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ARCHITECTS, almost as much as engineers, will hear with regret of the death of Mr. John C. Trautwine, of Philadelphia, whose admirable little "Engineer's Pocket-book" is, with very many of them, in constant use, both for reference, and as a text-book in the principles of construction. It is impossible to say too much in praise of this work, which, in its frequent and carefully revised editions, formed his most important service to his own and the allied professions, and those who have studied it faithfully will understand, almost as well as if they had known its author personally, his conscientious honesty, industry and intelligent zeal in his work. As an engineer he belonged rather to the old school, his active practice having begun more than fifty years ago, but his devotion to the profession which he loved and served so well kept him always among the leaders of engineering opinion, while his practical knowledge made him to the last a most useful adviser. It is interesting to know, in view of the peculiar usefulness of his "Pocket-Book" to architects, that Mr. Trautwine was himself educated partly as an architect, in the office of William Strickland, a distinguished engineer and architect of his day, Dr. Thomas U. Walter, the architect of the wings of the Capitol at Washington, and the present President of the American Institute of Architects, being a fellow student with him. Under Mr. Strickland he assisted in the construction of the United States Mint and other buildings in Philadelphia, and himself made a competitive design for the Penn Township Bank, at the corner of Sixth and Vine Streets, in Philadelphia, which was accepted and carried into execution. Some years after his entrance into the office of Mr. Strickland, the latter, in his capacity as an engineer, was put in charge of what is now the Philadelphia, Wilmington and Baltimore Railroad, and Mr. Trautwine became his principal assistant, meeting in this capacity Mr. Benjamin H. Latrobe, of Baltimore, whose connection with the architectural part of the old Capitol at Washington furnishes so interesting a chapter in our professional history. From this time Mr. Trautwine's attention was almost entirely occupied with engineering work, his most important undertaking having been the final survey for the Panama Railroad. His affection for the more artistic employments of his early years seems, however, never to have left him, and to the end of his life he continued to sketch for pleasure in oil and water color, both of which he handled with unusual skill.

THE strikes in New York continue without material change, the Union delegates still racking their brains for means to intimidate or coerce the contractors without provoking a rebellion among their own constituents by loading them with too great a burden, while the contractors, who have begun to see that the delegates dare not order more men on strikes than they can find employment for elsewhere, are gaining courage to resist their insolent demands. The proprietors of the patent hod-elevators having, like the trustees of the Clark estate, declined to act as the tools of the Union officers, war was declared against them, and strikes were at once threatened in

all the buildings where the apparatus was in use. A few contractors seem to have been alarmed by this menace, and a compromise was effected with them, but as it was clearly beyond the power of the delegates to carry out their threat effectively, the matter seems to have been dropped. An attempt was also made to whip back into line the German framers who returned to their duty in the buildings belonging to the Clark estate, and the contractors who employed them were notified that the wrath of the Amalgamated Union would fall upon them unless the framers were immediately discharged, but so far no attention has been paid to the admonition. The most recent accounts say that mysterious movements are going on among the Unions, and that hints are thrown out of a universal strike, with terrible consequences, but as one man can easily keep up a show of commotion, while another distributes hints, it may be safely assumed that the movement is nearly over, and that the pretence of serious movements to come is thrown out by the Union officers simply as a dust-cloud to cover their ignominious retreat.

A DISCUSSION is now going on in the daily papers over a suggestion made by the Grand Jury of New Orleans not long ago, that the bodies of persons dying of contagious diseases should be burned, rather than buried. An article in the *Princeton Review* supports this proposition by various arguments. According to its author, the soil of cemeteries may become saturated, not only with the emanations of the decomposing bodies, but with the "microbian organisms of disease," and it is even asserted as probable that "in a great number of cases people carry from cemeteries death-germs which soon result fatally." More evidence in favor of cremation is found in the well-known theory of Dr. Domingos Freire of Brazil, who believes that he has discovered the ferment of yellow fever, and has observed that the soil of a cemetery in which some victims of the fever lie buried swarms with the bacteria forms which he connects with the disease. Whether Dr. Freire scrutinized the soil of cemeteries not containing the corpses of yellow-fever patients, and found them free from the microbe in question, does not appear, but it is only fair to say that the value of his discovery is quite uncertain, until further investigations shall have confirmed his conclusions. As to the fatal effect of visiting cemeteries, people without theories to support will be likely to think that the conditions under which out-door funeral services are often held, taken in connection with the depressed mental and physical state of many of those in attendance, may very well account for a mortality among mourners which is far from being found among those who visit such places in favorable weather for mere pleasure. That thorough and scientific experiment may show the existence, in contagious diseases, of an organic poison so penetrating and persistent as to exhale in a fatal miasm from the soil of cemeteries is by no means impossible, but it is not yet proved, or even shown to be probable, and it is worth remarking that a French Commission, comprising, as most French Commissions do, the most eminent experts on the subject in France, which was recently appointed to consider the question of burning the bodies of persons dying of Asiatic cholera, has just rendered its report, in which the members express their opinion that the necessary handling of corpses in the process of cremation involves more danger of infection to the living than is to be feared from any miasm arising from bodies buried in the usual way; and they unanimously recommend, in consequence, that in case of the entrance of cholera into France, no change should be made in the present method of disposal of the dead.

A REMARKABLE pamphlet has been published by Professor Lucien Carr, Assistant Curator of the Peabody Museum of American Archaeology and Ethnology, upon the Mound-builders of the Mississippi Valley, in which the author maintains that the great mounds of the West, the subject of so much speculation and romantic theory, are the work, not of an extinct race of highly civilized beings, but of the immediate relatives and ancestors of the Indians whom we now know. In his opinion, which is certainly confirmed by even a hasty inspection of the objects themselves, the stone tools, pottery and other articles taken from the mounds are not only not superior in design or workmanship to those of modern Indians, but are identical in design and material with those made in

the Indian villages to-day, so that, as he says, "it is impossible to distinguish between a series of stone implements taken from the mounds in the Mississippi Valley, and a similar series made and used by the modern Indians." "Nor," he goes on to say, "does this similarity stop with objects made of stone. On the contrary, it is believed to extend to all the articles, of every kind whatsoever, that have thus far been taken from the mounds." To the objection that the Indians of the historical period have shown neither the disposition nor the ability to undertake such extensive works of engineering as the building of the mounds involves, Professor Carr replies that the capacity and industry of the native North American tribes have been underrated. That they should have built none within the last two hundred years may be true, although even that is not certain, but this is perhaps the result of political changes or other circumstances, such as affect all nations. That the Indians of our own day have always known how to construct earth-works of a certain sort is well-known, and a group of powerful tribes, living for a long time at peace under a strongly centralized government, such as he believes to have once existed in the Scioto Valley, for instance, may well have felt themselves secure enough to undertake permanent engineering works, as well as to put in practice the extensive system of agriculture which has left its traces in the same district.

ARCHITECTS who practise in the large cities will be interested in the answer given by the law editor of *La Semaine des Constructeurs* to a correspondent who asks whether the usual commission can be collected, where old materials are used in building, upon the cost of the work as it would have been if all the materials were new. The reply to this important question is a very satisfactory one, at least for architects in France. It appears that judicial decisions have established the law there that for his services in the construction of a new building an architect is entitled, in summing up the cost upon which his commission is calculated, to reckon all materials, whether old or new, and whether furnished by the proprietor or not, as if new and furnished by the contractor; the courts holding that the work and responsibility of the professional man, and his proper compensation, are the same in both cases. Moreover, if, as often happens in cities, the demolition of structures already existing on the ground forms a necessary preliminary to the construction of a new building, and if the architect of the latter includes in his service the direction of the work of taking down and sorting the old materials, and the provisions for the protection of the public, he is entitled in France, by a decision of the Tribunal of the Seine, to collect commission upon the cost of these operations, in addition to his fees for work upon the new building.

THE New York *Tribune* gives an extraordinary account of some experiments with the Daft electric locomotive, about which a few vague paragraphs have before appeared in the newspapers. According to the *Tribune's* account, the electric current is supplied by means of a stationary engine and dynamo-electric machine, at one end of the track, to the rails, which conduct it to the locomotive. The current is of very low tension, and is not disposed to jump from one rail to the other, so that no special means of insulation are used, and even water between the rails would not, it is said, cause short-circuiting of the current. The moving motor is arranged to receive the current continuously, without the reciprocating movement of ordinary steam and electric engines, and a very high speed may be maintained without danger, and without loss of energy. In the trial witnessed by the *Tribune* reporter a train of small cars was drawn over a track one-quarter of a mile or so in length, and laid with various curves and grades. The little locomotive ran over its course with great speed, and found no difficulty in clambering up and down the steepest grade, which presented an ascent of no less than two thousand feet to the mile. As no stock of the company which furnishes the money for these experiments is for sale, there is room to hope that no deception was practised on the spectators, and that some means has actually been found for practically operating an electric motor with a current of low tension. According to the *Tribune* account the cost of the power obtained in this way is less than half that of the force developed in ordinary steam locomotives. If this should prove true, the Daft electric locomotive has a great future before it.

AN Electrical Exhibition is to be held in this country next year under most excellent auspices, the Franklin Institute of Philadelphia having determined to hold such an exhibition in September next. It is a little surprising to find so grave a body as the Franklin Institute concerned with a public show, but every one must acknowledge the advantage of such intelligent and responsible supervision for an affair which would, in the hands of speculators, probably become a mere engine of imposition. The exhibition is to include all kinds of electrical apparatus, machinery, tools and implements, with other articles used in scientific, mechanical and manufacturing business and investigation, and an effort will be made to obtain as many interesting objects as possible from foreign countries. The electrical exhibitions which have been held within the past two years in Paris, Berlin, London and Vienna have proved very successful, and that a similar one in this country, where electrical appliances are more generally employed than anywhere else, will be quite as interesting as the others.

THE purification of the Seine at Paris would seem to be indeed a serious undertaking, but it is by no means improbable that an attempt will be made within a year or two to carry it out. The new Technical Commission for the improvement of the sanitary condition of Paris, with that ambition to surpass everything that has been done before so characteristic of the French, has formally resolved to request the Government to take the necessary measures for prohibiting the discharge of impure water into the stream of the Seine or the Marne, in any part of their course through the departments of the Seine and Seine-et-Oise. Of course, the principal part of the pollution from which the Seine now suffers comes from Paris itself, but the Commission has already made up its mind that this can and ought to be kept out of the river, and expresses its conviction that the sewer waters of the city of Paris, as at present constituted, can without danger to the public health be submitted to purification by the soil, adding the announcement that plans are to be immediately prepared for the utilization of all the sewage of Paris not now disposed of at or near Gennevilliers, together with that of the neighboring towns, by irrigation works in the plains which border the river above the city. It is worth noticing also, as an interesting commentary on Colonel Waring's paper published last week, in which he speaks of the flushing of drains and sewers as the most important sanitary innovation of recent times, that the Technical Commission has voted to recommend that about two hundred and sixty miles of the Paris sewers should be provided with regular flushing, by means of tanks, each containing ten cubic metres of water, or about twenty-five hundred gallons, one of which is to be placed at the head of each branch sewer, and others at intervals of eight hundred feet, and arranged to be suddenly discharged once or twice in every twenty-four hours.

AVERY modern discovery has thrown new light upon one of the most remarkable legends of the Middle Ages. Most reading people now know something about the ptomaines, the intensely poisonous alkaloids which have recently been isolated from the corrupt juices of a decomposing body, and, although the first announcement of their discovery was received with incredulity, and almost with derision, are now recognized as distinct substances, existing in several varieties. Further research has shown that the new alkaloids are capable of entering into combination with other substances, yielding stable compounds having new properties, and it is found that the ordinary white arsenic easily combines with many of them, to form volatile liquids of frightfully poisonous character. The singular coincidence between this discovery and the history of the sixteenth century lies in the fact that one of the many traditions respecting the *aqua Tophana* of the Italian poisoners, that deadly drug which destroyed life instantly, and without fear of detection, relates that it was prepared by sprinkling white arsenic upon pieces of pork, and collecting the liquids which drained from them, adding subsequently a vegetable infusion. The first part of the process is exactly the same as that now found to be the easiest mode of preparing the arsenical ptomaines, and it seems altogether probable that experience may have led the refined Italian poisoners, who, as the stories go, could destroy their victims by the perfume of a bouquet, to the secret concoction of the very substances which beneficent science is now adding to the list of well-known, and perhaps medicinal drugs.

THE ARCHITECT AS A SANITARIAN.¹

NOT long ago a plumber in describing to me the difficulties under which he, in common with the better class of his brethren, labor in competing for the work which architects have to give them, said that he had just come from an office in which the proprietor had been expressing the opinion that "this fuss about plumbing and drainage was all humbug," that "people used to live as long without it as we do now," and that he "didn't think there was anything in it." Probably this individual is not the only one of his kind, and it is well worth considering whether the "fuss" that some of us are in the habit of making about what we may call the organs of excretion in our buildings, is a proper and necessary part of our professional service to our clients, or merely the indulgence of a diseased appetite for novelty, to be gratified at our clients' expense. I trust there are not many among us who hold the latter view. It is true enough that our ancestors did not suffer as we do from what we call zymotic

diseases, but we must remember that they practised, from necessity, and unconsciously, certain hygienic principles which were abandoned when plumbing began to be generally introduced into houses, and have just been rediscovered, to the annoyance of those who are indisposed to exert their brains in following the development of a new art, but to the signal advantage of mankind in general. We all can testify that our great-grandfathers and grandmothers lived to a good old age in houses whose appliances for drainage consisted of a sanitary shanty in the back yard, and a wooden spout from the kitchen-sink, extending through the wall, with its outfall decently concealed by a group of luxuriant currant bushes; but we do not realize as we might that the main effort of modern sanitary science is, so far as is compatible with our luxurious habits, to restore the relations of our living-rooms with the appliances for the discharge of waste matters to their primitive condition; disconnecting our bedrooms from the offal heap by an abundant current of pure air, instead of laying the pipes to conduct the fumes back under the noses of sick children, as the bad plumbers do; and gathering the drainage waters, not in a visible puddle around the roots of the currant bushes, but in concealed rivulets just beneath the surface, where they are equally within reach of vegetation, and less obvious to our eyes and noses, instead of storing them, as the bad plumbers and careless architects do, in huge caverns far below ground, to rot and fester, corrupting the subsoil for many rods around them, and sending back their deadly fumes into the house through the leaky pipes and ineffective traps which generally go with them.

Practically, our houses differ from those of fifty or twenty years ago in being more complicated, but it would be strange if that were a reason for not trying to understand the modern ways. Every architect worthy of the name has now every other detail of the construction of an ordinary house at his finger's end, and habitually plans his rooms, arranges his doors and windows, distributes his closets, and designs his stairs and partitions, with constant reference to the course of gas-pipes, furnace-pipes, or hot-water tubes, the requirements of fireplaces and flues, and the movement of elevator balance-weights or other machinery; and that any one should think himself justified in leaving the administration of a portion of the work far more important in relation to the health and happiness of the occupants of the house than the ventilating flues, or the heating apparatus, or the arrangement of the butler's pantry, to the care of a plumber or a sanitary engineer certainly seems to the mind of the ordinary client discreditable as well as impolitic. He expects, and with reason, to find in his architect a man as familiar with all the anatomy and pathology of the dwelling-house and its diseases as the physician is with the human body in sickness and health, and the family doctor who should proclaim his entire ignorance of the nature and functions of the bowels, on the ground that the ancients did not appear to have them, and that he thought they were a humbug, anyway, would have about the same prospect of increasing his practice among intelligent people as the architect who chooses to remain in similar ignorance of the digestive apparatus and operations of the modern dwelling-house.

It does not follow that if architects were to become, as they ought to be, the usual and proper advisers in regard to questions of house drainage, the sanitary engineer would become a superfluous member of society. On the contrary, nothing would do so much to develop

the profession of sanitary engineering, and, what those who follow it faithfully think still more important, to stimulate and promote advance in that beneficent science, as an intelligent interest among architects in the results which have already been attained, and a demand for those better things which are sure to follow. We must remember that architects can rarely act as pioneers, especially in these matters. Not only have they no right to use their clients' money in experiments with appliances of whose value they are not reasonably sure, but they are bound to consider the comfort and health of the occupants of their houses, which the choking of a flush-tank, or the freezing of an outlet-pipe, might seriously endanger. All investigations into new fields, unless they choose to make them at their own expense, must usually be left to the sanitary engineer proper, who has the time, opportunity, and special knowledge for devising improvements in systems or apparatus, and for testing them thoroughly.

After these tests are made, and the results made public, it is not only praiseworthy in the architect, but, as it seems to me, one of his professional duties, to make himself acquainted with the new device at once, lest he should fail of doing for his next client all that might be done by an adviser who lost no opportunity of increasing his professional knowledge and skill. As an illustration of what may lie before us in the way of dwelling-house sanitation, it is worth while to consider a moment the present condition of the art of exterior drainage for country houses. Every one knows that by the enlightened and persistent efforts of sanitary engineers, the design and construction of plumbing apparatus inside the house have now been brought to a high degree of excellence. It is true that much remains to be invented in the way of securing perfect joints for iron pipes, and something, in this country, remains to be done in the way of introducing those clean and excellent kitchen and other sinks of earthenware which are so commonly used in England; but we are far advanced on a good road, and from our best houses all dangerous filth is now cast out by the appliances already in use quickly, and certainly never to return. Beyond the house we cannot say as much for the present condition of sanitary work. In the great majority of cases, even with the best plumbing within the building, the discharge from the pipes, as soon as it has passed the main trap, is hurried into an enormous leaching cesspool, built with walls of boulders insecurely balanced upon each other, and covered either with wooden planks, which soon rot through, or with flat stones. This foul pit, as we can all testify, forms the skeleton in the closet, so to speak, of nearly all country houses. To say nothing of such accidents as having horses and sometimes children break through the rotten covers, or the insecure arches, to be pulled out with difficulty, and perhaps not uninjured, the leaching cesspool is a source of constant contamination both to the ground around it and the air above it. It is very common, where such reservoirs are placed near houses, to cover them with loam and sow grass on them, but this only drives the gases which come from them to seek a roundabout but easy path into the atmosphere through the surrounding soil. There is no difficulty about this mode of exit; we know that wind passes freely through a brick wall, and that the emanations of a cesspool under a house meet with little interruption from a layer of concrete, and notwithstanding a certain superstition to the contrary, any person with a nose can convince himself in warm weather, that the stench from a covered cesspool is capable of being annoying if not dangerous to the inmates of all houses within a hundred feet radius at least. It is curious also that the products of the putrefaction going on in the cesspool, which probably contains some ammonia, have a marked influence upon the vegetation growing about it. In one case within my knowledge, a cesspool buried deep in the ground was covered with a flower-bed, and although the surface of the liquid in it was several feet below the ground, the flowers bloomed so brilliantly and grew so luxuriantly, as to attract constant attention; and in another instance, where the cesspool was nearly as far beneath the surface, and had a drain of loose stone, far below ground, connected with it as an overflow, the site of the cesspool, and the course of the overflow, were marked by an enormous growth of grass and weeds. Few persons who understand the principles of house drainage can see such sights as these without a conviction that our future progress in the art of clean living must be mainly in the direction of utilizing our house refuse, by completing the cycle of conversion of organic wastes into vegetable matter which nature has so beneficently provided.

How this is to be accomplished, we must ask the sanitary engineers to tell us, and they have already made answer in their attempts to perfect the method of sewage disposal by sub-surface irrigation which was introduced about ten years ago, and has been slowly growing into favor ever since. Most of us have probably used this system with success, but there may be some who have never met with a client adventurous enough to be willing to adopt it, and have for that reason missed the opportunity for personal experience of its working which would give them courage in recommending it to unwilling persons, while all those who have used it will be, I venture to say, glad to compare their experience with that of others.

In my own case, I can assert with truth that, although the sub-surface irrigation system, and still more the flush-tanks, which I have been the means of putting in, have been subject to occasional choking or overflow, the annoyance from them has not in a single instance been comparable with that which would have attended the use of a leaching cesspool in the same situation; and I can also say that although

¹ A paper read by Mr. T. M. Clark, F. A. I. A., at the late Convention of the American Institute of Architects.

from motives of economy I have felt obliged to employ the leaching cesspool in many cases, in some of them I have afterwards had reason to repent the weakness which preferred a cheap, but temporary expedient to an arrangement of permanent value. It is to be regretted, perhaps, that certain details of this system of sewage disposal are protected by patents, since the idea of a monopoly always alarms persons unfamiliar with the subject, but it is fair to say that the royalty charged for the use of the Field flushing appliances is a very moderate one, and there are several good ways of applying the principle by which no patent is infringed. In fact, it answers well enough in many cases, at least for a time, to omit all automatic flushing appliances, simply running off the overflow of the tight cesspool, or settling reservoir in which solid substances and bits of paper are reduced by maceration to a liquid thin enough to pass through the pipes, into long lines of land-tiles, laid with open joints. It is true that the sluggishness of the current through pipes so laid leads to the deposition of sediment, which in time chokes the pipes, but three or four years may elapse before this occurs, and it is then only necessary to lift the pipes and clean them, when the whole is again in running order for a few years more. The whole operation takes but a short time, and involves the disturbance of the ground only to a depth of about a foot, presenting thus a marked contrast to the disorder and expense involved in building a new leaching cesspool, which is inevitable when the old one becomes lined with filth and non-absorbent. Where suitable flushing devices can be used, to hold back the sewage in the reservoir until a certain quantity has accumulated, throwing it then all at once into the pipes, so as to fill them completely, the flow is then so much more rapid as to prevent the deposition of sediment, all suspended matter passing with the liquid out at the joints, where it is speedily destroyed by the air contained in the soil, or taken up by the roots of the plants above it. The old-fashioned Field's flush-tank, I must confess, I have not been able to make such use of as I should like, the siphon being disposed to clog with grease, which is not easily removed from it. Moreover, the quantity of water discharged by it is insufficient to fill more than a small portion of the irrigation pipes, and a large part of the use which it is intended to perform is therefore lost. The later ones are much better in many respects, discharging five or six times as much water at each operation, and being simpler and cheaper in construction. It is not necessary, however, to pay Mr. Rogers Field a royalty to secure very efficient flushing. At my own house the result is secured by means of a tilting-tank, which works in a separate compartment of the settling-tank and fills gradually by means of a pipe from the main portion of the tank, so arranged as to dip always below the surface of the liquid contained in it, to prevent floating scum from getting into the pipes. The tilting-tank is hung on brass bearings secured to the brickwork, and so balanced that when filled to within an inch or so of the top it falls forward, emptying its contents into the small reservoir in which it works. From the lowest part of this reservoir seven lines of irrigation pipes radiate in various directions, and distribute the charge from the tank among the roots of the plants beyond. The advantage of this arrangement lies, as it seems to me, in the accessibility of every part. By lifting a flagstone the little reservoir containing the tilting-tank is uncovered, and the tank can be lifted out and cleaned, or a stream from a hose turned into the lines of irrigation pipe to clear them, with the smallest possible amount of trouble, and without descending into the reservoir at all. By lifting another flag the main settling-tank is disclosed, consisting simply of a brick cistern lined with cement. The flagstone cover is perforated with a small hole for the suction pipe of a pump, and after the liquid contents are pumped out the stone can be raised, and the bottom and walls scraped clean in an hour or so with long-handled scoops, leaving everything in as good condition as on the day the workmen left it. The settling-tank, which is long and narrow, has its longer axis coincident with that of the main drain-pipe from the house, so that a rattan can be readily pushed up through it to dislodge the grease and sediment which inevitably accumulate in course of time.

It is possible that I set too much value upon the point of perfect accessibility of all portions of the drainage system, but experience has shown its value inside the house, and the capacity for thorough cleansing, without disturbance of any portion, seems to me quite as important outside, where the chances of obstruction are, if anything, greater than in the house pipes.

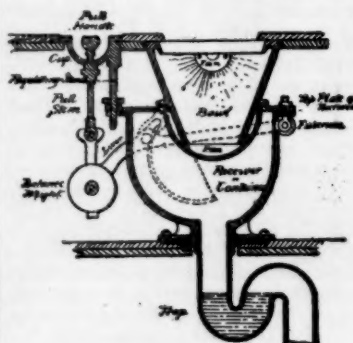
In the laying of the irrigation pipes at the same place I was also obliged to make trial of some novel arrangements. A considerable part of the plumbing of the house is in the basement, and the total fall from the point where the soil-pipe passes through the wall to the lowest part of the ground is less than three feet. Deducting from this the amount required for the necessary fall in the pipes, and for the operation of the flush-tank, it became evident that only in one small spot would it be possible to lay the irrigation pipes at that proximity to the surface—eight or ten inches, which is requisite in order that the liquid brought by them may be absorbed by the grass roots. In one direction, however, the rise in the grade was comparatively slight, amounting only to about sixteen inches in a hundred feet, and knowing that in good soil the roots of many plants will run to a depth of two or three feet, I cut a wide trench the whole length, grading the bottom to a fall of four inches in the entire distance, and laid in it three lines of irrigation pipes, which were thus at the farther end about thirty inches below the sod. The trench was then filled to the top with loam, well enriched, and as soon as the proper time comes a hedge of rose bushes will be set at work to

drink up the fertilizing liquid beneath them. So far as I know, the experiment in this form has never been tried, but there are so many situations, especially where house lots are small, where it is impracticable to bring the irrigation pipes within a foot of the surface without laying the main drain within the reach of frost, that the possibility of absorbing sewage by the roots of vegetation at a greater depth is a matter of considerable importance. The ground below the irrigation pipes is well drained, or it would not have been advisable to lay them in such a position.

It will at once occur to you that it would have been a great advantage if the house had been arranged with laundry wash-trays and servants' water-closet on the first floor, which would have rendered it easy to lay the irrigation pipes just below the sod in any direction over the place; and it is not impossible that the alteration may yet have to be made; but even this consideration will, I hope, serve to point the moral which I should like to convey—that the architect cannot delegate to others a question so important to the organization of a house as even the final disposal of its sewage outside. If he has had experience of the benefits of the irrigation system, or is disposed to believe in them from the testimony of others, he is very likely to be obliged to adapt the whole plan of the building to the conditions necessary for making its application possible. To some of you, perhaps, the study and observation needed for solving such problems with success may seem to be too much abstracted from the pursuit of the beautiful, but it is at least worth remembering that the true designer finds in all the practical difficulties which he encounters and surmounts new sources of beauty and picturesque-ness.

SANITARY PLUMBING.¹—IV.

THE PAN-CLOSET.



Ordinary Pan Closet

Fig. 4.

BY good rights this closet should have no place at all in our list, or anywhere else, because it possesses absolutely none of the merits which are to be sought for in closets; but for this very reason as well as on account of its great vogue and remarkable popularity, no type could serve better for the purposes of illustration. The initial-cut represents the ordinary pan-closet.

Referring to our table of requirements, the first relates to the manner of the flushing. It is sometimes asserted even by persons whose perception and education should have taught them

better, that the pan-closet has the advantage of requiring less water for flushing than any other. It is difficult to understand how a thoughtful person can make such an error as this.

(a) The small quantity of water which descends when the pan is lifted only *appears* to flush the closet, but actually does nothing of the kind. It simply transfers the waste matters from the pan to the receiver below, where a part of it remains for an indefinite length of time, and undergoes decomposition. Each subsequent flushing adds more or less to the deposit thus originated, until the entire surface of the closet below the pan becomes coated with a mass of filth which sometimes attains a thickness of an inch or more, and cannot be removed without taking the closet to pieces, and burning it off. In fact the flushing stream does not remove the waste matter in the pan at all from the receiver, but simply refills the pan after it has been tilted. The work of ejecting the wastes from the receiver into the soil-pipe must be accomplished, if at all, by the discharge above it of the contents of the pan, the mere trickling of the flushing stream over the edge of the pan, when it has been filled, having no effect whatever upon the matters previously dropped into the receiver and trap. Hence it rarely happens that a single flushing is sufficient to carry the wastes into the soil-pipe. A second tilting of the pan is indispensable, and often several are required. With the pan-closet, therefore, the formation of the parts is such that the immediate removal of the waste matter into the soil-pipe and the proper scouring of the closet, including its concealed parts, is absolutely impossible, and it may therefore be said that the quantity of water required for the purpose is at a maximum. Of late a sprinkler or flushing-ring has been invented to sprinkle the inner surface of the receiver at the same time with the upper flushing. The effect of this addition is to complicate the machinery and heighten the cost of the closet and the consumption of water. The accumulations of filth are, by such an arrangement, delayed in those places which happen to receive the jets of water from the sprinkler, but hastened in others behind the ring, which the spray cannot reach, such as the under surface of the pan and of the bowl, between which the wastes are sometimes caught and compressed out of sight by careless usage; the upper surface of the receiver; and especially the

¹ Continued from page 137, No. 404.

surface of the sprinkling-ring itself and the parts surrounding and covered by it. These parts receive the splatterings from the waste matters and the condensation of the gases and vapors of decomposition, and become finally encased with a coating of filth so hard that an ocean of flushing water could not remove them. The surface of the receiver is sometimes coated with enamel, to prevent the adhesion of wastes, but after a few years' use these surfaces become roughened by a fine deposit, and the incrustation begins as before. The parts which receive the direct impact of the water falling from the pan resist longest, but inevitably succumb in the end. Porcelain and earthenware receivers have also been made, but the result is the same as with the enamelled iron.

(b) The flushing stream does not enter the closet instantaneously upon operating the pull. The supply-pipe has first to be filled, which often causes considerable delay and inconvenience.

(c) The pan breaks the force of the flushing stream and prevents its passing through the receiver and trap in a compact volume. The effect and power of the "head" of the water falling from the cistern is thus totally destroyed, and,

(d) Its value as a scouring agent is lost.

(e) The machinery of the pan-closet is most ingeniously devised for the production of a variety of loud and disagreeable noises made in working it. The flushing is accompanied by a chorus of groans and squeaks, occasioned by the rust on the pan axis, more or less energetic and appalling as the age and rust of the closet increase; then follows the loud thud of the water falling from the pan, and the rush and splash of the flushing stream descending from the cistern; then a repetition of the groans and squeaks on a different key, as the rusty crank re-returns; a loud ring and a dull thump, as the empty pan strikes the bottom of the bowl and the heavy balance weight on the pull comes back to its bearing; and finally, from the cistern above, a bold, defiant crowing sound, occasioned by the rush of air back into the supply-pipe, appropriately terminates the mortifying concert, to the disgust and confusion of the occupant. A few of these noises may be cured; they are sometimes partly drowned by the greater noise of the flushing water.

(f) To lift and sustain, for the proper length of time, the weighted pull, and operate the pan and valve, require considerable effort, sometimes with the heavier closets beyond the strength of small children.

(g) The use of a special supply-cistern is possible and customary, but where the pan has to be operated by the same pull with the cistern valve, a complication of cranks and wires is needed. Only with a direct supply of water from the main can such a complication be avoided in the case of pan-closets, but the use of a direct supply is undesirable.

(h) When the pan is tilted, the peculiar movement is apt to cause a splattering, sometimes projecting a small quantity of water high up into the air.

Form.

The form of the pan-closet is

(a) Complicated and bulky.

(b) Its receiver occupies so much space below the bowl that there is no room for the trap above the floor. This is a most serious fault. The trap should never be buried out of sight and out of reach. Should it lose its water-seal through evaporation, siphonage, or other cause, or become in any way defective, the loss cannot be seen, and poisonous gases and germs of disease may make their way unobserved into the house.

(c) In all the pan-closets known to the writer the bowl is too wide, the surface of the standing water at its bottom too small and too far down below the seat.

(d) It is found that the lower the water stands in the bowl, the greater the splattering occasioned by the falling wastes. This surface can safely be brought within six inches of the seat without inconvenience in the use of the closet, and this distance, where the flushing is effected properly and without splashing, is the best.

(e) The bowl should be narrower and the sides should be more nearly perpendicular. A narrow bowl is (within reasonable limits) equally convenient whether used as a closet or as a slop-hopper; the flaring drip-tray will serve to direct the slops into quite a narrow bowl. In all these respects the pan-closet, as usually made, is defective.

(f) None of the trap, and but a small part of the interior of the receiver are visible from the outside of the pan-closet. The accumulation of filth in these parts cannot therefore be seen, nor, if seen, could it be reached and removed.

(g) The presence of the pan renders the use of this closet as a slop-hopper unsafe, because it causes splattering and overflowing when large quantities of slops are suddenly thrown into it. There should be no obstruction to the full outflow of the water.

Material.

The bowl of pan and nearly all other closets is made of enamelled earthenware. This is not the best material for the purpose, inasmuch as the enamel or glaze is neither thick nor strong enough to stand the usage it receives. It cracks or crazes and soon becomes discolored. Under the microscope the surface will be found covered with minute fissures, through which the acids of the waste matters penetrate into and corrode the porous interior of the earthenware, where they accumulate and decompose.

Construction.

(a) The pan, receiver, and all the machinery connected with them, are unnecessary, because the waste can be better removed without them, and they form no additional security against the entrance of sewer-gas. Until lately it has been regarded as important to hide the trap from view, because it was assumed that it necessarily retained at times waste matters, the sight of which was offensive. Now, however, we have learned that with properly constructed closets the trap can be perfectly cleared at each flushing, and that it is not only advantageous but necessary for perfect security that all parts of the closet and trap should be visible. Consequently we see that the pan and its bulky receiver are superfluous, and that the labor and money thrown away upon them might be saved for improving and strengthening the useful and necessary parts.

(b) There is nothing in the mechanism of the pan-closet to provide against the loss of its water-seal through evaporation, siphonage, or suction, though such a provision would be possible. The loss of the water in the trap would remain undiscovered, so long as the odor of the entering sewer-gas escaped observation, and it is known that the most dangerous sewer-gases are those which have no odor.

(c) There are two joints between the bowl and the trap, where there should be none.

(d) The connection between the bowl and the receiver being, in most pan-closets, made with putty alone, without bolts or screws of any kind, a slight shock will make a crack at this connection, and pan-closets are at any time liable to be rendered leaky at this point. The crack being out of sight and above the water-line, there is nothing to give warning of the entrance of foul gas. This is one of the ways foul air may enter. The receiver, usually coated with filth, acts in fact as nothing more nor less than a retort for the generation of gases of decomposition, which escape at numerous holes provided for the purpose. Every time the pan is tilted, the water discharged into the receiver displaces a corresponding bulk of foul air, giving a second way by which gases of decomposition may enter. The brass pan-journal passes through the receiver-shell, leaving generally at the point of entrance a third passage for sewer-gas. The joint between the receiver and trap is made with putty only. This joint is sometimes cracked by the shrinkage, settling or jarring of the floor-joists on which the receiver is screwed at the point of its connection with the trap. This leaves a fourth passage for foul air.

The shell of the receiver is usually cast very thin, and the castings are seldom air-tight before painting or enamelling. After several years' use it is liable to become perforated with an indefinite number of holes, which give additional chances for the entrance of foul air.

(e) There is no frame around the bowl for the support of wood-work. The bowl itself and its connection with the iron-work of the closet is evidently too frail to allow of its sustaining the slightest weight or shock.

(f) In setting the pan-closet the receiver is screwed into the floor over a flange made in the leaden trap. Putty and paint alone are used. The trap has to be placed between the floor-joists, and the connection with the soil-pipe must be made in a contracted space. The proper adjustment of the various parts of the closet and its connection with the cistern-valve is more difficult, and requires more time on the part of the plumber than is necessary for the best sanitary water-closets.

Cost.

The cost of manufacture evidently depends upon the number, material, and complexity of the parts, and the manner of putting them together.

The pan-closet consists of nineteen different pieces, not including bolts and nuts, or fifty-one pieces including them. [A perfect closet can be made of three pieces, with the bolts and nuts to secure them.]

1. The bowl of earthenware.
2. The fan and its two brass fan-screws, nuts and washers (seven pieces).
3. The receiver proper, of cast-iron, and receiver feet and three screws (four pieces).
4. The receiver top-plate and its four brass bolts, nuts and washers (thirteen pieces).
5. The tinned copper pan.
6. The pan-journal.
7. The journal bolt and collar (two pieces).
8. The brass lock.
9. The brass tumbling-bolt, nut and washer (three pieces).
10. The brass or iron lever.
11. The brass fulcrum and bolt (two pieces).
12. The balance weight.
13. The weight regulator and set-screw (two pieces).
14. The pull stem and handle (two pieces).
15. The porcelain cup and cup-frame of iron (two pieces).
16. The regulating stand with its set-screw (two pieces).
17. The brass lock-check and bolt, nut and washer (four pieces).
18. The lead trap.
19. The brass trap coupling.

In addition to the above pieces, the receiver sprinkling-pipe and its connections, the ventilating-pipes, and in some pan-closets the overflow arrangements, make quite a number of additional parts.

To make these closets so that they shall yield a profit to the manufacturer, to the dealer, and to the plumber, when sold at the low price to which competition has reduced them, is only possible by reducing

the weight and the quality of the materials and workmanship to the minimum. They are usually of the most flimsy character, calculated to last but a few years.

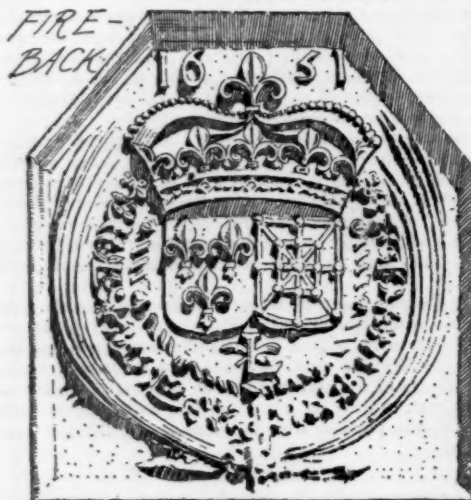
Appearance.

The appearance is not so prepossessing as to tempt one to omit the casing, and in fact the casing never is omitted, though a device so dangerous should always be exposed to full view, in order that such defects as occur on the exterior may be discovered as soon as possible. But the outside machinery is not interesting to look at, especially when covered with dust, which collects in every crevice and cannot easily be removed. So offensive is the sight of the pan-closet machinery to the eye of the sensitive Frenchman, that he often prefers to construct it all within the body of the receiver, swelling the latter to an abnormal size to receive it. Here it soon corrodes and becomes coated with filth in a very short space of time.

Let us hope that the days of the pan-closet will soon be numbered; for it is hardly possible to conceive of a device more ingeniously contrived, were the object to obtain, under the appearance of the greatest security, the greatest real danger.

The writer lately passed a small plumber's shop having a large show-window. There was room enough in this window to display a handsome and instructive system of sanitary appliances, arranged in such a manner as to inspire the beholder with a sense of the wisdom and skill of the proprietor. The exhibit in this window, however, consisted of three large pan water-closets in a row extending from one side of the window to the other, with a few diminutive basin-faucets, plugs and valves lying on the floor at their feet. The sign above read "Sanitary Engineer." We wonder that the public should insist upon having unsanitary fixtures; but how can we expect anything better of them, so long as professors of hygiene themselves thus recommend them, with triple emphasis and to the total exclusion of what is really good!

NEW BOOKS.



THE recent publication in our own pages of the competitive designs for what is to be eventually the most important Protestant cathedral in the country, together with the rumor that the rejection, by the committee, of the more imposing of the designs was caused by its excessive certain cost, has led us to

reflect on the great opportunities which an established church, with its large revenues controlled by a clergy versed to a high degree in archaeology and architecture, places within the reach of the English architect. We have always had a feeling that it must be much more entertaining to be an English than—the volume of work being the same—an American architect, because the former seems to have submitted to his treatment, not only a great variety of buildings—perhaps not greater than comes within the reach of a good practitioner in this country—but several classes of work which are quite unknown here. In the matter of cathedral building, for instance, how rarely a chance of designing a cathedral falls in the way of an American. Cathedrals of any sort are not numerous here, and the few there are chiefly belong to the Roman Catholic church, whose dignitaries take good care that the work in all its branches shall be done only by those within the pale of the true faith, so that, this being a Protestant country, most of the profession are debarred from cathedral building. And there being few cathedrals—and those of course somewhat youthful—there is no occasion for the practice of the arts of design, and the exercise of the cunning resources of the scientific constructor in those "restorations" of the decaying monuments of past ages, which have fallen to the lot of a large number of English architects of the present generation. Another class of work which must excite the romantic, as cathedral work must arouse the religious, enthusiasm of those who have to do with it, and which, of course, is quite out of the reach of Americans, who lack a feudal ancestry, is the restoration or reconstruction of the feudal castles of Great Britain. Still another class of work within the reach of the Briton is the designing of buildings for erection in some distant colony where the architectural tradition, the routine of daily life, and the exigencies of climate compel him to come out from the ruts of familiar forms and strive for success on a new road to fame. The nearness of the Continent of Europe also offers kindred opportunities, and through

public and private competition, and the freaks of social connection and acquaintanceship gives the English architect an occasion for exercising his fancy in a style of architecture, and for a purpose which home life and traditions deny to him.

Probably all English architects of mark have more or less frequently had the monotony of their lives interrupted by being called to work in each of these several directions. At any rate, the book¹ before us shows how varied, and, consequently, how entertaining was the professional life of the late Mr. William Burges, while, as it only professes to contain a selection from his works, it is impossible to say what more of the spice of life fell to his share.

In the several lines of work we have indicated, we have before us in the way of cathedral building a score of plates illustrating the general design and details of St. Finn Barre's Cathedral, at Cork, Ireland, which Mr. Burges gained in open competition in 1863, to the discomfiture of sixty-one competitors,—by so doing showing that it is not necessarily unwise for a young man of thirty-seven years to take part in an open competition. Also about half as many plates which exhibit the design made in 1873, and submitted by him—this time in a small limited competition—for the new cathedral at Edinburgh.

In the way of church restoration we are shown two views of the restorations which Mr. Burges carried out at Waltham Abbey in 1860—one of his earliest labors; while to typify the restorations of those secular buildings whose walls are mute witnesses of high historic event perhaps, and whose atmosphere seems to be charged with the memories of chivalric romance, we have several plates showing the restorations that were carried out at Cardiff Castle for the Marquis of Bute; a series of works that were begun in 1865, and have been prosecuted steadily up to the present time, and are still far from completion. We cannot help feeling that if Mr. Burges did not actually consider this his greatest work, it was the work which most appealed to his peculiar temperament, and that it was while working at Cardiff Castle that he conceived of carrying out in his own London house many of the fantastic schemes of decoration which have made it so noted. Then, too, there is a plate showing roughly the restoration of Castell Coëh, of which Mr. Pullan says, "Carcassonne and Pierrefonds, restored by Viollet-le-Duc for Napoleon III, and Castell Coëh, restored by Mr. Burges for the Marquis of Bute, are the only mediæval fortresses, to the best of my belief, that have been restored almost in their original integrity."

As to work for the colonies and on the Continent we are shown his design for a church at Constantinople in memory of the soldiers who fell in the Crimean war, which gained the first prize in a competition in 1856, and for which Mr. Burges laid the corner-stone two years later, though subsequently the work was taken out of his hands and entrusted to him who gained the second prize. There are also a couple of interesting plates, which show the School of Art which was built at Bombay in 1865. Not satisfied with working in so widely separated countries as Scotland and India, we find Mr. Burges embracing the opportunity of designing for erection in this country a large group of collegiate buildings, which the President of Trinity College at Hartford, Conn., not unwisely thought best to entrust to his masterful hand, and we have some half-dozen plates which show what the group is to be when completed. The most interesting plates, however, are those which show Mr. Burges's design for the Royal Law Courts, the failure of which to receive the suffrage of those who sat in judgment on the competition will always be regretted by many.

In domestic architecture Mr. Burges, judging from the specimens in the book before us, was not as successful as on the higher levels of architectural designs, and especially do we think the design of his own house, which has achieved much notoriety, here shows a most forbidding and unhomelike dwelling.

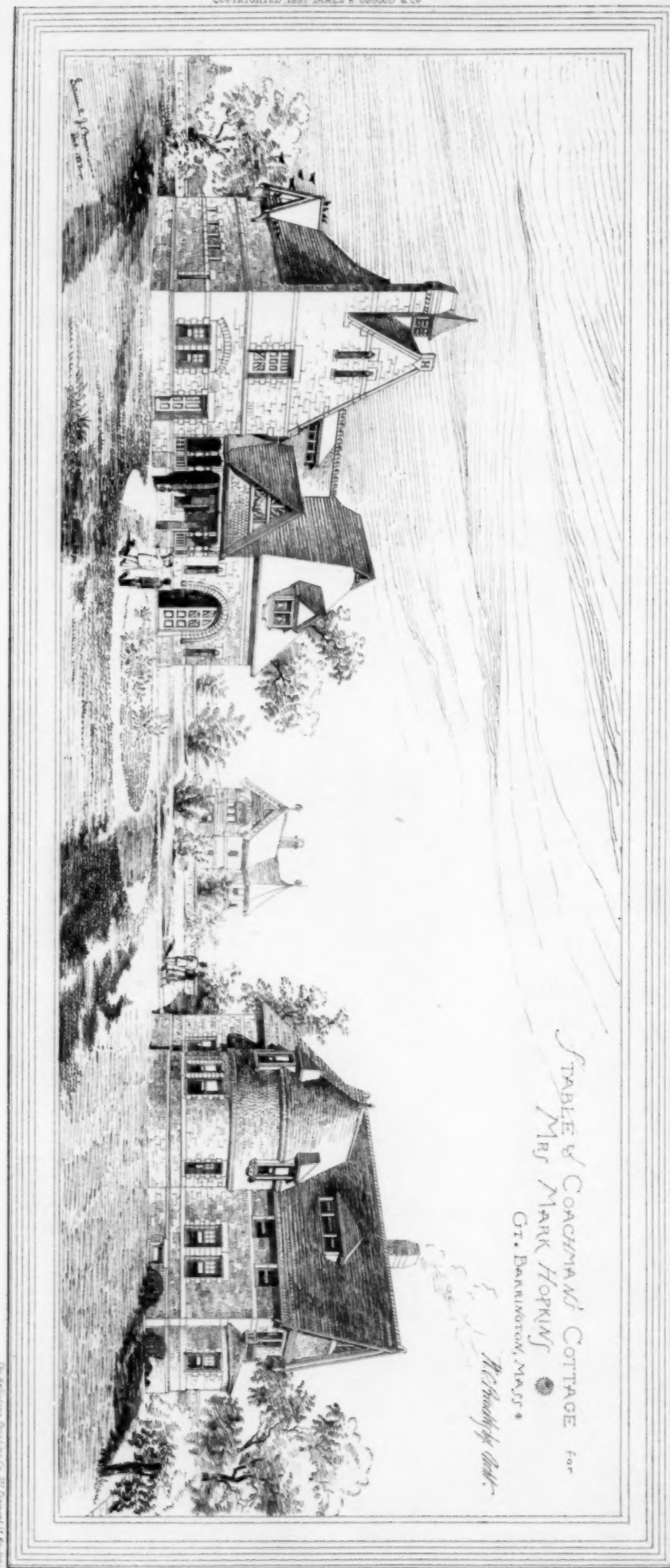
Such a monograph as this, which shows the work of a master at various periods of his life, and the manner in which he dealt with divers problems in many countries, is both curious and instructive apart from its purely architectural serviceableness, and the value of the book is increased by the judiciousness of Mr. Pullan's introductory notes which give briefly the necessary facts connected with each design.

We admire the modesty of the members of the Architectural Association of Boston, when they say, in the prefatory sheet of the initial issue of what we trust will be a long-continued publication: "Should the accompanying set of thirty plates meet with favor, the Association will publish similar sets from time to time." "Meet with favor!"² Is architecture practised by the blind? Have the artistic palates of men and women formerly endowed with critical taste lost the power of detecting the fine flavor of so savory a dish as this? If we do not err, the Association will find the last numbers of its limited edition of three hundred copies readily saleable at a premium.

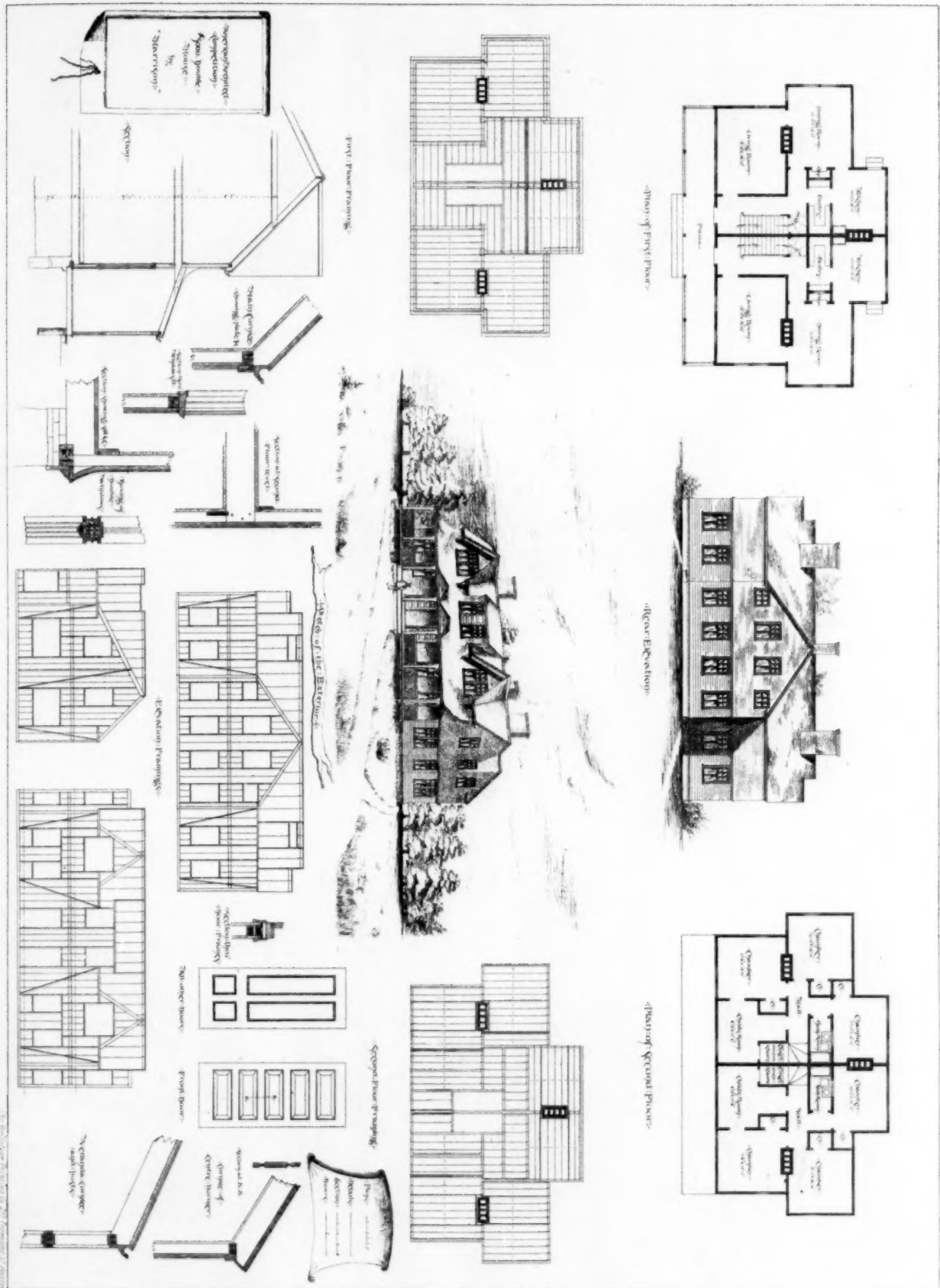
Much as we admire the modesty of these young men, we more applaud the discreet reserve which leads them to state that future publication will not be made "oftener than once a year." Right. Such sketches as these are not to be prepared at fixed times and seasons. The hour and the mood must be propitious, the spirit of the artist

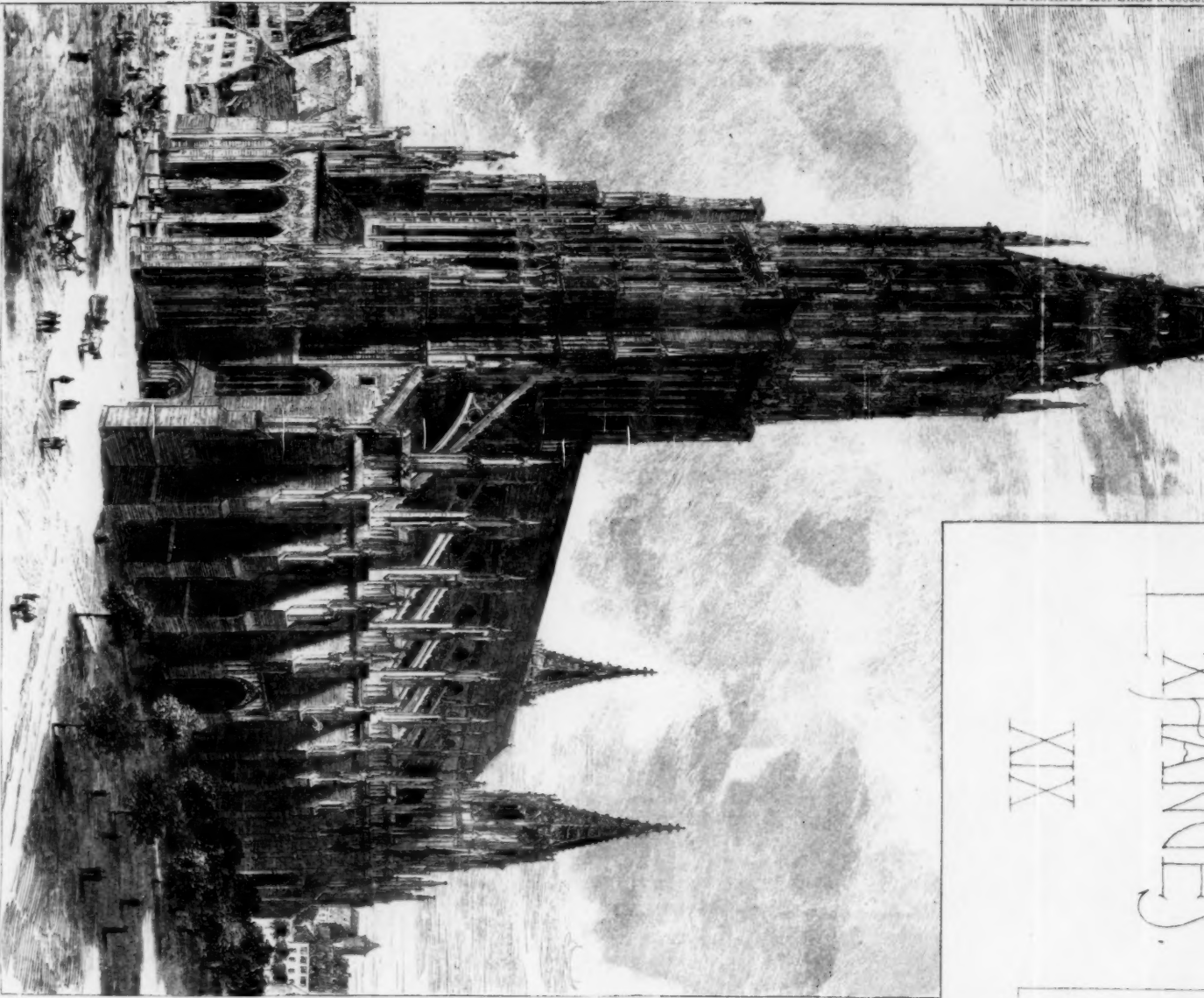
¹The Architectural Designs of William Burges, A. R. A.; edited by Richard Popplewell Pullan, F. R. I. B. A. London: 15 Buckingham St., Strand, 1883.
²Sketch-Book of the Architectural Association of Boston (300 copies printed). 30 quarto plates in portfolio. First issue, 1883. For sale by Cupples & Upham and W. B. Clarke & Carruth, Boston. Price, \$7.00.

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The American Building Co. 20 Nassau St. N.Y.





EXTERIOR OF ULM CATHEDRAL AS PROPOSED TO BE RESTORED.

The Architect: Friedrich Schinkel, Berlin.

THE ARCHITECT.

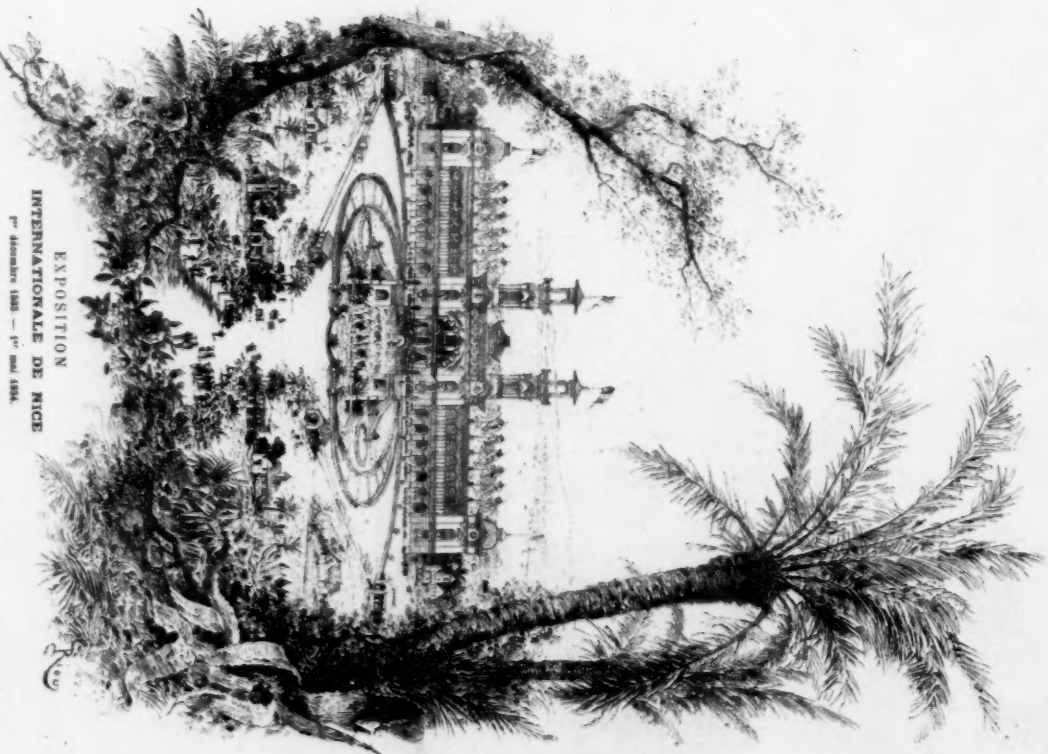
L'ESPANNE.
XIX



Sketching by the artist, J. R. Osgood.

THE ARCHITECT: J. R. OSGOOD.

The artist's sketch.



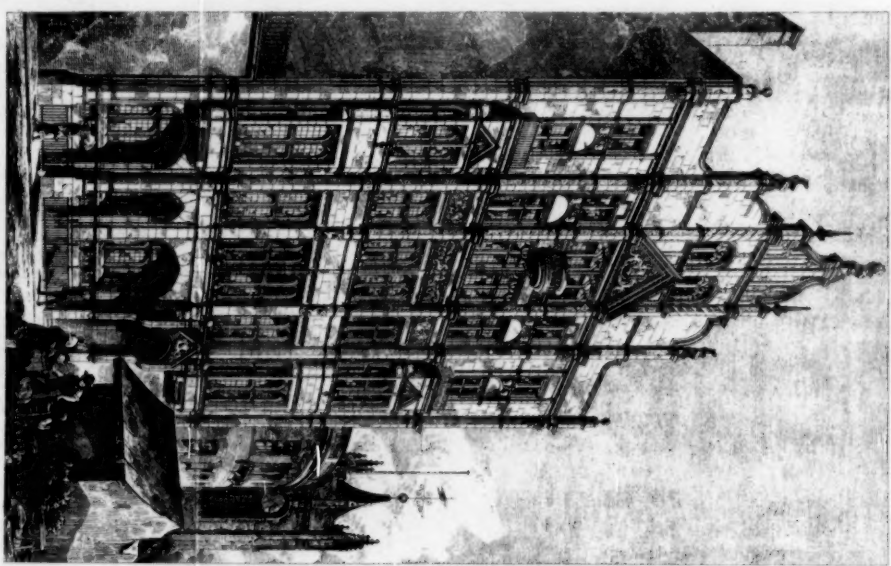
EXPOSITION
INTERNATIONALE DE NICE

par des architectes 1885 — 1^{er} mai 1885.

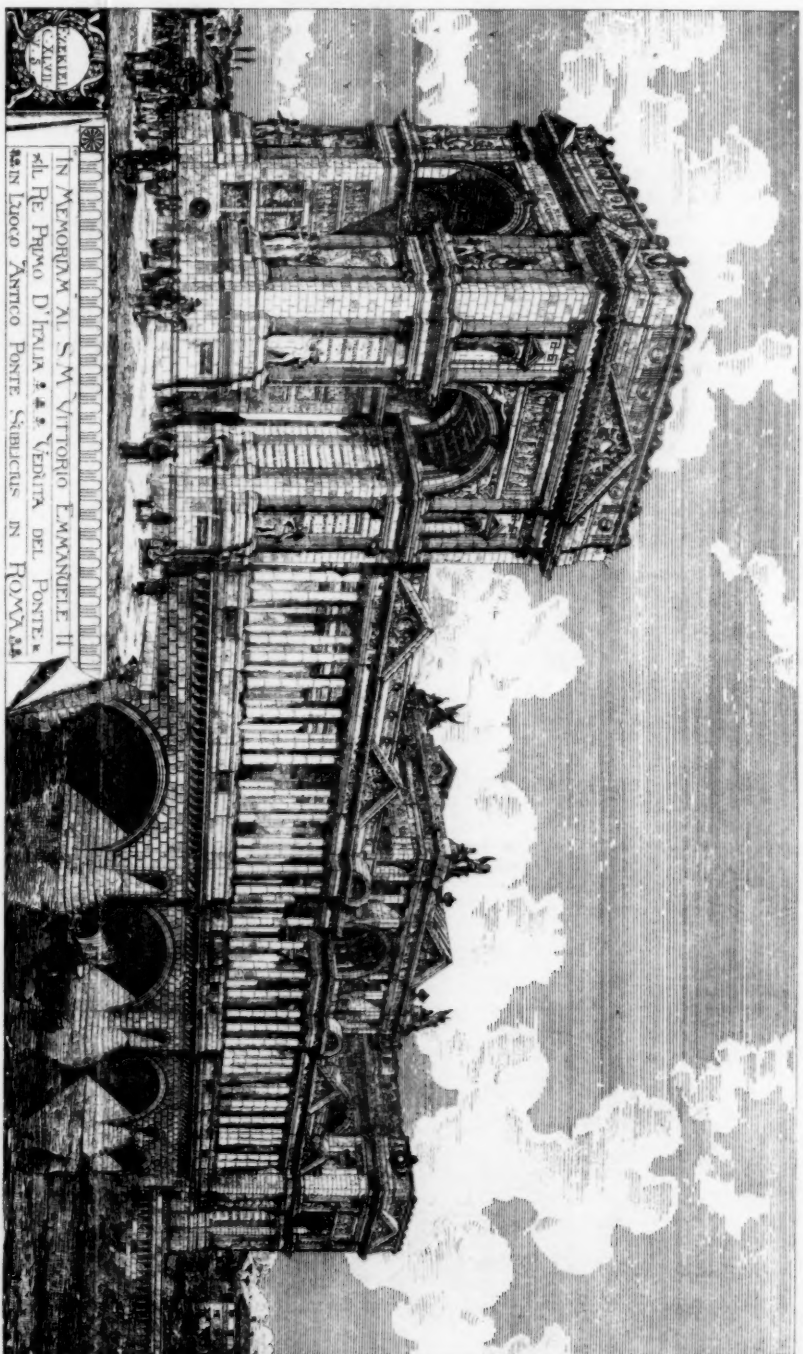
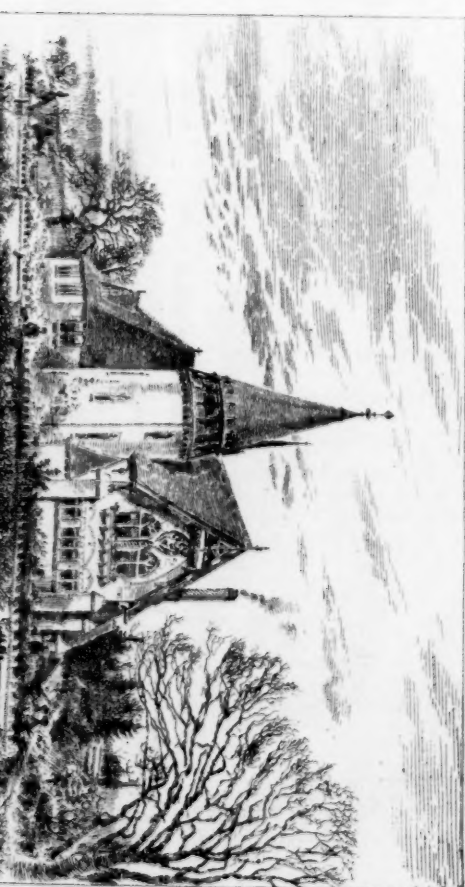
Cette exposition, ouverte sous le patronage et avec le concours de la ville de Nice, du littoral, du département des Alpes-Maritimes et de la Chambre de Commerce de Nice, comprendra les produits de l'agriculture, de l'industrie et des beaux-arts. — L'Exposition a été le Commissaire général de l'Exposition internationale, à Nice.



Worshipful Brethren St. Martin's Church, London, and Co. F. H. Osmond & Co. Architects.
The Building, 1853.



OUR FOREIGN EXCHANGES.



DESIGN FOR THE VICTOR EMANUEL MEMORIAL.
PROPOSED REBUILDING OF THE PONT S. MICHELLE, ROME.
By DANIEL SHARP FRANK.

See Article.

keenly awake, and the subject one that tempts to the exercise of one's best efforts.

The suggestion that in future publications a certain classification of subjects will be attempted is also an excellent one. The principle of co-operation is now-a-days applied to the making of books with marked success, and histories are written and dictionaries made in a few years in this way, which would have taken a single man a lifetime to perfect, and the common work gains in interest by the greater vivacity which is maintained throughout the work, and the variety of style lends a piquancy which the work of the same hand too often lacks when the effort is a long sustained one. The principle is an excellent one, but the best success of such an undertaking must depend on the skill with which the scheme is organized, the fidelity with which the controlling spirit performs his work, and the success with which he can maintain his hold on those who work with him.

The publication of this set of sketches is, we believe, instigated by the appearance of a similar set of sketches which were issued about a year ago by the younger members of the profession in New York. We have not that publication at hand, but we are sure that the Boston collection would not suffer in a comparison with its foregoer.

The subjects of the sketches before us were without exception encountered by their authors during their several trips in various parts of Europe during the last few years, and even to those who have no real interest in architecture they cannot but be pleasing. As they were not prepared with a view to publication, they—even if they be selected specimens of workmanship—prove how honestly our younger men are doing their work, and that a trip to Europe is not the holiday time that parents and guardians are too prone to fear it may be. They also prove that the camera is not having the effect of discouraging that active and constant practice with the pencil which is the corner-stone of artistic success.

The style of workmanship in which the drawings are executed is in general as various as their subjects, and yet many of the artists, evidently trained in the same school, have adopted an identical style in some of their slighter sketches. This is quite noticeable on one plate, where four sketches by different authors have been grouped together, each one of which might well have been made by another, or all four by the same hand without affecting the result: in themselves they form an admirable example of what an architect's memorandum-sketch should be. But when we turn to sketches over which some hours have been spent, the individuality of the artist comes out with emphasis. Rarely have we seen a more delicate and refined touch than Mr. Walker shows in his two sketches of Spanish fountains, and yet the work is so slight as to be hardly visible; but all the grace and sentiment of the originals, one feels, must be here, though perhaps refined by the eyes which saw and the fingers which drew them. After this plate, the most notable in the portfolio is Mr. Warren's elaborate rendering of a corner of the Ducal Palace at Venice. If it is a copy of a photograph, it has been accomplished with extraordinary fidelity and success; but if it is drawn from nature, it is a veritable *tour de force*. Of the many good contributions of Mr. Andrews, his sheet of capitals strikes us as the most interesting in treatment, and in style of rendering it finds an admirable foil in Mr. Chamberlin's sketches of similar subjects, which are so much more spirited than his sketches on another sheet that we wish the latter had not been published. To go farther in this way would but compel us to speak separately of almost every one of the thirty plates, but we cannot forbear to mention Mr. Wells's sketches, which show how much can be gained in effect by a judicious use of the brush in simple washes. There are other plates as worthy of mention as these, but we have said enough, we hope, to show that we consider this one of the most pleasing and graceful contributions that have yet been offered to the public by American artist-draftsmen.

We cannot forbear repining that it is not within our power to take advantage of so much skill and talent, for our own and our subscribers' benefit, and make the illustrations of each issue of the *American Architect* as acceptable as these plates. Our processes and our presses are capable of producing results identical with these which are accomplished by the Forbes Lithograph Company; but since the pressure of commercial economy prevents our absorbing to ourselves the best of everything, as we would willingly do, we can but hope that the Association will meet with such encouragement as will make the continuance of its publications an obvious necessity.

Any one who looks over Mr. Gould's little book¹ will acquire the belief that one of the most important tools in a carpenter's kit is the steel square, and that there are few problems of constructive science which, by the aid of its myriad markings, a little simple arithmetical and geometrical knowledge, and a proper share of common-sense, cannot be solved; even the problems of simple topographical survey seem capable of solution by its ingenious manipulation, and carpenters who may have need of vertical measurements on buildings to which it is difficult to apply the measuring-rod and tape-measure, would do well to master the processes by which such measurements may be determined without quitting the standpoint which they have selected. The ordinary uses of the square for finding the lengths of braces, the bevelling of hip-rafters, the squaring of timbers, and the mitring of joints are fully and carefully explained and illustrated,

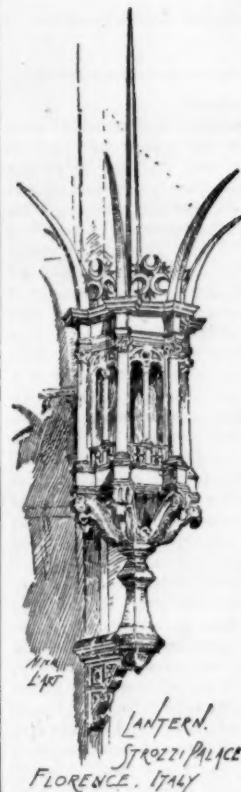
¹ *Steel Square Problems*, together with a large number of Geometrical Demonstrations of practical Value to Mechanics. Illustrated by 60 engraved plates. By Lucius D. Gould. New York: Lucius D. Gould, 1883.

and many of the problems are worked out under a larger number of the conditions they are likely to offer than seems to be quite worth while, as it leads the reader to expect that if he searches long enough he will find the exact solution he requires, and so checks the spirit of original mental effort that it should be the office of all technical books to encourage.

THE ILLUSTRATIONS.

DESIGN FOR THE ITALIAN MEMORIAL OF VICTOR EMMANUEL.
BY MR. DANIEL BRADE, F. R. I. B. A.

[From the Architect.]



WE publish this week an illustration of the design which was submitted in the competition for the National Memorial of King Victor Emmanuel. It was one of the designs to which a gold medal was awarded. A drawing of the design is in this year's exhibition of the Royal Academy. The following is a translation of the report which Mr. Brade sent with his design:—

"In submitting herewith the accompanying design for a memorial to the late King Victor Emmanuel II, I would add a few words in explanation of the design. As will be seen, it is proposed to construct a bridge across the Tiber, at or near the locality of the ruined Ponte Sublicius. The bridge would be flanked by triumphal arches at each end, and with colossal groups of statuary (varied), and along the bridge on both sides, double colonnades vaulted at top, the central portion forming a grand cortile or larger loggia. I would enrich the faces of the triumphal arches, and the friezes and spaces suitable, with statuary, sculptured decoration, inscriptions, and names of illustrious men and women of Italy—both ancient and modern—the form and nature of the structure being designed specially for and adapted to this purpose. The bridge and arches throughout and the abutments and river walls to be in stone, and the faces in Travertine stone, the columns of the triumphal arches in marble, and the capitals in bronze. The bassi relievi in bronze or marble of varied colors.

"As to the estimated cost, it will be judged from the nature of the memorial that it need not be carried out in its entirety, as to statuary and sculpture, at once. The large groups of statuary and decorative features can be erected in materials more or less costly, from time to time as funds permit, and they may be devoted partly to the commemoration of future notabilities and events of Italian history. But taking the work as herein indicated complete, with its pediments, cornices, coffered soffits, festoons, columns, and all architectural and sculptured carving (as apart from the human figure), I estimate the cost at 7,500,000 Italian lire, or 300,000*l.* sterling, leaving a sum of 60,000*l.* sterling to complete the statuary groups and artistic works named—say, in total lire, 9,000,000.

"In conclusion, I may briefly explain the *motif* or reasons for giving my design the form adopted. First, I consider that a memorial of this nature should be adapted mainly for and to its own special purpose, else it is not worthy of erection at all. The popular notion of coupling some other object therewith, such as a hospital, college, charitable or religious establishment, or other utilitarian scheme, is a vulgar and an ignoble one. For a great and national work the object commemorated is worthy in *itself* the cost and sacrifice involved in its creation. But if, as no doubt it is desirable, that a large structure like this should serve some practical purpose, I would point out that no more noble or useful purpose could be associated therewith than a public bridge, and on a place hallowed by one of the most heroic achievements of Latin history, the defence of the old Sublician bridge by Horatius Cocles.

"Further, I have conceived the idea that the reunion of the severed banks of the Tiber, as shown in this bridge, is a project worthy of associating with the union of the great Latin people and the consolidation of its empire and future greatness, as inaugurated and perfected by the late King Victor Emmanuel II."

The *Pons Sublicius* was the oldest and most interesting of the Roman bridges. Nothing is left of it at present except some of the foundations of the piers, visible at low water. Originally of wood, or piles, from which it takes its name, it was noted as being the bridge defended by Horatius Cocles, who in person withstood the entire army of Porsena till the retreating Romans succeeded in breaking it down behind him. It was subsequently rebuilt at three different times as a stone bridge, and finally destroyed by an inundation in 780, but some of the broken arches and the piers existed till the middle of the fifteenth century.

STABLE AND COACHMAN'S COTTAGE FOR MRS. MARK HOPKINS, GREAT BARRINGTON, MASS. MR. W. C. BROCKLESBY, ARCHITECT, HARTFORD, CONN.

INTERNATIONAL EXHIBITION BUILDING, NICE, FRANCE.

[From *Le Génie Civil*.]

WAREHOUSE, BLACKFRIARS, MANCHESTER, ENGLAND.

[From *the Building News*.]

ULM CATHEDRAL.

[From *The Builder*.]

For a description of the restorations, see the *American Architect* for April 28, 1883.

THE QUINTA SCHOOLS. BY MR. T. RAFFLES DAVISON, ARCHITECT.

[From *the British Architect*.]

THESE schools have been erected for the purpose of Sunday teaching. It has been necessary to provide also for numerous concerts and entertainments given during the year, and this has given the building somewhat more of a public than a merely denominational character, involving some consideration as to how the plan might be best arranged to efficiently answer its double purpose. The building will accommodate about three hundred and fifty. The infants' room is entirely separated from the general school by a hollow wall, and is shut off from sound by two doorways. It is provided with a large cooking-range for the cooking-classes regularly held there. The large school-room, of oblong shape, has two class-rooms on each side of it, opening into each other by revolving shutters, and divided from the main room by folding doors. At one end of the large room is a platform arched recess, and at the other is a wing containing library on the ground floor and class-room over, both these opening to it by folding doors. In one of the angles formed by this wing with the main building is placed a porch, and in the other a circular tower which, on the second floor, contains a semicircular class-room, the lower part containing the stairs and service entrance. There is another porch entering to the infants' room, and also to the platform end of the general school-room. A cellar, centrally placed, contains the heating apparatus, which consists of one of Constantine's convoluted stoves, from which hot air is carried to the large room, the side class-rooms, the infants' room, and the class-room over the library. All these apartments may be heated together, or either one separately, by this means. In order to be independent of the heating apparatus there are fireplaces in the library and class-room above it, as well as in the infants' room. There is a use of some new materials or processes in these buildings which we may refer to. Great care has been bestowed on the prevention of damp, and to this end the whole of the site has been covered with a layer of concrete, and the flooring placed over this is laid according to a new method lately patented by Mr. Edward Hughes, the senior member of the firm who erected the schools. The flooring consists of cubes of wood laid in cement over the concrete, the lower edges of the blocks being cut so that a dovetail opening is formed by the joint, into which the cement bed penetrates. There is thus formed a dovetail connection of cement with the cement bed, which gives enormous strength to the flooring, it being next to impossible to detach the blocks except by a very great leverage, such as is never likely to occur, even where it is used for railway or warehouse floors. A flooring such as this is especially nice for schools, as there is an entire absence of reverberating sound to the tread of the feet which is so distressing in a hollow flooring. In these schools the cubes are laid in a mixture of teak and pitch-pine, the teak squares forming the centres of diamonds in the pattern. The effect is admirable, and, if finely polished, would form a fine parquet. The exterior walling is executed in red bricks, with red terra-cotta mullions, heads, sills, etc. The interior is finished with brown glazed-brick dado and buff bricks over, the corbels, arch-mouldings, door-heads, etc., being buff terra-cotta. The winding stairs up the tower were made of cement concrete in wood moulds on the ground by the contractors, and provide steps probably more durable and far less costly than stone. Ventilation is provided for by the admission of fresh air through the window sills (directed upwards), as well as through hopper casements in the lead lights, with which all the windows are glazed, in transparent glass. The extraction is provided by two of Messrs. R. Boyle and Son's air-pump ventilators, and by flaps (opening by cord and pulley) over the windows. A large amount of teak is used in the wood-work. The illustration is from a drawing in the Royal Academy this year, and was sketched on the spot after the completion of the building.

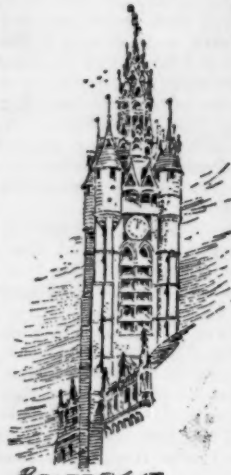
COMPETITIVE DESIGN FOR A MECHANICS' DOUBLE COTTAGE, SUBMITTED BY "Harrison" [MR. H. H. ATWOOD, BOSTON, MASS.].

For description see the following article.

THE EXPLORATIONS AT ASSOS.—Assos was delightful, one of the most beautiful situations I ever saw; the climate exquisite, the hospitality delicate and friendly, the ruins far beyond my expectations in magnitude and interest, the drawings a miracle of faithful and intelligent skill. I am sure that nothing like them was ever undertaken. When they are published they will make previous work of this sort seem crude and untrustworthy. This year's work has been very fruitful in results and I was relieved to find that everything had been done that seemed really worth doing. — *Extract from a Private Letter.*

THE COMPETITION FOR A MECHANICS' DOUBLE COTTAGE.

DESIGN SUBMITTED BY "Harrison."



BELFREY AT DOUAL, FRANCE.

THIS is a simple, easy house to build, as will be seen by the drawings, with no over-hanging projections, studs running from sill to plate, with a very simple roof. It is proposed to build in the vicinity of Harrison Square, in the outskirts of Boston, labor, materials of all kinds and good railroad accommodations being handy. The following is a short description:

SPECIFICATION.

Excavating:—The necessary digging is to be done, material being deposited on the lot where directed.

Foundations and Cellar Wall:—To start from a solid bottom, to be of local stone, the exposed portions being random rubble-work, neatly pointed.

Brickwork:—Consisting of piers and chimneys, to be hard-burned common brick, the exposed parts of chimneys laid in red mortar, and flues plastered in the usual manner.

Lathing and Plastering:—Spruce laths to be used throughout, plastered with a good coat of mortar, and finished with a skimming.

Lumber and Framing:—To be spruce of the following dimensions: sill, 4" x 6"; girders under floors, 6" x 8"; first and second floor joists, 2" x 8", 16" on centres; second-story ceiling-joists, 2" x 4", 24" on centres; posts, 4" x 6"; wall-studs, 2" x 4", 16" on centres; partition studs, 2" x 3", 16" on centres; plate, 4" x 4"; rafters, 2" x 6", 24" on centres.

Boarding and under Floors:—To be good dry mill-planed spruce boards.

Roof-Boarding:—To be matched mill-planed spruce boards.

Outside Finish:—To be clear seasoned spruce, roofs to be covered with cedar shingles laid 4½" to weather, and flashings of heavy zinc; other parts to be as indicated, shingles in second, and clapboards in first story, sheathing paper to be laid under all.

Gutters:to be Stearns's, 4" x 6" cypress, with leaded joints. Conductors to be corrugated galvanized-iron, connected to gutters with heavy lead goose-necks.

Under Floors:—To be good clear seasoned spruce floor boards, in narrow widths, and neatly smoothed off.

Window Frames and Sash:—To be the regular mill-work frames, having pulley-stiles, parting and stop beads, with box for weights. Sash 1½" thick.

Door Frames and Doors:—Frames to be rabbeted plank, with stops. Mill doors 1½" thick, four panels, flush mouldings; front doors 2" thick, all pine.

Stairs:—To be strongly constructed as shown on plans, with an ash balustrade.

Inside Finish:—To be of dry seasoned spruce ¾" thick, and 4" wide; base, first story, 6" high; second story 5" high; pantries and china closets to have shelves and cupboards; bath-room to be sheathed, water-closet to have double cover, etc.; all rooms to have a wood shelf 10" wide, 1½" thick, moulded face, with brackets under.

Gas Piping:—To be of sizes required by the local gas-company; the owners to provide fixtures.

Plumbing:—To consist of a kitchen sink, bath-tub, water-closet and bowl for each house.

Painting:—To be three coats outside, and two coats inside, the outside in three tints, the main roof not to be painted. The pulley stiles to be oiled with linseed oil, and also the kitchen floors.

Glass to be second quality double-thick throughout.

Jobbing and cutting for pipes, etc., is to be done, all rubbish, etc., collected during the progress of the work is to be removed, and the houses left in good condition.

Owners to provide furnaces.

The following bill of quantities and prices, obtained from a reliable Boston builder, whose proposal is attached includes both houses, and also the builder's profits:—

Excavating, 11,836 cu. ft. = 438 cu. yds., @ 25 c..... \$119.50
Foundations and cellar wall, 112 perch (laid), @ \$3.75..... 420.00
Brickwork: chimneys and piers, 11 M. (laid), @ \$16..... 176.00

Frame.

Sills, plates, walls and partitions, 4500 sq. ft.
First floor, 2180 "
Second floor and piazza roof, 2268 "
Second floor ceiling joists, 1240 "
Main roof, 2120 "
12,308 " @ \$14 per M..... 173.00

Outside Boarding.

Walls, 3744 sq. ft.
Roof, 1340 "
5084

Outs.

First story, 22 windows, 410 sq. ft.
4 doors, @ \$3.75..... 155.50
Second story, 16 windows, 330 "
740 sq. ft.
4344 sq. ft., @ \$13 per M..... 56.23

Under Floors.

First floor, 1360 "
Second floor, 1320 "
2700 " @ \$12 per M..... 32.00

Shingles.

Second story and piazza roof, 1680 sq. ft.
Gable and dormers, 160 "

Main roof,	1340 sq. ft.		
	3180 "		
110 sq. ft. to 1000 shingles; 29 M. @ \$3.....			\$67.00
36 windows (including frames, architraves, sash, glazing, lines, weights, and hardware, no blinds used), @ \$3.50.....			133.00
36 doors (including architraves, thresholds and hardware), @ \$5.....			180.00
2 front doors, @ \$8.....			16.00
Stairs (flight from first to second floor, and cellar stairs).....			70.00
Clapboards, first story, 1780 sq. ft. (1,000 clapboards lay 1100 sq. ft.) = 1650, @ \$26 per M.....			34.70
Sheathing-paper, 4 rolls, @ \$3.....			12.00
Nails, 800 lbs., @ \$4.....			32.00
Gas-piping.....			25.00
PLASTERER'S WORK (including lathing).			
Walls.		Ceilings.	
First story, 4304 sq. ft.	First story, 1340 sq. ft.		
Second story, 4420 "	Second story, 1320 "		
			11424 sq. ft.
First Story.		Second Story.	
22 windows, 330 sq. ft.	16 windows, 240 "		
4 outside doors, 84 "	20 doors, 420 "		
18 inside doors, 378 "			
			1452 sq. ft.
			9072 =
			1108 sq. yds., @ \$20.....
			221.60
Base, 932 ft., @ 3 c.			27.96
Plumbing (kitchen sink and bath-room in each house).....			300.00
Gutters, 80 ft., @ 10 c.			8.00
Conductors, 70 ft., @ 12 c.			8.40
8 piazza posts and brackets, @ \$3.50.....			28.00
Painting (outside work, except roof, and inside work included).....			250.00
Labor.....			600.00
			\$3,129.16
Architect's commission, 5 %.....			156.45
Total cost.....			\$3,285.61
BOSTON, May 16, 1888.			
My estimate for building double house, according to "Harrison's" plans, is \$3,129.16.			
J. F. TALBOT, Builder.			

MR. HILL ON THE REPORT OF THE INVESTIGATING COMMITTEE.

TREASURY DEPARTMENT,
OFFICE OF SUPERVISING ARCHITECT, September 21, 1883.
HON. CHARLES J. FOLGER, Secretary of the Treasury:—

Sir, —The Committee of Investigation of this office, whose report has been recently published, have arrived at some conclusions which it appears to me neither the law nor the evidence justify. They have in my judgment made some very grave mistakes in the application of the evidence before them, have failed to appreciate the value of certain testimony and certain important elements in the matters which have received their attention, and in their interpretation of the law relating to advertising have given a rigid and strict construction which it seems to me is in accordance neither with its letter nor its spirit. I believe, too, they have failed to understand both the character of the office and the system under which its business is transacted.

It is but natural that, so far as these errors have contributed toward the conclusions which are unfavorable to my administration of the office, I should earnestly protest. They also, in my judgment, do great injustice to my superior officers who have in any way had to do with its business, and with my numerous subordinates, who I believe have given to its work years of conscientious and intelligent labor.

While the presumption may be in favor of the committee that, within the scope of their limited time and divided duties, they have rendered an honest and impartial judgment, I shall certainly not yield the strong presumption in my own favor that in the technical affairs of my office my own trained and professional judgment is better than theirs. I desire, therefore, to indicate, in as brief a manner as possible, the respects in which I regard their conclusions wrong.

Before proceeding to remark upon the several matters covered by the report, it may be proper for me to call your attention to certain peculiar and unique features of this investigation. You are aware of the grave character of the accusations, and of the vaunting manifestoes of Mr. Murch, who was so free in his scandalous statements on the floor of the House, and so persistent in his alleged efforts to aid you in unearthing frauds. You have seen the unlimited scope of their charges, which embraced nearly every offence known to the law, and the vague and indefinite specifications which made any orderly and regular proceeding next to impossible, and multiplied the obstacles in the way of such a defence as that to which any accused person is entitled as of right under the fundamental law. With such conditions as those existing, and with the rude machinery of the court as organized, I appeal to your judgment whether it were probable that justice would be done to an accused laboring under such overwhelming disadvantages. The defence could make no objection to the organization of the court, or to its methods, without at once raising the presumption of fear or an accusation of effort to suppress evidence and prevent a fair investigation. The issues were undefined, and irrelevant evidence grew in proportion to cloud the judgments and poison the minds of both the committee and the public, to whom it sat with open doors. I do not deem it necessary to enlarge further upon the unfavorable conditions which I met in my defence. I came out of it with such a sense of disgust at the personal hardship which I was compelled to suffer through more than two months of unbroken and uninterrupted insult, as to be reasonably indifferent of what the results of such a disorderly and irregular proceeding might be.

Whether or not on these accounts I may with justice appeal to you for a very careful review of the findings of the committee, is a question which I submit to you with some degree of confidence.

The charges relating to the modification of the *Fifteen per cent Contracts* were those which particularly interested Mr. Murch, and were the only ones about which he pretended to have any personal knowledge. This matter occupied the larger share of the attention of the committee, and received whatever benefit Mr. Murch's personal services could give.

The committee say: "Your committee would not be willing to accept Mr. Steinmetz's unsupported estimates as proof of fraud or incompetency. . . . Your committee finds that the prices agreed upon were largely in excess of the then ruling market rates, and had the contracts been cancelled and new ones made by advertising proposals, the Government could undoubtedly

have secured these lower rates. But very important legal and prudential, as well as economical considerations entered into the settlement of that question, which appears to have been weighed with great care and deliberation by the committee, whose work was subsequently approved by the Secretary of the Treasury."

This finding is entirely consistent with the evidence, and I deem it necessary to refer to this branch of the case only because of the fact that while the committee call attention to other evidence offered, they make no allusion to the fact that the chief witness in this branch of the case, and the originator of this investigation, admitted under oath his own speculations, and was shown by the records to have been guilty of the very frauds of which he was complaining.

Of course this fact is no defence for any possible offence by any one else, but to my mind it is a very material fact to show the character and motive which developed this attack upon the office. This is the man who by a parade of pure hands and an avowal of horror at official speculation, has commanded the attention of the Department.

I cannot but think that this fact was worthy of remark on the part of the committee, particularly as the accused has practically no remedy against his slanderous statements.

The committee base their verdict of *official favoritism* upon the dealings of the office with two parties, viz.: Geo. L. Damon and Bartlett, Hayward & Co.

The respects in which improper favor is alleged to have been shown to Mr. Damon are two; viz.:—

First: In the purchasing of safes and vault-work from him without advertising each fiscal year.

Second: In the award of the contract for fire-proof shutters for the custom-house building at Cincinnati, O., to the United States Fire-proof Shutter Company (of which company Mr. Damon was superintendent), while the Manly & Cooper Manufacturing Company were the lowest bidders.

The respects in which improper favor is alleged to have been shown to Bartlett, Hayward & Co. are three; viz.:—

First: In obtaining plans, specifications, and schedules for heating-apparatus for the larger buildings from a heating engineer who was a member of that firm, without inviting bids therefor from other parties.

Second: In the appointment of a Mr. Newton as inspector of materials for heating-apparatus for Chicago Custom-House Building: said Newton having been an employe of Bartlett, Hayward & Co., before his said appointment, and having returned to their employ after completing his service to the Government.

Third: In giving to Bartlett, Hayward & Co. a large percentage of the work of repair on the heating-apparatus of the numerous public buildings, without advertisement.

I propose to direct your attention particularly to each one of these items to illustrate the errors which, in my judgment, the committee have made.

Favoritism to George L. Damon.

First: In the failure to advertise for safes and vault work at least once in each fiscal year.

The committee say that advertisements for proposals for the supply of this class of work were made September 16, 1875, and August 5, 1879, and that since the last-named date Mr. Damon has finished all or nearly all of the work of that character ordered by the Supervising Architect for the use of the Department, and that no other advertisements for such supplies were made during that period. While it is perhaps immaterial to the issue, it is proper to say that the last statement is incorrect.

The vault work for the Sub-Treasury and Mint at San Francisco, and the Sub-Treasuries at New York and Philadelphia, was advertised, and contracts were awarded to Mr. Damon, who was the lowest bidder in each case. These several contracts were in evidence before the committee.

With the above exceptions, the safe and vault work have been purchased from Mr. Damon, without the yearly advertising, since the fiscal year ending June 30, 1880. The committee say that this was in direct conflict with the letter and spirit of the law. (Sec. 3709, Rev. Stat.)

I will not enter into argument as to whether vaults and safes can be classed as "supplies," within the meaning of the Statute, a doctrine which it seems to me is contradicted by the fact that the accounts for these expenditures have been approved and settled by the proper accounting officers, so far as I know, without objection. I maintain, however, that beyond all doubt there has been a compliance with the spirit of the law, in that the rates paid were those secured under the last advertisement, in 1879. The purpose of the law is to give the Government the benefit of the very lowest rates in its purchases.

Evidence was furnished to the committee that these rates were exceedingly low, and that safe manufacturers had declined to furnish work at these rates, and there was no attempt made to contradict this evidence, as indeed it is beyond all contradiction. The rates had been fixed by competition, and were so far below market rates that I was satisfied that to advertise would be only to incur unnecessary expense, and that without any prospective advantage to the Government.

This action, it is submitted, was not favoritism to Mr. Damon, but certainly was in the interest of the Government, and in vindication of my judgment in this matter, and as proving conclusively that the finding of the committee is erroneous, I beg leave to call your attention to the results of the recent advertisement for proposals for this class of work. In response thereto there were only two bidders. Mr. Damon has advanced his rates on an average of from twelve to fifteen per cent, while the rates of the other bidder are over seventy per cent higher. The contract is of course awarded to Mr. Damon, and by this advertisement the Government sustains a loss of from fifteen to twenty thousand dollars.

Second: In award of contract to United States Fire-Proof Shutter Company for fire-proof shutters for the custom-house building at Cincinnati, O., the Manly & Cooper Manufacturing Company being the lowest bidders.

The committee are in error in stating: "The arrangements for making the proposed test seemed not to have been sufficiently perfected for a practical test." The details of the construction of the furnace, to be sure, were not fully presented to the committee, as I did not see what part it could play in this investigation, and I did not suppose that the qualifications of the committee as experts were such as to lead or entitle them to pass upon this question. They seem to have been governed by the opinion offered in the testimony of Mr. Rettig, a draughtsman who (as he admitted) never made a fire-test nor saw one.

Mr. Rettig says: "I have not witnessed any experiments before, but my experience in engineering would tell me that the test as arranged would not be of any great value to determine the superiority of one shutter above another for the reason that sufficient heat could not have been generated."

The preparations for the test were complete, and the construction of the furnace similar to that in which tests of shutters were made by me in 1879. In those tests some of the shutters were practically destroyed, and heat enough was generated to melt the grate bars, which were railroad iron.

This result surely ought to outweigh any mere opinion that the arrangements were not sufficient for the test. At the conclusions of the committee in this case I must confess surprise.

Aside from the fact that the lowest bidders presented for test an article entirely different from that contemplated in their proposal, the fact that Manly & Cooper were simply experimenting with an article they had never manufactured, and evidently did not understand, and that the specified conditions which were positive in language were not observed by them, seems to have had but little weight with the committee. Great stress seems to be given to the fact that I did not save \$20,000, the difference between the lowest and the next bid. I claim that I saved \$124,666.65, the amount of the lowest bid, as under no consideration should such work have been permitted to go into a public building, and money invested in it I should consider wasted.

The evident groping of the Manly & Cooper Co. after something fire-proof, — their inability to furnish in six weeks what they stated they could prepare in ten days — the wretched character of the work when finally prepared satisfied me then as it does now, that it would have been folly to award the contract to them.

Favoritism to Bartlett, Hayward & Co.

First: In the ordering plans, specifications and schedules for heating apparatus from a member of this firm without inviting bids therefor.

The committee expresses the opinion that "proposals should also have been obtained for drawing plans and specifications for the Chicago, St. Louis, Philadelphia and Cincinnati heating apparatus, that some competitive price might at least be fixed."

The preparation of such plans and specifications is not merely mechanical or routine work. They embody the opinion of an expert upon a complicated problem, and each case requires personal study of the same character that a lawyer gives to a difficult case. It would be as impossible to obtain suitable service by the lowest-bidder method in the one case as the other.

I employed for this work the most competent expert within my knowledge, and paid him a price equivalent to the usual professional fees or commissions.

Second: In the appointment of Mr. Newton as Inspector of Materials for heating apparatus for the Chicago custom-house building, said Newton having been an employé of Bartlett, Hayward & Co., I have nothing to add to the testimony in this matter which was before the committee.

That the motive of his employment was not to favor Bartlett, Hayward & Co., and did not as a matter of fact, I think even the report of the adverse Expert Committee will show. Admitting the reliability of their findings, the value of variations, so far as they could be of any possible benefit to the contractors, is less than two hundred dollars, and the committee give the contractors no consideration for the extra work done by them, for which they made no charge.

But the findings of this expert committee are distinctly and emphatically contradicted in material points. Their examination was made surreptitiously, although your committee had distinctly agreed that the defense should have notice of the intended examination. Such notice was not given, but with the allowance of the truth or their findings the sum is so insignificant in comparison with the contract price, \$94,948, that in a private contract of this magnitude it would not be thought worthy of consideration.

Third: The committee say that Bartlett, Hayward & Co. have had the "lion's share" of this work.

The policy of the office has been, when repairs were found to be necessary to any heating apparatus, to employ for this work of repair the original builders if they were accessible. This is believed to be the most economical as well as most reasonable method, and I have never believed, and do not believe now, that the law requires advertising in respect to these repairs.

These are the facts and the only facts which the committee cite in justification to their verdict of *Official Favoritism*.

I cannot pass unnoticed the following clause in the report, viz.:—

"Such official favoritism is so manifold in the conduct of the Supervising Architect's office as to give some color of truth to a statement made by Mr. Coleman in his argument that for everything that goes to make up a building, Mr. Hill has some one person or some one firm with whom he deals to the exclusion of everybody else."

This is an insinuation merely, and surely should have no place in a report of this character.

Either Mr. Coleman's statement is true or it is false, and it is precisely to ascertain whether such mismanagement existed that the committee was appointed.

The fact that they conclude that in two cases favoritism was shown hardly justifies their deliberate statement, that this gives color of truth to Mr. Coleman's broad statement. I pronounce the statement false and without justification. If it be true the committee have certainly neglected their duty in not ascertaining that fact.

While it is true that for certain specialties other than those mentioned in the investigation, I apply to certain persons or firms—as, for instance, safes from Sargent & Greenleaf, sash-fasteners from the Morris Sash-Lock Company, and certain plumbing goods from Meyer, Sniffen & Co.—yet for the general materials and labor which enter into the construction of a public building, and which consume by far the largest part of the appropriation, such as masonry, iron-work, joiners' work, plastering, slate, and copper work, etc., I defy any one to point to anything that indicates that there is a grain of truth in this assertion. An inspection of the list of contractors on work under this office would dispel any such idea.

The committee seem to have had no hesitation in disposing of the question of organization of this office. Although I have given the matter considerable reflection, I am still unable to submit any scheme of re-organization which has not in it serious defects. It may be that a long experience in the office has led me to entertain an undue appreciation of the difficulties of the problem.

The committee, fortunately, is not handicapped by any such disadvantages. They were repeatedly urged to visit the office and ascertain the details of the present system. To these urgent requests they never responded. I submit that it is not in the interest of the Government to thus summarily dispose of a grave question of administrative policy.

Very respectfully,

JAS. G. HILL,
Supervising Architect.

NOTES AND CLIPPINGS.

FACTORY CHIMNEYS.—It is well known that the round form is the best for the chimneys of factories and workshops. It facilitates the escape of the smoke, and gives less hold for the wind, besides requiring less material for construction. Round chimneys, however, are more difficult to build, so that in some places the want of workmen who are skilled in this kind of construction leads to the adoption of a square or octagonal section. In order to facilitate the erection of round chimneys, M. Houzen, of Nuremberg, prepares materials cut in the form of

wedges, corresponding with the radius which the chimney is to have, so that the construction presents no kind of difficulty. — *Chronique Industrielle*.

EVOLUTION OF HEAT BY DIFFERENT ILLUMINANTS.—The following figures show the comparative product of heat given off by seven different kinds of light, each light being equivalent in power to a hundred candles. The two forms of the electric lamp, the arc and the incandescent, are incomparably below any other kind of light, the arc being of the two the lowest heat producer. The caloric of an arc lamp of 100 candles power is given as from 67 to 158 calories, that of the incandescent lamp of equal brilliancy being from 290 to 636. The argand gas-burner is represented by 4,860 calories, a colza-oil lamp by 7,200, a paraffine candle by 9,200, while a tallow candle which would give the light of any of these lamps would produce no less than 9,700 calories of heat. — *N. Y. Mail and Express*.

MALARIAL FEVER IN FLORENCE.—A correspondent writes from Florence: "The cholera panic has had an effect on our municipality which no pressure or complaint has ever had, and perhaps Florence never was so clean as to-day. The Ghetto, the by-lanes, and the recesses of the old market have been explored, and the filth of years (I speak without exaggeration) moved for the first time in this decade. The activity cannot last; it is too abnormal, and too much of an effort. When it requires the fear of cholera to make a people clean, the cleanliness will not last long. But the chief danger is not in the least affected by the inquisition and requisitions: the drainage of Florence is abominable; every house has a vast cesspool, the waste-pipes are never trapped, and the cesspools often not cleaned for months, while in many houses the well from which the water-supply is drawn is in the same courtyard as the cesspool, and in some cases, which I know by personal inspection, there is a free drainage into the well. The last winter was more prolific of malarial fevers than any one in the recollection of residents, and the landlords obstinately and universally refuse to make the improvements demanded for health. One European doctor told me that he had fifteen cases of typhoid on his hands at one time, and even Italian physicians were compelled to admit that malarial fever had become a serious element in Florentine existence. There will be no reform till the English and Americans desert the city. We pay a greater death and disease tribute in proportion than the foreign colony of any other Italian city, increasing every winter, and we have no recourse, for there is no sanitary law, and no disposition on the part of the proprietors to expend a franc on improvements by which *forestieri* alone profit. The condition of things is simply scandalous, and there will be no bettering, but the contrary, until the *forestieri* learn that there is more fever in Florence than in any city of its size in Italy, and decide to go elsewhere for their winter's 'health-seeking.' — *Pall Mall Gazette*.

SOLAR MOTORS.—Among the companies recently formed in Paris is a society for the utilization of solar heat, with a capital of 1,000,000 francs. The problem which the patentees profess to have solved is as old as Archimedes, who is said to have set fire with burning-glasses to the Roman fleet, when besieging Syracuse. One hundred years afterward Hero of Alexandria constructed a solar fountain. In 1651 Adam Lonicer adapted solar heat to the process of distillation. In the next century various solar clocks were constructed, and the first hint was given of using the sun as a motive power. The first scientist to turn his attention to sun force as available for practical purposes in the present century was John Herschel, who constructed an apparatus for cooking by the sun's rays. Several Frenchmen continued the experiment, and solar pumps and hot-air machines were patented in France. In 1860 Professor Tyndall in the course of his experiments on lunar radiations constructed a machine of great delicacy. It consisted of a cone-like reflector with a highly sensitive test in the centre, on which all the rays striking the interior of the cone were reflected. In 1871 M. Mouchot adapted the idea to a sun machine and exhibited it to the Academy of Sciences in France in 1877. Twenty thousand francs were granted by the Minister of Public Instruction to enable him to perfect his invention, and in the following year a further subvention was made by the Society for the Advancement of Science. In 1879 M. Abel Pifre took up the subject, and further subventions were made by the Government of Algeria. The company thus formed does not profess to be able to do much in climates such as the north of France or England, but in the south of Europe, in Algeria, India and America it is maintained that the invention will be of great value. In these countries fuel is often scarce, and a motor that will supersede steam produced by furnaces may produce extraordinary results where a cheap motive power is required. It is claimed that sun force is far less variable than wind or water power. In the torrid zone the radiation of the sun remains nearly the same for many months and presents a gratuitous power only waiting to be harnessed by science. For the purposes of irrigation, agricultural machines, mills, etc., also for the rectification of alcohol, distillation of perfumes, production of ice, the distillation of water for drinking, and many other uses requiring a low power cheaply produced, the promoters claim that their invention is valuable. No stokers are necessary nor are explosions possible. All that is required is to keep the machine, like a sun flower, always turned toward the sun. The invention consists of a huge reflector not unlike an inverted umbrella, the interior of which is lined with a high reflecting agent. In the centre of this and occupying the position of the umbrella stick is a standard boiler made of a material highly conductive of heat. This receives the rays from the whole reflector and thus collects sufficient heat to generate steam. In addition to motors the society supplies domestic sun machines which boil water, prepare tea or coffee, grill chops and steaks, fry eggs, and cook other food. Portable machines are made for carrying on horseback which will boil water and serve a dinner on short notice. The company also supplies scientific machines and even furnishes the same power in the shape of a children's toy. Unfortunately machines do not always realize the vivid hopes of their inventors and practical people will doubtless wait awhile before ordering a new solar motor. — *New York Tribune*.

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

284,993. SASH-HOLDER. — William Abele, Zanesville, O.
 284,994. FIRE-ESCAPE. — William O. Avery, Washington, D. C.
 284,997. VISE. — James O. Barrett, Erie, Pa.
 285,001. WASH-STAND. — Nathan O. Bond, Fairfax, Va.
 285,006. ROLLING WINDOW-SCREEN. — Alasworth Brown, Colorado Springs, Col.
 285,017. DIVIDERS. — John H. Crowell, Providence, R. I.
 285,023. BURGLAR-ALARM. — Bernard Fay, Pittsburgh, Pa.
 285,051. SHINGLE-SAWING MACHINE. — Moise Marcoux, St. Eugene de Grantham, Quebec, Can.
 285,076. FIRE-ALARM TELEGRAPH. — Edwin Rogers, Brookline, Mass.
 285,079. SASH-BALANCE. — Warren Shumard, Richmond, Ind.
 285,087. PROCESS OF AND APPARATUS FOR PRESERVING WOOD BY IMPREGNATION TO GIVEN HEIGHTS. — George S. Valentine, Brooklyn, N. Y.
 285,097. AUTOMATIC SAFETY-HATCH FOR ELEVATOR-SHAFTS. — Henry Albert, Newcastle, Cal.
 285,104. BLIND. — Michael J. Bird, East Saginaw, Mich.
 285,112. PORTABLE CHIMNEY. — Leonard E. Clawson, San Francisco, Cal.
 285,120. SPEAKING-TUBE. — E. Neilson Gaillard, New York, N. Y.
 285,131. COMPOSITION ROOF. — John F. Hoffman, Cincinnati, O.
 285,137. WEATHER-BOARDING GAUGE AND CLAMP. — Samuel A. Kennedy, Xenia, Ill.
 285,146. FIRE-EXTINGUISHING APPARATUS. — Hermann Molendo, New York, N. Y.
 285,151. PAINT. — Anson L. Munson, Fresno, Cal.
 285,156. PNEUMATIC DOOR-CHECK. — T. Nichols Page, Boston, Mass.
 285,164. SHINGLING-BRACKET. — Patrick W. Ryan, Marlborough, Mass.
 285,179. JOINT FOR EARTHENWARE PIPES. — John S. Tibbals, San Francisco, Cal.
 285,180. BACKWATER GATE FOR SEWERS. — John S. Tibbals, San Francisco, Cal.
 285,191. WATER-CLOSET VALVE. — Peter White, St. Louis, Mo.
 285,197. FIRE-ESCAPE. — Albert R. Yount, Yountsville, Ind.
 285,210-211. FASTENER FOR THE MEETING-RAILS OF SASHES. — William H. Bayles, Montclair, N. J.
 285,216. SASH-BALANCE. — Edwin Bradshaw, Toronto, Ontario, Can.
 285,218. LUMBER FOR WALLS. — James E. Brong and Edward A. Carter, Canistota, N. Y.
 285,230. FIRE-ESCAPE. — Richard Christie, Truro, Nova Scotia, Can.
 285,250. FIRE-ESCAPE. — John H. Ford, Toronto, Ontario, Can.
 285,275. REFLECTOR. — Julius Jaeger, Rutherford Park, N. J.
 285,273. FIRE-ESCAPE LADDER. — Francis E. Josel, Freeport, Ill.
 285,282. FIRE-ESCAPE. — Jeremiah Lockwood and John Kivett, Sullivan, Ind.
 285,292. HANGER FOR LEAVES-THROUGHS. — Theodore McMaster, Sloansville, N. Y.
 285,296. FIRE-ESCAPE. — John Moffet, New York, N. Y.
 285,301. FIRE-ESCAPE. — James S. Parmenter, Woodstock, Ontario, Can.
 285,319. FIRE-ESCAPE. — Joseph Stofflet, Seigfried's Bridge, Pa.
 285,334. ELECTRIC BURGLAR-ALARM. — Alvah Wiswall, Cincinnati, O.
 285,347. SHUTTER-WORKER. — Russell G. Dudley, Jersey City, N. J.
 285,350. PRESERVATIVE COMPOUND. — William S. Fickett, Rochester, N. Y.
 285,365. DOOR-BALANCE. — William F. Sexton, Sr., and William F. Sexton, Jr., Toronto, Ontario, Can.

SUMMARY OF THE WEEK.

Baltimore.

CHURCH. — Messrs. J. A. & W. T. Wilson, architects, have prepared plans for a one-sty. with tower, Baptist church and chapel (colored), 32' x 102', to be erected cor. Park Ave. and Howard Streets. It will be built of stone and brick, have a seating capacity of six hundred, and cost \$10,000; H. C. Smyser, builder.

DWELLINGS. — William F. Weber, architect, has prepared plans for 18 three-sty brick buildings, with stone finish, each 18' x 48', to be erected on North St., between Townsend and Lanvale Sts., for J. Irvine; cost, \$70,000.

Three-sty brick building, with brownstone finish, 20' x 67', to be erected on Huntington Ave., for N. Y. Applegarth; cost, \$4,500.

STORE AND OFFICE. — Chas. L. Carson, architect, is preparing drawings for Messrs. Gregg & Brother, for a four-sty brick building, with stone and terra-cotta finish, 46' x 93', to be erected cor. Charles and Barnet Streets, and to cost \$31,500.

STORE. — Three-sty brick store-building, with stone and terra-cotta finish, 23' x 66', to be erected at No. 61 North Eutaw Street, for Chas. Wattenscheidt; cost, \$7,000; W. F. Webster, architect.

BUILDING PERMITS. — Since our last report thirty-three permits have been granted, the more important of which are the following: —

Andrew Kohn, three-sty brick building, w s Wolfe St., between Gough and Pratt Sts.
 Lucy E. Burck, 2 three-sty brick buildings, s s Lombard St., between Caroline and Spring Sts.
 McCoy & Gortier, 4 two-sty brick buildings, e s Gilmore St., commencing n e cor. Windsor Mill Road.

John Mears, 2 three-sty brick buildings, n s Eager St., e of McKim St.
 L. Swift, four-sty brick building, in rear of s w cor. Eastern Ave. and Duncan Alley, 45' x 50'.
 Jos. M. Cone, 7 three-sty brick buildings, s s Harlem Ave., between Fremont and Gilbert Sts.; and 10 three-sty brick buildings, w s Fremont St., s of Harlem Ave.

Wm. Grecht, two-sty brick building, 23' x 100', n w cor. Sharp and Ostend Sts.
 Juliet H. Turner, 4 two-sty brick buildings, w s Eutaw St., s of Hamburg St.

Wm. Groseup, two-sty brick stable, s s Rice Alley, e of Arlington Ave.

Jas. D. Hodge, 4 two-sty brick buildings, s s Randall St., between Light St. and the Park.

Sheep Butchers' and Wool-Pulling Association No. 2, 4 two-sty brick buildings, s s Boulden Alley, s of Robert St.

S. D. Price, 4 three-sty brick buildings, n s Chase St., n w cor. Constitution St.

J. J. Harvey, three-sty and mansard brick building, e s Charles St., between Monument and Madison Sts.

Boston.

OFFICE-BUILDING. — The buildings Nos. 18 and 20 Beacon St., formerly occupied by the Boston University have been demolished, and a new building measuring 40' x 82' is now in course of erection. The new building will be six-sty high, of Longmeadow freestone and terra-cotta, with store in first-sty, and offices above; Mr. J. P. Lovering is the mason, and L. Greely, the carpenter; Mr. Wm. G. Preston, of Boston, architect; cost, \$45,000.

BUILDING PERMITS. — Wood. Centre St., rear 16 and 18, Ward 21, for L. Prang, dwell., 18' x 32', one-sty flat; J. McNamara, builder.

Washington St., near Tremont St., Ward 25, for Frank W. Webster, dwell., 20' x 40', two-sty hip; Mr. Marshall, builder.

Cambridge St., near North Beacon St., Ward 25, for Wm. C. Walker, dwell., 22' and 32' x 35', two-sty pitch; Daniel O. Connell, builder.

Paris St., near Porter St., Ward 2, for Neal M. Campbell, 2 dwells., 20' x 30' and 32' x 40', three-sty flat; John C. Frame, builder.

Washington St., rear Ashland St., Ward 23, for Caroline F. Freeman, stable, 12' x 15', one-sty pitch; W. Doe, builder.

Brooklyn.

CHURCH. — The corner-stone of the Union Congregational Church of New-Lots was laid, cor. Orient and Liberty Aves., last week.

BUILDING PERMITS. — Fifth Ave., n e cor. Pacific St., four-sty brick store and tenement, felt and gravel roof; cost, \$10,000; owner and builder, E. L. Donnellon, 186 President St.; architect, R. Dixon.

Magnolia St., No. 309, w s, 200' s Irving Ave., 3 two-sty frame dwells., tin roofs; cost, each, \$1,800; owner, Samuel P. Banham, on premises; architect, G. B. Colyer; builders, J. Thatcher and G. B. Colyer.

Willoughby Ave., n s, 140' w Nostrand Ave., 3 two-sty brownstone front dwells., tin roofs; cost, each, \$4,500; owner and builder, David Weild, 358 Gates Ave.

Willoughby Ave., n s, 100' w Nostrand Ave., 2 two-sty brownstone front dwells., tin roofs; cost, each, \$4,500; owner and builder, Daniel B. Norris, 359 Clifton Pl.

Sixteenth St., s s, 100' w Fifth Ave., one and two-sty brick hall, etc.; cost, \$9,000; owner, South Brooklyn Turn Verein, on premises; architect, C. F. Eisenach.

Hart St., n s, 350' w Lewis Ave., 10 two-sty brownstone front dwells., tin roofs; cost, each, \$6,000; owner and builder, Thomas Donohue, 133 Stuyvesant Ave.; architect, J. E. Dwyer.

Carlton Ave., e s, 90' n St. Marks Pl., 2 three-sty brownstone front dwells., tin roofs; cost, each, \$8,000; owner and builder, Jno. Monas, 92 Park Pl.; architect and carpenter, J. J. Gilligan.

Park St., n s, 150' e Broadway, 2 three-sty frame stores and tenements, tin roofs; cost, each, \$4,000; owner and builder, George Straub, 704 Broadway; architect, T. Engelhardt.

Mansie St., Nos. 189 to 195, two-sty brick church, slated roof; cost, \$30,000; owner, the German Evangelical Lutheran St. John's Church, Graham Ave., cor. Ten Eyck St.; architect, T. Engelhardt.

Concord St., No. 136, s s, between Jay and Bridge Sts., four-sty brick tenement, tin roof; cost, \$8,000; owner and architect, E. T. Backhouse, Carlton Ave.; builders, E. T. Rutan and F. K. Schermerhorn.

Fifth St., s s, 187' 10" e Sixth Ave., 9 two-sty brownstone front dwells., tin roofs; cost, each, \$8,000; owner and builder, Thos. Donohue, 103 Stuyvesant Ave.; architect, J. E. Dwyer.

Stuyvesant Ave., e s, 20' n Van Buren St., 5 two-and-one-half-sty brick dwells., tin roofs; cost, each, \$4,500; owner, Wm. Godfrey, 139 Stuyvesant Ave.; builders, M. Kuhn & Co.

Buffalo, N. Y.

CHURCH. — St. James Church, stone, cor. Spring and Livan Sts.; cost, \$20,000; architect, A. J. Warner.

HOUSES. — North St., near Delaware Ave., brick,

stone, and tile; owner, Mrs. E. F. Metcalfe; architect, McKim, Mead & White; cost, \$25,000.

House on Seventh St., near Porter Ave., brick and frame; owner, Geo. H. Lewis; cost, \$12,000; architect, James G. Cutler.

PRINTING-OFFICE. — Building for Courier Publishing Co.; owner, Chas. B. McCune, Washington St., near Seneca St.; Silsbee & Marling, architects; cost, \$30,000.

ADDITIONS. — Addition to house of B. C. Rumsey, Delaware Ave.; cost, \$6,000; architects, Silsbee & Marling.

Addition to factory of M. H. Birge & Sons, cor. Niagara and Maryland Sts.; cost, \$1,500; J. G. Cutler, architect.

Chicago.

ADDITION. — E. W. Blatchford & Co. are adding three stories to their shot-tower building, cor. of Clinton and Fulton Sts., to cost \$20,000; F. H. Waecher is the architect, and Rossler & Winekler are the builders.

FLATS. — T. V. Wadskier is architect of the three-sty flats on State St., for C. B. King, to cost \$40,000; Geo. Kabbell is the builder.

Alfred Smith, architect, planned the four-sty flats for Wm. M. Hoyt, on East Illinois St.; cost, \$16,000; J. G. Deltz, builder.

The flats to be built for B. A. Hills, on West Jackson St., will cost \$12,000; Charles C. Miller, architect, and George Lehman, builder.

HOUSES. — Gregory Vigeant is architect of dwell. and stores for D. O. Callaghan, on West Indiana St.; cost, \$18,000; builder, A. Kaiser.

Thos. S. Kirkwood will build 2 three-sty dwells. and stores on Chicago Ave.; cost, \$14,000; architect, L. D. Cleaveland.

Furst & Rudolph, architects, planned the dwells. and stores for R. Healy, on Archer Ave., to cost \$12,000.

STORE. — Jno. Boddie will build a six-sty store on Market St., to cost \$30,000; the architect is F. Baumann.

TENEMENT-BUILDING. — Frommann & Jepsen are architects of the tenement-building to be built on Cass St., for H. Kalmann, to cost \$16,000.

WAREHOUSE. — The seven-sty warehouse building on Market St., for S. P. Farmlly and A. W. Robbins, will cost \$60,000. The architect is F. L. Charnley.

BUILDING PERMITS. — H. H. Porter, two-sty dwell., 272 East Huron St.; cost, \$6,000; architects, Cobb & Frost; builders, Clark & Fuller.

J. G. Earle, 10 two-sty dwells., Eda St., cor. Wabash Ave.; cost, \$20,000.

A. Crane, 2 one-sty stores, 215 and 217 Wabash Ave.; cost, \$3,500.

H. Kalmann, three-sty tenement-building, 212 and 214 Cass St.; cost, \$16,000; architects, Frommann & Jepsen; builders, P. Reipenker & Son.

Emil Schryer, three-sty and basement dwell., 510 Halsted St.; cost, \$5,000; architect, P. W. Ruehl; builder, A. Kaiser.

C. W. Wells, three-sty dwell., 129 Peoria St.; cost, \$5,500; architect and builder, J. W. Cassel.

Geo. H. O'Brien, three-sty dwell., 319 Wells St.; cost, \$5,000; architects, Holabird & Roach.

S. C. McDowell, 2 two-sty stores and flats, 292 and 294 State St.; cost, \$3,000; architect, J. H. Huber.

John Dotka, two-sty dwell., 514 Ashland Ave.; cost, \$5,000; architects, Furst & Rudolph.

Thos. S. Kirkwood, 2 three-sty stores and dwells., 62 and 64 Chicago Ave.; cost, \$14,000; architect, L. D. Cleaveland.

Wm. M. Hoyt, 2 four-sty flats, 240 East Illinois St.; cost, \$16,000; architect, A. Smith; builder, J. G. Deltz.

R. Seedorf, two-sty flats, 3009 Wentworth Ave.; cost, \$4,000.

St. Peter's German Lutheran Church, brick basement, 366 West Chicago Ave.; cost, \$6,000; architects, Furst & Rudolph; builder, Chas. Meister.

Faust Mickelson, three-sty store and flats, 3710 State St.; cost, \$7,500; architect, Wm. Linghurst; builders, Walker & Lorimer.

W. L. Beck, three-sty store and flats, 3708 State St.; cost, \$7,500.

J. A. Sackley, two-sty dwell., 253 Walnut St.; cost, \$3,300.

E. W. Blatchford & Co., three-sty addition, Clinton St., cor. Fulton St.; cost, \$20,000; architect, Waecher; builders, Rossler & Winekler.

B. Pontius, two-sty dwell., 204 Hudson Ave.; cost, \$3,500; architect, A. F. Boos; builder, N. Gerten.

Peter Ray, two-sty dwell., 166 Emerson Ave.; cost, \$3,000.

John Nathan, two-sty dwell., 152 Maxwell St.; cost, \$4,000; architect, P. W. Ruehl; builder, A. Kaiser.

Aug. Mendel, 3 two-sty stores and dwells., 1498-1502 Milwaukee Ave.; cost, \$7,500.

R. Healy, 2 four-sty stores and dwells., 2800 and 2802 Archer Ave.; cost, \$12,000; architects, Furst & Rudolph; builder, M. McCarthy.

D. O. Callaghan, three-sty store and dwell., 630 and 632 West Indiana St.; cost, \$18,000; architect, G. Vigeant; builder, A. Kaiser.

H. Heintz, two-sty and basement dwell., 304 Loomis St.; cost, \$3,600.

C. Kaub, two-sty flats, 9 Lane Pl.; cost, \$3,000.

A. Walters, addition to store, 722 West Madison St.; cost, \$3,000; architect, W. H. Drake; builders, N. P. Noberty & Co.

George L. Frank, cottage, 165 Mohawk St.; cost, \$1,000.

N. Fatty, three-sty dwell., 236 Superior St.; cost, \$6,000; architect, F. H. Waecher.

Wm. Baker, three-sty store and dwell., 2888 Archer Ave.; cost, \$10,000; architect, P. W. Ruehl; builder, M. J. Hogan.

S. P. Farmlly & A. W. Robbins, seven-sty warehouse, 222 to 228 Market St.; cost, \$60,000; architect, F. L. Charnley; builders, Price & Avery.

D. A. Titcomb, two-sty dwell., 507 Polk St.; cost, \$3,500; architect, W. J. B. Hunter; builder, Wm. H. Cameron.

Wm. Gubbins, two-sty store and dwell., 703 Ogden Ave.; cost, \$3,000.

Peter Bentz, two-sty and basement dwell., 371

Larrabee St.; cost, \$5,000; architect, R. F. Boos; builders, Ebertshausen Bros.

B. A. Hills, 2 two-sty flats, 421 and 423 Jackson St.; cost, \$12,000; architect, C. C. Miller; builder, Geo. Lehman.

Jno. Boddie, six-sty store, 131 and 133 Market St.; cost, \$30,000; architect, F. Baumann; builder, E. F. Gobel.

J. McDowell, 2 two-sty dwells., 2356 and 2358 Dearborn St.; cost, \$5,000; architect, S. Nelson; builders, W. & S. Nelson.

C. B. King, three-sty flats, 171 to 177 State St.; cost, \$40,000; architect, T. V. Waskier; builder, Geo. Kabell.

A. Dressell, two-sty flats, 681 South Ashland Ave.; cost, \$5,000; architect, H. Strippelman; builder, A. Dressell.

Cincinnati.

APARTMENT-HOUSE. — Jos. Smith, Jr., has contracted for a six-sty building, to be used for flats, on Seventh St., between Elm and Plum Sts., 27' x 200'; cost, about \$30,000; Samuel Hannaford, architect; H. E. Holtzinger, builder.

BUILDING PERMITS. — Epiphany Church, Lane St., between Locust and Oak Sts.; cost, \$5,500.

Michael Lloyd, one-sty brick building, 128 Elm St.; cost, \$2,500.

Jos. Lammert, four-sty brick building, n e cor. Fourth and Smith Sts.; cost, \$5,000.

Procter & Gamble, addition to two-sty brick building, 746 Central Ave.; cost, \$3,500.

Mrs. M. A. Bates, two-sty brick building, Coleman Pike; cost, \$4,000.

Eight permits for repairs; cost, \$5,000.

New York.

BUILDING PERMITS. — First Ave., n w cor. One Hundred and Third St., 4 one-sty brick tenements, gravel roofs; cost, each, \$1,000; owner, John Simon, 138 Christie St.; architect, A. Aretander.

One Hundred and Thirty-sixth St., n s, 225' e Seventh Ave., one-sty brownstone front church, tinned peak roof; cost, \$10,000; owner, Church of the Holy Innocents; architect, F. A. Peterson; builders, Smith & Progers.

Eighty-sixth St., s s, 100' w Ave. B, two-sty brick dwell., tin roof; cost, \$3,000; owner, Thomas Tully, 333 East Ninety-second St.; architect, A. B. Ogden.

Second Ave., s w cor. Ninety-eighth St., 4 five-sty brownstone front tenements, tin roofs; cost, each, \$16,000; owner, Henry G. Monarch, 2145 Third Ave.; architect, A. Spence.

Ninety-eighth St., s s, 96' 8" w Second Ave., 5 five-sty brownstone front tenements, tin roofs; cost, each, \$16,000; owner, etc., same as last.

Eighth Ave., e s, 49' 11" n One Hundred and Forty-third St., three-sty frame store and tenement, tin roof; cost, \$5,000; owner, Patrick J. O'Brien, One Hundred and Forty-third St., between Seventh and Eighth Aves.; architect, A. Spence.

One Hundred and Seventeenth St., n s, 64' e First Ave., three-sty brick tenement, tin roof; cost, \$7,000; owner, Win. Austin, Third Ave., s w cor. Thirty-fourth St.; architect, A. Spence.

West Forty-ninth St., No. 534, on rear, five-sty brick tenement; owner, architect and builder, Philip Housmann, 522 West Forty-ninth St.

Eighty-eighth St., s s, 110' e Third Ave., 4 five-sty brick tenements, tin roofs; cost, each, \$17,500; owner, Philip Brainerd, Ave. B, between Eighty-fourth and Eighty-fifth Sts.; architect, J. Brandt.

Philadelphia.

COTTAGES. — Six cottages of the Queen Anne style of architecture are being erected by Mr. William Bullock, at Yeadon, which is near Fernwood Station.

BUILDING PERMITS. — Over St., above Diamond St., 6 three-sty dwells., 16' x 56'; E. H. Flood, contractor.

Twenty-second St., cor. Diamond St., three-sty dwell., 20' x 60'; E. H. Flood, contractor.

Twenty-second St., w s, n of Diamond St., three-sty dwell., 20' x 50'; E. H. Flood, contractor.

Bowman St., above Thirty-fifth St., two-sty dwell., 16' x 30'; E. C. Sheppard, contractor.

Broad St., n of Lehigh Ave., stable, 16' x 60'; W. J. Nolan, owner.

Hancock St., e s, s of Norris St., 3 two-sty dwells., 12' x 35'; A. M. Hoffman, contractor.

Rochelle Ave., n e of Manayunk Ave., three-sty dwell., 20' x 44'; G. F. Payne & Co., contractors.

Rear of St. James's Church, bet. Front and Second Sts., 2 two-sty dwells., 15' x 44'; Wilson Milnor, contractor.

Ridge Ave., w of Lelper St., 2 two-sty dwells., 12' x 36'; Wilson Milnor, contractor.

Washington Ave., n s, e of Twenty-first St., two-sty storehouse, 45' x 60'; Jno. Robinson, contractor.

Cogshall St., between Lehman and Rittenhouse Sts., 12 two-sty dwells., 14' x 28'; D. S. McNabb, contractor.

Chestnut St., No. 1015, three-sty store, 22' x 94'; Thos. Little, contractor.

Thomas St., s s, e of Green St., 3 two-sty dwells., 17' x 32'; Harrison & Gastor, contractors.

Chestnut St., w of Ninth St., rear of Record Building, boiler and press room, 50' x 60'; E. H. Flood, contractor.

Wellington St., s s, e of Kensington Ave., two-sty dwell., 14' x 40'; B. B. Logan, owner.

Willow St. Wharf, ice-house, Knickerbocker Ice Co., owners.

Ninth St., cor. McKean St., 3 two-sty dwells., 14' x 40'; Joe. Stuckey, owner.

Ninth St., cor. Dauphin St., four-sty factory building, 128' 6" x 129'; E. H. Flood, superintendent.

Bainbridge St., n s, w of Eighth St., church building; F. W. Tweed, contractor.

Venango St., s s, bet. Eighth and Ninth Sts., 2 two-sty dwells., 15' x 45'; J. H. Dorff, contractor.

Garnet St., Nos. 2734-36-38, 3 two-sty dwells., 12' x 40'; C. McArdle, owner.

Wayne Junction, three-sty factory, etc., 42' x 100' and 39' x 222'; McCallum, Crease & Sloan, owners.

Sells St., e of Ridge Ave., two-sty dwell., 18' x 32'; Chas. F. Rambo, contractor.

Sixteenth St., w s, n of Allegheny Ave., two-sty well, 30' x 35'; T. W. Draper, contractor.

Summit St., e of Ridge Ave., three-sty dwell., 21' 6" x 34'; Geo. Gillet, contractor.

Chestnut St., w s, s of Walnut, Manayunk, three-sty dwell., 18' x 29'; Geo. Gillet, contractor.

Thirty-third St., e s, near Locust St., 8 three-sty dwells., 17' x 54'; A. Demmitt, owner.

Germantown Ave., s of Susquehanna Ave., three-sty office, 26' x 42'; H. Brockelhurst, contractor.

Jefferson St., cor. Hamilton St., two-sty dwell., 15' x 30'; Henry Rowland, contractor.

Twenty-second St., cor. Norris St., two-sty stable, 23' x 27'; J. S. Steel, contractor.

East Township Line, cor. Gowen Ave., two-sty stable, 31' x 74'; Townson Bros., contractors.

Highland Ave., 3 three-sty dwells., 32' x 36'; Townson Bros., contractors.

Neff St., e s, n of Richmond and Salmon Sts., n s, w of Neff St., 9 two-sty dwells, 15' x 42'; Jas. Hood, contractor.

Dauphin St., s s, bet. Eleventh and Twelfth Sts., 4 two-sty dwells., and 2 three-sty dwells., 15' x 44'; J. A. Beaver.

Haverford St., bet. Sixty-ninth and Seventieth Sts., two-sty dwell., 16' x 40'; R. C. Doehard, contractor.

Torr St., n s, w of Forty-ninth St., two-sty dwell., 16' x 46'; R. C. Doehard, contractor.

Haverford St., w of Fifty-fourth St., two-sty dwell., 17' x 20'; W. D. Hunkle, contractor.

Sycamore St., cor. Wykeop St., 2 three-sty dwells., 15' x 40'; Geo. McNichol, contractor.

Broad St., s of Locust St., two-sty stable, 35' x 35'; Geo. McNichol, contractor.

Locust St., n s, e of Thirty-ninth St., three-sty dwell., 42' x 52'; A. A. Catnach, contractor.

St. Louis.

BUILDING PERMITS. — Forty-four permits have been issued since our last report, fifteen of which are for unimportant frame houses. Of the rest, those worth \$2,500 and over are as follows: —

A. Guiller, two-sty brick dwell.; cost, \$3,000; Hermann, builder.

L. Roos, two-sty brick dwell.; cost, \$4,000; H. Ellermann, builder.

Chapman & Moller, two-sty brick dwell.; cost, \$2,700; J. Ferguson, builder.

H. Parker, two-sty brick dwell.; cost, \$3,000; A. Berthe, builder.

M. E. Church, two-sty brick parsonage; cost, \$2,800; Beinke, architect; Sudholde, builder.

C. C. Murphy, 2 adjacent two-sty brick dwells.; cost, \$7,800; C. C. Murphy, builder.

A. Schultheis, two-sty brick dwell.; cost, \$5,000; contract sub-let.

Dr. Alex. B. Shaw, two-sty brick dwell.; cost, \$10,000; C. E. Illaley, architect; Geo. E. Miller, builder.

General Notes.

ALBERT LEA, MINN. — The trustees of Albert Lea College have appointed Messrs. Abbott, Parker and Brown, a committee to proceed with the excavations for the college. The plans and specifications presented by Mr. Dannel were practically selected as those to be used in the erection of the building.

Messrs. Brown & Simms have commenced excavating for the two-sty brick building, 22' x 70', to be completed this fall.

W. H. Turrell has commenced preparations for a one-sty brick building, 22' x 40', on the site of his building lately burned.

Preparations will be made this fall by Ranson Bros., Schlender Bros., S. S. Edwards, John Stage, and others, to put up brick buildings on the ground recently cleared by fire.

AMHERST, MASS. — The Chi Psi Society of Amherst have broken ground on their lot opposite College Hall for a society building; Bartlett Bros., of Whately, being the contractors.

ATTLEBORO, MASS. — The corner-stone of the Catholic Church was laid September 15.

BANGOR, ME. — The Bangor City Government has appropriated \$1000 toward the construction of Agricultural Hall at the Eastern Maine Fair Grounds.

BRIDGEPORT, CONN. — P. T. Barnum is erecting a large building, which is to be used as a place for almost every form of amusement. It is to be 202' long, and will contain billiard and reading rooms, a skating-rink, etc.

BRYN MAWR, PA. — Brick stable for Geo. Vaux, Esq., capacity 5 horses and 4 carriages, plans by Addison Hutton, architect, Philadelphia.

CAMBRIDGE, MASS. — The Jefferson Physical Laboratory connected with Harvard College, and now in course of erection, will be a brick and stone two-sty building, measuring 65' x 200'; the engine-house is completely isolated from the main building, and all shafting carried on separate piers to prevent vibration from injuring delicate experiments. Messrs. Shaw & Hunnewell, of Boston, are the architects, and Norcross Brothers, of Boston, contractors.

FAR ROCKAWAY, L. I. — Robert B. Hughes intends to build a hotel for summer boarders.

FLUSHING, N. Y. — Adjutant-General Farnsworth, Chief of Ordnance, and Inspector-General Briggs, have approved the site on Amity St., in the village of Flushing, selected for the Armory of the Seventeenth Separate Company. The property has a frontage of 59 feet on Amity St., runs back 175 feet to Locust St., and was purchased for \$3,000 by Queens County. The State will give \$12,000 for the building.

GARY, D. T. — C. B. Cook, architect, of Winona, Minn., is building a \$4,000 house, for Irving Sibley, of Owatonna.

GREEN ISLAND, LAKE GEORGE, N. Y. — Robert Glendinning, Esq., Phila., proposes to erect a cottage, from plans by Wilson Bros. & Co., architects, Philadelphia.

HURON, D. T. — Mr. Chas. B. Cook, of Winona, Minn., is the architect of the new court-house and jail, which is to cost \$50,000.

WHITEHALL, WIS. — Court-house; cost, \$20,000; architect, C. B. Cook, Winona, Minn.

JERSEY CITY, N. J. — L. H. Broome has plans for a four-sty brownstone apartment-house, floor, 25' x 64', to be built on the north-east corner of Wayne

St. and Jersey Ave., for Nicholas Lohse; cost, \$14,000.

JOHNSTOWN, PA. — Offices for the Gautier Steel Works, two-sty high, 40' x 60'; plans by Addison Hutton, architect, Philadelphia.

MEDIA, PA. — The paper mill of J. Howard Lewis is to be rebuilt at once.

MILWAUKEE, WIS. — Ground is to be broken immediately for 2 frame houses, to cost between \$4,000 and \$5,000 each, for M. H. Brand and Fred. Johnson on Mitchell Heights.

James Douglas, architect, has let the contract for Dr. Danforth's house, cor. of Van Buren and Division Sts.; cost, \$12,000.

MONROE, WIS. — James Douglas, architect, is getting up plans for a hotel, to cost \$30,000, which Ludlow, the wealthy banker, is to build here.

MONTREAL, CAN. — The Grand Trunk Railway has offered to build a large central depot here, to cost \$1,000,000 provided the city finds the land.

MOOSEHEAD LAKE, ME. — A stock company is being organized by A. H. Eveleth to build a \$25,000 hotel at West Cove.

PATCOGUE, N. Y. — Mrs. K. L. Gilbert, of New York, is, it is said, to build a hotel and cottages here, at a cost of some \$200,000.

PITTSFIELD, MASS. — Mrs. Zeno Russell has bought a lot on the west side of Bartlett Ave. next to E. T. Slocum's, and Architect Hill is planning a house for her.

PROCTOR, O. — A new city building is to be built. The lot is 40' x 120', with streets on all sides; the building will cover the entire lot, be three stories high of pressed brick, and will cost about \$75,000. The council have adopted the design submitted by W. E. Brown and Chas. Crapey, joint architects.

REDWOOD FALLS, MINN. — The new public school building, of which the foundation walls are in, will cost at least \$15,000.

ST. PAUL, MINN. — The National German American Bank of St. Paul opened proposals for its new building Sept. 24.

WILKES BARRE, PA. — The corner-stone of the Methodist Episcopal Church, to be built on Franklin St., was laid last week.

WINONA, MINN. — Mr. Charles B. Cook, architect, has the following in hand: —

The Harvester Works buildings in the First Ward, to cost \$45,000.

Mrs. F. A. Smith's frame dwelling-house on East Broadway, \$9,000.

J. Ferd. Pudor's frame dwelling-house on West Broadway, \$6,000.

John Loshe, brick residence on East Fifth St.; cost, \$3,000.

Bids and Contracts.

CINCINNATI. — The following is a synopsis of bids for iron stairs for the Custom-House, etc., at Cincinnati, O.

The Sneed & Co. Iron Works, \$7,148 (accepted).

The Phoenix Iron Co., Trenton, \$7,462.

Joseph Hall & Co., \$7,654.

Haugh, Ketcham & Co., \$7,961.12.

Scherpe & Koken, \$8,560.

McHose & Lyon, \$9,000.

M. Clements, \$7,885, informal.

FURNITURE FOR U. S. PUBLIC BUILDINGS. — The following are the successful bidders for furniture, for the public buildings at Philadelphia and other cities: —

Robert Mitchell Furniture Company: Philadelphia, \$20,496 and \$10,093.50.

Charleston, W. Va., \$5,391.82.

Indianapolis, Ind., \$97.

Chicago, Ill., \$3,234.75.

Dubuque, Io., \$2,375.52.

Cincinnati, O., \$255.25.

United States buildings east of Rocky Mountains, tables 1b., letter-presses, desks, office chairs, portable broomracks, and revolving stools, \$810.50.

Mellor, Lingenman & Co., New York: New York, \$270.50.

Atlanta, Ga., \$200.

United States buildings east of Rocky Mountains, file cases No. 10, and wash-stands, No. 11, \$1,328.

Middletown Furniture Company, Middletown, Pa.: New Orleans, \$228.40.

Petersburg, Va., \$604.54.

Barge-office, New York, \$160.30.

Boston, Mass., \$966.

A. H. Andrews & Co., Chicago, Ill.: Wheeling, W. Va., \$215.

Newark, N. J., \$70.

United States buildings east of Rocky Mountains, table desks, 1a., tables, 2 and 3; water-cooler stands, 4; desks, 6; revolving stools, 23, and congressional chairs, \$1,442.26.

Stotz, Woltz & Co., Chicago, Ill.: Sub-treasury, New York, \$54.

SAFES AND VAULTS FOR TREASURY DEPARTMENT. — The following is an abstract of the bids received for safes and vaults for the United States Treasury Department, opened September 13, 1893: —

Safes. — Double steel-lined, burglar-proof, per foot, inside face measurement, Hall Safe and Lock Company, \$16.75; Geo. L. Damon, \$7.75.

Single steel-lined, burglar-proof, per foot, inside face measurement, Hall Safe and Lock Company, \$10.50; George L. Damon, \$6.75.

Double steel-lined, burglar-and-fire-proof, per foot, inside face measurement, Hall Safe and Lock Company, \$21; George L. Damon, \$10.25.

Single steel-lined, burglar-and-fire-proof, per foot, inside face measurement, Hall Safe and Lock Company, \$15.25; George L. Damon, \$10.

Vaults. — Fired in Place. — Double steel-lined, per foot, Hall Safe and Lock Company, \$14.75; George L. Damon, \$7.75.

Single steel-lined, per foot, Hall Safe and Lock Company, \$13; George L. Damon, \$4.70.

Fire-proof doors, fixed in place, Hall Safe and Lock Company, \$245; George L. Damon, \$180.

The contract has been awarded to Geo. L. Damon.

SOUTH CHICAGO, ILL. — The contract for the Taylor School building in South Chicago has been awarded to Roehr & Duggan. The bids on the Colehour school-house all being above \$10,000 were rejected and the architect was requested to reduce the plans.