to being classed with peddlers and mountebanks, or who actually is not sufficiently educated to pass the required examinations, from forming a partnership with a licensed architect, and embarking on the practice of architecture. This possibility certainly weakens, if it does not totally destroy, the safeguards which the license law was supposed to interpose between the public and the incompetent architectural practitioner.

A SEQUEL to the collapse of the floor of the old wooden African Methodist Episcopal Zion Church in Brooklyn, N. Y., last winter, during the burial service of a colored person, declares itself in the very unusual form of a series of suits for damages in the sum of one hundred and seventy thousand dollars brought by the injured survivors and the friends of those killed against Peter J. Collins, Superintendent of Buildings for Brooklyn, as an individual, the object being to collect the damages, if any may be awarded, from his personal estate. We believe the attempt to hold public officials privately responsible for their public acts always results in the nonsuiting of the plaintiffs, as to do otherwise is held to be contrary to the precepts of sound public policy, since, if a public official is to be held privately responsible for his public acts, it would be difficult to find men willing to hold public office. The argument is fallacious, since, even now, public offices are filled by men who, financially speaking, are mere men of straw, from whom it would be impossible to collect damages in any amount, even should the Court award them. Yet in this case, just as in the case of the Iroquois Theatre fire and in that of the *General Slocum*, it is a distinct and unjust hardship that the injured should not be able to collect damages from the public purse, or from the private means of public officials, for injuries received while in situations where they had been assured by the governmental powers that they might be with propriety and safety.

IN view of the very pronounced opposition of the faculty, the alumni and the undergraduates of the Massachusetts Institute of Technology, the recent vote cast by the Corporation in favor of the projected alliance with Harvard University is very extraordinary and is strong proof of the real business and educational advantages that are likely to accrue to the Institute from the proposed association. Now that the Institute has declared in favor of the plan, it remains to be seen whether the Harvard Corporation will be as willing and also what, if any, legal obstacles stand in the way. Amid all the enquiries that have been set afoot, it is singular that no attempt has been made to learn the opinion of a considerable body of men who are peculiarly well fitted to reach a conclusion deserving of attention. In the last thirty years a very considerable number of Harvard graduates have pursued their technical and professional studies in one department or another of the Institute; they have thus had the means of observing and weighing the advantages of both institutions and they have also ascertained by personal experience how real a hostile feeling there is at the Institute against Harvard, and how far such feeling is likely to be prejudicial to the combined undertaking. It seems to us that the opinion of these men should be especially valuable.

THE ROYAL PALACE AT STOCKHOLM, SWEDEN, AND ITS ARCHITECT.

IF not by instinct, the Swedes are by training and by virtue of a long and brilliant history aristocrats. It is true that the present-day nobility is shorn of all legal privileges, but the characteristics remain, and nearly all "educated" classes share them. In this respect they differ sharply from the people of Norway, which is exceedingly democratic. The Swedes have never forgotten, and probably never will forget, the days of former glory; there is so much of it still left in the shape of palaces, châteaux, castles, churches and what not, in all parts of the country. While this proneness to cherish the past is expressed in a tendency to high-living on the one hand, for few countries can show as much of this as Sweden, there is, on the other, a far better result flowing from old memories. In no country do they build better, both in the matter of pure technique, plain, good construction and æsthetic aspirations.

The grandest souvenir, without exception, from the grand old days is the Royal Palace of Stockholm. It stands to-day, as it has stood for generations, almost above criticism, admired equally by foreigners and natives for the exceptional beauty of its location by the waters of Lake Maelaren, for its imposing and generous dimensions, and for the dignity and elegance combined with the purity and variety of its design and proportions. These are big words, but justified, for they refer to one of the masterpieces of the world, produced, too, at a time when Fontana and Bernini and the other decadent Renaissance artists held sway—this is not its least claim on attention.

ENTRANCE FEATURES IN THE INTERIOR COURTYARD: ROYAL PALACE, STOCKHOLM.

All the greater is the pity that history has tried to rob Sweden of its author, claiming him for France. Nikodemus Tessin was born in Nykoping, in 1654. He was the middle representative of three generations of noted architects. His father came from an old German patrician family of Stralsund, which at the time of the son's birth was a Swedish possession, and his mother belonged to the Swedish *bourgeoisie*. His father was architect to Royalty and a great favorite, his best work being, probably, the Château of Drottningholm.

Nikodemus Tessin, the younger, entered on the stage of life with the best possible equipment—good parentage, favored by Royalty from his cradle—the Queen of Sweden herself was his godmother, and the very Government determined that the child should be trained as an architect—and backed in his education by all the resources of the Government. It is a wonder he was not spoiled.

It might be interesting in these modern days of discussion as to architectural education to follow the training of the young Swede. At the University of Upsala, he completed and complemented, as much as was then possible, the teaching his father had been able to give him, devoting himself to "French, Italian (!) and mathematics." At the age of 25 he was sent at the expense of the Government to Rome. He remained six years in Italy, studying under Bernini and Fontana and measuring old buildings. In view of his executed work it is quite easy to imagine that he spent more time on the real structure than he did in the ateliers of the Rococo masters. Before returning he made visits to Naples, Sicily and Malta, Paris and London he visited on his way home, stopping at the latter place a few months. Again he was sent out, this time to Paris, where he spent two years under Lenotre. Returning in 1682, he was appointed architect for the palace and to the city of Stockholm.

Busy days followed, with all manner of building for Royalty and the nobility. Sweden was at the very zenith of political power, one of the important states of Europe, and the hard-headed Charles XI. was King. The young Tessin was given free hand in the matter of money, and no one crossed him in his artistic plans.

Soon thereafter the King decided to rebuild the palace, but Tessin was first sent on a thirteen-months' trip abroad for further study and to get acquainted with all manner of foreign artisans and art workers. During this trip he was received by Louis XIV., who caused the fountains of Versailles to play for his special benefit, an extraordinary honor. He returned loaded with big booty in the shape of drawings, casts, models, trained workmen and connections with foreign workshops and artists.

One wing of the palace was rapidly completed according to his designs, and so universally admired was it that at least three other kings wanted him to prepare plans. Then, in 1697, the entire palace, old and new, was destroyed by fire. It was this gave the architect his chance and a new palace was begun, using what was still standing of the walls of the new wing.

The building progressed rapidly from 1697 to 1707, when the military reverses of the young King, Charles XII., brought the operations to a practical standstill. In 1727 the Parliament

decided to continue the work and it was intrusted to Tessin's son, Carl Gustaf, as the original designer was then very old and in disfavor at court. But not before 1754 could the court take possession and only in 1776 was the interior finishing completed. The north terrace was not added until 1824-30, a successful addition, indeed quite necessary, though somewhat different from the original design.

The palace is three stories high, with a mezzanine and a story in the cornice. The main part is built around a court measuring about 260 feet each way, which is bare of treatment. To the east are two wings continuing the long north and south fronts in the first story and mezzanine and inclosing a sunken garden. To the west is a similar wing and two quarter circles, forming, together with the main building, a small court. These wings give life and interest to the group without in the slightest detracting from the dignity of the composition.

There is a delicate and well-proportioned crowning balustrade, but there is no visible roof, and in this respect the palace is practically unique in Swedish architecture. A visible roof on such a huge structure would have crushed it or been out of scale. Smaller buildings in this snow-clad climate without visible roofs look inappropriate. It is fortunate that the old-time architects felt this to be the case and never "cribbed" the palace.

The materials are stucco of a yellowish tint with trimmings of stone. Lack of funds prevented the execution of many details and curtailed others that were designed by Tessin, at least so it is said by those who have seen the original drawings.

In one respect Tessin, and his father, too, learned much from the Rococo architects. Both planned beautiful and grand staircases, full of variety, yet imposingly simple. The best of these by the elder Tessin is seen in Drottningholm. And the son was not one whit behind in the several grand stairways of the palace at Stockholm.

The history of the erection is long for a modern building. It was begun in flush times. Its completion was a task, an immense undertaking for a people well-nigh crushed. In fact, the special tax which in 1727 was levied for the purpose over the whole country did not run out until 1810. No finer compliment could have been paid by the Swedish people to the author of the design. For, though the inception was the result of the autocratic will of Charles XI., the completion was the free undertaking of the people—perhaps a unique instance in history.

Many capable architects were connected with this work during its long period of execution, and thus it served as a veritable school of instruction, or one might say a standard of excellence. There is good reason for ascribing to Tessin's masterpiece an overpowering influence on all Swedish architecture, and this partly explains that it succeeded in avoiding the eccentricities of Rococo and the Baroque. Even to-day it is undoubtedly a factor and, consciously or not, acts as a purifier—a check on the vagaries of l'Art Nouveau. No wonder it is so highly cherished. And yet the author lies buried in a church near by without a monument. His own father was more honored.

Tessin died in 1728, not quite forgotten (for he had a pension), but ignored. The limited space does not permit even the mentioning of his other more important works. Suffice it to say that much is ascribed to him, some without real proofs. Among new projects is worth mentioning a grand plan for the remodeling and beautifying of Stockholm, an undertaking which was not even begun, all the more is the pity.

Tessin served his country in other capacities than as architect, often being appointed as director for grand court functions, such as weddings and funerals. During the later years of his life he drifted into the political field, or, perhaps, was forced thither. It is a pleasure to record that here he took a decided stand as a sound-money man against a certain Goertz, a species of free and copper coinage schemer of the eighteenth century—that is, free-coinage for the King, but disastrous nevertheless. In 1699 Tessin was created a lord. His father had been raised to the ordinary nobility only.

OLOF Z. CERVIN.

HEATING AND VENTILATION.—VIII.

FOUR SYSTEMS OF VENTILATION.

THE most satisfactory method of ventilating buildings having six or more rooms is by means of a fan or blower.

With this system the air-supply is practically constant under all usual conditions of outside temperature and wind action. This gives it a decided advantage over natural or gravity methods which are affected to a greater or less degree by outside conditions as already stated. In the usual or *plenum* method, the air is forced into the building after being passed through a heater for raising it to the desired temperature. The heater is usually made up in sections so that steam may be admitted to or shut off from any section independently of the others, and the temperature of the air regulated in this manner. Sometimes a by-pass damper is employed, so that part of the air will pass through the heater and part around or over it; in this way the proportions of cold and heated air may be so adjusted as to give the required temperature to the air entering the rooms. These forms of regulation are common where a blower is used for warming a single room, as in the case of a church or hall; but where several rooms are to be warmed, as in a school-house, it is customary to use the main or primary heater at the blower for warming the air to a given temperature, somewhat below that which is actually required, and to supplement this by placing secondary coils or heaters at the bases of the different flues, or by the use of direct radiation in the rooms. By means of these arrangements the temperature of each room can be regulated independently of the others. The so-called double-duct system is sometimes employed for this purpose. In this case two ducts are carried to the base of each flue, one conveying hot air and the other cool or tempered air, and a mixing-damper placed at that point for regulating the quantity of each for producing the desired temperature.

The term "fan" is commonly applied to any form of apparatus for moving air in which revolving blades or propellers are used, while the word "blower" is used only in those cases where the wheel is enclosed in a housing. The enclosed fan with inlets in both sides of the casing is the form usually employed in school-house work. The discharge-opening can be made in any position desired, to meet the requirements. It may be either up, down, top horizontal, bottom horizontal or at any angle. Where the height of the fan-room is limited, a form called the three-quarter housing may be used, in which the lower part of the casing is replaced by a brick pit below the floor level.

Another type of fan known as the "propeller" or "disk" fan is sometimes used where the air passages are large and the resistance to air-flow is small; but for ordinary ventilating work the encased blower is much to be preferred.

The volume of air which a given fan will deliver depends upon the speed at which it is run and the friction or resistance through the heater and air-ways. The pressure referred to in connection with a fan is that in the discharge outlet, and represents the force which drives the air through the ducts and flues. The greater the pressure with a given resistance in the pipes, the greater will be the volume of air delivered, and the greater the resistance, the greater the pressure required to deliver a given quantity. Fan-wheels of the same manufacture are usually made with a nearly constant ratio between the diameter and width, although special forms are made where this does not hold true. All practical data on the action of fans are based on the results of tests, and from these the following relations have been found to be approximately correct:

(1). The volume of air delivered varies directly as the speed of the fan, that is, doubling the number of revolutions doubles the volume of air delivered.

(2.) The pressure varies as the square of the speed: for example, if the speed is doubled, the pressure is increased $2 \times 2 = 4$ times, etc.

(3). The power required to run a fan varies as the cube of the speed; again, if the speed is doubled, the power required is increased $2 \times 2 \times 2 = 8$ times.

The value of a knowledge of these relations may be illustrated by the following example:

Suppose for any reason it is desired to double the volume of air delivered by a certain fan. At first thought we might decide to use the same fan and run it twice as fast; but when we come to consider the power required, we shall find that it will have to be increased 8 times, and it will be cheaper in the long run to put in a larger fan and run it at a lower speed.

In speaking of a fan as a 4 or 5-foot fan, the diameter of the propeller wheel is meant, but if we say an 80 or 100-inch fan we mean the height of casing. It has been found in practice that fans, of the blower type, having curved floats, operated quietly and give good results when run at a speed corresponding to half-ounce pressure at the discharge outlet; this gives a speed of about 3,600 feet per minute at the circumference of the wheel. Higher speeds are accompanied with a greater expenditure of power and are more likely to produce a roaring noise or to cause vibration. A very much lower speed does not provide

sufficient pressure to give proper control of the air-distribution during strong winds. The following table gives average capacities for various sizes of fans and the corresponding horse-power of engine required:

Nominal size of fan, height of housing in inches.	Diameter of fan wheel, in feet.	Width of housing, in inches.	Ordinary speed, giving ½ ounce pressure.	Cubic feet of air delivered per minute.	Horse-power of engine to drive fan.
30	1½	9	870	1,600	½
40	2	12	580	1,600	1
50	2½	15	465	2,600	1
60	3	18	390	4,500	2
70	3½	21	333	6,000	2½
80	4	24	293	8,000	2½
90	4½	28	260	11,000	4
100	5	32	233	12,500	4
120	6	43	195	21,500	7
140	7	48	167	28,600	9
160	8	48	147	31,800	10
...	9	54	130	40,400	13
...	10	60	117	51,000	16

A simple, quiet-running engine is desirable for use in connection with a fan. It may be of either the horizontal or vertical type and should be provided with large cylinders so that the required power may be developed without carrying a steam-pressure much above 30 pounds. In certain arrangements, to be described later, cylinders of such size are used that a pressure of 12 or 15 pounds is sufficient. The quantity of steam which an engine consumes is of minor importance as the exhaust can be turned into the coils and used for heating purposes. If space allows, the engine should always be belted to the fan. When it is direct-connected, there is likely to be trouble from noise, as any slight looseness or pounding in the engine will be communicated to the air-ducts and the sound will be carried to the rooms above.

When an engine is belted, the distance between the engine and fan shafts should not be much less than 10 feet for fans up to 7 or 8 feet in diameter, and 12 feet for larger sizes. When possible the tight or driving side of the belt should be at the bottom, so that the sag in the loose side will tend to wrap the belt around the pulleys and so increase the arc of contact.

Engines having the crank and connecting-rod encased are especially adapted to this work as this protects the bearings from dust and grit which are liable to be present to some extent when the engine is placed in the fan room.

With the blower type of fan the size of the main ducts may be based on a velocity of from 1,000 to 1,200 feet per minute, and the branches on a velocity of 800 to 1,000 feet per minute, and as low as 600 to 800 when the pipes are small. The velocity in the vertical flues may be from 600 to 700 feet per minute, although the lower velocity is preferable. The size of the inlet register should be such that the velocity of the entering air will not exceed 350 to 400 feet per minute. The velocity between the inlet windows and the heater may be from 800 to 1,000 feet, provided the distance is short.

When the air is delivered through a register at the high velocities mentioned, some means must be provided for diffusing the entering current in order to prevent disagreeable draughts. This is usually accomplished by the use of deflecting blades of galvanized-iron set in a vertical position and at varying angles, so that the air is thrown toward each side as it issues from the register. The proper angle for the blades depends upon the position of the register, whether in the corner of a room or in a central position.

The size of the vent-flues should be about the same as for a gravity system, that is, about six square feet for a standard class-room, and in the same proportion for smaller rooms. In some buildings large vent-flues are used, extending from the basement through the roof and being connected with two or more rooms on each floor. In cases of this kind the cold air at night is apt to settle down the flue, even though a damper is provided, and flow into the rooms. To prevent this light checks of gossamer-cloth about five inches in width are strung on wires and fastened to the backs of the vent grilles. The pressure in the room made by the fan when running, will cause the checks to open outward and allow the air to pass by them, but a reversal of the current will close them tightly and prevent the inleakage of cold air.

Vent-flue heaters are not usually required in connection with a fan system, as the force of the fan is sufficient to supply the required quantity of air at all times without the aspirating effect of the vent-flues.

The usual form of heating-coil as made by the manufacturers of blowers is better adapted to hot-blast heating where high temperatures of air are required than to school-house ventilation which calls for large volumes at moderate temperatures. These heaters consist of sectional cast-iron bases with loops of wrought-iron pipe screwed into them. The steam enters one side of the base or header, which is divided by a partition, and passes through the loop to the other side, where the condensation is taken off through the return drip. These heaters are made up in sections of two or four rows of pipe each. The height varies from 3½ to 9 feet and the width from 3 to 7 feet in standard sizes. They are usually made up of 1-inch pipe, although 1¼-inch is commonly used in the larger sizes.

A heater for ventilating purposes does not have to be more than 8 or 10 pipes deep, so, if this type is employed, the larger sections may be used and a sufficient number placed side by side to make up the required amount of radiating-surface for a heater of this depth. Fig. 35 shows a section of a special heater particularly adapted to buildings where a large volume of air is to be supplied and the available space somewhat limited. It is made up of 1-inch pipe connected with supply and return headers. Each section contains 14 pipes and they are usually made up in groups of 5 sections each. These coils are supported upon tee-irons resting upon brick foundations. Heaters of this form are made to extend across a room with brick walls at each side. One of the best forms of heater for small and medium sized buildings is made up of sections of pin-radiators supported upon I-beams above the water-line of the boiler. The "School pin" and "Utica pin" radiators are both well adapted for this purpose.

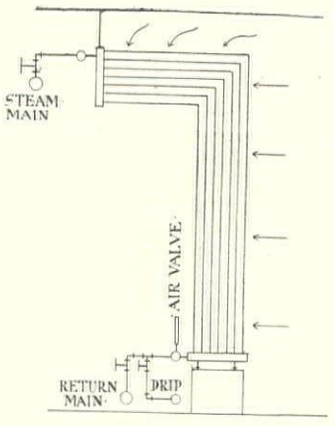


FIG. 35.

The efficiency of a heater used in connection with a fan varies a good deal, depending upon the temperature of the entering air, its velocity between the pipes, the temperature to which it is raised and the steam-pressure carried in the heater. The general method in which the heater is made up is also an important factor. In designing a pipe heater care must be taken that the free area between the pipes is not contracted to such an extent that an excessive velocity will be required to pass the given quantity of air through it. In ordinary ventilating work it is customary to assume a velocity of 800 to 1,000 feet per minute; higher velocities call for a greater pressure on the fan which is not desirable on account of the increased power necessary to run it.

In the pipe heaters described, about .4 of the total area is free for the passage of air; that is, a heater 6 feet wide and 8 feet high would have a total area of $6 \times 8 = 48$ square feet, and a free area between the pipes of $48 \times .4 = 19.2$ square feet. The depth or number of rows of pipes does not affect the free area, although the friction is increased and additional work is thrown upon the fan. The efficiency in any given heater will be increased by increasing the velocity of the air through it, but the final temperature will be diminished, that is, a larger quantity of air will be heated to a lower temperature in the second case, and while the total heat given off is greater, the air quantity increases more rapidly than the heat quantity, which causes a drop in temperature. Increasing the number of rows of pipe in a heater with a constant air quantity increases the final temperature of the air but diminshes the efficiency of the heater, because the average difference in temperature between the air and steam is less. Increasing the steam-pressure in the heater increases the final temperature of the air and the efficiency of the heater.

In designing a system of ventilation for a school building the main heater is usually made large enough to raise the total air-supply to a temperature of about 75 deg. in the coldest weather. The heat for warming is then supplied by a separate system of direct radiation placed in the rooms or by indirect stacks at the base of the flues.

A heater 8 or 10 pipes deep, with steam at 15 pounds pressure, and the air passing between the pipes at a velocity of 800 to 1,000 feet per minute, will have an efficiency of about 1,800 B.T.U. in zero weather when raising the air to a temperature of 75 deg. or 80 deg.

EXAMPLE.—A school building requires an air supply of 60,000

cubic feet per minute, raised from 0 deg. to 80 deg. The heater is to be made up of 1-inch pipe. How many *linear* feet will be required?

$$\frac{60{,}000 \times 60 \times 80}{55} = 5{,}240{,}000 \text{ B. T. U. nearly,}$$

and $5{,}240{,}000 \div 1{,}800 = 2{,}900$ square feet, or $2{,}900 \times 3 = 8{,}700$ linear feet of pipe.

If the heater is made up of loops 10 feet high, it will contain $8{,}700 \div 10 = 870$ pipes, and if 10 pipes deep, it will be $870 \div 10 = 87$ pipes long.

One-inch pipes are usually spaced 2½ inches on centers, so the length of the heater will be $\frac{87 \times 2\frac{1}{2}}{12} = 18$ feet and 2 inches.

The next step is to compute the free area through the heater and find the resulting air-velocity through it. The total area is $10 \times 18 = 180$ square feet, $180 \times .4 = 72$ square feet free area, and $60{,}000 \div 72 = 833$ feet per minute velocity beteen the pipes, which is satisfactory. Cast-iron pin-radiators may be counted upon to give an efficiency of at least 1,500 B.T.U. under the conditions above mentioned, and the ratio between the heating-surface and free air-space is such in the School and Utica patterns, that the velocity of air-flow through them will not exceed 800 feet per minute.

In making the pipe connections for a main heater it is customary to divide it into six or more sectons, depending upon its size, and to carry a pipe main, or header, across in front and make separate valved connections with each section. Part of the sections should be valved so that they may be supplied either with exhaust-steam from the engine or with live-steam direct from the boilers. Fig. 36 shows in diagram the method of making these

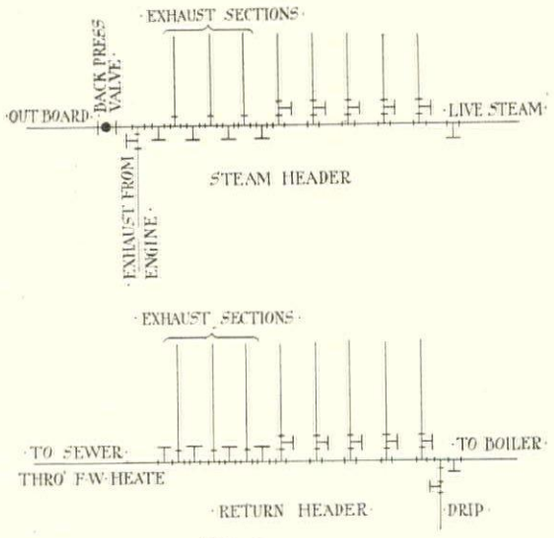


FIG. 36.

conections with their corresponding returns. A back-pressure valve, opening at about five pounds pressure, should be placed as shown. This acts as a relief, and opens when the pressure in the exhaust sections rises above the point at which it is set. In case it is desired to run the fan in mild weather when no heat is required, the back-pressure valve should be fastened open and all of the steam exhausted outboard.

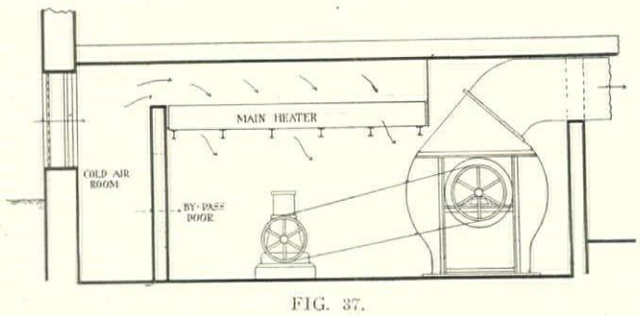


FIG. 37.

Fig. 37 shows a typical arrangement of fan and overhead cast-iron heater. The air is drawn in through the inlet windows, as shown, and passes into the space above the heater; it is then drawn through it and into the fan, from which it is discharged into the main distributing-ducts at the basement ceiling. The bottom of the heater should be at least 30 inches above the water-line of the boiler so that the condensation will easily flow back by gravity through a check-valve.

This is one of the simplest arrangements of fan and heater, as it does away with the use of pumps and traps for returning the condensation to the boiler. When this system is used, an engine with a large cylinder should be employed so that the steam-pressure need not exceed 15 or 18 pounds, and the whole system, including the direct surface, may be run upon the same pressure. This arrangement is adapted to all buildings of small and medium size where the heater can be placed at a sufficient height above the boilers. From 50 to 60 square feet of radiating-surface should be provided in the exhaust sections of the heater for each engine horse-power, and should be divided into at least three sections, so that it can be proportioned to the requirements under different outside temperatures. The hot condensation from the exhaust sections contains oil from the engine so that it should not be returned to the boilers; much of its heat, however, can be saved by passing it through a feed-water heater. A heater for this purpose may be made of a piece of 8-inch pipe, 7 or 8 feet long, with flanged heads, and containing a coil made up of four lengths of 1-inch brass pipe. The feed-water to the boilers is made to pass through the brass pipe while the space around it is filled with hot condensation.

A similar heater is sometimes placed in the exhaust pipe for use when exhausting outboard. After passing through the feed-water heater the condensation should be trapped to the sewer.

The following pipe-sizes may be used for cast-iron main heaters with a gravity return to the boilers. These are somewhat smaller in proportion to the weight of steam condensed than those used in ordinary indirect heating, but the connections are short and the whole apparatus placed near the boilers, so that the sizes may be reduced somewhat and still have ample capacity.

Square feet of surface.	Steam pipe.	Return pipe
150	2″	1¼″
300	2½″	1½″
500	3″	2″
700	3½″	2″
1,000	4″	2½″
2,000	5″	2½″
3,000	6″	3″

For large high-schools the cast-iron heater becomes somewhat cumbersome on account of its size, and an exceedingly large engine would be required for running the fan on a low steam-pressure. In this case it is best to carry a boiler-pressure of 35 to 40 pounds, and reduce to about 10 for the main heater, and 3 to 5 pounds for the supplementary or direct radiation. The main heater is usually made of wrought-iron pipe in large buildings, being more compact and occupying less space. As these heaters are made to rest upon foundations near the floor, the bottom is below the water-line of the boilers, and it becomes necessary to return the condensation by the use of pumps or return traps. Steam is reduced from a higher to a lower pressure by means of a special valve called a pressure-reducing or regulating valve.

The general principle upon which these valves operate is practically the same in most of the different makes, although differing more or less in construction. In general, the steam on the reduced or low-pressure side is made to act upon a diaphragm or piston, held in place by properly adjusted springs or weighted levers. When the pressure reaches the point for which the valve is set the diaphragm or piston rises, and in so doing partially closes the valve admitting high-pressure steam to the low-pressure side. This action continues until just the right opening is obtained to mantain the reduced pressure desired. If the pressure rises above or drops below this point, the valve opens or closes as may be necessary to bring the pressure back to its normal position. Reducing-valves should always be provided with cut-out valves upon each side, and a by-pass, with valve, should be furnished for use when the reducing-valve is removed or cut out for repairs.

A back-pressure valve is a form of relief-valve which is placed in the outboard exhaust pipe to prevent the pressure in the heating system from rising above a given point. It is simply a low-pressure safety-valve with a specially large opening for the passage of steam through it. Its office is the reverse of a reducing valve which supplies steam when the pressure becomes too low. They are made for both horizontal and vertical pipes.

CHARLES L. HUBBARD.

(To be continued.)

THE "WESTMINSTER CHAMBERS" CASE.

THE special legislation affecting the Hotel Westminster by limiting the height of buildings in Copley Square to 90 feet for the avowed purpose of promoting the æsthetic beauty and attractiveness of the square, and of protecting the light and air of buildings fronting it, fell hard upon the city of Boston, which was made to shoulder the financial burdens of the act, when a verdict for $481,970.48 was found against it in the Westminster Chambers damage suit, by a fourth session jury of the Superior Court, before Judge Schofield, yesterday afternoon. This is one of the biggest, if not the biggest, verdicts found by a Suffolk jury in years.

Henry B. Williams and Edward H. Eldredge, the trustees of the Westminster Chambers hotel trust, were awarded $410,843.12 of that amount, being the damage done the property by the passage of the Copley Square act, with interest added, while Woodbury & Leighton, the builders, were awarded the balance of $71,127.36, being based upon the loss the statute caused upon materials contracted for but not used, materials wasted and the expense of rearranging the design or plan of the building, which was being built when the act was passed, in order to make it conform to the 90-foot limit, and interest.

This statute was evoked to prevent the erection of such a 10-story hotel building to a height of 120 feet, as the Westminster owners had begun to erect, and the verdict is a substantial victory for them and the contractors in their suits for compensation under the act. They had fought against the legislation, but without success. They had also fought, hard and persistently, the constitutional power of the Legislature to pass such an act, not only through the Supreme Court of this State, but also through the Supreme Court of the United States. But they had to bow down to the constitutionality of the law and seek compensation under its provisions from the city for the injury they sustained by its passage.

Not only that, but the building which they erected to the height of 96 feet in an alleged attempt on their part to conform to the statute had to come down to the exact legal height. They were compelled to do so by the extraordinary procedure of the full Supreme Court itself directing them by mandatory decree to take off the extra 6 feet which they had sought to justify under a sanction or approval which the Boston Park Commissioners had given under a statute to the sculptural ornaments or cornice on the upper portion of the building. And down came the extra 6 feet, the building being held to be an unlawful structure under the Copley Square act, as built to that height, because the statute did not tolerate any of the habitable portion of the building reaching beyond the 90 feet. The expense, however, of putting the structure up to the 96 feet and of taking it down to the legal limit of 90 feet was not sought for or considered by the jury, it being conceded that the plaintiffs could not recovor the damages they suffered by putting up an unlawful building and afterward making it conform to the law.

Charles W. Clifford, of New Bedford, had heard the case as an auditor, and he had found in favor of the owners for $292,716, exclusive of interest, and in favor of Woodbury & Leighton for $49,896, also without interest. But the city was dissatisfied with his finding and fought the case over again before the jury, but apparently without much of any success, for the jury's verdict virtually, if not precisely, adopts the findings of the auditor with the added 42 per cent. interest which has accrued since May 23, 1898, the day the act was passed.

The city had claimed, and the court so ruled, that the damages were to be assessed by finding out the market-value of the land and the uncompleted building just before the act was passed and the market-value of the same after the act was passed. The difference or diminution was recoverable with interest. The plaintiffs were not allowed to recover the damage to the scheme or enterprise which they were prosecuting on the land as such.

The suit for damages caused by the act has been on trial for three weeks and has attracted much interest in real-estate, legal and financial circles. Prominent real-estate experts testified in behalf of both sides, and ex-Mayor Nathan Matthews testified in behalf of the city as an expert on the effect of building restrictions upon the land.

The plaintiffs' experts variously estimated the damages caused by the statute at from $325,000 to $450,000 and interest, exclusive of the cost of the materials unused or wasted. Those for the city placed the damage upon the land and unfinished building due to the act at from $35,000 to $50,000 exclusive of those same items.

The legislation operated as a taking by eminent domain of rights in the land by restricting the height of any building to be erected to 90 feet, and was novel, to other States at least, in that it imposed upon the city of Boston the burden of paying as compensation to the owners and parties interested, the value of the building rights of which they were deprived, as well as for the loss they sustained for materials they had bought and could not use in a building of the legal height and for materials they had put into the 90-foot building before the act was passed, but which they would not have put in had they known at the beginning they could only erect a 90-foot building.

After the passage of the act on May 23, 1898, the owners and builders continued the erection of a building to the finished height of 96 feet. This looked like defiance of the law, and the Attorney-General, at the instance of the Trustees of the Art Museum, began a suit against Henry B. Williams and his co-trustee for a mandatory injunction to enforce strict compliance with the letter and spirit of the law. This was on September 11, 1898, and the respondents demurred and pleaded that the act was unconstitutional.

But the full Supreme Court, in a majority opinion, declared the statute constitutional. It said Copley Square was a public square of the city, fronting which was Trinity Church, the Public Library, the New Old South Church, the Second Church, and close by the Institute of Technology, and the Legislature had the power to enact a law like this for the sake of promoting the beauty and attractiveness of the square and of preserving light and air, and that it could make the city of Boston foot the bills.

Subsequently, the Attorney-General's suit was again taken up to the full bench in January, 1901, and was argued upon the question raised by the owners of the property that the city of Boston, being required to pay the damages and having the right to enforce the building laws of the city, was a party which should be joined in the suit, having a legal right to be heard. An adverse decision upon this point was rendered on March 13, 1901, coupled with the iron-clad full-bench decree requiring the taking down of the illegal 6 feet, and the reduction of the building to the legal height of 90 feet by October 1 of that year. But these decisions were not sufficient to make the owners yield in the matter. They still felt that the act was a taking of their property by undue process of law, and they sued out a writ of error to the United States Supreme Court upon constitutional grounds.

This procedure had the effect of suspending the final mandatory decree of the State court until the Federal Supreme Court had passed upon the case. The case was argued at Washington in December, 1902, and in February, 1903, another adverse decision for the owners was announced. The United States Supreme Court, while speaking of the statute as a novel one, in that the financial burdens of it were placed upon the city, still held it was an eminent-domain act for the taking of land for a public use and providing compensation, as it did, it was constitutional and did not violate the Federal Constitution. This finally clinched the matter, leaving no further ray of hope of saving the 96-foot building, and the owners at once proceeded to take off the illegal 6 feet. This somewhat cramped the eighth story, took off the ornamentation and left the building with no cornice whatever, the result being that it appears unfinished.

The suit for damages arising out of a statute passed under a novel situation gave rise to several legal questions as to the correct measure and elements of damages, and will undoubtedly be taken by the city to the Supreme Court for their final determination.

R. M. Morse tried this case for the plaintiffs; T. M. Babson for the city.—*Boston Herald, June* 10.

ILLUSTRATIONS

BLOCK ON WEST END AVENUE BETWEEN 84TH AND 85TH STREETS, NEW YORK, N. Y. MR. CLARENCE TRUE, ARCHITECT, NEW YORK, N. Y.

At the time of publishing a detail of this block of dwelling-houses in our issue for May 29, we had been unable to ascertain the name of its author. Now that this has been accomplished, we suggest that the subscriber should add Mr. True's name to the earlier illustration.

THE ROYAL PALACE: STOCKHOLM, SWEDEN. NIKODEMUS TESSIN, JR., ARCHITECT.

In view of the recent political upheaval in Scandinavia, the publication of these views and the article published elsewhere in this issue has a certain timely interest,

THE HALL OF STATE: ROYAL PALACE, STOCKHOLM, SWEDEN.

THE GYMNASIUM: PRINCETON UNIVERSITY, PRINCETON, N. J. MESSRS. COPE & STEWARDSON, ARCHITECTS, PHILADELPHIA, PA.

DORMITORY OF THE CLASS OF '79: PRINCETON UNIVERSITY, PRINCETON, N. J. MR. BENJAMIN W. MORRIS, JR., ARCHITECT, NEW YORK, N. Y.

INTERIOR VIEWS: HOUSE OF GEORGE A. NEWHALL, ESQ., SAN FRANCISCO, CAL. MESSRS. MAYBECK & WHITE, ARCHITECTS, SAN FRANCISCO, CAL.

HOUSE OF EX-SENATOR G. H. BARKER, NEAR PASADENA, CAL.

HOUSE OF FRANK BERGEN, ESQ., BERNARDSVILLE, N. J. MESSRS. HOPPIN, KOEN & HUNTINGTON, ARCHITECTS, NEW YORK, N. Y.

Additional Illustrations In the International Edition.

THE ORANGERY: HOTEL ASTOR, NEW YORK, N. Y. MESSRS. CLINTON & RUSSELL, ARCHITECTS.

FOUNTAIN IN THE SAME ROOM.

NOTES AND CLIPPINGS.

EQUESTRIAN STATUE TO GENERAL FORREST.—The equestrian statue of Lieutenant General Nathan B. Forrest, C.S.A., was unveiled in Forrest Park, Memphis, Tenn., May 16. The statue is the work of Mr. C. H. Niehaus. It was cast in Paris.

A TRANSMOGRIFIED LONDON.—American and Colonial visitors to London this year, writes a London friend, will be struck by the evidences on all hands of the rapid growth of a new and magnificent city. The old familiar Strand already boasts some new buildings that suggest the glories of Paris, and now the great piles which the Government are erecting in Whitehall and Parliament street for the War Office and the Board of Trade suggest that before long this new London will be one of the most magnificent cities in Europe. In Regent Street, the old-fashioned crescent of George the Fourth's time is being in part demolished in the clearing of St. James's Hall, which is giving place to a monster American hotel, which will have a frontage in Regent Street and Piccadilly. Within the next few years it may be that old, grimy London will be transformed as much as the French capital was under Napoleon the Third's régime. What was it Dr. Johnson said, speaking as usual like a whale? "It is not in the showy evolution of buildings, but in the multiplicity of human habitations that the wonderful immensity of London consists." In the past but little taste and no magnificence in design were found in the bulk of London's buildings. But in these days a more opulent commercial class has displayed more ambition in the building of houses of business; and some of the millionaire firms and great public companies having set the fashion, a display of wealth in stone and mortar has succeeded to the unobtrusive and often ugly houses of past generations, whose age alone made them picturesque or interesting. It is a most fascinating study to the observer in almost any part of London today to watch the sweeping changes and the striking contrast between the old and the new buildings that make one wonder what London will be like in another ten or twenty years.—*"The Cosmopolitan" in Boston Transcript.*

THE UNITED STATES AS A MARKET FOR FRENCH ART.—It is well known that the cities of the United States are advantageous markets for works of art by French artists. During the year the value of such works imported into New York alone was £447,000, an increase of £13,000 over the year preceding. It has been caculated that France supplied 43 per cent. England, however, comes second with 23 per cent. of the imports. That may appear incredible, but statistics often reveal facts which are unexpected. There might be a larger percentage from this country if some of our sublime officials would condescend to suppose that artists have commercial interests like the leather dressers and tin merchants. In virtue of reciprocity agreements concluded with France, Germany, Italy and Portugal, paintings in oil and water colors, pastels, pen-and-ink drawings and statuary can be imported at a lower rate of duty from those countries than from the United Kingdom. Is it not time that Great Britain should be placed on equality with Portugal, although a little trouble might be imposed on our official world or some section of it?—*The Architect.*

THE HIGHEST-PRICED SITE IN NEW YORK CITY.—The historic southeast corner of Wall St. and Broadway, known as 1 Wall St., was sold this week for $700,000 cash, a little more than $625 a square foot, the highest price ever paid for a parcel of real estate in New York. Lorenzo E. Anderson, the vice-president of the Mercantile Trust Company, of St. Louis, bought the plot for a client from Edward Mitchell and Grosvenor S. Hubbard, 44 and 46 Wall St., the trustees and executors of the estate of the late Benjamin Douglas Silliman. The lot measures only 29.10 by 39.10 feet, and includes 1,170 square feet. At this price a full lot, 25 by 100 feet, would be worth more than $1,750,000.

The building on the lot at present is an old four-story structure and is leased to the United Cigar Stores Company for three years for a net annual rental of $25,000. The lease dates from May 1, 1905. The next highest prices realized for plots of New York real estate were $400 a square foot for the southwest corner of Wall St. and Broad St. and $348 for the northwest corner of 34th St. and Broadway.

The parcel sold has for years been considered one of the most valuable on Manhattan Island. It has been in the Silliman family for more than half a century, and the last transfer was recorded in 1872, but was between members of the family. The late Benjamin Douglas Silliman, who was known as the "Nestor of the New York Bar," refused an offer of $600,000 for the plot two months before he died, on Jan. 24, 1902. The American Bank Note Company at one time had offices in this site, and Jim Fisk had an office here in his palmy days. In the cellar are a number of old vaults which were used in the war for the storage of valuables. W. Wheeler Smith, who owns the building at 7 Wall St., which inclosed the plot sold on two sides, has often tried to buy No. 1 without success.

There is an old anecdote that a broker once asked Mr. Silliman to put a price upon the land. He replied that he would take as many gold dollars as would cover the lot. The broker figured this out and made an offer, but the crafty owner declared that he had arrived at the result by placing the coins flat, whereas he meant that each coin should stand upright.—*New York Tribune.*

THE VALUE OF LIGHTNING-RODS.—M. R. Chavannes discusses the general prejudice against lightning-rods in Paris *Electricien*, and his argument is translated and adapted by the *Electrical Review*. He calls attention to the need of investigating more thoroughly the value of these devices so as to remove this feeling. A distinction is drawn between lightning-arresters (parafoudres) and lightning-rods (paratonnerres), the former being that type of apparatus intended to protect objects insulated from the earth, and the latter protective devices for objects not so insulated. The reliability of lightning-arresters has been taken up by a Swiss commission, but its report has not yet been made public. M. Chavannes holds that lightning-rods are valuable protective devices when properly installed, but the way in which this should be done is not well recognized. The original idea of a lightning-rod was a device which would allow atmospheric charges to escape slowly to the ground, but, in fact, the action of the device is generally otherwise. Discharges are sudden and severe, and have apparently an oscillatory character. M. Chavannes has conducted experiments on a laboratory scale, with a view of studying the effect of sudden oscillatory discharges, using for this purpose high-tension transformers. These experiments have given the following results: The surface of a lightning-conductor is as important as its cross-section. The ohmic resistance of the conductor is of little importance. Breaks in the continuity of the conductor are of small consequence. The self-induction of the conductor should be as small as possible. Induction between the lightning-conductor and neighboring circuits may give rise to discharges in these circuits, and offer a resistance to the discharge of the main circuit. A house covered with a metal roof is analogous to a condenser, and may set up resonance phenomena.

The following rules should be observed wherever possible: All lightning-protective apparatus should be placed exterior to the building. The rod, the conductor and the ground plate should be placed in a straight line. The coefficient of self-induction should be sensibly zero. While it is not always possible to arrange the different parts of the lightning-rod in a straight line, unnecessary bends should be avoided. M. Chavannes believes that, when the question has been studied thoroughly and the necessary conditions more fully understood, the real value of lightning-rods will be recognized, and that, by means of them, the accidents due to atmospheric discharges will be greatly reduced.—*N. Y. Evening Post.*

The American Architect and Building News

Vol. LXXXVII. SATURDAY, JUNE 24, 1905. No. 1539.

CONTENTS

OFF and on for several years, there have appeared in the daily newspapers of Wilkes-Barre, Pa., many and detailed complaints as to the manner in which the court-house for Luzerne County in that city was being built, or rather not being built, and for several months passed these complaints have been persistent and continuous, as the situation seemed to have developed into a complete dead-lock between the architect, Mr. F. J. Osterling, of Pittsburgh, and the general contractor, Mr. W. J. Smith, which the County Commissioners have been unable to dissolve. Recently the Grand Jury for the county, under instructions from the Court, have made inquiry into the situation, and have just rendered their report, a rather slovenly document by the way, from which we learn, amongst other things, that a grand jury may do other things than simply find indictments, or refuse to find them, but may recommend action of various kinds which may tend to the promotion of the public welfare. In this case the recommendations are, first, that Mr. Osterling be dismissed at once and another architect be appointed to his place by the judges of the County Court, and, second, that the contractor, though possibly equally deserving of dismissal, be given a chance to carry on the work under the new architect. Not having all the evidence before us, we cannot guess why this discrimination has been made in the treatment of the two men. All we can say is that we have at different times seen in print obviously partisan statements that reflected with equal unpleasantness on architect and contractor alike.

HOW intelligent actually were the twenty-four men who constituted the grand jury, we do not know; as their names are "good American names," and the men reside in a dozen different townships in the county, they probably are a representative body. But judging from the text of their report, one of the chief reasons for recommending the dismissal of the architect, since it is the first mentioned and receives the largest part of their attention, is one for which Mr. Osterling may or may not be responsible. The fact that seems to them most abhorrent is this: under the terms of the competition, which was held early in 1899, competitors were given to understand that the commission of the successful architect entrusted with the work was to be five per cent. on four hundred and fifty thousand dollars, and two and a half per cent. on whatever sum the building might actually cost in excess of that amount. Yet when the Commissioners actually made the contract with Mr. Osterling, they agreed, simply, to pay him five per cent. on the cost of the building, an arrangement obviously for his advantage, but which seems to afford no reason in itself for now requiring his dismissal. But the grand jury is much impressed with the iniquity of the contract and, as it does not seem possible to break it, advises for this and other reasons the dismissal of the original architect, so that his successor may be compelled to have his commission computed as announced in the competition notice.

UNFORTUNATELY for Mr. Osterling, there are more sinister charges brought against him. He seems to have been able to induce Mr. Smith to contract for the stone with a concern in which the father and the brother of the architect are chief owners, and he seems further to have overcertified, in the sum of at least fifteen thousand dollars, on the work actually done by the sub-contractors for fireproofing, and, furthermore, expert testimony has been procured tending to show that the steel work introduced by these fireproofing contractors does not comply with the requirements of the specifications, and there are other charges of a less serious nature. Now, if the architect is dismissed he will probably bring suit for breach of contract, and the facts will then be ascertained in court, so it is not worth while to discuss the matter here. The facts are that there has been a very grievous delay, and that this delay is due to a falling-out between architect and contractor, and for such disagreement there seems ample justification on the following statement of fact: Some time after the awarding of the contract the Commissioners decided to make a change in the entrance to the building, one which the architect assured the judges of the Court would "cost but a trifle." The contractor, however, demanded a supplementary contract for this alteration in the sum of seventy-two thousand dollars; the architect then produced his own figures, showing the cost should be about nineteen thousand, and finally a contract was made for the change in the sum of forty-seven thousand dollars, a goodly sum, but still nearly thirty thousand less than the contractor desired to pocket. But the building was still to build, and there would be other chances of making good. But when, in the case of later alterations in the foundation-work the

Entered at the Post Office at New York as second-class matter.

contractor found that the architect valued the cost at twelve thousand dollars less than he did, it is easy to see how and why an effective dead-lock between architect and contractor may have come about. Our readers, who have had their own experiences, might possibly have reached another conclusion than that reported by the Grand Jury of Luzerne County.

THE action recently taken by the Cleveland Chapter of the American Institute of Architects seems to us regrettable, astonishing—coming from members of a liberal profession—and, really, not a little cowardly. With a preamble that declares that "the best results can be obtained by the employment of local architects and builders," the Chapter has published a resolution, addressed to the building-committees of the various important buildings in Cleveland in the future, recommending that "Cleveland architects be employed"—quite forgetting to add a similar recommendation on behalf of builders. The purely accidental fact that certain architects are doing business in a given town does not guarantee their ability to create as satisfactory buildings as the community amid which they dwell really deserves, while, if the buildings they have already erected do give assurance of the highest capacity, why is there need of any resolution? Many people will feel satisfied that the action just taken by the Chapter really means that the members, as they review the work they have already accomplished, have been stricken with misgivings as to its real worth, and, though they cannot longer deceive themselves in the matter, half hope they can deceive the community by putting forth a resolution. "Johnny on the spot"—to use a colloquialism of the hour—has, by the mere fact of being there, all the advantages against outsiders that legitimately should be his, in his intimate knowledge of men, local conditions, needs and sentiments. Cleveland architects are clearly the most American of Americans; they wish to live and do within their own little ring-fence, with high-tariff protection against outside competitors, the doors tight shut, and yet demanding the "open door" for the entry of their goods into every other community that may hold an architectural competition. We have no patience with attempts to use organizations established to promote the general interests of the profession and the art merely as engines for securing the commercial prosperity of members in them.

PHILADELPHIA has, in the person of Mr. W. B. Powell, a city architect whose occupation is likely to be pretty seriously affected by the new political upheaval in that city. Through the manipulations of the party "machine" and its "boss" a good deal of municipal work, that normally should have been submitted to Mr. Powell, has been steered into the hands of unofficial architects, the most fortunate of whom is said to be the brother-in-law of the boss, his commission on one important building running as high as seventy thousand dollars. Mayor Weaver's reforms have put an end to all that sort of thing, for the moment at least, and Mr. Powell is likely to be far more busy than he has for some time.

SOMETHING in the way of a similar political house-cleaning seems to have taken place last year in Australia, as the result of which the Government architect of New South Wales congratulates himself and the public on now having a much more efficient, though far less numerous, corps of assistants than cumbered his office before the new "drastic investigation" took place. How drastic the change was is shown by the fact that whereas in July, 1903, he had under him four first-class architects, seven second-class architects, eight district-architects and fifteen draughtsmen, a year later "the respective numbers were three, four, five and ten," and instead of eighty-one assistant-engineers and thirty-seven engineering-draughtsmen there were of each class respectively but twenty-eight and nineteen, the reduction in force effecting a saving in salaries of over one hundred thousand dollars annually—and yet the working force was found to be more efficient than when in its inflated form.

WHILE it is not so laborious and important a task as that of the Italian Government's in preparing a list of the works of art in the Kingdom, or as that initiated by the Pennsylvania Academy of Fine Arts in listing those of Philadelphia, private as well as public in both cases, the listing of the works of art belonging to the municipality of New York undertaken by the Municipal Art Commission of that city was a very desirable and almost necessary thing to have done. The city's artistic property, apart from its architectural monuments, consists of paintings, statues, busts, medallions and bas-reliefs, fountains, tablets, stained-glass windows, lamp-posts and eight mounments, ranging in dignity from the Fireman's Monument in Hudson Park to General Grant's Tomb on the Riverside Drive. Many of the smaller and more movable numbers were practically unknown to the public and lost sight of by everyone, coming to light only through a close scrutiny of each room in every public building. In some cases it has not been possible to ascertain the name of the artist, but the record is surprisingly complete in detail.

WE were somewhat hasty a week or so ago in assuming that a Frenchman was generally fairly satisfied if, in return for some service rendered, he were empowered to adorn his breast or his button-hole with the insignia of some order of merit. It is possible that one might consider it worth many dollars to have the right to wear the Victoria Cross or the clasps of the Garter, the Legion of Honor, the Golden Fleece, the Black Eagle and yet find it a little unreasonable to be expected to forego the satisfaction of having some sixty thousand dollars in one's bank account, because of being allowed by a gracious potentate to endue oneself with the insignia of the "Imperial Order of the Lion and the Sun." This, at least, seems to be the feeling of a French architect, M. Meriatt, at whose instance the Tribunal of the Seine has just summoned to appear before it his serene mightiness Mouzzaffer Ed Din, generally known as the Shah of Persia, and explain why he seeks to make his order of the "Lion and the Sun" stand as payment for the sixty-thousand dollars he owes M. Meriatt for a certain pavilion designed and built by him at Teheran.

HEATING AND VENTILATION[1]—IX.

THE pumps used for returning the condensation to the boilers are automatic in action. They are usually combined with a receiving tank of wrought or castiron mounted upon the same base. Inside of the tank is a ball-float connected by means of levers with a valve in the steam pipe which supplies the pump. When the water-line in the tank rises above a certain level, the float rises and opens the steam-valve which starts the pump. When the water is lowered to its normal level the valve closes and the pump stops. By this arrangement a constant water-line is maintained in the receiver and the pump runs only as needed to care for the condensation as it returns from the heating system. In buildings of considerable size it is customary to use a wrought-iron tank somewhat larger than that commonly furnished for this purpose, and to connect it with two duplex pumps, each of sufficient size to do the whole work. This gives an extra pump in case of repairs. In this arrangement it is usual to use a pump-governor instead of a float in the tank. The governer consists of a chamber connected at top and bottom with the receiving-tank and containing a float which operates the steam-valve in the manner already described.

When two pumps are provided it is customary to use them alternately, changing once a week or so, and thus keeping them both in working order. If one is allowed to remain idle too long at one time, it is apt to become rusty or gummed with oil inside.

Where different parts of the system are run on different pressures, it is necessary to discharge the condensation from each into the receiving tank through a trap; the tank being connected with atmospheric pressure through a vapor pipe carried to the top of the building. Overhead returns and the condensation from the main heater are trapped directly into the receiver, while, in case of the main heating system, it is desirable to seal the long horizontal return pipes in order to ensure quietness of operation. This is accomplished by establishing a "false water-line" at such a height as desired by the use of a "water-line" trap. On account of its form and construction, the Curtis-balanced trap is especially adapted to this purpose when properly connected.

The condensation should enter at or near the bottom of the trap, which is elevated to the required height, and a balance or equalizing pipe leading from the heating system is connected with the top of the trap.

A return trap is sometimes used in small plants for returning the condensation to a boiler in place of a pump. In principle, a return trap consists of a chamber or receiver placed 2 or 3 feet above the water-line of the boiler. The returns are connected with this, and when it becomes nearly filled the action of a bucket or tilting-bowl opens a valve and admits steam at boiler-pressure to the space above the water in the trap. This higher pressure closes a check-valve in the return connection, and the water in the trap being at a higher level than that in the boiler and under the same pressure, flows back by gravity. When the trap is empty, the bucket falls and closes the steam-valve; then, as soon as the steam in the trap condenses and the pressure falls, the condensation flows into it again, as before.

A check-valve in the trap discharge prevents the water in the boiler, which is under a higher pressure, from backing into it while filling.

Figure 38 shows a typical arrangement for a pipe heater, with

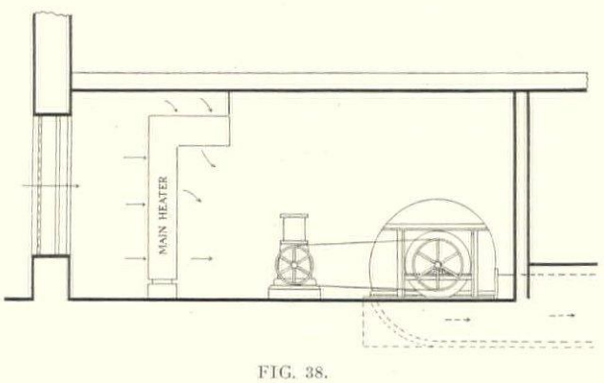


FIG. 38.

a fan discharging into an underground airway. In this case a higher boiler-pressure is carried, and reduced pressures are used for the main heater and direct heating-surface; the condensation must be pumped back to the boilers, as already described. Figure 39 shows a common arrangement for the return connections in a

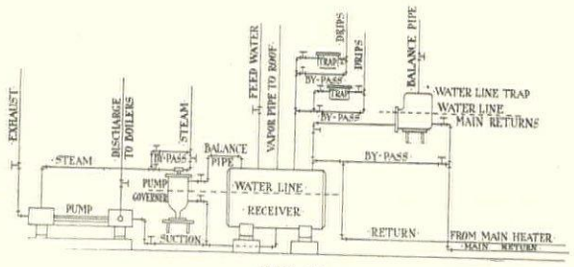


FIG. 39.

combination system of this kind. The traps from the different systems and drips discharge into a vented receiver, as shown, and the water is pumped back to the boilers automatically, when it rises to a given level in the receiver, a pump-governor being used to start and stop the pumps, as required. A water-level or seal of suitable height is maintained in the returns from the direct heating system by the use of a water-line trap placed upon a shelf at the desired elevation.

In case indirect supplementary heaters are used at the base of the flues, instead of direct radiation in the rooms, the heating-surface may be reduced about one-half. This is because the higher velocity of the air passing over them when placed in this position doubles their efficiency. Heaters of wrought-iron pipe are some times placed in the flues, but more commonly pin-radiators are hung at the basement ceiling.

Temperature regulation may be obtained by placing mixing or by-pass dampers at the heaters, or by the use of automatic steam and return valves, which shut off and turn on the heaters as required.

Theventilation of the toilet-rooms of a school building is of the greatest importance. The first requirement is that the air movement shall be *into* these rooms from the corridors instead of outward. To obtain this result it is necessary to produce a slight vacuum within them, and this cannot well be done if fresh air is forced into them. One of the most satisfactory arrangements is to provide exhaust ventilation only, and to remove the greater part of the air through local vents connecting with the fixtures.

A duct may be carried along back of the fixtures, having a sectional area of about 12 square inches for each one, and connected with the local vents.

Sometimes a closed chamber is constructed of slate or marble back of the fixtures and the local vents connected directly with this. Ducts are taken from the tops of the chambers and connected with heated flues or with exhaust fans. In case of grammar-schools or small high-schools a loop of 1½-inch pipe from 30 to 40 feet high within the flue will usually furnish sufficient heat to produce the necessary draught. Where it is convenient, an open heater containing 30 or 40 square feet of heating-surface and placed in the flue just above the connection from the fixtures will be somewhat more effective.

In large buildings an exhaust fan is often connected with the sanitary fixtures. If this is done, a discharge of 10 to 12 cubic feet of air per fixture per minute should be provided for; this gives a velocity of 125 to 150 feet per minute through a pipe 4 inches in diameter, which is sufficient to carry off all odors and provide sufficient general ventilation from the room. Disk fans are generally used for this purpose, being placed in the attic and run by electric motors. The following table gives the air-delivery per minute against a slight resistance, and the proper size of motor for fans of this type:

Diam. of fan.	Rev. per min.	Cu. ft. of air per minute.	Horse-power of motor.
18	800	1,500	½
24	500	2,300	1
30	410	3,500	1
36	380	5,700	1½
42	330	7,800	2
48	280	9,900	3

Small toilet-rooms having a single fixture may be vented through the local vent, the same being connected with a 5 or 6 inch vertical pipe containing a loop of ¾-inch pipe 6 or 8 feet high. This vent-pipe may be carried up inside the vent-flue from

[1]Continued from page 194. No. 1538.

a class or other room to a point 12 or 15 feet above the last inlet from a room, and may then discharge into the general ventilation. When carried to this height there is very little danger of odors being carried downward into the rooms by back-draughts.

Chemical hoods are either connected with a hot flue or are ventilated by means of a fan. Where there are only three or four hoods, a gas-jet placed at the top just below the outlet will usually give sufficient draught.

When there are a larger number of hoods to be ventilated, it is better to connect them with a fan of sufficient capacity to change the entire contents of all the hoods five or six times per minute. A fan for this purpose should be provided with copper blades.

Automatic temperature regulation is now successfully used both in dwelling-house and school-house work. The principal systems of automatic control now in use consist of three essential features: First, an air-compressor, reservoir and distributing pipes; second, thermostats, which are placed in the rooms to be regulated; and third, special pneumatic-valves on the radiators or diaphragm attachments at the mixing-dampers.

The air-compressor is usually operated by water-pressure in small and medium sized plants and by steam in larger ones. A water-compressor is similar in principle to a direct-acting steam-pump, in which water under pressure takes the place of steam, as the motive power. A piston in the upper cylinder compresses the air, which is stored in a reservoir provided for the purpose. When the pressure in the reservoir drops below a certain point, the compressor is started automatically, and continues to operate until the pressure is brought up to its working standard.

A thermostat is simply a mechanism for opening and closing one or more small valves, and is actuated by changes in the temperature of the air in which it is placed. In some thermostats the valves are operated by the expansion and contraction of a metal strip. The degree of temperature at which it acts may be adjusted by throwing a pointer one way or the other. Another form operates on a somewhat different principle. It consists of a vessel separated into two chambers by a corrugated metal diaphragm. One of these chambers is partly filled with a liquid, which will boil at a temperature below that desired in the room. The vapor of the liquid produces considerable pressure at the normal temperature of the room, and a slight increase of heat crowds the diaphragm over and operates the small valves in a manner similar to that of the metal strip just described.

The pneumatic-valves which replace the usual shut-off valves on the raditors are similar in construction to the ordinary globe or angle valve, except that the stem slides up and down instead of being threaded and running in a nut. The top of the stem connects with a flat plate which rests against a rubber diaphragm. The valve is held open by a spring, and is closed by admitting compressed air to the space above the diaphragm. In connecting up the system, small concealed pipes are carried from the air-reservoir to the thermostat, which is placed upon an inside wall of the room, and from there to the pneumatic-valve at the radiator. When the temperature of the room reaches the maximum point for which the thermostat is set, its action opens a small valve and admits air-pressure to the diaphragm, thus shutting off the steam from the radiator.

When the temperature falls, the thermostat acts in the opposite manner, and shuts off the air-pressure from the diaphragm valve, and at the same time opens a small exhaust, which allows the air above the diaphragm to escape. The pressure being removed, the valve opens and again admits steam to the radiator.

Thermostats may be arranged in the same way to open and close mixing-dampers by the use of diaphragms and suitably connected levers.

CHARLES L. HUBBARD.

(To be continued.)

THE SEPARATION OF CHURCH AND STATE IN FRANCE.

WE have received from some one, presumably the correspondent whose letter may be found in another column, a copy of *The Converted Catholic* containing a paper by Augustine Baumann, a quondam Passionist Father, from which we are glad to make the following extract:

"The efforts of the French Government to dissolve its unnatural union with the Church of Rome is a task of Herculean dimensions. Judging from the fact that the matter has been prepared for over a year and the project has taken up a whole session of discussion in the French Chamber, bringing it no farther than the beginning of the fourth article in a bill containing nearly fifty, it is evident that it was almost easier for Napoleon to make the famous Concordat than it is for the French Republic at the present day to break it.

"The first three articles laying down the principle that the Church and State are henceforth to be separate were voted, almost in one sitting, without any discussion. On the principle all are agreed. It is almost unanimously recognized that there can no longer be any fraternity between the two institutions. But the problem to be solved by the bill comprises the numerous details concerning the allotment and control of Church property.

"Church property in America, as a rule, has a very simple meaning. In most cases it consists of nothing but the place of worship and perhaps a presbytery. But in France, where the Roman Church has been established for ages, and has enjoyed privileges of every description under royal patronage, the question of church property becomes an enormously complicated matter.

"It consists of almost everything which may be possessed. It includes not only places of worship, convents, institutions of every description, lands, communal rights, etc., but also incomes of all sorts—pious foundations of the most varied nature, national monuments, treasures of art, without forgetting even the famous patent or license of the Carthusians to manufacture a world-renowned liqueur.

"If an angel from heaven were asked to come and create order out of this chaos he might well decline the task. It is no wonder, therefore, that the French Deputies (for the bill has not yet reached the Senate and may not reach it this year) find themselves in a hopeless tangle. They wish to do justice to everybody, and although few of them have seen the inside of a church since the day they were baptized or married, they wish, as far as possible, to take the standpoint of the faithful, and make a law which will not shock the sentiments of any honest believers.

"Although many of the Deputies had a vague notion that the Church of France was rich and the treasures, now to a great extent under the control of the Government, enormous, still they were all startled when among the first things brought to their notice was a circular of the Minister of Worship stating that the works of art, such as paintings, reliquaries and curios, contained in the churches of France were estimated at a commercial value of $400,000,000, and the statues, marble altars and similar works of sculpture in stone amounted to another $400,000,000. Adding to this the value of all the churches, cathedrals and shrines, many of which are unique historical monuments, which is at least another $400,000,000, the total value of the treasures of the Church, counting only the temples and the works of art, amounted to $1,200,000,000, or six milliards of francs, a larger sum than the famous ransom paid to Germany thirty-five years ago.

"The circular of the Minister of Worship, M. Bienvenu-Martin, was issued to all the Prefects and Sub-Prefects of France, commanding them to take an inventory of all the treasures of the Church. The reason for this step was that Rome had an inventory taken of the same objects, and it was reported that there was a scheme on foot in many parts of France on the part of the clergy to sell such treasures of art as might find a ready sale in the market, and lay by the money, robbing not only the Government, but the people, towns and villages where these treasures have been kept for ages.

"The danger was not imaginary, but real, as is proved by the fact that at Nice, for example, the throne of the former bishops of that city, which is considered one of the finest pieces of wood carving of the sixteenth century, was sold to a dealer. The curé of Montpezat sold a beautiful set of tapestry, the gift to his church of an ancient noble family, to a well-known art-dealer, M. Lippmann, for two thousand francs, in order, he said, to add a little to the revenue of the Church. M. Lippmann, who knew the value of the tapestries better than the curé, sold them soon after for forty-five thousand francs. The curious fact in connection with this sale is that the priest sold the articles with the consent of the bishop.

"At present the Government is supposed to be the owner of all these treasures, and the clergy were, on being appointed to their posts, considered merely as delegates or caretakers. The strangest thing of all is that a Socialist Minister like M. Bienvenu-Martin, who is far from being a devout Catholic, should have to undertake the defense of the treasures of the Church and put a stop to the vandalism of the clergy.

"The French Chamber of Deputies, in voting the bill of 'separation' is, therefore, concerned not only with the question as to who shall hereafter be the legal owner of the Church property, but also, in view of the ignorance or indifference of the clergy, to prevent the loss to France of some of its most valuable and ancient treasures of art.

"The fourth article in the bill on the separation of Church and State was drawn up with a view to settle the question. The laws of the United States and England were taken as models. But although in America and England, where conditions are much simpler, they work admirably, many additional provisions had to be introduced to meet the situation in France.

"The article states that associations are to be formed for purposes of worship, containing at least seven members, clerical or lay, in each parish or on behalf of each congregation, and that these associations are to be considered invested with the legal ownership of all the Church property belonging to such congregations.

"The whole debate for one month hinged on this article. On the one hand, it was argued that the text was too vague; there might be an association of seven members formed with the parish priest at the head, a second with the vicar at the head, a third with the bishop, etc., and then who was to decide which of these associations represented the congregation? On the other hand, it was said, dissenting members might claim a church and the law would give rise to schism in the Church and all the disorders of religious disputes in villages and country districts.

"The authors of the bill, M. Briand and the Minister of Worship, explained that, in case of conflict, it was understood that the case would have to be decided by the courts, and that it was impossible to foresee all the conflicts that might arise. This at once raised a storm. Many Deputies whose enthusiasm for the Church is only a borrowed one for political purposes, said that the law was a deliberate trap set for believers, that it paved the way to the wildest schisms and dissensions; that instead of giving the country peace and religious tranquility it would stir up endless religious strife.

"M. Briand, in defending the text, said: 'The real objection of the adversaries of the bill is that the new law confers a new and unexpected power on the civil tribunals. But this is inevitable. The clergy will sooner or later in every modern and free State be compelled to submit to the same courts and the same laws as other citizens. The law tends to their own emancipation, although, strange to say, they do not seem to see it or to wish that emancipation.

"There are a hundred thousand priests to-day in France who are defenseless and without judges in all questions concerning their ministry. They will have these judges and defenders to-morrow in the persons of the judges of the ordinary tribunals. A priest unjustly treated by his bishop, removed from office without just cause, will hereafter be at liberty to appeal to the courts and then the bishop will have to give valid reasons for his action. The fact is that for the future, a priest will no longer be merely a curé or a vicar, but also a citizen.

"The debate was concluded on the eve of Easter as regards the first clause of the fourth article, which was finally voted, but the discussion concerning further details will probably continue many months longer.[1]

"The Catholic clergy have been filled with consternation, not at the prospect of the separation of Church and State, but at the separation of the Church from its treasures."

REPORT OF THE LIGHTNING RESEARCH COMMITTEE.

THE long-promised report of the Lightning Research Committee, appointed nearly five years ago from among members of the Councils of the Royal Institute of British Architects and of the Surveyors' Institution, assisted by experts, has just been published. It is prefaced with a note by Sir Oliver Lodge, who points out that the main differences between what is recommended to-day and what was considered sufficient by the Lightning-Rod Conference in 1882 result from the recognition of the influence of self-induction on electrical inertia. Twenty years ago it was supposed that all that was necessary was to get electricity from the clouds to earth as quickly and easily as possible by the shortest path—the drain-pipe theory. Now, however, it is perceived that it is not so much quantity of electricity that has to be attended to as electrical energy; that this electrical energy is stored between clouds and earth in dangerous amount, and that our object should be to dissipate it not as quickly, but as quietly, as possible. "These, then," says Sir Oliver, "are the two points of novelty: (1) The possible occurrence of a totally unprepared-for and sudden flash in previously unstrained air, by reason of overflow from a discharge initiated elsewhere: what is called the B spark, ocurring as the secondary result of an A spark. (2) The effect of electrical inertia or momentum, so that the discharge is not a simple leak or flow in one direction, but a violent oscillation and splash or impulsive rush, much more like an explosion, and occurring in all directions at once, without much regard to the path which had been provided for it; no more regard, in fact, than is required to enable the greater part of it to take the good conductors, and to prevent any part of it from being able to enter a perfectly inclosed metallic building."

The committee state that experiments have tended to demonstrate that iron is in many situations a very useful material for lightning-rods, as the effective energy of a flash of lightning for rapidly dissipated in iron. This metal, however, unfortunately oxidises rapidly in towns and smoky districts, and the use of copper as a material for a lightning-rod is still recommended for main conductors in relatively inaccessible positions, though iron is electrically preferable. The committee consider that with few exceptions buildings in this country are not in reality efficiently protected against the effcts of a B flash, although in many cases the lightning-conductors may be said to have at least partially fulfilled their purpose by carrying off the more violent portion of a discharge, and that without them greater damage would have occurred in many of the cases reported. Many of the reports of damage to unprotected buildings show that the lightning discharge followed the path of wire ropes, metallic pipes, and other conductors, and that the damage to the structure occurred at the breaks in continuity at the upper and lower terminals, respectively. It may be considered that a lightning-conductor of the ordinary type, if properly constructed, affords an undefined area of protection against A flashes; but it cannot be said to have any protective area against B flashes. Absolute protection of the whole of a building could only be assured by inclosing the structure in a system of wirework well connected at various points to earth—a contrivance, in fact, of the nature of a birdcage. For structures intended for the manufacture or storage of explosives the adoption of this birdcage protection would be justified on the score alone of public safety. Architectural considerations prevent the adoption of such a method in its entirety for ordinary buildings; there is no doubt, however, that practically perfect protection may be assured by a judicious modification of the existing practice of erecting single lightning-rods. especially in the case of extensive and lofty buildings that project well above surrounding structures, or that stand isolated in the open country. It is obvious that the extent to which the building should be protected, and the expense to be incurred in this protection, must bear some definite relation to the importance or cost of the building itself. In cases where heavy expense is not justified, two or more lightning-rods might be erected in the ordinary manner, these being connected by a horizontal conductor, and the metal portions of the roof and the rainwater down-pipes should be metallically connected and well earthed. Tall chimney shafts are not efficiently protected against a B flash by an ordinary single lightning-rod, as a hot column of smoke issuing from a chimney conducts as well as or even better than a rod. A circular band should surround the top of the shaft; four or more conductors should be raised above the latter in the form of a coronal, or the Continental practice of joining the elevation-rods together, so as to form an arch over the chimney, may be employed with advantage. One or, preferably, two lightning-rods should extend from this circular band to the earth. As most buildings contain systems of gas and water pipes, a good earth for lightning-conductors is highly desirable. The various cases noted by the committee show that, while even single conductors tend to diminish the damage done to buildings by lightning, no reliance can be placed on an area of protection. In churches and other buildings with spires and towers the lower projections should also be protected, even if forming part of the salient features of the building. No cases of damage to modern steel-frame structures have come under the notice of the committee. The ordinary method of construction, however, in this country does not provide full protection. In many cases the steel columns stand on stone foundations, and the metal is not carried deep enough for effective earthing. The metal columns ought to be earthed at the time of construction. In the opinion of the committee the methods advocated in the

[1] Since this was written the articles up to and including Article 16 have been debated and adopted.—EDS. AM. ARCHITECT.

report of the Lightning-Rod Conference still hold good, provided arrangements are made to keep the earth permanently moist.

The investigations of the committee warrant them in putting forward the following practical suggestions:

1. Two main lightning-rods, one on each side, should be provided, extending from the top of each tower, spire, or high chimney stack by the most direct course to earth.
2. Horizontal conductors should connect all the vertical rods (*a*) along the ridge, or any other suitable position on the roof; (*b*) at or near the ground line.
3. The upper horizontal conductor should be fitted with aigrettes or points at intervals of 20 feet or 30 feet.
4. Short vertical rods should be erected along minor pinnacles, and connected with the upper horizontal conductor.
5. All roof metals, such as finials, ridging, rainwater and ventilating pipes, metal cowls, lead flashing, gutters, etc., should be connected to the horizontal conductors.
6. All large masses of metal in the building should be connected to earth either directly or by means of the lower horizontal conductor.
7. Where roofs are partially or wholly metal-lined they should be connected to earth by means of vertical rods at several points.
8. Gas-pipes should be kept as far away as possible from the positions occupied by lightning-conductors, and as an additional protection the service-mains to the gas meter should be metallically connected with house services leading from the meter.

In an appendix to the report, the committee gave particulars of, and observations upon, 115 cases out of over five hundred buildings in Great Britain known to have been injured by lightning during the three years 1901-4. Of these 115 buildings, 75 were without any form of protection, and the other 40 had been provided with lightning-rods. The failures appear in most cases to have been attributed to an insufficient number of conductors or to the ineffective quality of the earth connections. A second appendix gives particulars of the latest practice in Holland, Hungary, Germany, the United States, and Canada.—*The Building News.*

SPRING EXHIBITIONS IN LONDON.

THE rejection of Mr. Thomas's "Lycidas" by the Royal Academy has been a magnificent advertisement for the sculptor, which, probably, was not the result contemplated by the Council. A snub when an artist or author has influential friends and eager trumpeters, is of more value than wholesome praise be it given by powers that be or professional critics. In this particular case the probability is that the work would have been little noticed had it been placed in the sculpture hall of the Academy; whereas at the New Gallery it has been given a good position in their spacious entrance hall, and the notoriety of the Academicians' mistake has brought the artist deserved fame. "Lysidas" is not the first work of art which has been unjustly treated by Academicians (by many thousands); but the thousands have had to bear their misfortune as best they could; whereas the thousand and first, with a few other fortunates, has had his sorrow turned into joy—the injustice has made him famous. After all, the blunder is nothing to the one committed years ago when M. Rodin was turned out, and the Academicians asked "Who is Rodin?" just as they asked on another famous occasion "Who is Harpignies?"—questions one would imagine impossible in these days of international exhibitions and tourist tickets.

But why did the Academy thus bring itself into trouble? Is the statue a great work of art? That is the question on everybody's lips, and the answer is undoubtedly in the affirmative from one point of view, that of Realism—Mr. Thomas has paid no attention to the conventional codes usually observed by sculptors.

The figure is excellently modeled from an ill-made man, or rather from a man who has suffered from the wearing of clothes. Instead of a perfect example of humanity, this figure is full of imperfections consequent upon the facts of modern life, of which the feet are the most glaring examples and may suffice for this occasion. In painting, we are allowed to represent very imperfect specimens of humanity, but in sculpture, Michael Angelo and M. Rodin are the only famous breakers of the law of convention which come to our minds, although the rank and file may include a few others of minor fame. The Greek artist who gave us the Venus of Milo was content also to model his exquisite figure from the life, and hence his goddess remains to this day a work of intense interest which the more perfect examples of Greek sculpture do not possess. The Italians of the Renaissance were satisfied with Nature, and often extremely imperfect nature; why then should not an Englishman of the 20th century be allowed to show the world a figure modeled from an imperfect specimen of humanity, if he thinks it a more fitting interpretation of his idea, than it would have been, had the imperfections been toned down and made beautiful according to the code of Greek perfection? That is the gist of the whole matter—the point of view; and certainly if an artist represents a Greek runner, a man whose body has been more or less free from the bad effects of clothes, as he would a modern European who had taken off those encumbrances, he naturally makes a mistake. An Italian fisherman or an Arab has preserved the beauty of his feet simply by reason of his shoeless daily life; whereas the ordinary dweller in the North has been obliged to pass his days with his feet shod in what cannot be called anything but devices to destroy their natural shape and beauty. But Mr. Thomas has a great example among artists for this manner of treating his subject (if it were intentional), and he might ask if Donatello idealized the model who stood for his "S. John the Baptist." Art is, or ought to be, wide enough to include Phidias, Michael Angelo, and Donatello, just as it includes Memlinc, Titian, and Velasquez.

Another disputed work is Mr. Colliers's "Cheat" from another point of view—which is the Cheat? Well, surely this is obvious. Given a scowling lady with red hair playing bridge with two gentlemen who look anxious, and another lady who is standing to denounce the sitter, can there be any reasonable doubt? Yet crowds surround the picture and talk, and talk, and discuss what seems to be their only interest in the work. Certainly it is the least satisfactory of a series of indifferent pictures of popular games by gaslight.

The landscapes are many and excellent at the Academy, and the "Cubbing" by Charles Furse makes one lament once more the untimely death of this clever young artist who was elected an Associate a few weeks only before he was taken from us, cut off at the outset of what was certain to have been a successful career. Why does not the R.A. adopt the graceful custom of the French artists, of placing a crape bow over the pictures of artists who have recently passed away?

Mr. La Thangue continues in his original path as regards technique, unpleasant to the eye though it be; but his effect of sunlight is remarkably successful. Mr. Fred Hall has been equally successful in the same effect, but by simpler and pleasanter means—the sunlight in his "Purbeck Hills" is marvelous. The setting sun shines upon a hill opposite one occupied by sheep and the effect thus portrayed is gained by a series of touches of opposing colors—blue, green, madder, yellow; there is no blackness, no darkness one might say; but the light snadows only enhance the intense glow of sunlight. The picture is a study for landscape painters.

Of Mr. Sargent's many portraits, "Mrs. Ernest Raphael," is one of his greatest successes. The line of the dark velvet bodice is unpleasantly hard—as an old lady remarked: "When we wore gowns made like that one, we sewed in a white lace tucker." But were it only remarkable for the painting of some pendant pearls, it would be an artistic *tour de force*, a marvelous example of frank and direct painting. Possibly a certain hardness would not have hurt the eye at the first glance had the background been less monotonously dark—it is just suggestive of, and brings to the recollection, some unpleasant performances of Ingres's; but when one studies the wonderful modeling of the face and neck, the superb treatment of the pearls, the Empire armchair, and other accessories, the portrait strikes one not only as Mr. Sargent's masterpiece, but as a masterpiece among contemporary painters. Will the painter never give us another subject picture, was our reflection in passing through the Tate Gallery the other day. "Lady Warwick," at the R. A., is less successful, and the great Marlborough picture is, of course, a species of historical painting which, with all its faults, may hold its own in the future among other heirlooms of the family; but Mr. Sargent is quite himself in the dextrous *A vele Gonfie.*

Mr. Orchardson's portrait is one of his exquisite studies of tone and color.

Of quite different elements is the exhibition at the Grafton Gallery of a portion of the late James Staats Forbes's collection of French and Dutch pictures. Here we may study many of the original drawings by Millet which have become familiar to the public in the many cheap little books upon artists of note which have lately swarmed upon our bookshelves. The Corots are many of them very fine, and one or two show us the painter before he painted classic landscapes, such as a delightful little "River Corner."

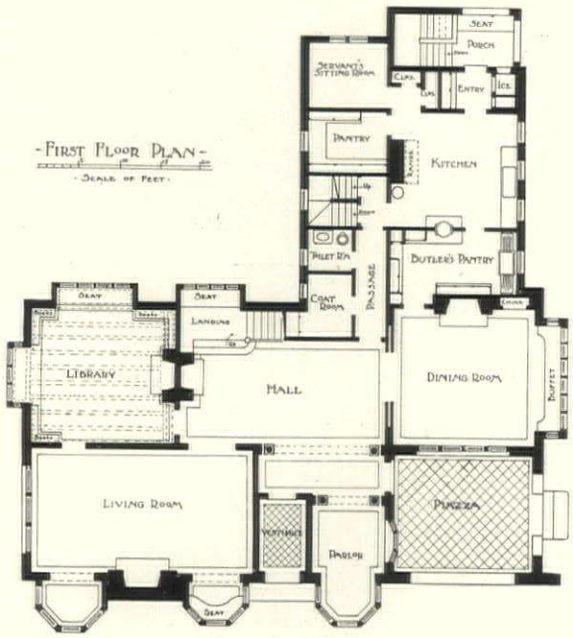
Mauve is in great force, always charming, although his talent was a limited one. The numbers by Diaz make one wonder once again why he has gained such a great reputation; but there is no gainsaying the charming art of Israel, of Gabriel, David Cox, Bonnington, and above all, of Constable and Daubigny, two of the greatest landscape painters the world has seen. PENGUIN.

ILLUSTRATIONS

DESIGN FOR LIBRARY FOR UNIVERSITY OF MAINE. MR. FRANK A. BOURNE, ARCHITECT, BOSTON, MASS.

ELECTROLIER, TWENTY-THIRD STREET AND FIFTH AVENUE, NEW YORK, N. Y. MR. V. A. CIANI, SCULPTOR.

HOUSE OF W. H. NEVINS, ESQ., SPRINGFIELD, MASS. MR. G. WOOD TAYLOR, ARCHITECT, SPRINGFIELD, MASS.



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G. Wood Taylor, Architect.

UNITED STATES MARINE HOSPITAL, SAVANNAH, GA. MR. JAMES KNOX TAYLOR, SUPERVISING ARCHITECT, WASHINGTON, D. C.

HOUSE OF SAMUEL CABOT, ESQ., CANTON, MASS. MESSRS. WINSLOW & BIGELOW, ARCHITECTS, BOSTON, MASS.

ENTRANCE, FRONT: HOUSE OF MR. JOHN L. BATCHELDER, JR., BROOKLINE, MASS. MESSRS, SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.

REAR VIEW OF THE SAME.

HOUSE OF H. N. CURRIE, ESQ., MAGNOLIA, MASS. MR. W. W. WARD, ARCHITECT, NEW YORK, N. Y.

COMPETITIVE DESIGN FOR $3,000-HOUSE. MR. GEORGE R. TOLMAN, ARCHITECT, RICHMOND, VA.

This design was submitted in a competition for designs for cheap houses, recently held by the Publishers of the *Ladies' Home Journal.*

Additional Illustrations in the International Edition.

HOUSE OF W. B. BOULTON, ESQ., CEDARHURST, LONG ISLAND, N. Y. MR. HENRY T. RANDALL, ARCHITECT, NEW YORK, N. Y.

COMMUNICATIONS.

THE FATE OF FRENCH ECCLESIATICAL PROPERTY.

BROOKLYN, N. Y., June 5, 1905.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sirs—I noticed in your issue of last week an editorial paragraph deprecating the action, or proposed action, of the French Government with regard to ecclesiastical buildings.

I should be one of the last to justify any act of vandalism involving, as you seem to anticipate, the destruction of real works of art, especially if with their artistic features is combined some truly useful quality. Your reference to Henry VIII.'s raid on church property, however, as being similar in character to the present action of the authorities in France, and also to the "harrying of the faithful" by that action, is suggestive of the possibility that you have fallen into the error, to which we are all more or less liable, of viewing this question from a mere specialist standpoint, without due regard to its general character and bearing.

The present movement in France is likely to be fraught with results in the highest degree beneficial to the nation at large, if not, indeed, to the whole civilized world, carrying with it, as it promises to do, emancipation from the thraldom of centuries of superstition and priestly tyranny; and it surely ill becomes any American, synonymous as the word is supposed to be with Freeman, to utter one word calculated to discourage or retard the progress of that movement, even although—which is in the highest degree improbable—the sacrifice of works of architectural or artistic value be its necessary concomitant.

C. WHITLEY MULLIN.

[It seems to us that our correspondent should not chide us and allege that we have "fallen into the error of viewing this question from a mere specialist standpoint," since it is our peculiar duty to look on the matter as specialists.—EDS. AM. ARCHITECT.]

HISTORIC ORIGIN OF CHURCH STEEPLES.

Burlington, Vt.

To the Editors of THE AMERICAN ARCHITECT:

Dear Sirs—Will any reader of THE AMERICAN ARCHITECT tell with *good authority* why churches are generally adorned with *steeples?* If you can answer this question it may not be necessary to publish it, but I have never yet found one who can give me the desired information. Most say the steeple points toward heaven, which, of course, is mere sentiment, and has nothing to do with the real reason. The writer has been unable to get the desired information from college presidents, clergymen, writers on Church architecture, cyclopedia or dictionary.

Very truly,
JOSEPH DANA BARTLEY, M.A.,

[Our correspondent's choice of the word "steeple" seems to imply that his inquiry is not limited to the spire alone, which in its modern form we take to be nothing more nor less than the architectural evolution of a need for, in some way, roofing a tower. Without undertaking to quote authorities we will say that church steeples, as now usually associated with church fabrics, are the simple and natural outgrowth of a need of the social, not the religious, life of the times when they were introduced, say, probably, about the sixth century, as the campanil at Ravenna amongst the oldest church towers date from about that time. The church was the rallying point for the people in time of public danger and alarm—the siege of Manila affording the most recent instance of such resort—and the church itself and especially the tower was often fortified, Albi, Perpignan, Avignon, Mont St. Michel, in France, offering instances of such fortified buildings, while the temple churches of various knightly orders afford later examples. Church towers were in the first instance watch-towers and signal stations. The tower of Hedley Church, Middlesex, England, has on the top platform an iron cresset fire-pan which was used as late as 1745 for giving an alarm, and the fact that towers were frequently surmounted with a "lantern" testifies to their use as signal stations. As the population thickened and it became possible to give alarms by bell, the treatment of the tower had to be varied so as to allow of the introduction of a belfry-stage, roofed over in one form or another, and the architectural treatment of this roof finally evolved the conventional spire. Yet this too, had its function, as serving in the daytime to indicate to those afield in which direction they should at need direct their flight—it was obviously more possible to run up a wooden spire to a point overtopping neighboring forests than a masonry tower of the same height. Viollet-le-Duc says: *"C'est principalement dans les contrées ou la féodalité séculaire élève ses châteaux les plus formidables, que les cathédrales, les abbayes et plus tard les paroisses, construisirent des clochers magnifiques et nombreux."* This was partly because the bishops and abbots had the same sort of feudal rights as to the maintenance of fortified places as the secular nobility, and partly was the result of mere imitation and rivalry. "Spires whose 'silent fingers point to heaven,'" is, we are convinced, merely a modern sentimental explanation.—EDS. AM. ARCHITECT.]

THE RIGHT TO ESTABLISH BUSINESS.

To the Editors of THE AMERICAN ARCHITECT:

Dear Sirs—As a subscriber to your periodical I would like to know your answer to the following:

Query.—What is there to prevent, in New York City, an architectural designer from joining in partnership with a modeler and sculptor, mosaic worker and others, and do business as decorative sculptors and modelers, and handling and working marble for interiors and exteriors, mosaic and tiles, free or sand stone and lime stone and modeling and sculpture?

Would we, as a concern, clash in any way with associations and unions as long as we hire union labor even if we, as a concern, do not become members of the Employers' Association?

Yours respectfully, H.

[We have no certain knowledge as to the difficulties our correspondent would encounter, but as the mosaic workers, the tile layers, the decorators, the marble workers and the modelers, each, have their separate union, we feel entirely satisfid that one or more of these unions would find easy excuse for making serious trouble, even if the union scale and hours should be scrupulously observed. Still there are concerns in New York who successfully carry on an equally variegated business. Money, pluck and tact in sufficient quantity and properly applied, might remove all obstacles.—EDS. AM. ARCHITECT.]

THE LIGHTING OF SCHOOL ROOMS.

To the Editors of THE AMERICAN ARCHITECT:

Dear Sirs—In reading Mr. Paul Gerhard's excellent articles, "Essentials of School Sanitation," I find one sentence which

seems to me ought not to go unchallenged, viz.: "Windows on opposite sides of rooms are always bad."

The methods of lighting class rooms in Europe are: "In England we have in the past always neglected the question of lighting our school rooms scientifically. Provided the quantity was sufficient, little care was used as to source or direction. [Robson, *School Architecture*, 1877, page 178.]

The German experts up to twelve to eighteen years ago require unilateral lighting from the left and now prefer windows in two adjacent sides, attributing the cause of myopia so prevalent in Germany to the former improper lighting of their rooms, although they were rarely over 20 feet wide. The best light on adjacent sides would be from the left and the rear; if the sun strikes the windows on the left the shades are drawn; they are dimmed and the main light would fall upon the pupils from the rear, throwing a shadow upon their work, and the teacher from his platform would look into this light.

The new French requirements permit light on one side only for rooms not exceeding 21 feet in width and in this case openings for ventilation must be made in wall or partition opposite the windows, occupying the whole of the wall space above the level of the tops of the doors. [AMERICAN ARCHITECT, March 21, 1896.] Rooms of greater width must have bilateral light; their long axis must run N.N.E., S.S.W., not to vary more than 40 degrees from N. to S. [AMERICAN ARCHITECT, Nov. 18, 1893.] By this arrangement, should it become necessary to dim the windows on one side, the light from the opposite side would remain in full force. The new French requirements are based on conclusions formed by a commission of eminent scientific men, mainly oculists, appointed by the French Government to investigate the problem of lighting school-rooms. The gentlemen limited unilateral lighting to rooms of five metres in width, and stated that there was no scientific evidence produced before them to sustain the opinion that cross light in rooms lighted bilaterally affected the eyesight injuriously. [Planat, 1882, Vol. I., page 21, *Construction de Maisons de École.*]

One of our public school-houses has been erected in accordance with the French requirements, the lighting has been found excellent; the drawings of it were published in THE AMERICAN ARCHITECT for Dec. 23, 1899. Respectfully yours,

GUSTAVUS STAEHLIN.

NOTES AND CLIPPINGS.

PARTIAL FAILURE OF THE SULPHATE OF COPPER WATER PURIFICATION.—It appears that the copper treatment of sources of water supply, of which so much was heard a year ago, and which was tried on a considerable scale in the Belchertown reservoir, is not an unqualified success. The theory of Dr. Moore of Washington, D. C., was tried by putting into this reservoir about three hundred pounds of blue vitriol, making a solution of about one part of blue vitriol to 8,000,000 parts of water. The pond was entirely cleared of vegetable growth in eight days, and while it was not claimed that the anabena would not reappear, it was supposed that it would be only in small quantity. Now it seems that not only has the anabena reappeared in this reservoir, but it has come about two months earlier than usual, while the water is at a temperature which was supposed heretofore to be too cool for the anabena to flourish in. The theory accounting for this is that the copper sulphate also killed the organisms in the water which have heretofore kept the anabena down until late in the season. Possibly a repetition of the treatment of last summer might result in getting rid of the vegetable growth which is so offensive, but the experiment cannot be coinsidered a success, and it is plain that the efficacy of the copper treatment in purifying water supplies has not been demonstrated sufficiently.—*Boston Transcript.*

WINCHESTER CATHEDRAL SERIOUSLY IN NEED OF REPAIRS.—The widening of a large crack on the south side of the choir of Winchester Cathedral near its eastern end has aroused the Dean and Chapter and their advisers to action. Last week a large excavation was made by workmen in the employ of Mr. John Fielder, of Winchester, on the south side of the east end, a few feet from the wall, to ascertain the state of the foundations of Bishop de Lucy's choir ambulatory, built between 1189 and 1204. At a depth of 16 feet, after traversing a bed of peaty mould, a stratum of gravel was found, as well as a strong stream of water, which appeared to flow southwards from under the cathedral itself. Hand pumps were put into the hole to clear out the water, which rapidly rose to a height of 5 feet; but after some hours of work it was found impossible to get the water lower than 2 feet. Boring was then started to ascertain the depth of the gravel stratum, for the purpose of judging its value as a foundation for underpinning; but, owing to lack of apparatus this work was suspended for a time. Mr. Jackson, the diocesan architect, visited the cathedral on Thursday, and conferred with the cathedral architect, Mr. Colson, on the matter. The east end of the cathedral was built upon swampy ground, and the foundation rests on oak piles. After the lapse of several centuries these piles may very possibly be decaying. At the present time the wall abutting on the Lady chapel is about 2 feet out of the perpendicular, and a great part of the east end is tilting towards the west. At the bottom of the excavation 16 feet below the present surface level, several pieces of finely-finished Roman pottery were found, along with a brass stylus, Roman tiles, and an almost perfect specimen of a silversmith's crucible.—*Building News.*

THE POSSIBILITY OF PROPAGATING THE BIG TREES OF CALIFORNIA.—The United States Bureau of Forestry has reached the stage, in its experiments looking to the reproduction of the famous "big trees" of California, of making the positive announcement that, contrary to prevalent belief, this race of forest monarchs need not become extinct, but may be greatly multiplied. In a bulletin just issued it is said the trees seed freely, but that the seeds rarely germinate, except when they fall where the ground has recently been burned over. Once started, the young growth need only a moderate amount of light and protection from fire and stock grazing. Healthy young growth, it is stated, is rare, but in some sections there are plenty of seedlings. It is proposed to remove some of these to localities best suited to their growth. The first extensive transplanting of the big trees has been accomplished in the General Grant National Park, California.—*Exchange.*

OPENING OF NEW MUSEUMS IN PARIS.—The Musee des Arts Decoratifs, definitely arranged in the Pavillon Marsan, has at last been formally opened. The ceremony has afforded an opportunity for appreciating the work of the architect to the Louvre, M. Redon, who has entirely transformed the portion of the Tuileries along the Rue de Rivoli and facing the Pavillon de Flore. Sixty new rooms have been allotted to the Union Centrale, which at its commencement was installed in the Palais de l'Industrie. The removal of that building has been the occasion for giving the collection a much larger and more sumptuous home, in which, thanks to M. Peyre and other generous donors, it can be grouped on a methodical system and with provision for future extension. The new rooms have been arranged by M. Redon around a very large central gallery lighted from a series of small cupolas. The central hall, preceded by a vestibule, leads to a large gallery looking on the Tuileries, the balcony of which overlooks the old "Jardin Royal." The Museum will be open every day, from mid-day on Mondays and from 10 o'clock on other days, till 5 p. m. in summer or 4 p. m. in winter. The entrance will be one franc on ordinary week-days, half a franc on special holidays, and free on Sundays.

At the other end of Paris, in the middle of the Bois de Boulogne, another museum has just been opened which will find great favor in Paris, especially in the artistic world—that of the Chateau de Bagatelle, the former home of Sir Richard Wallace, purchased by the Municipality of Paris, and put gratuitously at the disposal of a group of wealthy amateurs, who allow their collections to be seen there at the cost of a small entrance fee, the proceeds of which will be devoted to the purchase of such works of eminent masters as may be offered to the City of Paris with the view of forming a permanent collection. Various pictures of the English school have formed the subject of the first exhibition, which occupies one of the pavilions, and includes works by Gainsborough, Hoppner, Reynolds, Romney, Lawrence, and Constable. In the other pavilion, which is a kind of small edition of the Trianon, built by the Comte d'Artois and bearing his motto "Parva Domus sed Apta," is a collection of furniture and curiosities of XVIIIth century art, containing many rare and beautiful objects, arranged so as to give the impression of the interior of a princely mansion of the pre-Revolution period. —*The Builder.*