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VOL. XXIX.

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ARCHITECTURE

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DECORATION

TICKNOR & COMPANY

CONSTRUCTION

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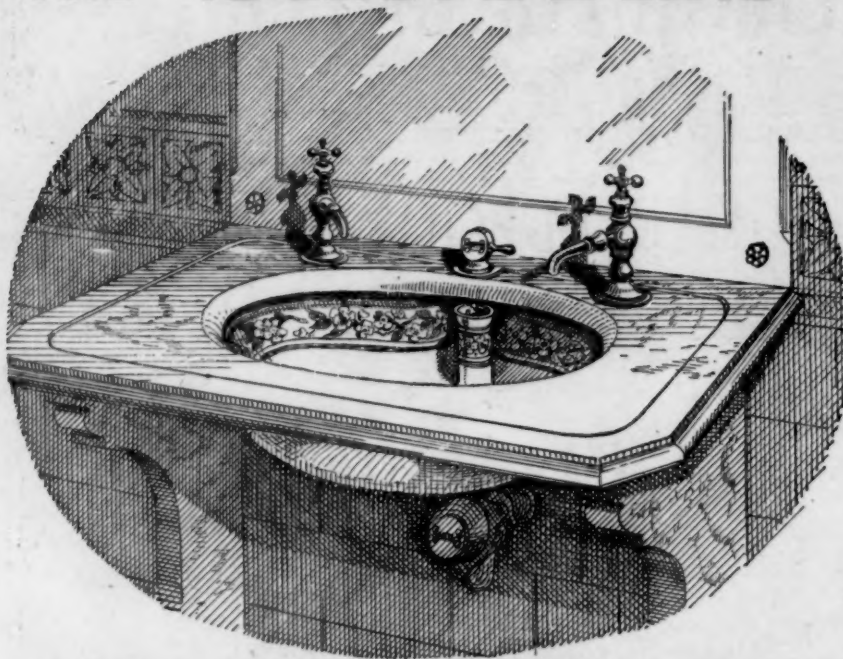
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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XXIX.

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JULY 12, 1890.



SUMMARY:—

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WHAT seems to us a rather unfair assault has been made upon the reputation of the new Thirty-second Regiment Armory, in Brooklyn, N. Y., following a report upon the condition of the building drawn up by the Colonel of the regiment. It may be imagined that a military man would not be the best judge of carpentry, and the newspapers have zealously improved upon his criticisms. Among other things we are informed that "the whole thing was a fraud. The big, solid oak doors that were supposed to be placed in the armory turned out to be comparatively thin affairs of pine, with an oak veneering. They have shrunk and warped until they cannot now be closed or opened without the exertion of at least one horse-power. Two or three soldier boys have to get their grip on the knob and pull away for three or four minutes before the doors will open. Some of these doors are wrecks, owing to this kind of usage, and need replacing." It will puzzle architects to divine how the "shrinkage" of a door, or even its warping, could make it bind so fast in its frame as to render it difficult to open without a combined attack by "two or three soldier boys." As for the "fraud" practised by veneering the doors with oak on a pine core, no one with the slightest knowledge of building needs to be told that this is not only the best way of making what is called an oak door, but that a door so made is more expensive than one of solid oak; and the reason why architects require hardwood doors to be veneered, instead of making them solid, is that a panelled door of solid oak, in our furnace-heated buildings, would warp, and crack badly. In the present case, instead of practising a "fraud, the contractor seems simply to have taken too much pains to get his doors thoroughly kiln-dried, and to have jointed them too accurately into their frames. In an armory, exposed to great variations of temperature and moisture, kiln-dried stock cannot be as closely fitted as in a dwelling-house, without danger that the swelling from dampness will cause it to bind. In a dwelling-house, the owner, if he finds that the doors stick, sends for the contractor to plane the back edge a little, or set in the hinges, which a careful contractor, who always prefers to make the fit at first rather too close than too scant, is perfectly willing to do; but in the case of the armory, instead of notifying the builder to come and "ease" the doors which had swelled, the "soldier boys" seem to have preferred to amuse themselves by tearing them to pieces, and then charging the wreck to the account of the contractor's "fraud."

A SOMEWHAT similar story is related of the drill-room floor, which, we are informed, "looks like a lot of small toboggan-slides." The explanation of this remarkable phenomenon is given by one of the papers, which says that "The supposed hardwood is soft pine, and has warped at spaces of two feet. It was never seasoned, and has never been planed." We are sure that architects would interpret these indications very differently, and much more favorably to the contractor. Whether pine was actually substituted for hardwood we, of course, cannot say, but it is at least very unlikely that any contractor would, without authority, make such a change, which would be instantly observed by every one who knew anything about the specification. As to the planing, again, we cannot say what the specification may have demanded, but we will hazard a guess that this document required that the floor-boards should be planed one side, to reduce them to an even thickness, and laid with the unplanned side up, for the sake of getting a better foothold for marching. Of course, the average newspaper reporter would never think of this, but would regard the unplanned surface as convincing evidence of one of the "frauds" which he is so quick to detect. Here, however, his last ground for criticism seems to end. The "warping," which threw the floor into "a series of small toboggan-slides" is, evidently, not warping, but the effect of the swelling, through dampness contracted in the building, of very dry floor-boards, laid very closely. It may comfort the reporters to know that they are likely never to see another example of "warping" of this sort in or about New York. The art of laying floors is very imperfectly understood by most New York contractors, and the rule there is to take boards of perhaps a few months' seasoning, mill them in a manner which excites the horror of a New England carpenter, and put them down in the building without any drying whatever. In a few weeks the boards shrink, leaving the ample joints between them characteristic of New York floors, but producing at least no "toboggan-slides." These formations are due to the drying of the floor-boards in a kiln, before bringing them to the building, and then laying them as closely as possible. The New England carpenters usually keep their floor-boards stacked for two weeks, at least, over a gridiron of steam-pipes, in a building heated to nearly the boiling-point of water, and bring them directly to the place where they are to be used, so that, when laid, they are often warm to the hand. They are, in laying, forced together with flooring-clamps, and the floor, for years afterwards, often looks like one piece, the joints being so close as to be indistinguishable. It is hardly necessary to say that if boards dried to this extent, and closely laid, are exposed to dampness, they will swell, and, if no other relief is afforded, will "huff up," drawing out the nails which secure them to the joists. In the furnace-heated New England houses, this is a rare occurrence, but an armory is just the place where a painstaking New England floor-layer might meet with a severe disappointment in this way, and the indications are that this is just what happened. For the plastering, which the accounts also criticise, we can make less defence. It is said that "Every time a company of men orders arms, some of the plaster falls off with a crash"; and "when it does not fall, the surface rubs off on the coats of those who hang their garments against the wall." In one room, it appears, "all the plaster in the ceiling has fallen to the floor." Most of us have occasionally seen plastering of this sort, and it is at least as common in New York as in other places; but, while this part of the work seems unquestionably to have been improperly done, that is no reason for condemning as a "fraud" the use of veneered doors.

MR. W. L. DOZIER, a young architect of Kansas City, died a few days ago under distressing circumstances. Being in active business, he found, as many architects do, that his cares and responsibilities weighed upon his mind so much as to prevent him from sleeping, and he often took a small dose of chloroform to induce sleep. We must say, as a warning to others, that the use of chloroform or chloral hydrate for this purpose is in the highest degree dangerous, and that loss of life or reason may occur without any warning. In the present case, Mr. Dozier, retiring rather late after a very hot day, probably found it difficult to sleep, and is supposed to have resorted, as usual, to a dose of chloroform.

Either this, together with the intense heat, or, as some suppose, the heat alone, acting upon a constitution not in a condition to resist it, seem to have brought on an apoplectic attack. About three o'clock in the morning, he rang violently at the door of Professor Parry's house, and, on being admitted, ran into the house and fell upon a sofa, dying almost instantly. The deceased was a young man of exemplary character, and had acquired a good and increasing practice. He had lived about seven years in Kansas City, coming there from Ohio.

THE New York *Sun* contains one of its liveliest descriptions of Mr. George Vanderbilt's new estate near Asheville, North Carolina. The fame of the house which he is to build upon it has already spread among architects and contractors, who have heard of it as the largest private house in the United States; but the details which the *Sun* reporter gives of the property in which it is to stand, and the methods of construction employed, will be new to most persons. Asheville, the most important point among the Black Mountains, the highest east of the Rocky Mountain range, is noted for its delightful climate. Mr. Vanderbilt had a fancy for a great country estate, and, knowing the reputation of Asheville, which he found to be justified by the reality, bought, in small lots, a tract of about five thousand acres, with four miles' frontage on the French Broad River, the principal stream of the neighborhood. The territory was first laid out under the skilful direction of Mr. F. L. Olmsted, and plans for the house made by the no less skilful hand of Mr. R. M. Hunt, and the work of construction is now well under way. No details of the plan are given, but it is understood that the building is to be nearly five hundred feet long, of Indiana limestone, in the early French Renaissance style, of which Mr. Hunt is so profound a master. One front stands at the edge of a terrace, formed upon the side of a mountain, and held up by a retaining-wall forty feet high. As bricks are not readily bought in the neighborhood, although clay is plenty, a steam brick-making plant has been set up, and bricks, to the number of two or three million, will be made for the mansion and dependencies, as well as drain-tiles, for the necessary under-draining of the estate. The site of the house being about two miles and a half from the nearest railroad, a branch railway has been constructed, at an expense of about seventy-seven thousand dollars, to bring materials to the place where they are needed. Water is to be brought by a six-inch pipe from a spring about three miles away. The place is said to be intended not merely as a pleasant summer residence, but as a permanent home for the owner and his family, and modern farming will be practised on an extensive scale. The neighboring country is far from being the wilderness, peopled by barbarians, that it was twenty or thirty years ago. Since 1880, Asheville has grown to be a town of twelve thousand inhabitants, with four miles of electric railway, sixteen churches, telephones and other requisites of modern civilization. Many of the people are rich residents from the North, who have been attracted by the climate. According to the United States Signal Service observer, the maximum temperature last year was seventy-eight Fahrenheit, and the minimum thirty-six; while there were only ten days in the entire year during which there was no sunshine, although the rainfall for the year was thirty-eight inches.

LE GENIE CIVIL contains a long article, describing the immense development in Europe, within a few years, of what may be called horticulture under glass. For a long time, flowers have been grown in greenhouses in Belgium and England, and to a smaller extent in France and Germany, and on the great estates in England it has been common to find two or three houses devoted to pineapples, grapes and tomatoes, with perhaps a shelf for strawberries, and a few cucumber-vines; but of late years this part of the work has been extended, until not only the more delicate fruits and vegetables, but even potatoes, are forced in glass-houses, in enormous quantities. The first English horticulturist who took up this business on a great scale appears to have been Mr. Meredith, of Liverpool, who, some years ago, arranged an immense establishment exclusively for grape-raising. Soon afterwards, the gardener to the Duke of Buccleuch, Mr. Thomson, who has the name in England of being the most skilful grower of grapes under glass in the world, built a vinery near Edinburgh, from which he still sends out vast quantities of grapes, which, under his name, are sold at exorbitant prices all over England. The writer of the article, M. Renouard, mentions that, wish-

ing, not long ago, to try some "real Thomson" grapes, he was obliged to pay nineteen shillings, or nearly five dollars, for the smallest bunch he could find, weighing about two pounds, while larger bunches, hanging in the windows of the Regent Street fruit stores, were marked at far higher prices.

ANOTHER grape-grower, who sends out also other fruit, as well as flowers, is Philip Ladds. This great horticulturist began business by selling flowers in the street, and at last saved money enough to build a greenhouse at Bexley Heath. From this beginning, he has come to have now fifty acres under glass, and is constantly adding to the area. Every day, thirty-four horses drag to Covent Garden market, about seven miles away, the flowers and fruit gathered either in the early morning or the afternoon before, while carloads are sent off to other parts of England. Among Mr. Ladd's houses at Bexley, ten, each a hundred and thirty feet long and twenty-six wide, are devoted to the gardenia, or Cape jessamine, a flower very popular in England, but almost unknown in this country. Another group of houses, covering fifteen acres, is devoted solely to grapes and tomatoes, and each variety of product has its special place, where aspect, temperature and other conditions are kept as favorable as possible. Another more recent establishment is that of the Rochford Brothers, near London, which has fifty-three acres under glass, devoted to flowers and vegetables. The most remarkable establishment of all, however, is perhaps, that of Mr. Bashford, in the Channel Islands of Jersey and Guernsey. Mr. Bashford, a few years ago, was a photographer. In some way, he conceived the idea of experimenting on raising vegetables under glass, and built his first greenhouse in 1874. His idea succeeded, and he has since then become a millionaire, and the principal grower for the London market. His houses are of colossal size; the latest addition to his establishment consists of a group of six, each a thousand feet long and thirty feet wide. Some are devoted to grapes, while in others tomatoes are forced, and in a third set potatoes are grown, a crop being obtained at Christmas, and another in April. A line of steamers runs from the islands directly to London, to carry the vegetables and grapes, which arrive in perfect condition.

ANOTHER incident of the building strikes deserves to be recorded, as illustrating the tender mercies of the people who claim that "capitalists" spend their time in devising means for "taking the bread out of the mouths of poor people." Quite recently, nearly all the other people in the building trades having struck in succession, the Union bricklayers in Boston took their turn, the reason why their leaders ordered them out being, we believe, that they were expected to work on the same building with non-Union men. It happened that, in a hotel now under construction by Messrs. Woodbury & Leighton, an old bricklayer was at work. He was a man of seventy, a good and experienced workman, who had tried to join the Bricklayers' Union, but had been rejected "on account of his age." The other bricklayers notified Messrs. Woodbury & Leighton that the veteran must be discharged, and, as his friends and employers declined to cast him adrift, they were "struck," and their building was stripped of workmen. We have before pointed out that walking-delegates, like death, love a shining mark, and, as Messrs. Woodbury & Leighton are also the contractors for the great Public Library building, they probably thought that they would get more gratuitous advertising by this attack than by any other that they could make; but, after a few days' idleness, the bricklayers themselves rebelled, and went back to their work, leaving the delegates highly dissatisfied with the proceedings.

IN other respects the Boston troubles seem to be progressing in a manner very satisfactory to the people who live by conducting such affairs. Whether the result has been equally satisfactory to the men who contribute to pay for having them conducted is another question. The great freestone cutters' strike still persists, but the leaders of the Union actually congratulate their constituents on the fact that only ninety members of the Union now remain in the city, the others having removed to other places, to pick up what work they can, at such wages as they can get. The striking carpenters, learning that the supply of money from their brethren in Philadelphia and elsewhere was not exhausted as they feared might be the case, recently voted unanimously to continue the strike.

RELIGIOUS ARCHITECTURE.¹—XIV.

THE FURTHER INFLUENCE OF BYZANTINE ARCHITECTURE.

IN France and beyond the borders, numerous edifices of the Byzantine order were erected during the Merovingian period; nothing, however, remains of these. Defective con-

struction was probably the cause of their complete ruin. It is through the chroniclers alone that we learn that Byzantine churches once existed near Paris, at Soissons, at Poitiers, at

Holy Sepulchre, built most of their churches or chapels on the circular or polygonal plan. The double-apsed edifice reappears in the ninth century in

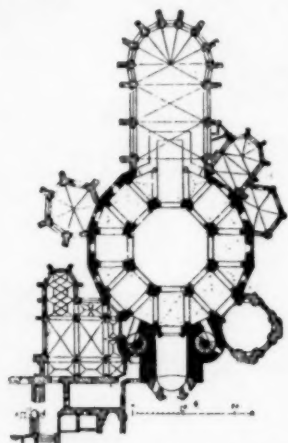


Fig. 1. Plan of the Chapel of Charlemagne's Palace, at Aix-la-Chapelle (8th-9th Centuries).

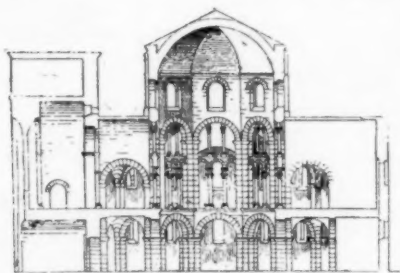


Fig. 2. Section of Charlemagne's Chapel.

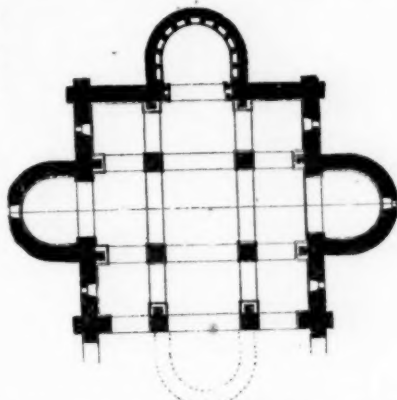


Fig. 3. Plan of the Church of Germigny-les-Prés (9th Century).

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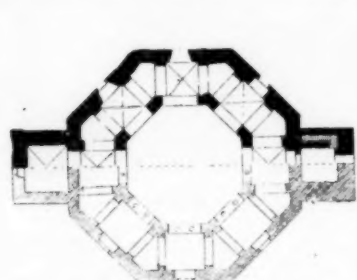
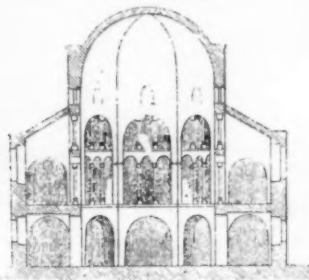


Fig. 4. Plan and Section of the Church of Ottmarsheim (11th Century).



Angers and at Clermont. Besides basilicas which, in general features, were doubtless much like those just described, a great many circular or polygonal churches were erected in imitation of S. Costanza and of S. Stefano Rotondo, at Rome. The old Saint Germain l'Auxerrois or Saint Germain-le-Rond, at Paris, was on the same plan.

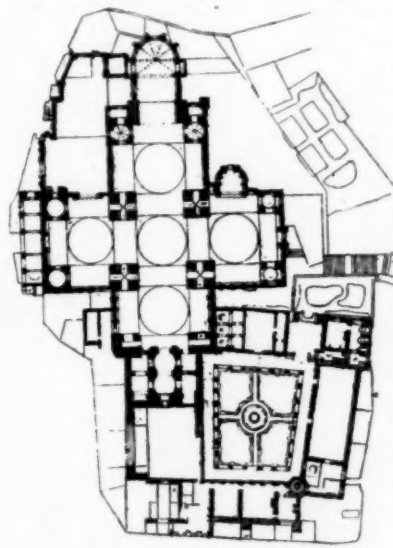


Fig. 6. Section of St. Front, at Périgueux (11th Century). After M. de Vernellh.

The edifices of which remains have come down to us date from the Carolingian era. The oldest known is the Dom at Aix-la-Chapelle, built by Charlemagne at the end of the eighth century. It is octagonal in plan (Figures 1, 2); the aisle running around the choir has sixteen sides and is two stories high. "Romanesque architecture is already foreshadowed in this edifice, by the systematic employment of groin arches in the vaults. But the absence of buttresses, and the spandrels introduced into the bays of the first story above the octagon, show its relation to Byzantine architecture."

Two reproductions on a smaller scale of Charlemagne's

the church at Germigny-les-Prés (Figure 3), which is evidently a product of the Byzantine style.

Coming down to the tenth and eleventh centuries, we encounter a specimen of church architecture, celebrated among



Fig. 7. Interior of St. Front, at Périgueux (10th Century).

archæologists, and which is derived from another Byzantine type. This example is all the more noteworthy because there have been many imitations of it in France, which, belonging to an epoch when Byzantine art was about to give way to a new,

¹ From the French of P. Planat, in Planat's "Encyclopédie de l'Architecture et de la Construction." Continued from page 5, No. 758.

NOTE.—By an error, the titles of Figures 11 and 12, printed in our last number, were transposed. The smaller plan is that of Santa Fosca and the larger that of the Martorana.

western style of architecture, exhibit a singular state of transition, wherein two opposing tendencies can be traced—the tendencies of the two extremities of the European world.

We refer to the church of St. Front at Périgueux, of the tenth and eleventh centuries. Is it, as has been affirmed, a copy of St. Mark's at Venice? To discuss this question intelligently, it would first be necessary to fix the dates of construction for both edifices, but it is impossible to do this. The most critical archæologists are inclined to the opinion that both churches are imitations of a third and much older structure, the church of the Holy Apostles, reared at Constantinople by Justinian. Nothing now remains of this last edifice; but the detailed description of it by Procopius seems to prove that it was the original model for structures of its kind, for the Greek historian's description is applicable

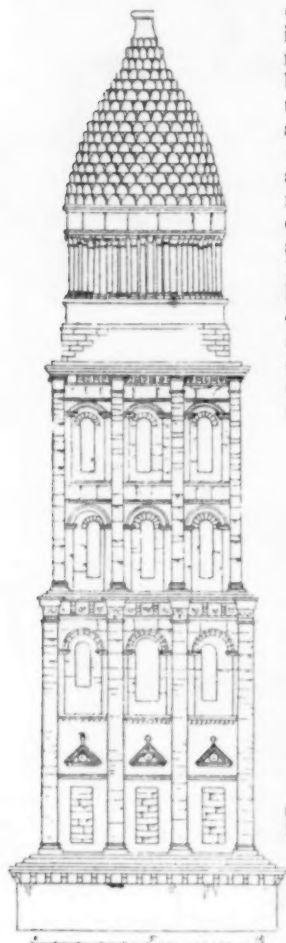


Fig. 8. Tower of St. Front.

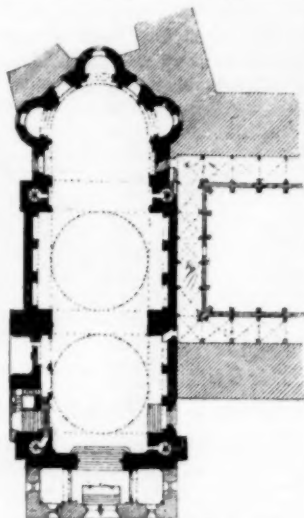


Fig. 9. Plan of the Church of Cahors (11th-12th Centuries).

alike to St. Mark's and St. Front. In any case the analogy is striking. (See above Figures 8, 9, 10.)

St. Front (Figures 5, 6, 7, 8) embraces five halls covered with domes resting on powerful hollow pillars, which are veritable turrets: the same construction is found at St. Mark's.

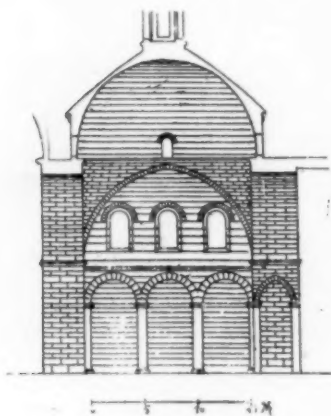


Fig. 11. Section of the Church of Cahors (11th-12th Centuries).

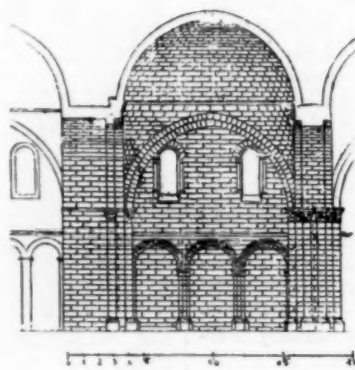


Fig. 12. Section of the Cathedral of Angoulême (11th-12th Centuries).



Fig. 13. View of the Cathedral of Angoulême.

The domes of St. Front are borne on pendentives, but both domes and pendentives are built by corbelling the horizontal courses of masonry; the constructive arches of St. Front are pointed, while those of St. Mark's are semicircular; the ruins

at St. Front, which give the plan the usual form of the Latin-cross churches, belong to anterior structures that have been partially preserved. A little later a return to the Latin form was effected, while retaining the series of square, dome-covered halls, as may be seen in St. Stephen's at Périgueux, the cathedral of Cahors (Figures 9, 10, 11) and the abbatial church of Souillac; then the supporting turrets were superseded by genuine pillars strengthened by pilasters; this change can be observed at Brassac, in the cathedral of Angoulême (Figures 12, 13) at Sablonceaux, at Fontevault (Figures 14, 15) where the similarity to the Angoulême cathedral is marked, and elsewhere. At the same time the ordinary barrel vault was revived for the transepts.

In the cathedral of Le Puy (Figure 16), which was evidently built in the same style, the successive bays are surmounted by octagonal drums, supporting octagonal cupolas. In the church of Champagne (Ardèche), the cupolas are on an oval plan and



Fig. 10. Interior of the Church of Cahors. After M. de Verneilh.

are crossed by two groin-arches. The collegiate church of Loches, originally ceiled in panels, was reconstructed in the twelfth century with pyramidal domes.

A most remarkable result of this local introduction of the dome into France is the peculiar form which it assumed when carried into neighboring provinces. In Anjou, where it encountered the northern system of groined vaults on diagonal arches, a sort of compromise was effected by which the intersecting vault was employed with a kind of stiling of the key, which gave it, the appearance of a cupola, in which the diagonal ribs constituted a decorative rather than a constructional element. This peculiarity is seen in the cathedral of Angers (Figure 17). The Plantaganet style thus produced prevailed exclusively in Anjou until the close of the thirteenth century, and a little later in certain more remote provinces.

"To sum up," says M. de Verneilh,¹ "the type of S. Vitale of Ravenna and of the Dom of Aix-la-Chapelle is one of the first created by Byzantine art. It is derived from the church

¹ F. de Verneilh. "L'Architecture Byzantine en France."

of S. Sergius at Constantinople, and is even connected, through the circular and octagonal constructions of Constantine, described by Eusebius, with such pagan rotundas as the Pantheon of Agrippa; it merely adds aisles to these.

"Precisely because of its antiquity, it has two forms, one Latin, as S. Costanza of Rome, the other Byzantine, and recognizable especially by the size of its central dome, supported on powerful pillars instead of columns. The rotunda type was introduced into France in various periods. It was usually in imitation of the Holy Sepulchre at Jerusalem that the Templars constructed their churches, but the copies were far from exact. Of old, inspiration was evidently drawn from the Dom of Aix-la-Chapelle. But, notwithstanding this, it cannot be said that

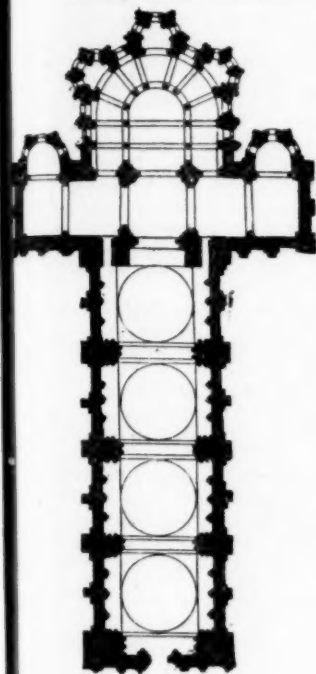


Fig. 14. Plan of the Church of Fontevrault (12th-13th Centuries).

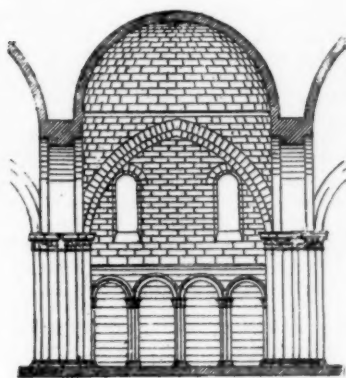


Fig. 15. Section of the Church of Fontevrault.

the monument of Charlemagne ever naturalized the Byzantine style on the banks of the Rhine. Little surely remains of this style in the Romanesque edifices of the region. We look in

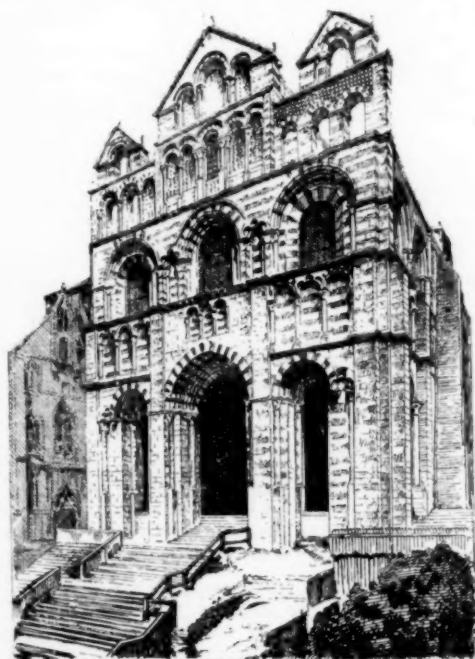


Fig. 16. View of the Church of Le Puy-en-Velay (12th Century). After M. Corroyer.

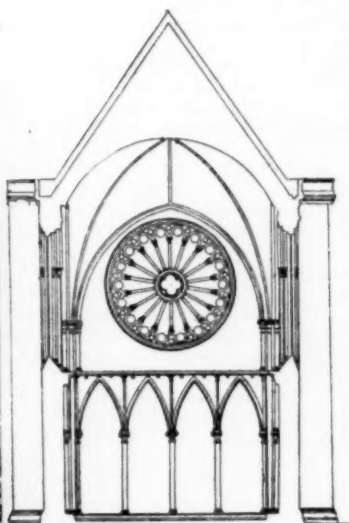
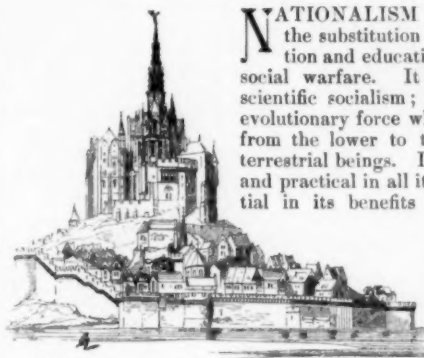


Fig. 17. Vault of the Cathedral of Angers (12th Century).

vain there for the dome of St. Sophia and of Périgord, so unlike the rotunda type, and constituting the most fruitful and characteristic element of the ordinary architecture of the Byzantines. If it had ever been produced there, it would have been perpetuated, as it was in Aquitaine."

(To be continued.)

ARCHITECTURE UNDER NATIONALISM. — I.



Mont St. Michel.

NATIONALISM may be defined as the substitution of universal coöperation and education for industrial and social warfare. It is a refinement of scientific socialism; a continuation of the evolutionary force which has raised man from the lower to the highest form of terrestrial beings. It is so strictly logical and practical in all its aspects; so impartial in its benefits to all classes; has already crept so deeply into the minds and hearts of thinking people in both continents, and has made such remarkable progress of late, in this country, especially on the Pacific coast, in

arousing the people to definite action with a view to hastening its practical introduction, that we are forced to believe the present generation will see it realized in all its main features. Nevertheless, there still exist many curious popular misconceptions as to its principles; and it is necessary to refer briefly to these, before entering upon the consideration of the particular branch of the subject we have chosen.

Perhaps the most common error in the popular conception of nationalism is that it will benefit chiefly, if not only the poorer classes, increasing their wealth at the expense of the richer. Whereas, a close study of its principles will clearly show that the wealthiest will in many respects, be the greatest gainers, not alone because, without the least diminution of their material possessions, they will be freed from association with a great unwashed and untutored public whom they both dislike and fear, but also on account of the many dangers and responsibilities inseparable from extraordinary wealth. For eighteen hundred years, at least, it has been pronounced a difficult feat for a man possessing wealth much greater than that of his neighbors to enter the Kingdom of Heaven, which would seem to indicate that Heaven is not a plutocracy but rather a commonwealth.

Another popular error, based on the first, is that the principle impeding the introduction of nationalism is selfishness, particularly on the part of the "capitalists" who control the machinery of production. For, since it is easy for any one who will investigate the subject, to see that all, without exception, will be immensely benefited thereby, it becomes clear that the real impediment is ignorance, and that selfishness will have the very opposite effect, and greatly aid its introduction as soon as this ignorance is removed.

Finally it is an error to suppose that nationalists either desire or require to appropriate, without just recompense, for the common use, property which is now possessed by individuals; to remove from office efficient workers in any calling; or to disturb the wheels of industry by any sudden, ill-considered action. The successful business man will retain all the advantages his industry and thrift have brought him, with this immeasurable gain, that he will be free from all worries and burdensome responsibilities now necessarily connected with them.

Considered in its relation to the architectural art, I propose to review, first the general, and then the specific advantages which nationalism will bring; and, in this material age, we may appropriately consider the material advantages first and the intellectual and moral ones afterwards.

That industrial coöperation enormously increases production is evident, and the trusts and great combinations of today seem created for the useful purpose of presenting to the world striking practical illustrations of the fact. But the extent to which that increase would be carried by a coöperation which is general throughout the nation, is likely to exceed the expectations of the most enthusiastic. With the imperfect statistics provided us at the present time, it is impossible to obtain anything more than approximate figures. But a safe minimum of waste may be reached, and even this minimum seems at first statement so monstrous that I have repeatedly refused to accept my own deductions, until again and again forced to do so by the overpowering weight of evidence.

I am convinced that it is very greatly understating the facts to say that at least nine-tenths of the energy exerted to-day is utterly wasted; or that, in other words, this country would produce ten times as much wealth annually under nationalism with the same quality of machinery as it does today.

Authorities do not entirely agree as to the aggregate amount of

wealth annually produced in the United States. Mr. Joseph Nimmo, Jr., Chief of the Bureau of Statistics estimates the total value of the annual product of the last census year, 1880, as over ten thousand million dollars. Mr. Edward Atkinson placed it at somewhat under ten thousand millions, but presents some very ingenious and convincing considerations to show that these estimates cannot be very far out of the way (see Atkinson's "Distribution of Products" published by G. P. Putnam's Sons, New York, 1885).

The various items making up this total may be estimated as follows:

Manufactures:—	
Total value of products of manufactures as given in the U. S. Census Report for 1880, after deducting the value of the materials (which are included under the subsequent headings)...	1,972,756,642
Agriculture:—	
Estimate of Mr. J. R. Dodge, Statistician of the Department of Agriculture of the United States.....	3,726,321,422
Illuminating gas (partly estimated). From Mr. Nimmo's figures...	30,000,000
Mining.....	236,275,408
Forestry.....	455,000,000
Fisheries.....	43,046,053
Petroleum (Manufactured Product).....	44,000,000
Value of all materials which are not included in the above; Products of Home Work of Women, and of Factories producing less than \$500.00 not included in the Census; Buildings, Books, Newspapers, Works of Art and Education, Manufactures of Railroad Companies, and sundry other items.....	
	3,500,000,000
Total.....	10,007,409,525

Assuming this estimate of ten thousand millions to be approximately correct for the total wealth production of 1880, a ten-fold increase under nationalism would raise the national wealth to a hundred thousand millions. This amount, paid yearly in dividends to the fifty million citizens of the same census year, as stockholders in the great national corporation, would give each an annual income of \$2,000, and as a dollar under nationalism will go at least twice as far as the same amount under the competitive system, on account of the fact that all education and countless objects of entertainment and luxury, now attainable only by the very rich, will be furnished the people by the nation free, this amount will have a value of at least \$4,000. Yet a still more important consideration in giving real value to this income lies in the fact that the whole of it may be, and is expected to be, enjoyed each year without anxiety for the future. A dollar which may be spent is worth two which must be laid up, and we shall see as we proceed that our four thousand becomes at least eight in actual pleasure and profit-producing capacity. All expenditures for charities of every kind, and all for mere ostentation will evidently cease to be required under nationalism; neither charity nor ostentation having any place there, and the extinction of these two factors will wonderfully modify men's ideas as to the importance of a large income.

Moreover, almost exactly half the population of the United States according to the last census, were under twenty-one years of age, and about a quarter were under ten years of age. Assuming that infants and youths will require a smaller dividend than adults, there will be a large surplus each year to be devoted partly to increasing the dividend of the adults and partly to paying the expenses of education and making public improvements which will be sources of profit and pleasure free to all and thus reduce the need of money for each.

Two people uniting in marriage will raise their yearly means of support to \$16,000, and every child born to them will still further increase the financial stability of the household.

Certainly if these estimates can be substantiated, our great capitalists need have no fear that nationalism will deprive them of any of the good things they now possess. Let us see if they can be substantiated.

I define *wasted* energy as that which produces no useful results, and arrive at the estimate of waste upon which I have based my calculations as follows:

First comes a great loss in our distributing system. In the year of our last census, there were over three hundred dry-goods distributing stores in Boston alone, five hundred shoe stores, and over a thousand grocers' shops, where a single one under nationalism would have sufficed for each, combined with a single central sample-building for the display of all the goods used by the nation. Accordingly a little over one one-hundredth part of the outlay and persons employed in distributing dry-goods in Boston, would have sufficed for the work, not over one one-hundredth part for distributing the boots and shoes, and perhaps a two-hundredth part for the groceries.

In the United States in 1880 more than a tenth of the whole working population of seventeen million people spent their whole working time in selling and distributing goods. Less than a hundredth part of this great army would have sufficed, under nationalism, to have done the work and to have done it infinitely more satisfactorily. This whole army of tradesmen, commercial drummers and peddlers would be transferred to the field of useful production. A simple system of reliable national illustrated catalogues, alphabetically arranged, of all the goods used by the people would take the place of the very unreliable travelling drummers. A grand sample-store with a number of distributing stores in each city or county, would take the place of the myriads of shops now required.

The national catalogues become practical cyclopædias of the most perfect form, giving concise scientific descriptions of every article

known and used in the nation, with its actual value, the few fluctuations in cost being published periodically in separate sheets like the discount sheets of our manufacturers of to-day.

With these catalogues and the modern improvements in transportation enabling travellers and merchandise to be transported safely at a speed of from one to two hundred miles an hour (a speed already proved to be practicable), the great central sample and distributing stores of the nation need not be duplicated in every large town. Methods of distributing merchandise with marvelous rapidity, safety and economy have already been devised, and a system which will now deliver packages with almost lightning speed about a large city will equally conveniently distribute them within a radius of ten or twenty miles with a very trifling increase of time in transit. Accordingly the great national sample and distributing stores, placed at a few convenient points in each State or National District, with, perhaps, small receiving-stations in each town will supply all the intervening territory with the greatest ease and convenience, and a few hundred such centres would suffice for the entire country.

In view of the above considerations, I think it safe to place the waste of energy under the competitive system due to the item of distribution at least one-tenth of the whole amount exerted.

The next great loss of energy comes from the increased labor required of every citizen in the effort to supply his wants in purchasing the goods furnished by the unscientific distributing system just considered.

A single instance taken from a single department of a single industry must serve for illustration, and no more representative industry could be selected than that which forms the subject of our paper.

An architect desires and is expected to provide his client with the best of everything the market affords up to the extent of the appropriation. Here the conscientious architect finds one of the greatest and most distressing elements in the practice of his profession, since it is utterly impossible for him ever to feel certain that he has fulfilled his duty in this respect, however great his effort. The wisdom of a Solomon and strength of a Hercules would miserably fail in the effort to justly weigh the conflicting claims for superiority of a hundred competitors in each of the thousand items of labor and material entering into the construction of a modern house. The inventive genius of the country, in spite of the discouraging effect of a proverbially inadequate reward for the inventor, still turns out improvements with marvelous and constantly increasing rapidity; the patented inventions in the United States in the past year alone numbering over twenty-three thousand. To keep thoroughly informed in the most important of these, even under the most perfect system of public expert valuation and classification would involve constant vigilance and great study on the part of the architect.

But to expect every individual practitioner to extricate independently from all this mass of invention the best, and to do so with no other guide than the conflicting claims of those who are admittedly the most biased, is to expect an evident impossibility. Yet this is exactly what is expected of the architect to-day.

I shall take my illustration from the department of sanitary plumbing, in which I have recently been obliged to make a number of particularly careful original experiments as the only way to obtain the very information above indicated—information which could have been obtained much easier and better, in the interest of all the people at once, by the State.

I found a great diversity of opinion existing among authorities as to many of the most important points connected with this branch of building, and a constantly increasing complication in the methods of piping in vogue, particularly in trap-venting, a complication which my investigations convinced me was not only unnecessary but even dangerous. I found that the special trap-vent pipe, so long as it performed its office of producing a ventilating current over the water-seal of the trap, tended to destroy this seal by evaporation and to open a direct avenue into the house for the so-called sewer-gas; that the efficacy of the vent-pipe was easily nullified by friction and clogging, and that its use produced a false sense of security which prevented the adoption of more reliable precautions.

These expensive and dangerous complications were, in many places, actually enforced by legislation, involving a pecuniary loss on the part of the public of a very large sum, amounting in Boston alone during the last few years, according to estimates based on the City Inspector's Building Reports, to an average of about \$50,000 a year. As the law benefits the dealers in lead and iron pipe, a powerful element exists in favor of its perpetuation and extension to other cities.

Under nationalism the drainage and plumbing of our houses being in the hands of the people, as is already partly the case with the water-supply, this condition of things would not for a moment exist, since it would be for the interest of all to have the simplest and best system of plumbing everywhere adopted, and the necessary investigations to determine what that system really was, at once made by the nation. The cost of such an investigation would be but a minute fractional part of the annual loss now sustained by the people on account of its omission.

Already the best authorities are opposed to the trap-vent law, in view of the great improvements made during the last few years, since the law was framed, in plumbing methods and appliances, and several cities have lately repealed it. But in Boston it still exists to the disgrace of the building professions, and it is likely to remain so until

the public come to a proper sense of the evil and insist upon reform.¹

We will suppose that it has been rumored among the ever vigilant manufacturers' sales-agents that our architect is about to compile his plumbing specifications for some building. Instantly a half-a-dozen eager drummers, armed with brass, scamper to his office and some of the most persistent of them succeed after many vain attempts in gaining access to his ear. Those manufacturers who have the least eloquent drummers, or who live at the greatest distance from the architect's office, or who do not happen to hear at the right time of the writing of this particular specification, stand at a considerable disadvantage, for how can a new article be of any great merit whose proprietor cannot afford to have special agents in all the principal cities and towns throughout the land? Still the architect does not feel at liberty to abide exclusively by the somewhat colored and mutually contradictory representations of the agents. He is forced to make a special study in books and catalogues of some of the latest improvements, and to consult a number of plumbers and sanitary experts. He finds in the catalogues, innumerable different kinds of fittings in every branch of the work, each declared to be in every particular the very best. He invites the various manufacturers to demonstrate the truth of their claims, and studies the arguments by which each proves the utter falsity and absurdity of the pretensions of all the rest. By a process of exclusion, he finally settles down to two or three kinds, and the agents for these fortunate specimens, offer to furnish him free of charge (he being an architect of influence) with a sample of his goods, set them up under water-connection in his office if necessary, for his personal trial. At last after a considerable amount of patient experimenting and a prodigious expenditure of time and very little satisfaction, he makes his final selection. It is the same in the choice of every article of construction and workmanship, from the foundation to chimney-top.

This foolish waste of energy will be entirely avoided under nationalism, all industries being conducted by the cooperative commonwealth in a single perfected organization administered in accordance with the simple principles taught us by the great corporations of to-day, but free from the corrupting influences and wasteful competition by which the latter are crippled. No opportunity will be offered for intentionally false or exaggerated representations as to the value of any production, since all inventions will be owned, manufactured and sold by the commonwealth, the inventors being rewarded by royalties and special honors bestowed by the people. The amount of the royalty will be determined by the popular recognition of the value of the invention as shown in their use of it and by its merit as to ingenuity, novelty and scientific importance as determined by experts appointed in the same manner with other Government employes.

It would, of course, be foolish for any one to attempt to foretell with any pretensions at accuracy the details of a future social state so radically different from and immeasurably above the present. But nationalists are accused of being only theorists, unable to suggest any practical steps by which their vision may be realized; and as an answer to this accusation we are justified in pointing out at least a possible form under which the ideal may appear, without claiming or believing that this form is necessarily the only one it can assume.

It is then possible, and, I believe, even probable, that the inventor in the future will receive his recompense directly from the State, and that the recompense will be certain, prompt and just, instead of the reverse as is now the case, and as must necessarily be the case under the competitive principle, since the very qualities and conditions which fit a man for being an inventor unfit him for exploiting his invention.

Mr. Bellamy has outlined with his usual good practical sense and great ingenuity in his "Looking Backward" a possible and, in my mind, very probable way in which books will be published in the cooperative commonwealth. The first cost of printing is defrayed by the author, after which the book is placed on sale by the nation. "The price," says Dr. Leete, "of every book is made up of the cost of its publication with a royalty for the author. The amount of this royalty is set to his credit, and he is discharged from other service to the nation for so long a period as this credit at the rate of allowance for the support of citizens shall suffice to support him." As with the author so it will be with the inventor. The price of the experimental work is defrayed by him, after which the invention is duly classified, catalogued and placed on sale by the nation. The price of the article is made up of the cost of its manufacture with a royalty for the inventor, who is discharged from other service to the nation, as long as these royalties serve to support him. This system is admirably calculated to encourage true inventive genius and to discourage its mere semblance; for all will be free to select the work for which they are most fitted without misgivings as to their support, and since the acquisition of extraordinary wealth will be neither

desirable nor possible, the unhealthy incentive which dazzles the eyes of most of the would-be inventors of to-day, will cease to exist, and with it also the unhealthy crop of useless inventions which burden our patent reports. Those inventions which, under nationalism, will find their way into the national catalogues, will then well be worth the cost to the people of their classification and printing. As soon as it becomes important for the public to know the exact relative value of two similar inventions, scientific experiments will be conducted by the nation to that end, and the results will be published in the catalogues in properly condensed form, the most valuable invention being clearly designated as such in accordance with the regular system of classification adopted.

Thus a glance at the catalogues or a visit to the nearest great sample-store, will suffice to give the architect at once, and with absolute accuracy, all the latest information on any subject he may wish to investigate, and the time required for selecting all that enters into the construction of the building becomes reduced to a hundredth part.

The determination of cost also now uselessly consumes a vast amount of the architect's time. He has, in fact, absolutely no means of correctly ascertaining this item even though it has a most important bearing upon his selection. The prices are indeed usually published in the catalogues of the dealers, but these published prices have no more to do with the selling prices to builders and other large buyers than the advertisements of a quack medicine have to do with its real value. The actual price is determined by the discount, and these the architect is rarely permitted to know. They not only vary from 5 to 95 per cent and more, but differ for different individuals, at different seasons, and are always subject to fluctuations without notice on the turn of the market or the caprice of an individual. All this insane tinkering with prices will instantly disappear under nationalism with the disappearance of its cause, and a fixed and just price will accompany every article in the great trade-catalogues of the nation.

What has been said of the architect applies also to the engineer, builder, broker, housekeeper, and, in short, to all who have purchases to make. Indeed, the work of purchasing all the things daily used in a household consumes nearly all the out-of-door working hours of a housekeeper. Under nationalism, housekeeper's shopping will cease altogether to be required, the national catalogues, telephone and rapid transmitting service rendering it superfluous.

For the sake of convenience and clearness, I will call the item of waste just described, the waste in "purchasing," as distinguished from the waste in "selling," before alluded to, and the amount of waste is, at least, as great on the part of the former as of the latter. For wherever there is a sale there must also be a purchase, and it takes exactly as long for a salesman to "stuff" (the only really appropriate word which occurs to me) a purchaser as it does the purchaser to be stuffed by the salesman. But since much more time is wasted in travelling to and from the place where the bargain is made, than in actually making the bargain, and as by far the greatest number of sales are made in the shops or warerooms of the sellers, the greater aggregate loss of time is suffered by the purchasers.

The seller has, moreover, to learn the qualities and prices only of his own goods, whereas the purchaser has to learn those of all the goods he purchases, and under the most conflicting representations which must evidently consume much more time. Nevertheless, to keep well within the facts, we will call the loss the same in both cases, namely, a tenth part of the entire working energy exerted by the whole people.

We come now to our third great waste which I call the waste of contention.

I estimate² that legal protection of all kinds costs each citizen on the average from one to four per cent of his income, which means, from the standpoint of nationalism, a waste of from one one-hundredth to one twenty-fifth, or an average of about one-fortieth, of all he produces. Adding an equal amount for loss in time, we are safe in putting the total loss due to quarrels at a twentieth.

Since ninety-nine one-hundredths of all litigation is the result of the competitive system of industry, we may add to the above twentieth, the loss as an unnecessary waste of energy, of substantially the whole working hours of all lawyers and their clerks and employes, claim-agents, sheriffs, judges and jurymen, army, navy and police forces, jailors, detectives, private watchmen, collectors, tax-assessors and insurance men. These aggregated in the year of the last census about one one-hundredth part of the whole working population. This hundredth added to the above-mentioned twentieth give us a sixteenth. To this again we may safely add another twentieth for the waste involved by the necessity of providing against mistakes and fraud, including all financial accounts, banking and bookkeeping, rendered almost entirely superfluous by nationalism, and we have thus again a tenth for our third great waste.

This item of the waste of contention has a peculiarly important bearing upon the architectural profession. It is truly said of the architect of the present day that he must be one-third lawyer and detective, and one-third business man. The preparation of his contracts, the search for defects in its fulfillments, and the settlement of disputes between his client and the contractors, occupy a very large part of his time, and require qualities of mind and training quite inconsistent with his legitimate duties as an artist and mechanic. Accordingly architects of the most sensitive and refined natures are

¹For a more complete consideration of this subject, see the writer's book on "The Principles of House Drainage," published by Ticknor & Co., Boston, and "Improved Plumbing Appliances," published by Wm. T. Comstock, New York.

It is gratifying to see that our Building Inspector, Danrell, in his last annual report (for 1889), wisely calls the attention of the City Council to this evil, in the following emphatic language: "Plumbing is a question of growing importance for it has to do with the safety of our dwellings, school and business houses; and whether the present method of ventilating is not prejudicial to health is a matter of serious moment, and I respectfully call your attention to the ordinance regulating it, believing that it is necessary for the best interests of the city to amend and revise said ordinance before the revision of the ordinances now in process is completed and accepted."

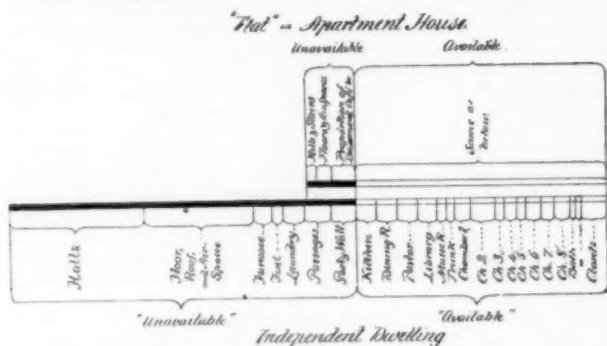
²Deduced from Engel's Law. (See Ely's "Political Economy," page 281).

placed at a disadvantage by these necessities, and the result is an almost inestimable loss to the public and to the art of architecture.

Under nationalism no such burden is laid upon the architect, the nation supplying him with all material and labor of absolutely uniform quality and cost, and his entire energies will then be turned with enthusiasm to the cultivation and practice of his art.

A fourth great loss is due to what I call "exclusiveness," and has reference particularly to our mode of living. We are anti-social, and owe this evil to the social and intellectual inequalities of the people resulting from the competitive system. I have shown in a previous article on "The Apartment-House," written for the *American Architect* in January, 1890, that our dwellings, built as is now customary in the United States in the form of isolated "towers," cost us from two to four times as much as equal accommodations would cost built in the form of "flats" in a properly constructed apartment-house. These figures are explained and verified by means of simple diagrams one of which I will here reproduce to make clear what follows.

In this diagram, the long black-and-white line represents an



ordinary isolated city dwelling which we have called "tower," and the shorter the "flat" in apartment-house, which served for our illustration. The black part of each line denotes unavailable, and the white part available room, the sum of the two denoting the total cubical contents of each dwelling (by "available" I mean space which is directly occupied by the owner of a suite as distinguished from staircases, furnace, etc., which are simply used as means of rendering the occupied rooms habitable).

The white parts of the lines measure the same length in each case, because the amount of available room in both buildings is assumed at the outset to be the same. Thus in the "tower" the front and back staircases and halls take up 22,000 cubic feet out of a total 106,000 covered by the entire building. "In the 'flat' the proportional part of the halls and staircases for each suite is represented by a comparatively insignificant quantity as shown." The eighty families in our illustration by uniting their eighty homes in one cooperative apartment, save 156 staircases, consisting of seventy-six front and eighty back staircases, seventy-eight furnaces, seventy-nine laundries, etc., and all the space they occupy, and the land, foundation and roof they represent. Again an enormous waste is shown in the flooring, roof and air-spaces of the "tower," while this item is but a trifle in the "flat." The six floors, each 16 inches thick, and the roofing, make up together in the "tower" 12,000 cubic feet, or nearly the equivalent of an entire story. Add to this 12,000 cubic feet of air-space under the roof and over the concrete, and we have in these items a waste of 24,000 cubic feet, against only 4,000 in the "flat." Thus we see that the waste space in the "tower" actually exceeds the available. Yet it must be paid for at the same rate with the latter. Deducting the waste in the "flat" from that in the "tower," we find the balance of waste space in the "tower" to be equal to the available, showing graphically that the "tower" most cost, in these items alone, just twice as much as the "flat."

The annual running expenses are also greatly in favor of the "flat" system when the advantages of cooperation are used to its greatest extent. Eighty independent Irish cooks give way to a professional chef and half-a-dozen attachés. The wages and maintenance of the 80 cooks would amount to an annual sum of not less than \$40,000; those of the chef and his assistants to hardly \$10,000, making in this one item a possible annual saving of \$30,000.

The management of the 80 independent Irish cooks, if possible at all, could only be accomplished by the constant struggle of 80 worried and largely inexperienced owners or their wives. The management of the chef and his attachés could more easily be managed by a single person.

Corresponding savings are evidently possible in every other department of housekeeping, including steam-heating, ventilating, laundry-work, lighting and elevator work. In all these particulars, cooperation, judiciously conducted, has been shown to produce surprising economies. In the matter of heating, for instance, besides the large saving in fuel due to handling the materials at wholesale, there is a vast saving in the amount of space to be heated. The "tower" contains 106,000 cubic feet to be heated. The same amount of available space in our "flat" contains about 50,000 cubic feet. Hence there is but half the space to heat, and, therefore, the cost of the fuel will be but one-half. In a like manner the cost of management is very much less, just as much less, in fact, as it costs

less to manage one large heating-apparatus than to manage eighty small ones.

From an artistic standpoint, an immense advantage is seen. The rooms "may be grouped in the 'flat' in a manner which renders possible the highest architectural effect, whereas in the 'tower' the perpendicular arrangement evidently precludes such opportunity by limiting the design to a wearisome and monotonous repetition from basement to attic."

No argument can be sustained against the "flat" on the ground of transmission of sound or want of privacy and isolation, for sound may be as fully deadened as in the "tower" by means of improved deafening treatment now well-known to builders.

"Isolation may be made complete in the 'flat,' the private halls and front doors of each suite being in every respect the equivalent of those in the 'tower'; the only difference being that with the 'flat' the outer world begins with the public hall and its elevator, while with the 'tower' it begins with the public street and its horse-car."

Nationalism will bring us to the first true realization of the value of the society of our fellow-men. Universal education and cultivation under equal opportunities and equal material advantages will develop the highest qualities of mind, and the only true and perfect individuality. Men will become necessary to each other through their very differences of character, tastes and variety of intellectual attainments, and the selfish and narrowing isolation of the separate dwelling will give place to the cooperative apartment-house as surely as the isolated huts of the savage yield to the cities and villages of advancing civilization. Accordingly, under nationalism, the only valid objection to the apartment-house, namely, the uncongeniality of the people, will disappear, and with it half the expenses of living. In the United States to-day, over nine-tenths of the people live in isolated dwellings, and with ninety-nine one-hundredths the expenses are twice as great as they would be for better accommodation under the cooperative apartment-house system.

I am satisfied that it will be quite conservative to place the saving in this item also at, at least, a tenth of the entire present expenditure of the people.

Architecturally, the gain will be inestimable. Instead of the monotonous rows of inharmonious façades crowded closely together, largely to the exclusion of sunlight from their rooms, with their still more monotonous interiors, we shall have separate large and graceful edifices standing in open spaces wide enough apart to give ample chances for the air and sunlight to bathe every part. The streets will be laid out in such a manner as to enable all the rooms in the buildings to receive the sunlight at some part of the day, and each building will constitute a complete work of art in itself, set in an independent miniature park. So great is the economy of land-area obtained by this system of building, that ample space will be saved for verdure around each edifice, and there will be no crowded, insanitary, half-dilapidated fire-traps for "the poor" as now, constituting at once a disgrace to humanity and an eyesore and peril to the whole community.

The same principle of cooperative building will be practised in the country and at the seashore as in the cities, with the same end in view; namely, the promotion of social intercourse, preservation of natural beauties of site, and relief from household cares. The system admits of either detached or connected dormitories. The cooking, laundry-work, heating and other household drudgery of each community will then be done under a single management and with a single plant. By this system, the natural beauties of the landscape will be infinitely better preserved than at present. Now every one builds with little or no reference to the view and comfort of his neighbor, and the finest effects of scenery are destroyed. He does not even hesitate to imperil the health of his neighbor by the sinking of a cesspool or the laying of a carelessly-jointed drain close to his well, and I have known warm friendship between neighbors to be severed by the encroachment of the branches of an apple-tree belonging to one upon the premises of the other.

Under the new regime it will be for the interest of all to preserve all the beauties which nature affords, and the concentration of the residences of a special neighborhood on some one spot best adapted for building, besides giving to all the social and economical advantages which distinguish the civilized man from the savage, will ensure to each the most perfect enjoyment of the bounties of nature.

Nor does this necessarily preclude the possibility of an occasional entirely isolated and independent cottage for those exceptional natures who, for any reason, will prefer seclusion. It is only requisite that such isolation be attained without injury to the rights and privileges, as these will be under nationalism for the first time fully understood, of the rest.

There will, however, be no such shocking difference in the twentieth century in the aspect of the city and that of the country as now.

Remove from the city to the more suitable localities the crowded shops and grimy factories, and substitute for them parks and fountains; remove the insane clamor of traffic consequent upon our present system of industrial warfare, and the populous city will rival the rural village in natural beauty and repose. The various manufacturing and agricultural industries will be concentrated in those parts of the country best fitted by nature and climate for their conduct, instead of being divided up and planted anywhere, haphazard at prodigious waste in power and transportation. Animal power,

as a motor for transporting freight is already being rapidly supplanted by electric-motors, and in the twentieth century animals will be debarred from the streets, which will then be everywhere smoothly paved with asphaltum or flagging, and maintained as clean and even as a hall floor. As a consequence of this, one of the greatest evils of city life, greatest, whether considered from a sanitary or from an artistic and economical standpoint, *dust*, the distributor of disease germs, and the perpetual torment of the housekeeper, will be substantially banished from the city forever.

The coast line of picturesque seaport cities like Boston, instead of being brutally sacrificed as now to lumbering warehouses, will be transformed, as a matter of course, into esplanades of marvellous beauty after the general plan of the Lake Fronts of Chicago; the mercantile vessels and shipping wharves being transferred to the new points determined by the requirements of the great manufacturing and agricultural centres, leaving pleasure yachts and cultivated ocean terraces to take their places in front of the residences.

Of course, no one imagines that such a transformation could take place all at once. But as the nation assumes, in continuation of the evolutionary process long since begun, the management of the various industries one by one, beginning, perhaps, with the railroads, telegraphs and mines, and gradually extending its control as fast as the public good demands, so, one after another, the private business structures which cumber our streets will disappear, and the new city will rise in their places. The sooner the public becomes aware of the great advantages which this new order will bring them individually and collectively, the more rapid will be this transformation and the fewer will be the sufferings which would come to all through leaving the process to the slow course of natural evolution.

J. P. PUTNAM.

(To be continued.)

ITALIAN TOWERS.¹—IV.

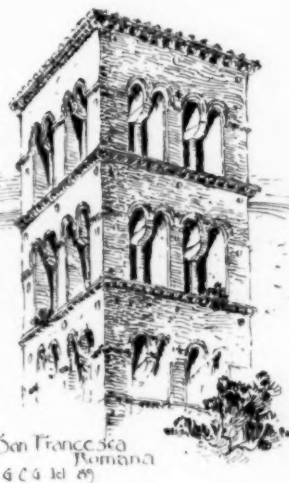
Nero. The dazzling whiteness of these same electric-lights once more, the tram-cars and omnibuses, the crowded streets, the lighted shops, everything down to the "drop a soldi in the slot and ascertain your correct weight" machine, made us feel almost as though we were at home again. And the next morning, when we climbed upon the roof of our pension, a pension high upon the Via Sistina, and the whole sweep of the city was before us, even then, although the greater mass of Rome lay under us in a panorama, it was the Rome of the Pope and United Italy that we saw. St. Peter's loomed up with its accumulations of Vatican buildings beside it, almost in line with the shapeless Castello S. Angelo, and a little to the south, down in the heart of town, there rose a huge flat dome, which we knew must be the Pantheon. But at the first glance, these were all we knew. Everywhere rose a multitude of roofs beyond roofs and out of them everywhere rose domes, cupolas and now and then, but rarely, a tower. The general view of Rome was a disappointment, compared with Siena, Florence, Naples, Genoa or even Venice. It must be seen in detail, not as a mass.

It is in Rome that one sees at their best the towers which show most fully the influence of classic Rome, of the type which to a certain degree pervades all Italy and gives to its towers their characteristic features; and next to its strictly ancient ruins, these towers are one of the most striking objects of the city. These, too, are the only towers in Rome that are worthy of remark, for the towers of the later days are passing ugly, although at times interesting through their irregularities and eccentricities. These towers, of which one or two will serve as a type as well as twenty, so greatly do they resemble one another, are one of the first things that you, if you are an observing tourist, will remark. They are all of brick, brick long and thin like the old Roman brick, and of a deep, dark red. There are a few courses of stone now and then and the roof is

generally of tiles, very flat. Each story is distinctly marked by its group of windows, and the openings, unlike those of the Tuscan towers, are all of the same size and shape in the different stories, except as they have, in many instances, been filled-in at later times. Most of these towers date from the twelfth century, though a few of them may be two or three hundred years older, and they belong, collectively, to the Carolingian epoch, that period of which Charles Martel was the founder and from whom it was named, a period which lasted until Italy was united directly to the German Empire.

Of these towers, one will suffice as well as all, for as I said before, they differ but slightly in their form and details, and the tower of Santa Maria in Cosmedin, will, perhaps, be as good an example as any. It is down in the older part of Rome and is attached to one of the many façades in which the city abounds, though this particular façade is not as bad as the average one by any means. In the portico of the church is an old marble fountain, and, according to tradition, the ancient Romans used it when taking oath, thrusting their right hands therein. It is built too, like so many other churches of Rome, upon the site of a temple of which ten columns, still standing, are built into the present wall. The name, "in Cosmedin," comes from a square in Constantinople, as it originally belonged to a Greek Brotherhood. The original church is said to have been built in the third century, but it was destroyed, and was rebuilt again by Hadrian I, and he is also said to have built the tower, although it has been added to more or less, probably in later days. The filling-in of the openings on the second story is very recent indeed, but the reasons assigned for it I do not know. It is almost a direct copy of the typical Roman tower which was used, however, in a circular rather than a square form, in all of the ancient walls of Rome. Viollet-le-Duc shows illustrations of them in his "Dictionary of Architecture."

These are the only towers of any architectural merit that remain in Rome. There are a few examples of the old tower-house here as there are in Tuscany and hundreds of them were destroyed in the Middle Ages, when they served simply as fortresses for the noble



families. But the remaining ones of these have no architectural merit to speak of; they are simply huge blocks of stone, set upon end, tapering slightly, after the manner of their Tuscan prototypes. And, since the middle of the fifteenth century there have been no good towers built in Rome, with one exception, and that is the Gothic spire of the American Church which, by the by, looks strangely out of place.

If the books of travel that I have read speak truly, there has been a greater change in Italy in the last twenty years than there has been in the most wild and booming portions of our own land. For, twenty years ago, according to all travellers, according to Howells and according to Storey, both delightful writers on Italy, the trip from Rome to Naples was one of the greatest ills that flesh is heir to; but now everything is changed, it only takes about six and one-half hours and the train service is simply perfect. Whatever we travellers of the last twenty years of the nineteenth century may have lost in the matter of the picturesque, we truly have gained in matters of comfort, and comfort in travelling means a great deal — means really a great deal more than comfort in any other respect in Italy. The trains are swift and they are luxurious and there are Pullman cars on some of them. It is a very beautiful journey too, from Rome to Naples. Every now and then you catch, off to the right, as you are going southward, glimpses of the Mediterranean, and for the last fifteen miles — or for the last hour, which is about the same thing, every one is on the *qui vive* for a sight of Vesuvius, which is most aggravating in showing up and generally does not, and then always comes on the wrong side of the train after all.

There are practically no church towers in Naples, not a solitary church tower of any particular merit. There is just one, which looks a good deal like one of our "old colonial" towers, and is a striking

¹ Continued from No. 757, page 195.

example as it stands all alone in the dirtiest part of the city, where it looks almost as though it might be in Boston, Salem, or Marblehead. But in Naples the want of church towers has a recompense: the peninsula and the country to the south are singularly full of them; towers, too, which differ decidedly from any other like structure; for all this region south of Naples, clear down to Sicily, was once under Norman rule, and the towers standing in many of the old towns to the south show distinctly Norman features.

We spent only a week in Naples, and then started southward by rail and a most despicable omnibus to Sorrento, the regular trip which all travellers make, then, after recruiting here a few days under the orange and lemon trees, we shouldered the knapsack and started out on a week's tramping trip across the backbone of the peninsula, and down along the southern shore, through Amalfi, Ravello, on to Salerno and thence down to Paestum. Our first day's trip carried us to Amalfi, which is without exception the most tortuous and doubled-up little town in all Italy, and there is absolutely no method, except by gauging the amount of dirt on the walls on either side, to find out whether the way you are on be a public one or a private one. If it be a public street, it is very dirty; if it be not, it is probably a private way into some one's house. The square in front of the cathedral is the only piece of ground in the town where a two-horse carriage can turn around comfortably — provided the square be clear, which it never is. It is the dirtiest, the noisiest and, I should think, in the summer must be the hottest town on all that Italian coast. It nestles down by the side of a little stream and climbs up on either side of the cliffs for five, six and eight hundred feet, in many places at an angle of nearly forty-five degrees, the houses huddling one above the other, the roofs of the ones below forming garden terraces for the people in the houses above. Amalfi was a famous town in the early part of the Middle Ages. She had a doge and was an independent State, and she fought with Salerno, Pisa, Venice and even Naples until finally, in the middle

of the twelfth century, King Roger of Naples reduced her. And in the latter part of this twelfth century the sea began slowly to undermine and in 1343, a tremendous storm, combined with a high tide, wrecked all the heart of the town and carried it completely under the sea. She has never recovered from this shock and is now nothing but a little fishing-village, with a depot for one or two enterprising wine-merchants and the paper manufacturers. It is full of paper-mills, where paper is made in the most primitive manner imaginable. The cathedral with its tower stands on the eastern side of the only piazza the town boasts. It has been altered and renovated, very well renovated indeed, but it was originally built in the eleventh century and in the so-called Lombard Norman style. There are antique columns from Paestum in it as there are antique columns from Paestum in every part of the Sorrentine peninsula.

The tower itself was built in 1276 and is a most interesting one. It is of brick, stone, stucco and glazed tiles—all over the upper part are these bright and richly-colored tiles, forming a sort of mosaic, and it is their presence with their barbarous coloring which gives to the tower its noticeable Moorish feeling.

Although it is said to have been built in 1278 it has suffered so many modifications that hardly any of its original surface remains.

The lower part, the square portion, has all been restored in the last two or three hundred years. The upper part, with the little round towers corbelling into the square, is probably a part of the original edifice, and it is that which gives the tower most of its character, a distinctly Norman character, too. This mingling of Moorish and Norman effect in the upper part is very queer, and the form of the tiles as they are laid, is rather on the Romanesque order, while the opening in the central tower, in which the bell hangs is of distinctly Moorish character. The lower part of the tower is decidedly conventional and whatever merit it may have had before these restorations has been entirely hidden by them. It is a plain, unmeaning, Renaissance tower, bad in every respect. The church itself is wonderfully full of interesting bits. The doors are of eleventh-century work and are very good indeed. Inside, on a little staircase to the crypt, there is a marble panel which is said to have come from Paestum, but which looks far more like a fifteenth-century piece; and in the crypt itself, the body of St. Andrew lies. The body is not visible but the crypt is a very gorgeous one. Then scattered all about the church are bits

of carving, some of them of the early Christian period and others of the much earlier period of Roman domination.

From Amalfi to Ravello is a walk of about an hour or three-quarters of an hour, provided one keeps in the right path and takes a sufficient number of cuts across the zigzags the latter part of the way. It is a very pretty walk, going up on the easterly side of one of the deep and narrow valleys, giving views at one time of the Mediterranean and another of the high mountain country off to the north towards Vesuvius and Naples, which lie behind a high ridge near at hand.

The two towns of Amalfi and Ravello were so closely allied in many respects, that there is very little of difference in them now, excepting that Ravello is, if possible, far more dead than Amalfi. The two churches contain many points of similarity, and their towers, although now quite different, were formerly much alike. The tower of the Ravello cathedral is now in a much

more ruined condition than the Amalfi one, and yet, on the whole, it is more pleasing. In short, it has not been spoiled as the Amalfi one. Although it has more the look of the conventional Italian tower, still there is enough of the Norman feeling about it to show that it must have been designed by a northern artist. This, too, has been covered with stucco and the stucco has dropped off in places, the tiles which composed the surface once, show through, and there are traces upon the tile roof of an additional story, which has long crumbled away. It is very ruinous and the lower openings have been filled up, probably more with a view of saving the structure as a whole than for any other purpose. It has traces of carving on it of a distinctly Romanesque character. It would be interesting to know if the upper story of this tower which has been lost in the lapse of so many centuries was as closely akin to its Amalfi neighbor as the rest of the tower, and indeed the cathedral and the town. Such is very probably the case. The materials, as of that at Amalfi, are stone, brick and stucco, though originally it was probably built almost entirely of brick with a few stone belts, but it has been patched up with stone and brick in many places and also with plaster; and like many other towers all through Italy, within a few years, unless immediate steps be taken for its preservation, it will become a thing of the past.



THE CATHEDRAL AT RAVELLO, FINISHED IN THE 11TH CENT. A TOWER OF THE WALL OF THE PALACE RUFFALO AT THE RIGHT. THE TOWER HAS BEEN COVERED WITH STUCCO, AT A LATE PERIOD AND HAS TRACES OF ANOTHER STORY ON THE OPPOSITE SIDE.

The interior of the cathedral is exceedingly rich in ancient marble mosaic work. There is an ambo in marble, which is a distinct imitation of the famous pulpits designed by Niccolo Pisano in the cathedrals at Pisa and Siena. And there is a pulpit also, with rather less ornamentation, but with a most wonderful mosaic of Jonah and the whale upon it. Outside the portico, there are several caps of Byzantine work, which are very nice. It is very interesting, by the bye, to notice in Italy, as well as in America, the predominance in certain localities of certain architectural features, or peculiarities perhaps, which repeat themselves with unfailling regularity. On the southern side of this Sorrentine peninsula, for instance, we found church after church, with massive doors completely covered with bronze ornamentation distinctly Byzantine. Here, too, on the exterior of the towers, the use of the glazed tiles, was a distinctive feature which we noticed for the first time, and the remarkable similarity in the pulpits in the church at Ravello and in the church at Salerno showed immediately the close contact, which during the twelfth century Amalfi, Ravello and Salerno had with Pisa and Siena.

Ravello is noted for its examples of Moorish architecture, rather more perhaps than for its cathedral or for any other of its churches, of which there are several of a very ancient date, and the Palazzo Rufalo is perhaps the most famous and noted example of Saracenic work in all Italy and is well worth a visit.

From Ravello on to Salerno, it is an easy three hours' walk—a walk over, perhaps, the most beautiful road in all Italy. It winds along the precipitous cliff of that southern coast, sometimes two hundred feet, sometimes six and eight hundred feet above the sea, carried across chasms by great stone arches, and at times through cliffs by short arched tunnels.

One could spend several weeks in that long and narrow neck of land which juts out towards Capri, without exhausting the architectural treasures which it contains, and years without tiring of the natural beauties of the scenery.

From Paestum to the ancient Cape of Minerva and from there back to Naples, the country is full of historical interest and of architectural and natural beauty. From the low grass plains around Salerno and Paestum, where the buffalo grazes, to the peak of St. Angelo, 5,000 feet above the sea, is but a day's walk, and within that day's walk lies the record of twenty-five hundred years of art and civilization.

GEORGE CLARENCE GARDNER.

THE USE OF ALLOYS IN ART METAL-WORK.¹—II.

THERE are many varieties of it, but in both of these alloys, shaku-do and shibu-ichi, the point of interest is that the precious metals are, as it were, sacrificed in order to produce definite results, gold and silver, when used pure, being employed very sparingly to heighten the general effect. In the case of shaku-do, we shall see presently that the gold appears to enable the metal to receive a beautiful rich purple coat or patina when treated with certain pickling solutions, while shibu-ichi possesses a peculiar silver-gray tint of its own, which, under ordinary atmospheric influences, becomes very beautiful, and to which the Japanese artists are very partial. These are the principal alloys, but there are several varieties of them, as well as combinations of shaku-do and shibu-ichi in various proportions, as for instance, in the case of kiu-shibu-ichi, the composition of which would corres-

pond to one part of shaku-do rich in gold, and two parts of shibu-ichi rich in silver.

With regard to the use of pickling solutions, so far as I have been able to ascertain, they are made up respectively in the following proportions, and are used boiling:

	I.	II.	III.
Verdigris.....	438 grains	87 grains	220 grains.
Sulphate of copper.	292 "	437 "	540 "
Nitre.....	—	87 "	—
Common salt.....	—	146 "	—
Sulphur.....	—	233 "	—
Water.....	1 gallon	—	1 gallon.
Vinegar.....	—	1 gallon	5 fluid dra.ms.

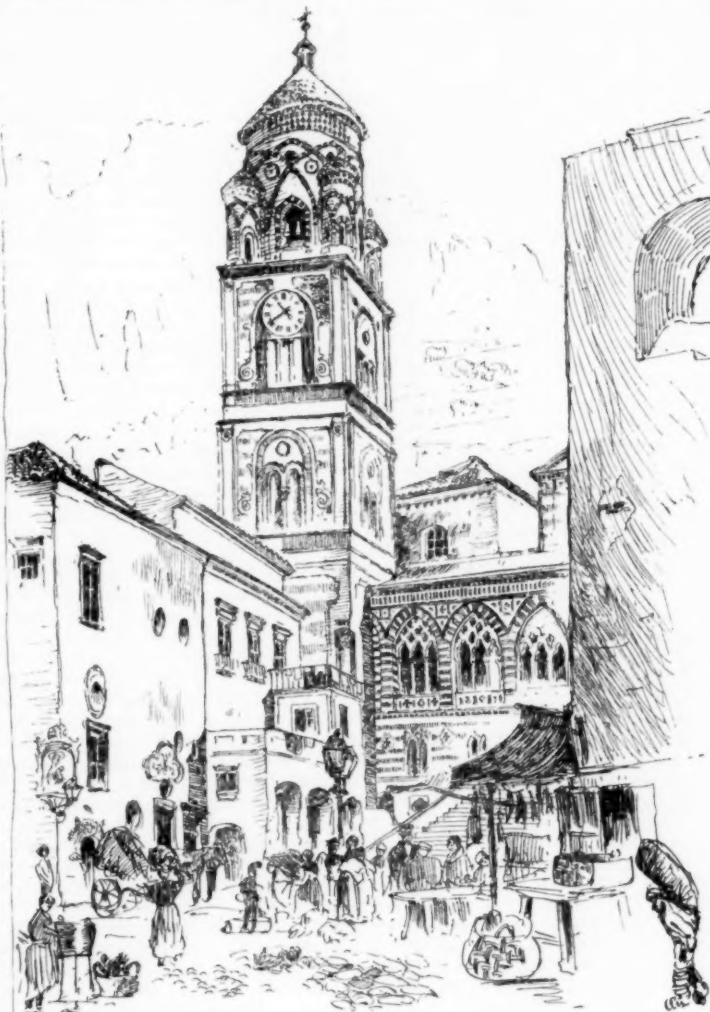
That most widely employed is No. I. When boiled in No. III solution, pure copper will turn a brownish red, and shaku-do, which,

you will remember, contains a little gold, becomes purple. And now you will be able to appreciate the effect of small quantities of metallic impurity as affecting the color resulting from the action of the pickle. Copper containing a small quantity of antimony gives a shade very different from that resulting from the pickling of pure copper. But the copper produced in Japan is often the result of smelting complex ores, and the methods of purification are not so perfectly understood as in the West. The result is that the so-called "antimony" of the Japanese art metal-workers, which is present in the variety of copper called "kuromi," is really a complex mixture containing tin, cobalt, and many other metals, so that a metal-worker has an infinite series of materials at command with which to secure any particular shade; and these are used with much judgment, although the scientific reasons for the adoption of any particular sample may be hidden from him. It is strictly accurate to say that each particular shade of color is the result of minute quantities of metallic impurity, and these specimens and diagrams will, I trust, make this clear, and prove that the Japanese arrange true pictures in colored metals and alloys.

The action of these solutions is remarkable. You have copper to which a small amount of silver and a small amount of gold are

added. The amount of gold may be variable, and artificers often take credit for putting in much more than analysis proves to be present, but a small amount of gold, it may be only one per cent, is sufficient to entirely change the character of the copper, and when you come to treat it by pickling solutions, you get a totally different result from what you would if copper alone were employed. The Japanese also take copper and dilute it, sometimes half copper and half silver, sometimes only about one-third silver and all the rest copper, and that gives the lovely series of gray alloys which, either by exposure to atmospheric influences, by handling, or by treatment of suitable pickles, gives the beautiful series of light and dark grays of which the Japanese are so particularly fond, and to which the name shibu-ichi is given. Then again they have copper in which a small amount of impurity may be present, and the nature of such impurity and its amount, which seldom exceeds 2-10ths per cent, is quite sufficient to change the character of the copper. The Japanese, working in no small measure by rule-of-thumb, find that certain varieties of copper are best suited for definite processes, and they store them up and use them in a definite way.

I have here a diagram which shows the particular tints produced by pure copper when adulterated, so to speak, with under two per cent of the elements indicated—bismuth, antimony, nickel, iron, arsenic and gold. There is also a series in which the impurity is under two-tenths per cent, and when a pickling solution acts upon



THE PIAZZA DEL DUOMO
AMALFI—JAN 26, 1890

¹ A paper read at a meeting of the Applied Art Section of the Society of Arts, London, by Prof. W. C. Roberts-Austen, C. B., F. R. S., and published in the *Journal of the society*. Continued from page 16, No. 757.

these metals you get these characteristic tints, the gold still holds its own, and produces the purple-blue alloy characteristic of the shaku-do, of which the Japanese make so much use. Remember that in all these cases the precious metals were deliberately sacrificed with a view to produce a definite result, and that is a point I want to insist upon. Why cannot we, in this country, use the alloys (of which we have the analysis here) in order to produce results in these lovely gray tints with which so many of you are familiar? The finest piece of shaku-do that I know, with its blue bloom, is this beautifully-carved sword-hilt from the collection of Mr. Edward Dillon, and shaku-do forms the basis of many specimens of Japanese art. Here is a little medicine-case (reproduced in a wall-diagram); the base of the case is shaku-do, and, I should think, nearly of the composition given in Analysis No. 1. The enrichments are the gray shibu-ichi, a kuromi fish, with twenty-four tiny dots of gold in the space of about one-eighth of an inch. Then there is a shibu-ichi shell, with a gold shell placed beside it, and a kuromi carrot, on which a gray shibu-ichi mouse, with shaku-do spots let into him, is feeding. All this lavish adornment is most perfectly done. The actual method of manipulation I will now describe.

Turn to this plate of light-brown bronze, which presents the simplest possible case. There is no attempt at a raised surface; the artist has simply taken a plate of bronze $8\frac{1}{2}$ inches in diameter; he has cut a design in it, and inlaid that design with shaku-do. Wherever he has scooped out the drawing of this beautifully graceful bird he has inlaid shaku-do; and he has taken a darker variety of shaku-do — that is to say, one which contains a little more gold which, when treated with a suitable pickling solution, will come out a little darker — and has in that way produced exactly the effect of an Indian-ink painting, in a dark and comparatively light shade, on a piece of glazed brown paper. There is no attempt at producing an effect by a raised surface, but the design is completed by an inlay of dark shaku-do on lighter shaku-do on a bronze basis. In this more precious case you have a larger plate, $18\frac{1}{2}$ inches in diameter, which is, on the whole, a fair example of the treatment of the complex series of alloys, and it has been reproduced in a wall-diagram with more or less success. They first of all take a plain surface of copper. In this case there is a raised ornament, instead of a perfectly flat one. They scoop out the outline of a leaf, undercut it to a certain extent, make the leaf that they wish to insert of a particular alloy — it may be shaku-do tipped with gold, the surface being roughened and the gold hammered on just as a dentist would — then the whole design is fitted in like a puzzle, and the result is they build up a picture gradually, using colored alloys, or alloys which may be colored by the action of a pickle, and they attain the result which is shown in the diagram. The basis is a plate of copper. Here in one place there is a leaf which is not really raised, but a little sunk below the surface of the original plate. The only relief it possesses is obtained by hammering a light variety of gold over it. Then comes a red bud of kuromi, set with its golden points. Here is a shibu-ichi leaf, half of which is of red kuromi, and, if you look closely afterwards, you will see the bird, of shaku-do, with all its feathers carefully drawn, and the lustrous effect of the plumage produced with really consummate skill by the use of fine lines. Then comes a shibu-ichi flower with a golden centre. This is typical of the work they do; however large or small it may be, they simply inlay these colored alloys, using generally a sombre base.

The Japanese do not merely trust to obtaining effects by high relief, as is the case with this plate; very often they employ a darker alloy for producing the effect of painting on metal, so to speak, in a very remarkable way. There is one example in Mr. Huish's collection, a knife-handle, which presents the effect of a duck's back and wings in comparatively high relief, with his neck under water. He is a shaku-do purple duck, plunging through silvery-gray water, but his body is in high relief, his neck is of a different nuance of tinted shaku-do to the rest of his body, and it is so beautifully let-in that it is only in certain lights that you can see it at all, but it produces exactly the effect of a duck's neck being below the surface of the water. I have not that specimen here, but I have in a sword-hilt, also from the collection of Mr. Huish, some tiny minnows, each about one-sixteenth of an inch, with minute gold eyes, swimming up a shibu-ichi gray stream, the effect of their being actually below the surface of the water being suggested with marvelous skill. I think at present no European artificer could obtain such a result as that, as it shows the most beautiful effects, not merely of texture, but brilliancy and transparency. The color-effect they produce by the use of the pickles — the composition has been already given — but many of the extremely valuable old Chinese bronzes have acquired their tint simply by long exposure to atmospheric influences. If you look, for instance, at No. 160 in the South Kensington bronze cases, it is a Chinese duck of about one foot across, if I recollect rightly, purchased about 1876, and it has a green patina, indicating extreme old age; and although my friend, Mr. Gowland, who has recently returned from Osaka, says the attribution of it on the label to the third century is inaccurate, still it is an extremely old specimen of bronze, which has acquired its green patina by perfectly natural causes, unaided by artificial treatment such as the Japanese always employ in more modern work. Again, there is No. 148, a green gourd, in the South Kensington collection, and No. 79, a vase in the form of two cups, base to base, a beautiful mottled-red on a green patina, and I think, in this case, the red is produced by heating, and not by pickling. Then, if you will

look at No. 224 in the Museum, you will see a bronze fish with scales inlaid with silver, which is very instructive. In one of the cases, not very easily accessible, near the windows of the same court, there are a series of specimens of bronze plaques, all modern, showing the method by which the Japanese produce their effects. Here, on the wall, is a faithful diagram of a bronze plate which has been splashed with gold; it is really hammered work, and is grayish-red bronze by daylight. There is also a clouded bronze, the effect of which, I think, has been reproduced by heating, and not by pickling. On this diagram some of these effects are shown.

Here is a portion of an ordinary Chinese bronze kettle, in which the ornament has been obtained by little punctures from behind which reflect the light. If you looked at this you would think at first there were two metals, a copper kettle inlaid with silver, but it is nothing but the effect of the polished surface of brownish copper, with raised prominences from behind to reflect the light and produce the effect of another metal; another example of similar ornament Mr. Gowland has lent me, for the purpose of this paper, a splendid kettle, the heating arrangements of which are intended to go inside it, a sort of double kettle. You will see how very beautifully the surface is worked, and that the effect is produced entirely without any variation of color, for the tint is uniform throughout. Here is a characteristic brass, of which the surface is produced by simply striking it all over with a blunted tool, which gives these particular lines.

But the particular alloys in which I am interested, and with which I hope to interest you, are those to which the names of moku-me (wood grain) and miyu-nagashi (marbled) are given. I have so often talked of them before, that I hesitate to describe them again. The characteristic alloys which the Japanese employ, are taken in thin sheets and soldered together — kuromi, shibu-ichi, and shaku-do — in alternate layers, as shown in the diagram; then you drill conical holes, A B, in them to a greater or less depth, or roll them out, and then beat them up from behind, and then file off the prominences, C, and then beat the sheets until the holes are obliterated, and, of course, you get these different strata, and you produce these beautiful banded effects. If you look at the specimens afterwards you will see what the Japanese can do, for you have here the finest collection of moku-me ever got together. There are two vases, not very good in form, but of remarkable merit as regards the manipulative skill displayed in their production; each vase is 7 inches high. The neck-band and foot are of shaku-do inlaid with gold, while the body of the vase is of miyu-nagashi, with a silver panel bearing a bird beautifully wrought in gold and colored alloys beaten into the silver. There are also some smaller sword-hilts and knife-handles, and a collection of beads, all remarkable examples of these banded alloys.

Now, so far as I know, no English artist has actually used this material with the exception of Mr. Alfred Gilbert, A. R. A., who I rejoice to say, has employed it in the now famous chain worn by the Mayor of Preston. But it is a beautiful material, that surely must be used by English art workmen if they hope to hold their own. The Americans have adopted it already, and in the Paris Exhibition there was a very remarkable vase exhibited by Messrs. Tiffany, of New York. I have only a photograph of it here; but I have a little piece of their beautiful work in a little blade of miyu-nagashi. In the vase they exhibited, the top and sides are silver, and so is the base, but the whole of the centre is of this marble alloy, produced exactly as I have indicated. This is some 29 inches high, and they asked the modest sum of £1,000 for it. They only employed five alloys, I believe, in its manufacture, but I am not certain as to the number, doubled it on themselves five times until they ultimately got 25 layers. This beautiful vase certainly constituted one of the greatest triumphs of manipulative skill the Paris Exhibition contained, and the firm were justly proud of it. Here is a little Japanese cigarette-case of copper and shaku-do in many layers, in which solder cannot be detected at all, and yet it is a most complicated pattern. Messrs. Tiffany have even produced the celebrated Japanese "lobster red," which has quite eluded my efforts to secure. The lobster red of the Japanese, I believe, not a product of pickling at all, but is cuprous oxide, formed by heating copper in air (it may be in air and steam, as is the case with their well-known and brilliant colored commercial samples of metal), and then burnishing it, but I am not certain about it. It is easy to match anything in this plate on the table, but it is difficult to produce the true lobster red of the Japanese.

Then again, to leave Japanese art for the present, those who visited Tiffany's room in the Paris Exhibition will have seen some very beautiful alloys which showed a beautiful purple tint. They were apparently of silver, and running over the object, which was usually small, a damask pattern in a darker shade of the same purple line. There was one coffee-pot, I think some 10 inches high; this had this beautiful damask-like ornament produced apparently by inlay, but yet it was not possible to see that there was any inlay. I believe the patina in this particular case was in some way produced by the action of light. We have tried to throw some of these beautiful Japanese specimens on the screen, but I found the reflecting surfaces were too brilliant, it was impossible to succeed, and obviously we could not draw them, and therefore we must presently resolve ourselves into a committee to look at these things individually.

No texture seems to elude the skill of the Japanese. There is a knife-handle, which represents gilded leather, from Mr. Gowland's collection, and there is a sword-hilt from Mr. Dillon's collection, in which alternate layers of shaku-do and copper, some 40 of them, have been cut through so as to form a pattern, and the result is a close

imitation of guri or tsuishi lac, in the manufacture of which the Japanese are skilled. I have seen in Mr. Dillon's collection a fish in lustrous shibu-ichi, which was so beautifully rendered that it almost suggested a marine smell. Nothing seems too difficult for the Japanese craftsman. Another very subtle effect they produce is by taking merely shaku-do in thin layers and ordinary silver solder, soldering them together, and then beating them up, and this is their finest work. I have only one tiny fragment of it, and it is produced by the contrast of the purple shaku-do with silver solder. In their very finest work they apparently use no solder at all, but simply trust to ordinary welding.

As an example of debased art, it is, perhaps instructive to look at this article which I bought in Italy the other day; it is said to be manufactured near Milan. It is a little casket in pewter, probably marked with a revolving tool on a lathe, and the result is, that if you look at it at a little distance, it has the most ludicrous resemblance to plush or thick satin, painted with thick body-color to represent painting on satin. It is the most frightful example of misapplied skill you can well see, still it is a close imitation of texture which might be applied to better things. Here are two little trays of quite cheap Japanese ware of copper bronze, which a botanist pronounced to be very faithful reproductions of a berried plant, and at once identified it as *Diospyros Kaki*. The skill with which the Japanese imitate the surface of the shells of crustaceans is well-known, and, in fact, as I have already said, there is hardly any texture that they cannot imitate with wonderful fidelity if they care to try.

In Sir Frederick Leighton's presidential address, delivered at the Art Congress at Liverpool, he said: "Well, what then is our charge with respect to the present relation of the country to art? What are the short-comings for which we are here to seek a remedy? Our charge is that with the great majority of Englishmen the appreciation of art as art is blunt, is superficial, is desultory, is spasmodic; that our countrymen have no adequate perception of the place of art as an element of national greatness, that they do not count its achievements among the grounds of their national pride; that they do not appreciate its vital importance in the present day to certain branches of national prosperity: that while what is excellent receives from them honor and recognition, what is ignoble and hideous is not detested by them, is, indeed, accepted and borne with a dull, indifferent acquiescence; that the æsthetic consciousness is not with them a living force, impelling them towards the beautiful and rebelling against the unsightly."

I suppose that is true as regards the majority of Englishmen, but as the President of the Royal Academy points out, real merit is acknowledged; and the enthusiasm with which any piece of metal-work of Alfred Gilbert is received, such as that grand table ornament which the army has recently given to the Queen, abundantly shows that a wide class of people will justly value really good work when they have a chance of seeing it. Any one who has had the privilege of seeing Gilbert's recent work must really feel lost in admiration of its beauty. Even people we should think uncultivated seem to feel singular interest in the good metal-work that is shown in the Arts and Crafts Exhibition. But cannot we introduce these beautiful Japanese alloys? Why is not Mr. Gardner using them? Why is it left to a metallurgist to suggest what may be done in this respect? Here they are before you, and I venture to think the metallurgists have done their part; we can tell you how to produce all these things with certainty, except, perhaps, the lobster-red, and it remains for you artists to employ them.

In conclusion, I would say that many of these alloys may be blended by casting; you may have an alloy with a solidifying point a little lower than the rest, and pour the two alloys in succession, and the one which sets first may be covered by the other one. Here is an example of a bronze god clothed in brass, with brass anklets and bracelets. That is done by pouring brass round a copper casting of suitable form. On slicing this figure through we found that was the fact. You have here the copper covered by the brass, and endless modifications may be produced in this way by pouring alloys one over the other.

While this paper is passing through the press an excellent exhibition of metal-work has been opened in a Hall of one of the ancient companies of the City of London—the Armorers and Braziers' Company. The works exhibited showed no lack of inventive power and careful design, notably in the case of the articles sent by the East-end "Guild and School of Handicraft," but the craftsmen limited their efforts to working in brass, copper, iron, and the precious metals, and appeared to have no notion that a wide range of beautiful alloys were equally available. Surely an effort should be made to induce British artificers to employ the materials and methods which their Japanese brethren have used for centuries with such remarkable effect.

TEST FOR LEAD IN BLOCK TIN.—Dr. Niedner, of Dresden, has discovered an optico-chemical method by which the presence of lead as an alloy of block tin may be speedily ascertained without injury to the utensil examined. Ten mg. of the suspected metal are scraped off, dissolved in nitric acid, and the solution made strongly alkaline with caustic potash. If this solution turns dark-brown on the addition of sulphuretted-hydrogen water, it contains lead. By making it exactly as above, diluting and comparing it with an accurately triturated solution of pure lead, one per cent. of the alloy can be detected with certainty, after a little practice.—*Roofer, Tinner & Sheet Iron Worker.*



[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

INTERIOR OF THE CHAMBER OF COMMERCE, CINCINNATI, O.
H. H. RICHARDSON AND SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS.

[Gelatine Print issued with the International and Imperial Editions only.]

PROPOSED CONSOLIDATED YACHT-CLUB HOUSE, NEWPORT, R. I.
MESSRS. HOPPIN, READ & HOPPIN, ARCHITECTS, PROVIDENCE, R. I.

AMONG some of the prominent members of the larger yacht-clubs of the country, it was proposed, last summer, to build a club-house to which all members of associating clubs should have entrance, and upon invitation from them these plans were made. The site of the proposed building was at the southern end of the inner harbor, easily accessible from yachts at the usual anchorage and from the new drive. It was found, however, to be too far from the centre of the city and this scheme was abandoned.

HOUSE AT BROOKLINE, MASS. MESSRS. ANDREWS & JAUQUES, ARCHITECTS, BOSTON, MASS.

DINING-ROOM AT 104 BEACON ST., BOSTON, MASS. MR. ARTHUR LITTLE, ARCHITECT, BOSTON, MASS.

PROPOSED FRONT FOR THE COMMONWEALTH TITLE-INSURANCE & TRUST CO., PHILADELPHIA, PA. MR. FRANK MILES DAY, ARCHITECT, PHILADELPHIA, PA.

HOUSE OF J. W. MCALISTER, ESQ., ST. JOSEPH, MO. MESSRS. ECKEL & MANN, ARCHITECTS, ST. JOSEPH, MO.

[Additional Illustrations in the International Edition.]

MAIN ENTRANCE TO OSBORN HALL, NEW HAVEN, CONN. MR. BRUCE PRICE, ARCHITECT, NEW YORK, N. Y.

[Photogravure.]

As already explained, circumstances prevented our issuing this plate last week.

DOORWAY, HOTEL DU VIEUX RAISIN, TOULOUSE, FRANCE.

[Etching.]

This little round-arched portico, with its caissoned intrados and the motive over the door skilfully arranged for sculptural effect, is a subject which deserves a place in the collection of documents which the *Moniteur des Architectes* is daily increasing, in the hope that its search after the beautiful works of French Art will have an effect on the work of contemporary architects.

HOUSE ON THE CORNER OF KAERNTHNER STRASSE AND THE OPERA RING, VIENNA, AUSTRIA. HERR FOERSTER, ARCHITECT.

[Gelatine Print.]

HOUSE AT FRANKFORT ON THE MAIN, GERMANY. HERR SCHMITT, ARCHITECT.

[Gelatine Print.]

FREE LIBRARY, LADBROKE GROVE, NOTTING HILL, ENG. MESSRS. T. PHILLIPS FIGGIS & H. WILSON, ARCHITECTS.

PANELS IN BURMANTOFTS FAIENCE.

It is unnecessary to say a word in praise of any of the productions of the Burmantofts Works, for they all are known to be distinguished by excellence of form and color. The material and workmanship are also of the highest class. We publish this week two of four panels which were specially designed by M. Sicard for the firm, and which will suggest the artistic skill employed for the adornment of Burmantofts faience.

BEDFORD ROW CHAMBERS, NO. 42 THEOBALD'S ROAD, LONDON, W. C. MR. THOMAS R. RICHARDS, ARCHITECT, LONDON, ENG.

This building is situated close to the north end of Bedford Row, and the view given is the front towards Theobald's Road. It is

divided into two blocks, connected by passage-ways on each floor. The front building is six and the back five stories in height; the staircase is placed between the two blocks, giving access to both buildings. There is a central area for lighting, and another area in the rear, by means of which the whole of the rooms, from top floor to basement, are well lighted and ventilated. The front portion of ground-floor is used as a shop, and the basement under goes with it. The rest of the premises consist of offices and residential chambers, divided into convenient suites, with a separate lobby to each set of rooms. Housekeeper's rooms are provided in the basement. The front above the ground-floor is executed in red brick, for the most part in red rubbers; the ground-floor is in red Mansfield stone, as also the finials to top story. The shop-front is in Cuba mahogany. The entrance-hall has mosaic paving and tile dado, the windows to staircase, etc., being glazed with tinted cathedral glass.

SUGGESTION FOR EXTENDING SPACE FOR MONUMENTS, WESTMINSTER ABBEY.

THE following letter from Mr. E. J. Tarver, F. S. A., is explanatory of the plate:

Sir,—The appointment of a commission to consider this subject gives me an opportunity of explaining, by a detail drawing, how the small plan published in your issue of April 5, 1889, could be worked out. This is no more than a suggestion which the eminent architect to the Abbey would be the proper person to carry out, if called upon to do so, and supposing that he has not already hit upon a better scheme. The chief object in illustrating it is to show that the windows of the chapter-house generally would receive more light than does its northern window, which faces the lofty Abbey.

The suggested chapels themselves would be partly lighted by windows placed like the west window of Henry VII's Chapel. The low flat roof of the ambulatory, which would also somewhat resemble the space between Henry VII's Chapel and the Abbey, would afford convenient means of keeping the adjoining windows constantly cleaned; this, of itself, would be no small advantage to the chapter-house. In addition to the light from the windows above named, and from three wall windows in each chapel, they would receive vertical light through the vaulting, the shadows from which, when modified by the side light from the wall windows, would be very favorable to the effect of sculptured monuments.

If there should be any difficulty in raising immediate funds for all the chapels at once, they could be built one at a time without producing any external appearance of incompleteness, because the chapter-house is not visible except from the approach to Poet's Corner.

With regard to the sufficiency of the five suggested chapels and of the covered approach to Poet's Corner for housing future monuments, it may be remarked that the age of huge monuments has passed by; modern men, whose eminence would have formerly provided an excuse for many superficial yards of marble, are now recorded by a simple bust on a bracket.

The number of monuments, as indicated on these drawings, which would comfortably fill without crowding each chapel, and not counting floor slabs, would amount to about 70, whereas the number in each of the existing chapels surrounding the apse of the Abbey is under 20. By the time, therefore, that the five suggested chapels should be built and filled, 350 monuments would have been accommodated, besides about 50 in the covered passage to Poet's Corner, in all say 400 monuments, with ample space for each. After that time it would still be possible to fill in vacant spaces without producing such a multitude of monuments as the visitor has to thread his way through in making the tour of the existing chapels.

EDWARD J. TARVER, F. S. A.

12 Buckingham Street, Strand: June 17, 1890.



THE *Engineering and Building Record* has for some time devoted a good deal of attention to the subject of the improvement of roads and pavements, and has not only made valuable editorial suggestions, but has taken pains to obtain reports of city engineers and committees, and other documents presenting the results of experience with various systems. These reports together with some of its own editorials, and other valuable matter from different sources, and also a series of essays on road-making for which it awarded prizes in March last, it has now collected in a book of convenient size, which, while not pretending to be a systematic work, will be extremely useful to engineers and town officers, and has the advantage of giving the latest information on the subject that can be found in any single book.

Of the necessity for such a publication there can be no doubt. Whether it is that the ordinary books on road-making are too technical for popular use, or not technical enough to merit the attention of practical road-masters, we cannot say, but those who have

read the books, and observed the methods adopted in building streets in and about our large towns, have, we venture to say, generally failed to notice any indication that the people who directed the building of the roads had ever seen any books on the subject, or availed themselves of any portion of the vast mass of information ready for those who were willing to use it.

We will not be so hasty as to claim that there is a direct connection between failure to follow good authority in the construction of our streets, and the imperfection of the results; but it is at least safe to say that in our road-building the rules laid down in the books are constantly violated, and the roads built are almost invariably costly and bad. Our observations have been mostly made in the neighborhood of Boston, where enormous sums are annually expended on what are supposed by the tax-payers to be macadamized roads, but are in practice vast areas of mud or dust, underlaid, at some depth, by a hard cellular formation, the cavities in which are of such dimensions that the hind wheels of a carriage will usually be in the bottom of a depression while the fore wheels are on the ridge. As both portions of this structure are of very transitory character, the mud being carried off on the varnished surface of vehicles, or blown, in the shape of dust, into the windows of the neighboring houses, while the harder substratum disappears in some mysterious way, the whole affair is annually renewed, always in the same manner. In the process of renewal, or extension, the chief object appears to get the worst possible foundation. Just at present, preparations are being made for widening one of the most important thoroughfares leading out of Boston, and the foundation has already been made, by the remarkable process of pumping up a black, fetid mud from the bottom of the river near by, and forcing it through pipes into the proposed road-bed, which is reclaimed from the river by a plank enclosure. Within this enclosure the water drains out of the mud, down to tide level, leaving a jelly-like mass, which cracks as it dries into a network of fissures.

Upon a substratum of this kind broken stone is piled; not broken granite or trap-rock, such as McAdam would have chosen, and which would have furnished angular fragments, lying as close to each other as the polygons of a Cyclopean wall, but lumps of the local "pudding-stone," the "plums" in which, in the shape of nearly spherical pebbles of agate and jasper, are to be seen rolling about by hundreds in the midst of the shapeless bits of matrix in which they were once embedded. After a sufficient quantity of this material is distributed, cartloads of brown gravel, apparently unscreened, are put on top, and the whole then wet and rolled. It is hardly necessary to say that nothing more is seen of the broken stone, which, by the next season, is apparently well on its way toward the bottom of the river.

Even where the conditions are far more favorable than on a much-travelled street on made land, the practice of some road-masters in the neighborhood of Boston is singularly unsuccessful.

As a rule, drainage of the road-bed, the most important part of the whole process of macadamizing, is almost entirely neglected. Even the side ditches, which our ancestors made with such scrupulous care, have nearly disappeared, and of under-drainage, the necessary supplement of the side ditches in the case of wide roads, and the essential substitute for them where circumstances make side ditching objectionable, there is usually no trace. We have in mind a street in the suburbs of Boston, two miles long, on which many thousands of dollars have been spent within two years, with the most unsatisfactory results. Here, broken stone of excellent quality is used, and rolled with a heavy steam-roller, but, although the subsoil is favorable, a few weeks suffice, after each annual rebuilding, to cover the whole with soft mud. The explanation is simple. The street is nearly level; there is no under-drainage, and the side gutters are so shallow that there is practically no flow in them, and the consequence is that after every rain the road is bordered, sometimes for days, with long pools of water, showing that the metalling must be saturated, a few inches from the surface. No macadamizing, when in this pulpy condition, would resist even light traffic, and a few rains completely ruin the surface. That this is the explanation of the total failure of the level streets to maintain their hardness, in spite of good material and constant repairs, is shown by the fact that the inclined portion of the same streets are almost always in admirable condition.

We have spoken of the practice of macadamizing, as this concerns the largest number of people; but the book before us gives the best information, perhaps, to be had anywhere on the subject of city pavements. Public opinion is fast coming in this country to the point it has already reached in Europe, that asphalt, on a concrete base, is the best city pavement yet devised, if it is kept clean; but there are several kinds of asphalt, and the problem of maintaining any pavement in good condition which is torn up every few months to lay pipes, or wires, or tracks, yet remains to be solved; so that we need all the knowledge of the experience of others that we can get together in order to repave our towns successfully.

EVERY architect must rejoice at the numerous signs which are now visible that the study of architecture, both in theory and practice, is becoming more and more popular. On the side of the practice of architecture, we find that the newspapers of all our large cities devote a considerable part of their space to what purport to be criticisms of buildings, and information on the subject of architecture and architects; while, on the theoretical side, each year

¹ "Pavements and Roads": their Construction and Maintenance. Reprinted from the *Engineering and Building Record*. New York: The *Engineering and Building Record*. 1890.

brings forth an increasing number of books on points of architectural history, which seem to improve in quality as the demand for them extends. That all these books and articles find readers is a sure indication that the world in general has begun to notice the difference between a beautiful building and an ugly one, and thinks it desirable to know something about the history of the art of architecture, and about the best examples of it; and, while we can hardly commend the disquisitions on the subject which are concocted by ignorant newspaper reporters to meet the demand, the popular books now within reach are excellent in nearly every respect.

Just at present, we happen to have on our table three works of the kind, two in Italian and one in English. The latter¹ is a new edition of Mr. Goodyear's book on the "*History of Art*," containing new matter and new illustrations. Mr. Goodyear knows well what the student and amateur needs, and supplies it carefully and concisely from a very extensive knowledge of the subject. Naturally, having to cover the fields of architecture, sculpture and painting in a single book of 360 pages, which must be profusely illustrated, his capacity for compressing what it is necessary to say into the smallest possible compass is severely tested, and it is creditable to his modesty that, knowing the importance of illustrations in such teaching, he has made room for so many of them. Their quality, too, is as remarkable as their quantity. The wood-cuts are perfection, and with them are mixed a great number of process-plates, which, if occasionally deficient in brilliancy, have the great advantage of giving the sculptor's or the painter's or the architect's effects at first hand, without translation through the mind of the engraver. We could wish, however, that it had not been thought necessary to print the illustrations in ink of various colors. Some of them, undoubtedly, would have been heavy if printed in black, but a uniform tint of sepia or indigo might have been used, which would have answered tolerably well for all, without giving the disjointed, scrap-book-like effect of carmine, blue, brown and purple pages succeeding each other, apparently without order.

ANOTHER book, quite equal in its way to that of Mr. Goodyear, and perhaps more interesting to the architect, is the little manual² of Italian architecture by Professor Melani, whose name is familiar to our readers. This unpretending but skilful piece of work furnishes two volumes of the long series of popular manuals of all sorts published by the great house of Hoepli, of Milan, and if the other portions have been as well done as Professor Melani's part, the series must be the best thing of the kind ever printed. It would be too much to expect a popular Italian book to be illustrated as profusely and splendidly as Mr. Goodyear's history; neither the price of the volumes nor the state of the art of wood-engraving in Italy would admit of such a thing; but Professor Melani's 159 illustrations are clear and well-chosen, and he has room enough left for a great deal of very interesting text, much of which will be new, even to tolerably well-read architects. Concerning some of the more curious pieces of information, the author mentions that they are abridged from a larger work on architectural history, which he has in course of preparation; and, with the aid both of his thorough acquaintance with the results of previous research and of his own investigations into Italian antiquity, the promised book seems likely to be of singular value.

One of the portions of the present little manual which will interest professional men the most is that describing Etruscan architecture, and comparing it with the Doric of Magna-Græcia. We imagine that a good many students of the history of the Grecian Doric, who, after saturating their minds with the Temple at Corinth, followed by the buildings on the Athenian Acropolis, have been next led to Southern Italy and Sicily, to criticise the coarse colonial profiles of Paestum and Agrigentum, have had their ideal of the regular sequence from the polygonal columns of Egypt, through the perfect style of Attica, to the stucco-covered colonnades of Magna-Græcia, rather upset by finding that the huge Doric temples of the Two Sicilies antedated those on the Acropolis of Athens by at least a hundred years, and that the Doric order was well understood in Italy before the temple at Corinth was begun; but the faith of most of us in the proto-Doric of Beni-Hassan has been too firmly rooted to be shaken by a mere chronological misfit, and the theory of the Egyptian origin of the Grecian Doric is still generally accepted in the professional world. Professor Melani, however, inclines to the opinion of Francesco Taccani, who, in 1855, published a "corrected" history of European architecture, in which he claimed that the theory that the design of the vast and splendid temples of Southern Italy was copied from a style existing in the mother-country, of which no examples are known to have existed until about a hundred years after they were built, was not merely questionable, but absurd, and declared that, in the constant intercourse

between the poor Hellenic towns, and their rich and brilliant colonies, it was far more natural that the former, when chance put into their hands money enough to build with, should have imitated, and undoubtedly improved upon, the temples already built by the people of Syracuse, Paestum and Agrigentum, who, in their turn, had derived the idea of them, not from one or two little upright stones in the doorway of a tomb in Egypt, but from the sacred buildings which they saw in the Etruscan towns around them, and to which, as we know, the Greek temples bore a thousand times closer resemblance than they did to the Beni-Hassan tombs. Without taking up arms on Taccani's side, a proceeding for which, he says, he has neither the courage nor the erudition, our author believes that Taccani's conclusions find legitimate support in the artistic development of architectural forms which, before being Italo-Greek in Magna-Græcia and Sicily, were Etruscan at Vulci, Volterra and Tarquinia, and became, later, Greek in Athens, Ephesus and Olympia.

Passing over this discussion, we find a great deal that is curious and new in the chapters on Etruscan and Italo-Greek architecture, about which, it must be remembered, a great deal has been discovered within the past few years. We come then to the Roman buildings, about which there is naturally less to be said that is new, although what we find is well said and well illustrated. This part has, however, an appendix on the Roman architects which is curious and interesting. According to Professor Melani, the architects in Rome were mostly slaves or foreigners, who worked for the Roman prætors and proconsuls much as, for example, Mr. Pelz is now working at Washington on the Congressional Library under the orders of Colonel Casey. Occasionally, a man, such as Apollodorus of Damascus, the architect of the Forum of Trajan, the Basilica Ulpia and a famous bridge over the Danube, would gain a reputation of his own, independent of the renown of his master, but distinction of this kind was not always desirable. This same Apollodorus was once invited, as a person skilled in architecture, to give his opinion on some plans which the Emperor Hadrian had himself concocted for building the Temple of Venus at Rome. The incautious architect, forgetting how thin the skin of an amateur is, and how dangerous an imperial amateur is likely to be, said frankly what he thought of the great man's construction. Hadrian never forgave him, and soon afterwards, on some ridiculous pretext, had him seized and put to death by the public executioner.

We have left ourselves no space to speak of the second volume of this excellent little work, which begins with the Romanesque, and ends with a short chapter on modern architecture. Those who read easy Italian will find it a very useful addition to their Fergusson, and those who do not may still be glad of the valuable plans and other illustrations which it contains.



[The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.]

A SERIES OF ARCHITECTURAL BLUE-PRINTS.

TOPEKA, KAN., June 19, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—I enjoyed, a couple of years ago, looking through a collection of blue-prints taken from negatives of foreign buildings, arranged by a Boston party for architects, etc. Please give me name and address, if you can, of party selling these prints and oblige. Yours very respectfully, SEYMOUR DAVIS.

[The blue-prints to which our correspondent alludes were copies of a portion of the collection of photographs belonging to the Architectural Department of the Massachusetts Institute of Technology, and were made several years ago by one of the pupils and by him furnished, with the permission of the authorities, to his fellow-pupils. We should question whether, under the circumstances, they were properly articles of public barter and exchange; but this point can be discovered and also the fact of the existence or non-existence of the negatives can be ascertained by addressing Mr. Thomas Fox, whose address a short time ago was, care of Messrs. McKim, Mead & White, 57 Broadway, New York City.—Eds. AMERICAN ARCHITECT.]

THE ARCHITECTURAL ILLUSTRATION SOCIETY.

BROOKLYN, N. Y., July 5, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—I am a subscriber for the International Edition of the *American Architect*. I notice that many of the extra plates illustrating that edition are reproductions of plates of the "First Series" or "Second Series" of "The Architectural Illustration Society." Can you tell me anything of this society? Is it an English or American one? Where is its home and what are the requisites for membership? Can its publications be seen and procured in this country, and, if so, where?

The illustrations of English country homes published during the

¹"*A History of Art, for Classes, Art Students and Tourists in Europe*"; by William Henry Goodyear, B. A., Lecturer by Appointment in the Cooper Institute, New York, and in Various Educational Institutions; lately Curator in the Metropolitan Museum of Art. Second Edition, revised, with new illustrations. New York and Chicago: A. S. Barnes & Co.

²"*Architettura Italiana*"; dell'Architetto Alfredo Melani, Professore alla Scuola Superiore d'Arte Applicata all'Industria in Milano. Parte Prima: "*Architettura Pelagica, Etrusca, Italo-Greca e Romana*." Parte Seconda: "*Architettura Medievale, del Rinascimento, del Cinquecento, del Seicento, del Settecento e Moderna*." Second Edition, totalmente Riformata. Published by Uirico Hoepli. Milan, Naples and Pisa. Two volumes, fully illustrated. Price, 2 francs each volume.

spring in your magazine have especially interested me, and I hope that many more are to follow. Can you name any recent books illustrating and describing such homes?

An answer to these inquiries either by letter or through your magazine will greatly oblige. Yours very truly,

ERNEST H. JACKSON.

[The Architectural Illustration Society is one of the most select bodies of English architects and one admission to whose membership is eagerly sought by those who, to tell the truth, have the least right to be enrolled in it. The best, and perhaps the only way for such a society to preserve its tone and the value of its labors to the profession is to take every precaution to make it a select and, therefore, a small body of men. At present no architect is a member who would not by common consent be acknowledged as holding a deserved place in the front rank of English architects or architectural draughtsmen, and our correspondent is quite right in finding the plates published under the aegis of the Society of exceptional value. These plates are published only in the *Architect*, the English organ of publication of the Society, and in the International Edition of the *American Architect*, its organ of publication on this side of the Atlantic.—EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS

THE BUILDING MATERIALS OF OLD ROME.—From the archaeologist's point of view the subject is an important one, as in many cases the strength, prosperity, and even the very existence of an ancient city has depended on the local supply of stone or brick with which defenses against rival towns or foreign enemies could be constructed. Rome itself is a good example of this; every one of its many hills consists of a soft volcanic tufa, which could easily be worked into blocks for walls of defence even by the bronze tools of the prehistoric settlers on the Palatine and Capitoline Hills. Later on, when iron tools had come into common use, the harder volcanic peperino from the Alban Hills was readily obtained, and formed circuit walls of great strength and durability. Next in order of time came the use of the beautiful travertine limestone from the cliffs of Tibur, and lastly, under the Empire, when magnificence and not military strength was aimed at in the capital of the world's conquerors, there was no longer any restriction to the use of local materials, and the most gorgeous marbles, granites, and alabasters of every hue were poured into Rome in almost inconceivable abundance. Whole armies of slaves were incessantly laboring in the marble quarries of Africa, Arabia, Asia Minor and Greece, and immense fleets of ships were constantly employed in transporting the great blocks or columns to the long Marmoratum or Marble Quay, which occupied nearly half a mile of the Tiber bank below the Aventine Hill. In the main, however, the local material which did the most to make Rome the Eternal City was, not her rich stores of stone or brick clay, but rather that wonderful natural cement, the pozzolana, which in some far-distant period was showered down out of volcanic craters in the Alban Hills, and formed a bed of considerable thickness over nearly the whole surface of the Campagna of Rome. This curious volcanic product, which looks like a red and rather earthy sort of gravel, has the property, when mixed with lime, of forming a hydraulic cement of the greatest strength and durability. Throughout the whole period of the Empire the chief building material of Rome was concrete made of small lumps of stone or broken brick bedded in a matrix of the pozzolana cement. This mixture, as soon as it had set, became much harder than most building stones, and each wall or vault formed one coherent mass, as if it had been cut out of a solid mass of rock. The extraordinary strength of this kind of building has been constantly tested during the last ten years or so of destruction of old buildings—the unhappy result of the rapid growth of the modern capital of Italy. The massive blocks of the grand old "Wall of the Kings," near the railway station and in the gardens of Sallust were removed and utilized for the new stuccoed barracks with comparative ease. But the massive concrete walls were far too much for the pick and hammer of the demolishers; dynamite alone was of sufficient force to shatter the obdurate masses. The pozzolana is found in great beds in various parts of Italy. Its earliest use seems to have been at Puteoli, near Naples, whence came its Latin name of *Lapis puteolanus*. And even in districts where none of this volcanic earth was to be found the ancient Romans imported it in great quantities for all buildings of any pretension.—*The Saturday Review*.

TIN—Tin, which every one knows, but which few except men of science and metallurgists are acquainted with, is one of the most precious and most interesting metals. After gold and silver, it is intrinsically the most precious of those in use. It is nearly of the same color and almost as bright as silver, but has less resistance and is less valuable. When warmed by friction it has a pronounced odor and taste. When it is bent, the derangement of the crystals of which its mass is formed causes it, without any fracture taking place, to emit a peculiar sound which metallurgists call its cry, and by means of which an expert can nearly determine its degree of purity. The places where tin is produced are few, scattered sparsely over the surface of the globe; and it disguises itself under the form of a blackish mineral which, to the profane eye gives no sign of the treasure that is within it. One of the richest as well as one of the most ancient tin-mining districts is in the Malay Peninsula, the Golden Chersonesus of the ancients. The name of the province, Perak, signifies silver, but it is peculiarly the province of tin. The use of tin dates from extreme antiquity. Homer mentions it as *kassiteros*, in the descriptions of the arms of his heroes. Herodotus speaks of the British Islands as the *kassiterides*. The Phenicians obtained the tin which they furnished to the ancient world chiefly from those islands, but partly also from Gaul and the Iberian Peninsula. Before the Phenicians and the Greeks, however, the Chaldeans knew this metal under the name of *kastira*. The most ancient document in

which a mention of it has been found is probably a hymn to the fire, which M. Oppert has translated from the Acadian language, a tongue, the knowledge of which has been recently revived from cuneiform documents. Tin was designated in them 5,000 years ago as *anaku*. The biblical text in the book of Numbers, in which Moses names tin in the enumeration of the metals, is therefore comparatively modern, for it is of fifteen hundred years later date than the hymn to the fire. Even more definite than these texts is an Egyptian statuette in bronze (an alloy of tin) of the age of the pyramids, or 3600 years B. C.—*Popular Science Monthly*.

THE OLD STAATS HOUSE.—One of the oldest houses in America is the stone mansion on the Staats farm, about four miles below the village of Greenbush, on the river bank. The building was erected of blue stone and brick in 1650, and at present is occupied by Lawrence and Philip Staats, and is in a splendid state of preservation. The house faces south and west, and commands an extended view of the Hudson and surrounding country. Hard by the ancient dwelling, on a pleasant knoll, is the family burial ground, which contains the remains of generation after generation of the Staats family, who came to this country when New York was settled by the Hollanders, about 1614. The Staats farm and the three farms adjoining to the north were occupied when the Van Rensselaer patroon received his grant for twenty-four miles square each side of the river, from the king of Holland, but the owners of these farms were exempt from paying him any rent.—*New York Telegram*.

MEMORIAL TO THOMAS WEBSTER, R. A.—A memorial has lately been erected in St. Dunstan's Church, Cranbrook, by Mrs. Webster to the memory of her husband, the well-known Royal Academician. The memorial is the work of Mr. Hamo Thornycroft, R. A., and is placed in the southwest aisle on the west wall. The tablet is of white marble, with a dove marble margin, and is about 9 feet 6 inches in length, by 4 feet in height. The figure of the deceased painter is represented in a recumbent position with the hands on the breast clasping a Bible and paint brushes. An angel kneels at the head holding a palm branch, and another at the feet with a wreath of immortelles. The angels are represented by winged boys, typical of the characters the deceased artist was so fond of portraying. The tablet bears the inscription: Thomas Webster, Royal Academician, born 20th March, 1800; died 23d Sept., 1886.—*Building News*.

TRADE SURVEYS

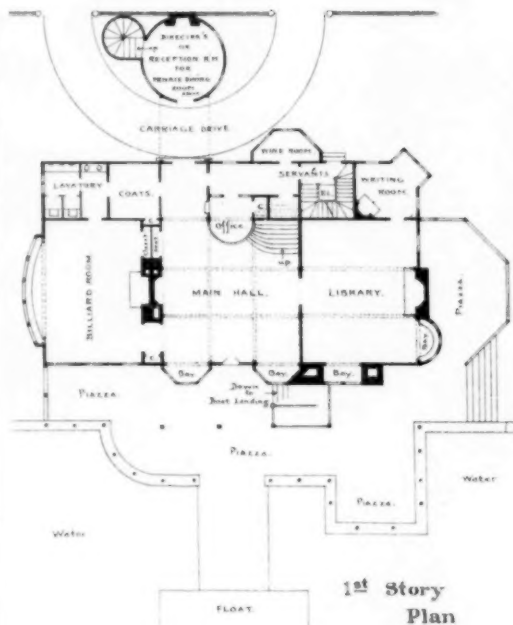
DESPITE all the extraordinary industrial activity and the great expansion in producing capacity this year, the surprising fact has been stated on very good authority that it would take but a little spurt of demand to cause an upward tendency in prices in almost every direction. No such tendency, however, is likely to manifest itself. It is necessary to note the fact that the supply of raw material and finished products, and merchandise of all kinds, is not, in a market sense, in excess of demand. There are a few hundred thousand tons of iron, a million or more tons of anthracite coal, two or three hundred thousand tons of bituminous, a few hundred million feet of lumber and only ordinary supplies of raw material of all kinds. There is nothing like a surplus, and what is better, there are no indications that a surplus will be created. The same observation applies to a multitude of the smaller industries. Shop-keepers are also in possession of only moderate stocks. Jobbers are keeping on the safe side. Little manufacturers are working only up to orders. Speculators are keeping out of the way. Legitimate investors are at the front. Manufacturers and business men are closely studying the probable requirements of the country. New industries are springing up in the South as usual, the total number for the first six months of the year being 2,353, as against 2,615 for the first half of last year. While the number of new enterprises has fallen off, the aggregate investment has increased. In the Northern States, so far as the scattering returns show, there has been an increase both in the number of new enterprises and in the volume of money invested. In the Lake Superior region, all kinds of mining enterprises have been pushed, and Lake craft is taxed to its utmost to supply tonnage for the increasing supply of minerals and lumber. In the farther West, new industrial enterprises are growing, elevators are being built and stores are being started to supply the incoming population.

The cotton planters have sold, this year, 290,000 bales of cotton more than at same time last year. The cotton-goods manufacturers both South and North have had no reason for curtailing production. Hosiery manufacturers everywhere are running pretty nearly full time. New England boot and shoe manufacturers have had a season of exceptional activity. Paper manufacturers, East and West, continue to extend their capacity, in spite of increasing complaints of dulness. In the West, nail-makers, tool and implement makers, wagon and carriage makers have had an unusually busy half-year. Manufacturers of and dealers in hardware of all kinds have distributed and sold more goods this year than last. Barb-wire manufacturers have been very busy all season, and they, as well as the manufacturers of farming implements, endorse the statements made as to the generally prosperous condition of the agricultural interests. Whether the extraordinary borrowing going on among nearly all classes of agriculturists is the best possible course may be a more fit subject for a magazine article than a trade review; but it is worth while to mention the fact that the demand for money to facilitate agricultural operations is steadily expanding. Whether an increase of silver currency will be beneficial or not, it is a notable fact that the farming interests are largely favorable to such a policy. Whether a further general expansion of manufacturing is safe may be open to discussion, but the fact is to be noted that there is scarcely an industry in which extraordinary efforts are not being made to increase the machinery-capacity. If the iron trade is a safe barometer of business, a very hopeful view can be taken. The increase in production is extraordinary. In round figures, the additional pig-iron capacity soon to come in will be equal to 1,000,000 tons per annum. The steel-rail mills are busy, and so are plate, structural, sheet and bar mills. There is a rushing demand, but it is under good control.

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3rd Story Plan.



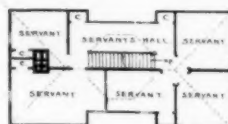
1st Story Plan



Plans of Proposed Consolidated Yacht Club
Hoppin, Read & Hoppin



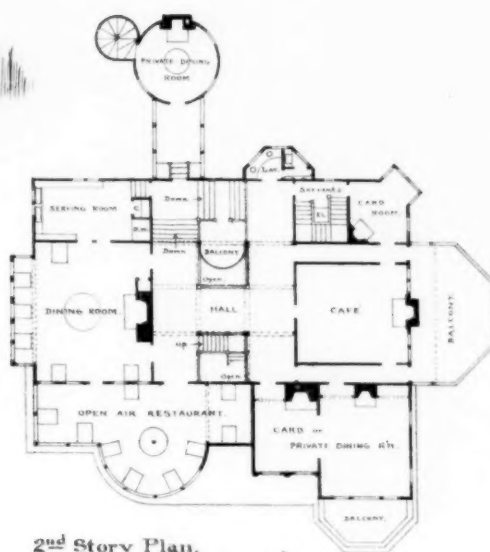
Yacht Club House. Newport, R. I.
& Hoppin, Architects. Providence, R. I.



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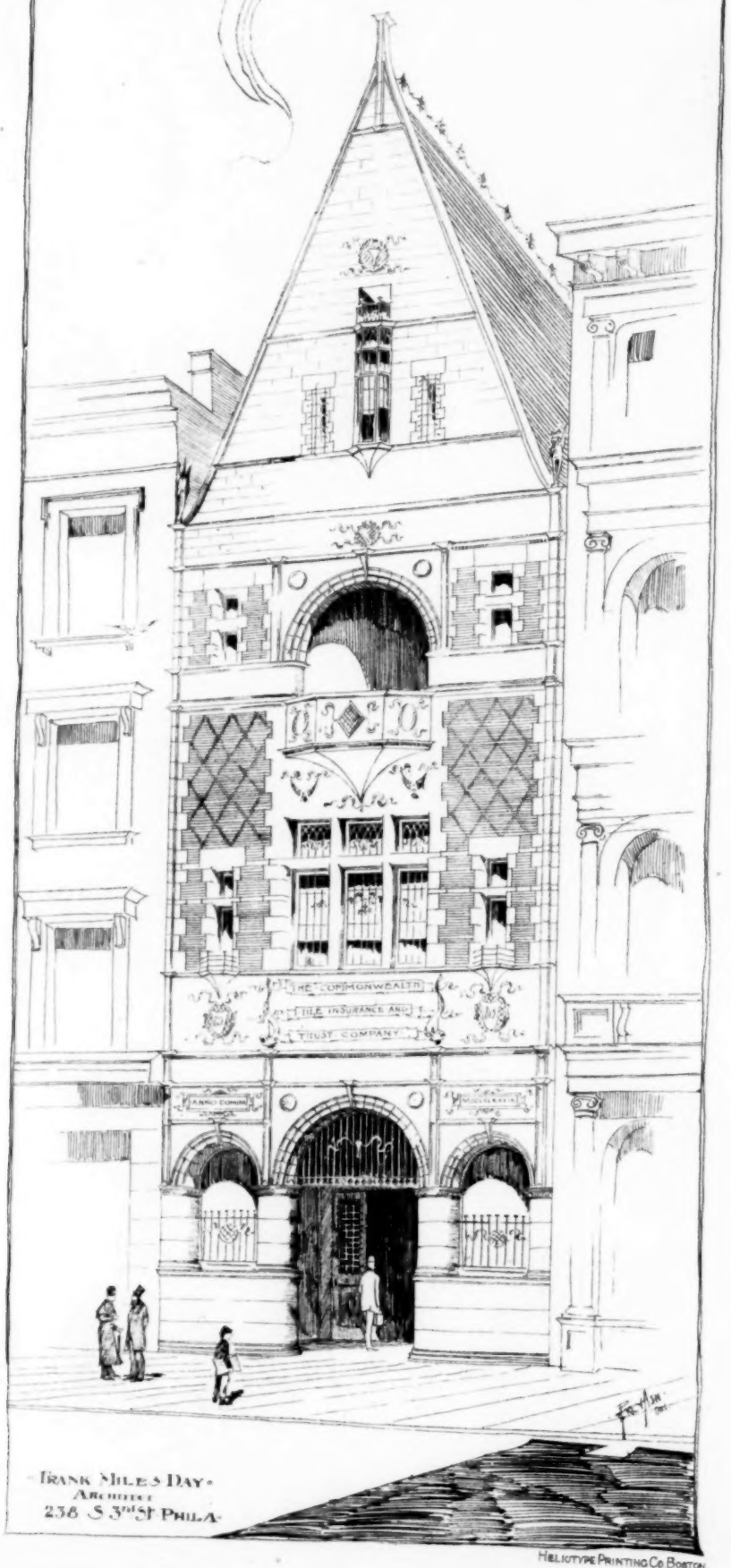
Tower.

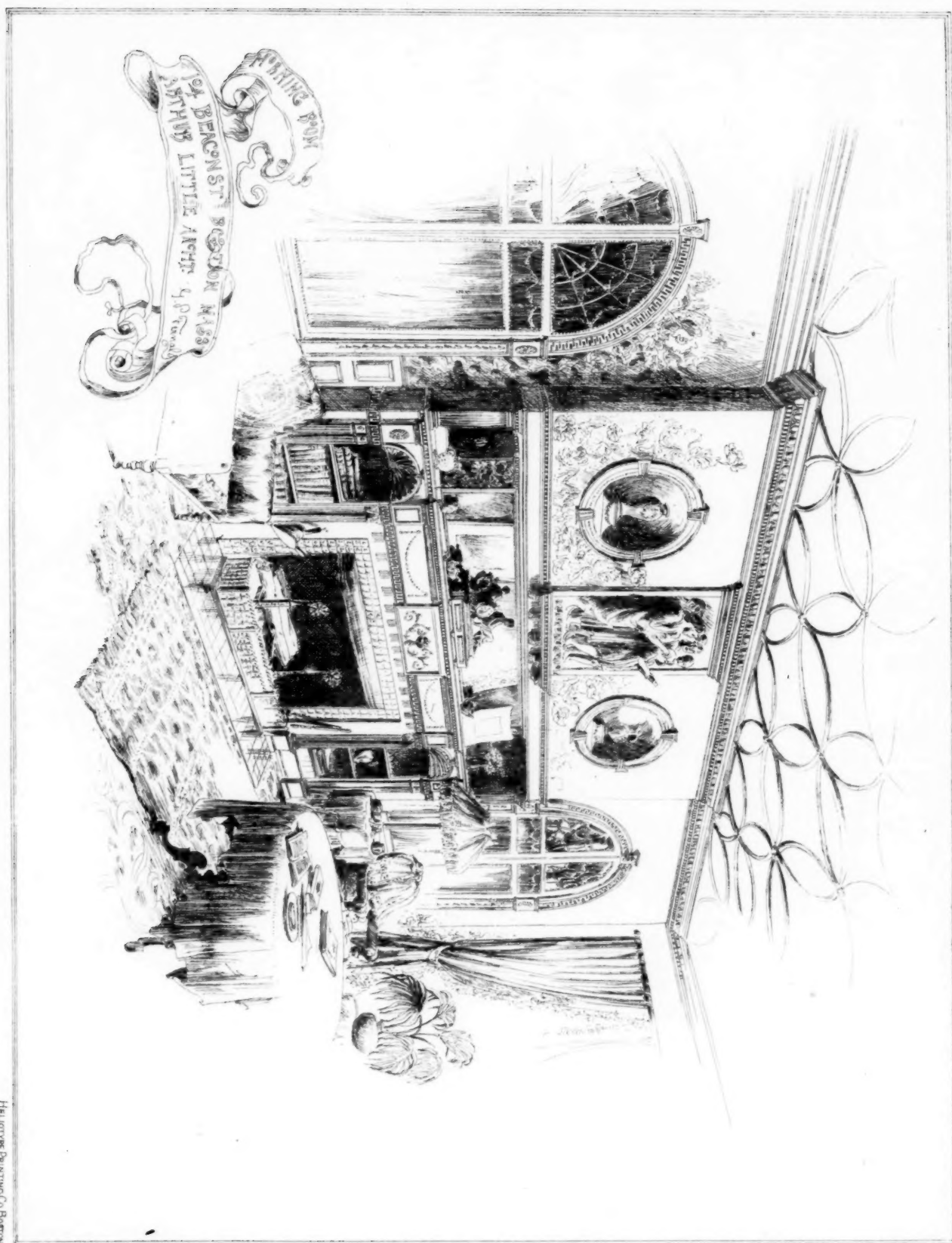


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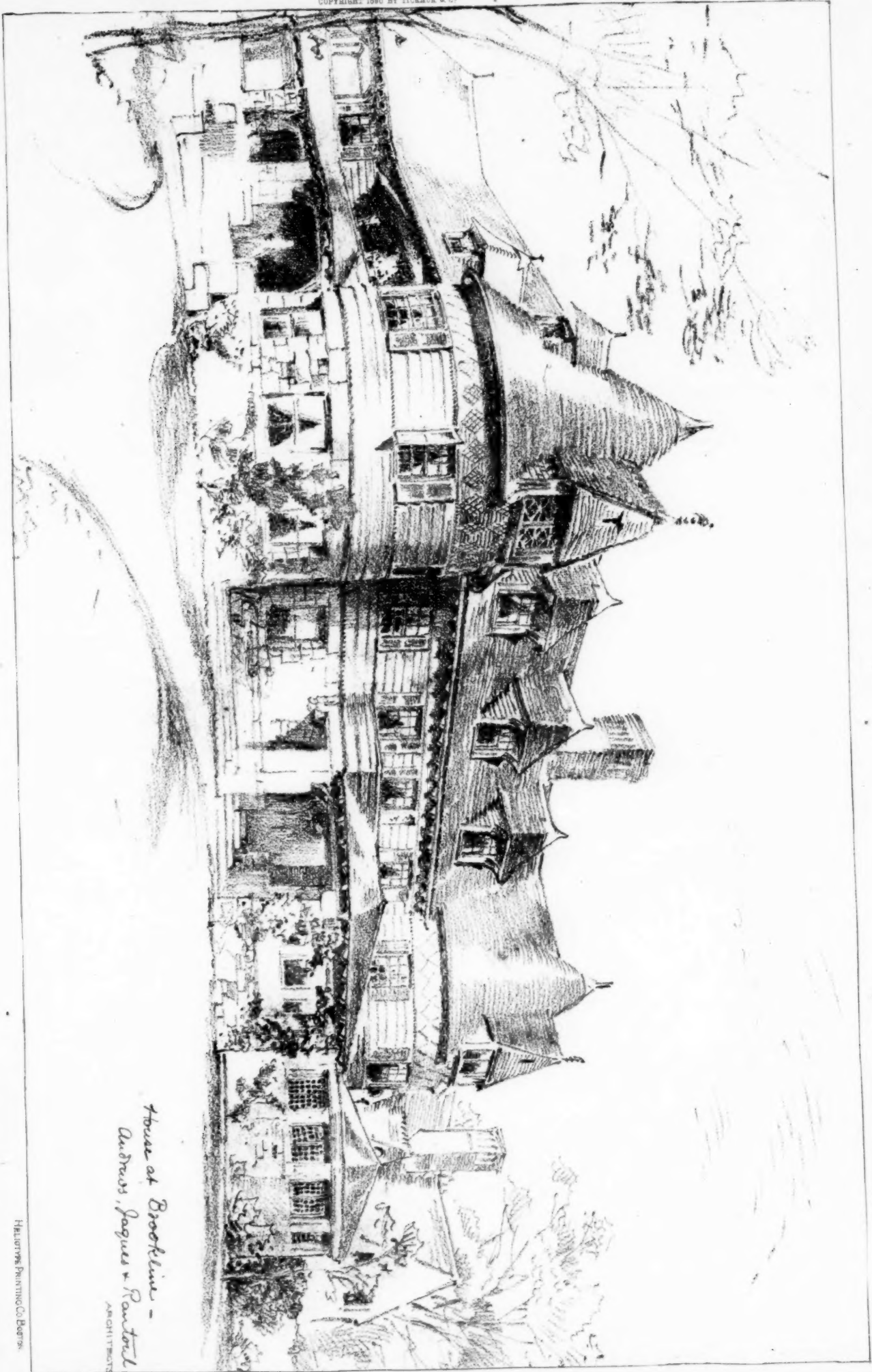
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