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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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THE name of the second winner of the open competition for the Shattuck Prize of the Boston Mechanics' Charitable Association should have been George G. Will, instead of Willis, as we had it in our issue of November 5. We are sorry to have printed Mr. Will's name incorrectly, but put it in as it came to us. Both Mr. Will and Mr. Barton, the other prize-winner, are prominent members of the Boston Architectural Club.

THE Boston Architectural Club has issued its prospectus for the season's work. The project for moving the Club quarters has been given up for the present, as class and exhibition rooms have been secured in connection with the present club-rooms on satisfactory terms. A class in Architectural Design, under Professor Despradelles, of the Massachusetts Institute of Technology, will be held on Monday evenings; there will be a class in modelling, under Mr. Hugh Cairns, on Tuesday evenings; a class in pen-and-ink rendering, under Mr. Charles D. Maginnis, on Wednesday evenings, and a life-class on Friday evenings. There will be also classes in French, for beginners and advanced pupils, on Tuesday and Friday evenings. In addition to these, the Saturday club nights will be devoted to instructive lectures on various topics. In the spring, it is intended to hold a general exhibition, similar to the very successful one of two years ago. The vacation Scholarship for the coming year is provided for, and members desiring to be considered candidates for it must send in their names before March 15, 1899.

WE regret to learn of the death of Mr. George C. Moser, architect, of Norfolk, Va., at the early age of forty-two. Mr. Moser was the son of Mr. John Moser, for many years a member of the American Institute of Architects, and was himself a Fellow of the Institute.

THE recent Public Art Congress, in Brussels, seems to have been a noteworthy affair, not only from the distinction of those who participated in it, but from the interest and importance of the questions discussed in it. The matters to be considered were divided into three sections, the first regarding public art from the legislative point; the second looking at it from the social point, and the third from the technical point. The questions in each section were prepared for discussion by a committee. In the first section, the question, whether it is desirable for the public authority to intervene in matters of public art, was answered by the Congress decidedly in the affirmative; while another proposition, that objects of great historical or artistic value, belonging to private individuals, should, at the discretion of the public authority, be declared of public interest, and the owner prohibited from destroying or concealing them, was, after discussion, referred to the next Congress. In the second section, the question, how art should be encouraged for the public good, was answered by the adoption of a vote favoring the establishment, in each country, of a national Bureau, where all projects for public works, or monuments in public places, should be collected, and where artists might find examples for study, and information to assist them in their designing, as well as particulars in regard to competitions open to them; the dissemination of such information being aided by the publication of an annual or periodical bulletin. The Congress also voted, in this section, that it was desirable for the public authority to make some knowledge of the history of art a part of the ordinary school training of children, and to favor the establishment of cantonal museums and artistic associations in provincial towns, making the museums, so far as possible, a means of popular instruction, rather than of exhibition; and, in regard to the question whether competitions were a desirable means of encouraging artists, declared that, if properly managed, competitions were desirable and useful, and added some suggestions as to the best mode of carrying them out. In reply to the question, whether great prizes, like those of Rome in France, were suited to the present exigencies of art, the committee declared that they were useful and desirable, provided reasonable liberty were given for the free development of the talents of the prize-holder, but that, while travelling, and due reports and evidences of actual work, should be required of the prize-holder, residence in Rome need not be obligatory; but the Congress, while adopting all the other conclusions of the committee, rejected that which made residence in Rome a matter of choice.

IN the third section, the committee and the Congress agreed in their response to the question whether reforms were desirable in the organizations of existing schools of art, saying that there should be more liberty, and more decentralization, in the great schools of fine-art; and also, that in art-schools of all kinds, whether concerned with pure or applied art, instruction should be both theoretical and practical, and, instead of being confined to one branch, should include, to a certain extent, all branches. With these excellent resolutions others, not less excellent, but of minor importance, were adopted, recommending city officials, in laying out new streets, to regard geometrical accuracy as secondary in importance to a plan suited to the advantageous display of public or private buildings of interest; specifying the main points to be observed in artistic competitions, urging the establishment of public testing-stations for building-materials, and so on, of which only the official abstract is as yet published. Finally, the Congress voted, on the proposition of the French delegates, to hold the next Congress in Paris, in 1900; but it was also voted to instruct the Executive Committee to act as a standing committee during the interval, to carry on, so far as possible, the work of the Congress, and to request foreign countries to prepare themselves by national meetings for the choice of delegates, for effective and authoritative participation in the Paris sitting. It is to be hoped that this suggestion will be acted upon in this country. Nowhere in the world is, at present, the public art the object of so much attention as here, and our delegates could not only furnish to the Congress information of the utmost value in regard to the relations of the public authority and artistic associations in a state where art has no official recognition, but would return with a certain backing of foreign recognition and regard which would probably aid them in their subsequent work at home. Mr. E. Bellamy Storer, Ambassador of the United States to the Kingdom of Belgium, at Brussels, is the American member of the Executive Committee of the Congress, and is admirably qualified to give information and advice in the matter to artistic associations in his own country.

ACCORDING to the newspapers of San Francisco, that city is sinking into the sea with astonishing rapidity. Surveys, made by the city authorities, are said to have shown that the average rate of subsidence is two inches a year, so that it seems probable that another half century may see important changes in the topography of the town. The engineers explain the phenomenon by saying that the peninsula on which San Francisco is built consists of sand, mixed with decayed

vegetable matter, extending to a depth of at least sixty feet, and that the compression or escape of this soil, under the heavy load of buildings which has been placed on it, is sufficient to account for the movement. Whether the spongy soil simply settles, or escapes laterally into the sea, remains to be determined, and the determination will be a matter of importance, at least to the owners of buildings on the water-front.

THE *Engineering Record* thinks that architects ought to know more than they generally do about the effect of oil on steam-boilers, the ways of preventing it from getting into them, and the dangers attending the use of exhaust-steam for heating, where the condensed water is returned. So many heating-plants in buildings are supplied by exhaust-steam from elevator or electric-light engines that the matter is of great importance, and, although we imagine that architects generally know more about it than the *Engineering Record* gives them credit for, it is quite likely that there may be something for them yet to learn. Probably every architect who designs an exhaust heating-plant calls in his specifications for some sort of grease-trap, and in most cases this answers its purpose tolerably well; but where high-speed engines are used, for electric or elevator work, the oil from the cylinders is blown through the exhaust in such fine particles that the ordinary traps will not separate all of it, and a certain percentage enters the boiler, where it soon decomposes, and produces serious corrosion at the water-line. On board steamships, where the exhaust-steam must be condensed and used, and where corrosion in the boilers would be a dangerous matter, it is usual to filter the condensed water through sand, or felt, or sponge, or straw, or various other matters; but such filters need a great deal of attention, and, in ordinary hotels or apartment-houses, it is often cheaper to run the condensed water into the sewer, and keep the boilers supplied with fresh water from the city mains. Architects must, therefore, weigh various circumstances before they can lay out such a plant judiciously. If high-speed engines are to be used for any purpose, it will probably be cheaper, in the end, to run the water of condensation into the drain; but if slow-running engines only are to be installed, the oil in the condensed water may very probably be sufficiently removed by a good separator, with, perhaps, an auxiliary filter. Meanwhile, some inventive genius might profitably devote himself to devising a separator which should be more efficient and economical than anything now in use; or, perhaps, to investigations into the effect of different oils upon boilers. It is quite common to fit up steam-boilers with kerosene injectors, which blow petroleum automatically over the surface of the water, for the express purpose of preventing corrosion; and if one sort of oil corrodes boilers, while another sort preserves them from corrosion, it certainly seems as if a mixture of the two, or the latter sort alone, might be used with advantage.

ALL advices from Europe indicate a general activity in construction. In France, Belgium, Germany and England the trade journals report the market for structural iron and steel as "extremely satisfactory," and prices in all these countries tend to advance. The great strike in the building-trades checked for the moment the French consumption of such products, but it is happily settled, and there seems to be no danger of another at present. Meanwhile, the rolling-mills are working extra hours, and, in some cases, day and night, and, even then, there is difficulty in filling orders. In Germany, prices have been materially advanced, but consumption still continues very active, and the same is the case in Belgium, where prices have also risen. Whether this happy state of affairs is the consequence of the long period of peace which Europe has enjoyed, or of the prospect that the powerful influence of Russia will be exerted to secure continued tranquility, or proceeds from some other cause, we will not attempt to say; but it would certainly be singular if our building workmen, so many of whom have been for years with little employment, should be obliged to emigrate from the United States to the Old World, in search of a living for themselves and their families.

SOME valuable experiments have been made in France, by M. Frémont, on certain causes of rupture in steam-boilers, which have gained for him a medal from the Society of Civil Engineers, besides the gratitude of all who use steam-boilers, or have to do with their installation. Architects, who form an important section of this latter class, know that boilers are subject to "mysterious" accidents, which are, in most cases, either laid at the door of Providence, or are attributed to a supposed disposition of boilers, in which the water has been allowed to get low, to develop a bursting pressure when fresh water is admitted. As actual tests, with pressure-gauges, show that this alleged disposition is purely imaginary, and as modern engineers believe that the operations of Providence are capable of being understood by those who will take the trouble to study them, M. Frémont applied himself to a close examination of the riveting of boilers which had failed, and found, as other engineers have suspected, that the rupture of boilers was very frequently begun at the time when they were made, by improper riveting. Most architects, in writing specifications for steam plants, expressly prohibit the use of the drift-pin in riveting, but some of them do not, perhaps, understand fully the operation of that deadly instrument. The drift-pin is used, in a word, to bring together rivet-holes which ought to coincide, but which do not. In punching the edges of boiler-plates for the rivets which are to hold them together, there is, as a rule, nothing to prevent a careless workman from varying, to a small extent, the distances of the holes. In consequence of this, the holes in plates punched by such a workman, when the plates are put together for riveting, do not quite correspond, and some of the rivets will not go into their places, although rivets considerably smaller than the holes are always used, to allow for a certain variation. The inferior workman, under these circumstances, puts bolts, or possibly rivets, into the holes that fit sufficiently well to enable him to do so, and proceeds to discipline the holes that do not fit by inserting into them the point of a long, tapering pin, of hard steel, and pounding the head of the pin with a sledge-hammer. The enormous force exerted by the pin so driven bends and crushes the sheets, elongates the holes, and very frequently, as M. Frémont shows, cracks the metal until a passage is forced through, and a rivet put in; and a similar operation is gone through with the next defective hole. When the riveting is complete, the boiler looks much like other boilers; yet many of the rivet-holes may be elliptical in shape, and not filled by the rivets; the sheets may be cracked under the rivet-heads, and the whole line of the joint may have been tortured until much of its strength is gone.

BESIDES this method of ruining a boiler, and preparing danger for innocent people, the bad workman has another, more easily detected, which consists in cutting and scoring the plates in riveting and finishing. The head of the rivet is usually finished, while still hot, by placing a hollow punch over it, and striking it with a hammer. The edges of the punch are quite sharp, and, if it is held obliquely, or struck carelessly, it is easy to cut with it a circular groove partly or wholly around the rivet-head, which, of course, affects the strength of the sheet. In the same way, the seams are usually calked, in order to make them tight, by striking them with a sort of chisel, so as to force the edge of the upper sheet into close contact with the lower; and the stupid and unskilful workman is quite disposed to save himself trouble by striking the calking chisel downward, so as to turn down a thin edge of the upper sheet, instead of a substantial portion, and, in doing so, to let the chisel slip, cutting a groove, or score, alongside the joint, and, of course, seriously weakening the boiler. Where the scoring is on the outside of the boiler, it can generally be detected; and, under a proper specification, the boiler in which it exists should be rejected; but the cutting of the sheets around the rivet-heads is likely to be inside the boiler, and strict examination of the inner surface should be made to detect the marks of this, as well as scoring at the edges of the plates. Injury with the drift-pin is much less easily detected, but architects, whose eyes are highly trained in some ways, can generally see whether the rivets are spaced with perfect precision; and if they are not so spaced, there will be good reason to presume that the punching has been inexact, and that the drift-pin has been used to get the rivets in. In this case, the boiler may be presumed to have been strained and injured at the joints, perhaps to a very serious extent, and a close examination should be made, both inside and outside, to see whether minute cracks around the rivet-heads, or other signs of incipient failure, are not visible.

THIRTY-SECOND ANNUAL CONVENTION OF THE AMERICAN INSTITUTE OF ARCHITECTS.

IN the light of past experience, we doubt whether the pleasurable feelings experienced by the attendants at this year's convention of the American Institute of Architects when they heard the chairman declare, at last, that the new By-Laws were passed and adopted, and that consequently that vexed matter was finally disposed of, was really justifiable. There is no finality to the by-law incubus in a body constituted as is this one, that is, one which has allowed to become part of its unwritten law the necessity of recognizing sectional lines. There is still far too much feeling between the Eastern men and the Western men, not of antagonism and distrust, but of needless misunderstanding, and the blame for the existence of this feeling, so far as it does exist, lies mainly with the Eastern men, who will not give themselves the trouble to attend the annual meeting even when it is held practically at their own doors. We feel that where sectionalism is recognized political manœuvring will inevitably exist, and political hocus pocus of any kind cannot be effected without meddling with the by-laws as a means of carrying out a piece of sectional policy, whether such policy be in the abstract good or bad.

The feeling that the By-Laws had been permanently and satisfactorily settled is all the more unreasonable because one of the committee reports, that of the Committee on Education, contained a recommendation so obviously proper and desirable that its adoption cannot long be deferred, and it can be adopted only by amending the By-Laws — after much discussion and the waste of many words by those who like to hear themselves speak, and the attrition of much patience on the part of those who would much prefer that the speakers should hold their tongues.

The re-establishment of the grade of Associateship which has now been effected will do something to strengthen the standing of the Institute in the eyes of those who have not cared to join its ranks, but the adoption of a prescribed examination for admission to membership, as is now formally recommended by the Committee on Education, will do vastly more, and moreover will have a very desirable practical effect in maintaining, if we may not say elevating, the average of the educational standing of members on the roll in the future.

If, now that the delegate system has been adopted, each Chapter will take pains to send to these annual meetings its very best men and set its face steadfastly against the snare of rotation in office, it will be found that two things have been accomplished with ease and certainty. First, the tone of the gathering will have benefited, for the delegates, finding that they are brought into contact with the really best men, will exert themselves to maintain their own right to a place in an assembly of the highest grade, and the quality of the discussion will surely be raised. It will no longer be possible for two or three men to impose their views — which may be wholly wrong — on a large assembly of men of average ability who are oppressed by the glamor which surrounds the utterances of a man of proved ability, but who is actually capable at times of being as pig-headed as any one. In the second place, it will quickly be understood that the character of these annual meetings has changed, and the average man who now goes to the meetings will not abandon his habit of attendance, but will stick to it all the more zealously as a means of educating himself up to that standard which should mark off the possible delegate from the impossible one — for there are impossible members, probably, in every Chapter. No one need fear that if the really best men come together there need be any doubt but that there will come with them an ever-enlarging fringe of non-delegates as listeners, and even as partakers in the debate, for the privilege of the floor is preserved to every one under the new By-Laws.

We believe that the growth, if not the salvation, of the Institute depends absolutely on the kind of man who is sent as a delegate and not at all on the size of the sum that has to be paid to the Institute as annual dues. When the annual gathering consists of such men as should come together, and when they honestly do the best that is in them, there are few so poor who would not find means to pay quadruple the present dues for the privilege of membership in a body known to be doing useful and honorable work of a high and intellectual order. And this, by the way, is a third thing that can be easily accomplished by always sending proper — that is, generally, the same — delegates year after year, namely, the filling of the Institute's treasury. The Institute has work to do, and cannot do it unless it has money, and we feel sure that its exchequer can never be kept in a satisfactory state on the basis of the new and altogether too meagre dues.

Doubtless, the average attendant at these meetings is fairly well satisfied with things as they are, and, perhaps, cannot see why an attempt should be made to better them, or in what way the proceedings in the past have fallen short of being full, fit and proper in every particular. If there are men who feel thus satisfied, they are men who can have no knowledge of the manner in which other similar bodies conduct their meetings and have never examined the matter which was listened to, considered and discussed at such meetings. And here is the nub of the whole matter — discussion. In the meetings of the American Institute of Architects the one thing which, seemingly, is considered out of place is discussion — save and excepted always discussions of the By-Laws. The fact is none the less incontrovertible that the one real excuse for assembling an organized body is that its members may interchange their views, barter and exchange their knowledge, swap their experiences one with another by means of a verbal discussion, and as a verbal discussion must have a text or provocative, this is usually provided in the form of papers, carefully prepared by men who have something to say.

The manner in which this most important matter has been treated at the late Convention does not vary greatly from that which has obtained in the past, save that the reader of one paper, Mr. Bradlee — a gentleman we never heard of before — was treated with flagrant discourtesy. This gentleman had read an interesting and important paper, well reasoned and fairly stated on both sides, as our readers can later discover for themselves. It was listened to with closer attention than any other paper that was read, for it more intimately concerned every person in the room than any other, since it affected each man's "pocket nerve," and there were many present who would have been glad to speak to the question. It was the only paper upon which even the semblance of a discussion was permitted, but the less that is said about such discussion as did take place, the better. There never has been a meeting at which better papers have been read than those presented by Professor Sabine on "Acoustics," by Professor Merrill on "Ornamental Building-stones," by Dr. Fernow on "Characteristics of Woods" and by Mr. Bradlee on the "Practice in Regard to employing Electrical, Heating and Sanitary Engineers," and each of these papers demanded and deserved a proper discussion and might easily have had it. Since these papers were not discussed at the meeting, we will point out that it is the practice of the American Society of Civil Engineers, of the Franklin Institute and of some English bodies, to publish with the stenographic reports of the actual oral discussion such written comments as may be furnished, and we will say that if the Secretary of the Institute finds it undesirable to invite the contribution of a written discussion upon these papers so that they may be included in his forthcoming report, we shall be glad to open our columns to any one — whether present at the meeting or not — who cares to say anything upon the papers that were read, according as we may find opportunity to refresh their memories by publishing the papers in question.

The ostensible reason for depriving the attendants of an interesting, and possibly valuable, discussion, was the necessity of disposing of the matter of the new By-laws, in reality a wholly dishonest excuse, since, with good will and good management, this matter could have been disposed of in one day, in place of spoiling the work of three days. But the Institute more and more disregards the homely old adage: "Work first and play afterwards," and the programme for each convention is planned, seemingly, so as to make the play-time most time-consuming, and arranged so as most to interfere with what should be the Institute's real and serious work. The serious work is laid out by the Secretary — and this year he had achieved greater success than ever before — and then his scheme of operations is ruthlessly cut apart and interfered with by the plans formed independently by the local entertainment-committee. This, with the indifference, on the part of officers and attendants alike, to the hour of assemblage and starting — save in the case of steamers, tally-hos and trolley-cars — has in the past made it very difficult to do even a semblance of justice to the efforts of a conscientious and industrious official who, by the accident of balloting, has now to yield to another the duties which for several years he has capably and acceptably discharged. No, the work of the Institute in Convention in the past has only at widely separated intervals been serious and really worth while, and unless the delegate system can bring about a change for the better, we believe it would be well to forego all pretext of being a learned body, and turn these annual gatherings into purely social occasions, leaving to the local Chapters the matter of attempting to be serious. The value of such purely social gatherings, with their attendant sight-seeing junketings, is not to be questioned, and we have no thought of suggesting that they should be given up, but it is surely absurd that a body of grown-up men cannot give more than three consecutive hours to serious work once a year without taking a prolonged recess.

If the meeting could be held in some dull, small town, or in the outskirts of a lively greater one until the real work were got rid of, the Institute's best work, the oral discussion of suggestive papers, could be accomplished without imposing upon the participants the feeling that they were losing their chance of a fish-dinner or a ride on a merry-go-round.

It is to be hoped that none of those who are in the habit of attending these annual gatherings will take amiss what is said here, or feel that we are trying to hold the individual responsible for the shortcomings of the body as a whole. But when one hears these men themselves repining at the way time is wasted, regretting that this man and that one has not found it desirable to add his voice and influence to theirs in the effort to make the occasion both interesting and profitable, it seems fair to infer that there are others than ourselves who leave these meetings with a sense of emptiness. It is just as well to speak of these things publicly, for, really, the greater part of the blame rests with those who stay away and they can be reached more effectively by a public than by a private appeal. But if the By-laws have been settled so that they need occupy no more time in frivolous discussion, perhaps these absentees may begin to feel that they can be present at future meetings with credit to themselves and profit to others.

As to the social side of this year's meeting, it was, thanks to the beautiful weather, very enjoyable, and the city is so rich in possibilities that the local Chapter found no difficulty in playing the host to the entire acceptance of the visitors. The Octagon House was the centre of interest and every one felt that its lease was a wholly justifiable measure, even if its only result should prove to be the restoration and preservation of a very interesting building. Considering the fact that the trustees of the estate to which the building belongs considered the structure of so little value that they had leased it as a store-house for old rags and papers, it is remarkable that the interior finish should have been found in such condition as to make possible a thorough restoration of the interesting and delicate work about fireplaces, cornices and doors. A portion of the work of restoration has been finished, while other parts as yet untouched show how considerable a task the committee took upon itself.

How much use will actually be made of the building, except by the Secretary and his assistant, remains to be seen; but at any rate the Institute now has a place where it can receive photographs, reports, presentation copies of new publications, and overflows from private libraries in the shape of duplicates, and Mr. Glenn Brown, the new Secretary, is just the man to arrange them and set them in order.

As to the officials for the year 1899, the ballots resulted as follows: *President*, Henry Van Brunt; *First Vice-President*, W. L. B. Jenney; *Second Vice-President*, J. W. McLaughlin; *Secretary* and *Treasurer*, Glenn Brown; *Auditors*, S. A. Treat and W. G. Preston; *Directors*, for one year, F. M. Day, J. C. Hornblower, T. D. Evans; for two years, R. W. Gibson, L. T. Scofield, W. M. Poindexter; for three years, A. G. Everett, W. C. Smith, G. B. Post.

GENERAL PRACTICE IN REGARD TO THE EMPLOYMENT OF ELECTRICAL, HEATING AND SANITARY ENGINEERS.[1]

THE practice of architects has undergone a gradual, but very decided, change during the past fifty years, a change which has been so gradual that its magnitude and importance are hardly appreciated, even by those who have been directly connected with it. The study of science and its application to manufactures and to the common affairs of life have broadened out the field which the architect is required to cover, and have added many new problems to the question of building design.

On the one hand, the range of building materials which the architect has at his disposal has been greatly increased. New processes in the manufacture of iron and steel, of terra-cotta and brick, of cement and plaster have made new forms of construction possible, and have produced the modern steel-frame fireproof building which has now become so familiar.

On the other hand, the architect's work is not confined to the design of a building which is architecturally beautiful, which is well and substantially constructed, and which is carefully planned, he must go farther, and equip the building with a complicated system of mechanical and electrical apparatus. He must design and provide for a network of pipes, flues and wires running through all parts of the building; he must install high-pressure boilers, steam-engines, dynamos, elevator-pumps, tanks and machines, electric-motors, ventilating-fans, refrigerating-plants and mechanical kitchen and laundry apparatus. To show how recently this change has occurred, it is only necessary to state that fifty years ago the steam-engine had not come into general use, and there was no source of mechanical power which could be used in a building. The heating and ventilation were taken care of largely by open fire-places and stoves; elevators were not used, the telephone, electric-light dynamo and motor were not invented, and the plumbing consisted of a cold-water supply and drain-pipe for two or three sinks, and an outdoor privy.

The architect of a modern building, if he is to design it complete in all its details, must therefore be an engineer, and must be familiar with mechanical, electrical and sanitary engineering in all its branches. Each of these departments of engineering has, however, grown to such an extent that a thorough knowledge of its details can only be acquired by years of study and experience, and, what is perhaps more important, they are at present in a state of rapid growth. New methods and new appliances are constantly introduced, so that the best work of ten years ago is considered very inferior to-day.

It is therefore clearly impossible for an architect to master all of these subjects and keep himself informed on the new methods which are developed. A man may be a good engineer or a good architect, he cannot very well be both. In fact, the particular traits of character which are necessary in an architect are different from those required by the engineer. Architecture has been defined as "the art of building beautifully." The architect, it is true, must consider economy and the practical requirements in relation to design, but the fundamental principle of his work is art. He must be, first of all, an artist. His one absolutely essential quality is an appreciation of beauty and the ability to express it in the buildings which he designs.

Engineering, on the contrary, might be defined as the science of building economically, of getting the most strength, durability and use for a given expenditure. The guiding principle of the engineer is economy of operation, and on most of the work which he designs beauty is not even considered.

If the architect is to personally take up the engineering problems he must neglect, to a greater or less extent, the work which architecture has stood for in the past. Even if he confines himself purely to the design of the building itself, the great mass of details and the business questions which he is called upon to meet take so much of his time that he is in danger of losing entirely the ideals of his profession. What the architect needs to-day is not new problems to solve, but relief from the many details which are placed upon his shoulders, and which bear no direct relation whatever to architecture. That the architects themselves have felt this is shown by the methods which have been adopted to meet the problem.

A few architects may be found who are, by nature, interested in engineering work, and who plan all of the details themselves, but these are very rare, and, in most cases, the entire engineering work is turned over to some one else to look after.

There are three general methods by which this may be done: *First*, the plans and specifications may be drawn by the contractor who is to do the work, or who is to figure on it in competition with others; *Second*, a consulting engineer may be called in to draw the plans and specifications and supervise the installation of the work; *Third*, if the architect has a very large volume of business, he may have a man regularly employed in his own office to take this part of the work in charge. This last method we need not consider, however, as there are very few cases to which it is applicable.

The employment of the contractor to design the engineering work was the first method adopted, and, up to perhaps twenty years ago, was almost universally employed. Gradually, however, as the work increased in scope and in importance it was found that there were some decided disadvantages in looking after it in this way and the employment of the consulting-engineer became more common. I do not need to discuss in detail the advantages or disadvantages of the consulting-engineer. It is sufficient to say that the causes which in the past separated the architect from the builder are now at work separating the engineer from the engineering contractor.

To those who are familiar with the situation it seems evident that sooner or later the engineer is to be in some manner as generally employed in connection with the building-equipment as the architect is to-day in connection with the building-design.

The method of employment of the engineer, the work which he is to be called upon to do and his position with relation to the architect and the owner are matters which custom has not yet defined, and they are at present very far from clear. This is unfortunate, as it often leads to misunderstandings and unsatisfactory results which might easily have been avoided, and, in many cases, to an unjust treatment of both architect and engineer in the matter of payment for services. I wish to speak to you to-night in some detail in reference to these questions and to suggest a remedy which will not correct all the difficulties, but will, I think, be of great help in connection with the more important ones.

The method of employing the engineer differs very much in different cases. Sometimes he is engaged by the owner, sometimes by the architect; sometimes the architect receives a commission on the building-equipment, sometimes he does not.

In one case that came to my attention the engineer was engaged by the architect and the contractor was told to add five per cent to his proposal to cover the engineer's commission. This latter method is, of course, not to be considered, but the question of whether the engineer should be engaged by the owner or by the architect is important.

The answer, I think, depends to a large extent upon the position which the engineer is to hold with relation to the architect. If the engineer is to be absolutely independent, if he alone is to be responsible for the entire planning and installation of the engineering work, if the architect is to give no time and thought to the matter and is to have no authority in regard to it, then the engineer should be engaged by the owner without reference to the architect in any way.

If, on the other hand, the architect is to be held responsible for the building as a whole and the engineer is to be considered as his assistant on certain parts of the work, and is to work in conjunction with him at all times, then the question assumes quite a different aspect, and it is advisable that the engineer should be engaged by the architect and not by the owner.

It certainly does not need any proof to show that a building must be designed as a unit in order to obtain the best results. The architect and engineer cannot go ahead independently on their respective parts. They must work together and must see that their plans conform to each other in all respects.

It is, however, very difficult to carry this out successfully if they are to have equal authority with regard to different parts of the work. It is human nature for each to think his own part the more important, and when they conflict in any way to claim that the other should be the one to give way and alter his plans.

The engineer is responsible for the design of the building-equipment and for the results obtained from its operation, and he should, therefore, be given every reasonable opportunity to design the work in the manner which he considers best. At the same time, he should remember that the equipment is in all cases subordinate to the building itself and that in most cases it is easier and cheaper to make changes in the engineering work than in the construction of the

[1] A paper, by Mr. H. G. Bradlee, read, November 21, 1898, before the Thirty-second Annual Convention of the American Institute of Architects.

building. He should, therefore, be under the direction of the architect and should make any changes which the architect may wish, provided the changes will not interfere with the success of his own work.

If the architect is responsible for the building as a whole, it will be as important to him as to the engineer to see that the equipment gives satisfactory results, and, consequently, he will not require any unreasonable changes and will see that the engineer has, as far as is possible, a free opportunity to carry out his own ideas.

It is not enough, however, for the engineer and architect to work together and see that their plans conform with one another's in a general way: either one or the other should be directly responsible for this; and it seems to me that this responsibility should in every case rest with the architect.

The architect is necessarily more familiar with the uses to which the building is to be put and the details of its construction than the engineer can ever become, and he will therefore notice discrepancies which the engineer might easily overlook, and which, if not corrected before the work is started, might cause serious delays and expensive changes. The engineer must do everything in his power to see that his plans can be properly carried out in connection with the other parts of the building-work, but the architect should look the plans over carefully and assure himself that this is actually the case.

The architect need not, of course, know the exact dimensions of every piece of apparatus, or bother with unimportant details, but he should be familiar with the general plan which the engineer proposes and should know the exact manner and location in which he expects to install his apparatus and the results in operation which he is trying to obtain.

Now, if the engineer is engaged directly by the owner, and especially if the architect receives no commission on the building-equipment, the above conditions cannot be properly met.

The architect will naturally feel that this matter has been entirely taken out of his hands and will go ahead with his plans, with hardly a thought of the engineering work, and will leave the engineer to get it in as best he may.

The engineer, on the other hand, will feel far more independent of the architect, will pay less attention to the architect's plans, and will trust to having the details of the architect's work changed later, if necessary, so as to allow his own to be installed.

Again, in order to have everything run smoothly and to the best advantage, the engineer and architect should have worked together sufficiently to be familiar with each other's methods — and this is very likely not to be the case if the engineer is selected by the owner; in fact, the owner may select an engineer in whom the architect has no confidence or with whom he does not wish to work for some purely personal reason.

It is, therefore, very desirable for many reasons that the engineer should be selected and employed by the architect, and not by the owner, although, naturally, the architect would, as a matter of courtesy, consult with the owner and would not select an engineer who will, for any reason, be objectionable.

The engineer having been engaged, the work which he is expected to do in the preparation of plans and specifications is generally clearly understood.

The architect is to furnish him with all of the information which he needs with reference to the details of the building, the uses to which it is to be put, and in a general way the results which it is desired to attain in the matter of heating, lighting, ventilating, power, etc. The engineer copies the architect's plans, draws on them the general arrangement of his own work, and makes all necessary drawings of the details of construction. He prepares complete specifications for the work, obtains estimates from a proper number of contractors, and confers with the architect and owner as to which proposal it is most advisable to accept.

If any difficulties arise on this part of the work they may generally be traced to carelessness on the part of the engineer.

The architect, since he assumes the engineer as his assistant, is now responsible for the general agreement of the engineer's plans with his own; but the engineer should not, on this account, proceed without regard to the details of the building construction, leaving the architect to straighten out the discrepancies. Neither should the engineer wait to receive details and general information from the architect: he should follow the matter up himself, and see that he has all of the information which he needs, should make himself as familiar as possible with the architect's plans, and so arrange his work that there will be a minimum number of changes required in the building construction.

The engineer is apt to be rather careless in these matters, and the results of his carelessness are extra work and inconvenience for the architect.

It is very difficult to overcome neglect and carelessness, but the trouble would certainly be reduced if the engineer were to be employed by the architect in every case, because he would then have an additional reason for wishing to have the work run smoothly and to the architect's satisfaction.

As soon as the contracts are let and the building started the question of inspection comes up, and on this there is a wide diversity of opinion. In some cases the engineer is expected to have a man on the ground the greater part of the time, and in other cases all that is considered necessary is an occasional inspection to see that the work is going ahead properly.

On large buildings a great deal of confusion and misunderstanding often arises because one set of men is being directed by the engineer and another set by the architect or by the clerk-of-the-works. Each is trying to push his own part of the work ahead as rapidly as possible, and neither knows exactly how the other's work stands. This necessarily causes interference and delays, which would be avoided if one man had charge of the entire work. The inspection is usually, I think, the most unsatisfactory part of the engineer's services; at the same time, it is a very important part, and for that reason should, if possible, be put upon a better basis.

First of all, it seems to me important that the clerk-of-the-works should have general charge of all of the contractors and of all parts of the work. He should be as well acquainted with the engineer's plans as with the architect's, should see that the work is carried forward in such sequence and at such times that one contractor will not interfere with or delay another unnecessarily, should see that the contractors have a sufficient amount of material and number of men on hand so as not to cause delay, and should keep a general oversight of the work and report to the architect and to the engineer if he finds that any changes in details are necessary, or if he notices any points in which the plans and specifications are not being properly carried out. In other words, he should be the engineer's representative at the building as well as the architect's.

Under this arrangement, the superintendence of the engineer will be similar to that of the architect; that is, he will simply be required to inspect the work sufficiently to assure himself that the requirements of the plans and specifications are being properly carried out and to give directions regarding any changes in detail which may be found necessary during the progress of the work.

I believe that general experience has shown that this method of managing the work is far more satisfactory for all parties concerned than the more common method of leaving a part of the work entirely in the hands of the engineer.

On smaller work, where a clerk-of-the-works is not employed, there are two methods in which the engineer's inspection may be taken up: *first*, he may take entire charge of the installation of the work which he has designed, giving personally all necessary directions to the men at work at the building; or, *second*, the general direction of all parts of the work may be left to the architect, and the engineer may visit the work from time to time and report to the architect on any part which is not being properly installed.

Either of these methods should give satisfactory results and the one to be adopted in a particular case would depend largely upon the local conditions and the personal wishes of the architect.

In what I have said so far I have assumed that all parts of the mechanical equipment of a building are to be placed in the hands of an engineer, and that a single engineer or engineering firm will take charge of the entire work. As a matter-of-fact, there are at present only a few engineers who are prepared to do this, and it is the general custom to have different engineers for different parts of the work.

This greatly complicates the situation, for it becomes necessary for the architect not only to see that the plans of each engineer conform to his own but also to see that theirs do not conflict with each other.

Moreover, the actual amount of work to be done is considerably increased, since each engineer must be familiar with the plans of each of the others, as well as with those of the architect, and it is practically impossible to avoid conflicting orders and changes while the work is being installed. This leads in many cases to the employment of only one or, at most, two engineers, who take charge of the more important parts of the equipment, and the less important parts are left entirely to the architect.

It is interesting in this connection to compare the parts of the work which are considered the most important, in different buildings, and which are, therefore, placed in the engineer's hands.

In one it is the plumbing and the heating and ventilating, in another the heating and ventilating and the lighting, in another the lighting alone, in another the machinery, but not the wiring or piping, and so on. In one building it is one part, in another a different part.

There seems to be a general misunderstanding among owners and, in some cases, among architects, as to what constitutes the real value of the engineer's services. In all too many cases his work is considered well done if a plant is installed without giving trouble and which accomplishes the desired results in the matter of lighting, heating, power, etc.

These results must, of course, be accomplished in any case, but the true value of the engineer lies in accomplishing the results in such a way that the annual operating expenses and the fixed charges on the building-equipment will be a minimum.

The importance of this is in many cases not realized and the plant is designed without giving the matter any serious consideration. As a matter-of-fact, the yearly operating-expenses and fixed charges on the mechanical equipment of a modern building are likely to be from twenty to forty per cent of the cost of installing the plant, and in a large building or group of buildings will be anywhere from $20,000 to $100,000, or even more, per year.

A poorly-designed plant may give results which are apparently satisfactory, but these results will be obtained at a needless expense to the owner of, perhaps, thousands of dollars per year.

I have had occasion myself within the last few weeks to examine two plants where this was actually the case. In one the extra cost

caused by mistaken design amounted to about fifteen hundred dollars per year and in the other to about three thousand dollars per year, and in both cases the loss could easily have been avoided without increasing the first cost of the plant.

The best results in general operation and in economy can, however, never be obtained by having each of the different parts of the equipment well designed. The electric-lighting plant and the heating plant may each be a model of economy and satisfactory operation when considered by itself, but they may at the same time be entirely unsuited to each other and uneconomical when operated together.

The different parts of the building-equipment are so mutually related that one cannot be properly decided on without considering all of the others. The same steam that drives the lighting-plant and the elevator-pumps should be used to heat the building and to heat water for the plumbing-system; the number of lights and the hours which they are burned must be considered in deciding whether it is best to use motors or engines to drive the ventilating-fans. The type of elevator which it will be most economical to use depends partly upon the size and load of the electric-lighting plant and on the amount of steam which will be required for heating the building. The type of engine to be used will be influenced by the requirements of the heating-system and the elevator-service. The type and size of boilers required will depend on the type and requirements of the lighting-power, and heating apparatus.

In fact the different parts of the equipment are so interconnected that it is impossible to properly design one without considering all of the others. The plumbing is the only possible exception to this; but even here the hot-water system is directly connected with the heating-plant, the plumbing-fixtures are often made a part of the ventilating-system, and a great many interferences and difficulties are avoided by having the plumbing piping designed in connection with the other systems of pipes and wires throughout the building.

The plan, therefore, which I have recommended — of having a single engineer or engineering firm take charge of the entire equipment — is the ideal method of looking after the work, and is the one which will undoubtedly be finally adopted.

There is one branch of engineering service in connection with building-work which is entirely outside of those already mentioned, but which should, in a certain sense, be considered with them. This is the employment of experts to calculate and design the steel-work and especially the steel frames of large buildings.

Up to the middle of the present century the principal building-materials were brick, stone and wood. There had been very few reliable and accurate tests made to determine the strength of these materials, and such tests as there were showed a wide range of results, with different samples and under different conditions. The architect and builder had, therefore, to allow a very large margin for safety in every case, and the amount and size of materials to be used were determined more often by precedent than by calculation.

When scientific study and invention developed the steel and iron industry it practically placed a new material in the architect's hands — a material, moreover, which was uniform in character, and which could be relied upon to have almost exactly the same strength at all times and under all conditions. As soon as this was generally realized, and the strength had been learned by careful experiments, the architects began to figure their work more exactly, and to put up higher and higher buildings, in which the load was carried largely, if not entirely, by the steel frame.

The problem of properly designing this frame so as to obtain the required strength with a minimum quantity of material is a difficult one, and there is a considerable difference of opinion as to whether its solution is a legitimate part of the architect's work or not.

I have myself talked the matter over with a number of architects without coming to any very definite conclusion and find that opinion seems to be about evenly divided.

On one side it is claimed that architecture includes and has always included a knowledge of all methods of construction and of the principles of applied mechanics. The architect has always been expected to be well informed on the strength of materials, in order that he might design his building properly for the load which it was to carry.

There is therefore no reason why he should not to-day be expected to be thoroughly familiar with all forms of steel construction and be able to properly design and calculate the work.

This is generally admitted by those who take the opposite view, but it is argued that an architect who designs only one steel frame in perhaps several years cannot possibly solve the problem as well as the engineer of a steel company or an expert who gives his whole time to this kind of work, and that the owner would in nearly all cases save money in the end if he were to pay a slight amount extra to have the frame designed by such an expert.

I shall not attempt to discuss the question in detail, because it is not strictly within the limit of the subject which I am considering to-night. I have mentioned it because the two matters are very closely connected and in the hope that some new ideas and opinions may be brought in the discussion which is to follow.

I have now considered in a general way the relation of the architect and engineer to each other and to the building-equipment and shall take up next the question of commission: first, the amount which the engineer should receive for his services and, second, the amount which the architect should receive on the building-equipment and the manner in which both should be paid.

The first question can, I think, be easily answered. The work which the engineer is required to perform in relation to the building-equipment is almost exactly the same as that which is expected of the architect in relation to the building itself. He should, therefore, make his change on the same basis as the architect and should adopt the Schedule of Minimum Charges which has been prepared by the American Institute; that is, he should receive not less than five per cent on work costing over ten thousand dollars and should receive a reasonable amount in excess of this on work of less than ten thousand dollars' value and upon alterations of old work.

This seems to be clear and beyond dispute in any way and we can therefore turn to the second question, or the amount which the architect should receive on the building-equipment and the manner in which he and the engineer should be paid. I have already shown that there are many reasons why the engineer should be engaged by the architect and should be responsible to him in all of the work. It therefore follows naturally that he should in all cases be paid by the architect either out of the architect's own commission or out of an additional commission which the architect should receive from the owner. Now, if the architect receives only five per cent on the building-equipment, he must pay all of this to the engineer, or, if the equipment costs less than ten thousand dollars, he must actually pay more to the engineer than he receives himself. At the same time, he is held responsible by the owner for the selection of a competent engineer and, in a general way, for the work which the engineer designs; he must furnish the engineer with all necessary information with reference to the details of the building and its requirements, must study the engineer's plans and assure himself that the equipment conforms properly to the building as a whole, and, finally, must make a very large number of changes in the details of the building-construction to allow for the proper installation of the flues, pipes, wires and machinery.

These changes make very little difference in the final cost of the building and therefore do not increase the architect's commission, but they do very materially increase the work which he is required to do.

It is evidently absurd to expect the architect to engage an engineer under these conditions, and it is clear that he must either receive an additional amount to cover the cost of the engineer's services or he must give up the engineer entirely and look after the work in some different manner.

There is, I find, some difference of opinion as to the amount of commission which the architect should receive in addition to the cost of the engineer's services, but the majority of the architects with whom I have talked have agreed that the full five per cent is none too much for the work which he is required to do.

It is, of course, impossible to obtain any accurate estimate of the expenses to which the architect will be put in connection with the design and installation of the building-equipment. In cases where the entire responsibility and work are thrown on to the engineer the architect's expense is comparatively small, but it seems to me, that if the architect is to assume the general responsibility and charge of the work in the manner which I have outlined he will not make any unreasonable profit if he receives his full five per cent.

The charge of ten per cent on the cost of the building-equipment seems excessively large to the owner, and, in most cases, he objects to having an engineer employed under any such conditions. But let us consider for a moment what he has to pay if the engineer is not employed. Under these circumstances, the architect in most cases calls in one or more contractors, explains to them the details of the building and its uses, and gives them a general statement of the results which he wishes to accomplish in the matter of lighting, heating, ventilation, etc., and asks them to submit plans and estimates for doing the work.

The contractor draws the necessary plans and brief specifications, and hands in a proposal for doing the work in accordance with these.

In some cases each contractor draws up his own plans for doing the work and in others only one set of plans and specifications are prepared, and competitive figures are obtained on these.

The owner thinks that he has avoided the engineer's commission, but, as a matter of fact, he is paying for the engineering work as a part of the contract-price.

This fact is sometimes admitted, but it is claimed that the cost of having the plans drawn up in this way is very much less than it would be if they were prepared by an engineer — and, at first sight, this might appear to be the case.

The contractor's plans and specifications are usually not as complete as the engineer's, and he is not, of course, expected to make any inspection of the work during construction. The amount of work which he does is, therefore, less, and his charge should be decreased in proportion. On looking into the matter more carefully, however, the saving will be found to be largely imaginary. It is true that the contractor does less work than the engineer in planning the equipment for a building, but when this part of the work is placed in the contractor's hands it is very often duplicated by having several sets of plans drawn for the same building by different contractors. In this way a large amount of unnecessary work is performed which must be paid for by the owners of the buildings. The contractor must add to each proposal a percentage amount sufficient to cover the average cost of the engineering services. And I am informed by one of the leading steam-contractors of Boston that the actual outlay for engineering work in his office — the drawing of plans, specifications,

etc., — averages each year nearly five per cent on the total of his contract-work.

The increased office expenses have been so great in some cases that the contractors have entirely given up their engineering department, have refused to draw plans and specifications, and have in this way tried to obtain an advantage over their competitors by being able to underbid them and make the same net profits.

It is clear, therefore, that the owner is deceiving himself when he attempts to save expense by refusing to have an engineer employed, because, whichever way the work is done, he must pay practically the same amount for the design of the building-equipment. He must either pay five per cent to the architect and approximately five per cent to the contractor, or he must pay ten per cent to the architect: five for his own services and five for those of the engineer.

If there are, therefore, any advantages to either architect or owner in the employment of a consulting-engineer to design the building-equipment, these advantages should be considered purely on their own merits, and the question of expense should be practically eliminated from the discussion.

The architect, from his general knowledge of the building-work, is in nearly all cases in a better position than the owner to decide upon the advisability of employing a consulting-engineer; the matter should, therefore, if possible, be placed in such a light that the employment of the engineer will be left to the architect's discretion.

The individual architect can do very little to improve the present condition of affairs. It is a rather delicate matter for him to go to his client and advise that an engineer be employed to design the entire building-equipment and state that an additional commission should be paid to cover the cost of the engineer's services.

The client does not understand the situation. He thinks that he has already agreed to pay the architect a commission for doing this very work, and in most cases concludes either that the architect is incompetent, or that he is trying to shirk a duty which legitimately belongs to him. He therefore tells him that if he needs any assistance on any part of the work he must obtain it and must pay the cost out of his own commission, or he may tell him that he will engage an engineer, and that as the architect does not consider himself competent to design the equipment he will, of course, not expect to receive any commission on this part of the work.

This is the position of the individual architect, but the situation would be entirely changed if the matter were taken up in a broader and more general manner.

The architects of the country might, I think, issue a statement, through the American Institute, which would have authority, and which would, in a general way, define the more important relations of owners, architects and engineers, and it is this which I have to suggest to you to-night.

If this is carried out, the architect can then refer his client to the publication of the American Institute, and, in all cases where he considers it advisable, can recommend the employment of an engineer without giving a false impression as to his own ability.

I have talked with many architects with reference to the matter, and have found them very strongly in favor of taking some action of this kind. I have also talked with them in relation to the form of statement which they advise, and submit the following for your consideration and discussion: —

First. — Change the Schedule of Minimum Charges by striking out the first paragraph, which reads —

"For full professional services (including supervision) five per cent on the cost of the work," and substituting for it the following: —

For full professional services (including supervision) when no additional expert services are required, five per cent on the cost of the work.

For full professional services (including supervision) when experts or engineers are employed by the architect to design and supervise the installation of certain parts of the work, five per cent on the total cost of the work, and an additional charge to cover the cost of the engineer's services.

Second. — Add a statement to those describing the professional practice of architects, the statement to be headed "Experts and Engineers," and to read as follows: —

"A clause has recently been added to the Schedule of Minimum Charges with reference to the employment of specialists to design certain parts of the work. The electrical, sanitary and mechanical equipment of a large modern building is so complex that it is practically impossible for the architect to acquire the special technical knowledge and experience to draw properly the detail plans and specifications. The custom is, therefore, increasing of placing this part of the work in the hands of experts, and it was felt that some uniform method of doing this should be decided on."

The engineer should be looked upon as the architect's assistant, and should, therefore, be employed by him rather than by the owner of the building. The work of the architect in designing the building is very much increased by the installation of the building-equipment; he must in a general way be responsible for the work of the engineer, must see that it conforms to the requirements of the building itself, and must make many changes in details to allow for the installation of pipes, flues, wires and machinery. He should, therefore, receive his full commission on the work which is designed by the engineer and should receive an additional amount to cover the cost of the engineer's services.

This additional charge does not materially increase the first cost of the work to the owner, for, if the engineer is not employed, the details, and often the entire work, must be designed by the contractor, and the contract-price must necessarily be increased to cover this. The employment of the engineer should, therefore, be left to the discretion of the architect.

This statement and the changes in the Schedule of Charges cover the most important points which I have mentioned to-night. They will not solve all of the difficulties which are likely to arise in the mutual relations of architects and engineers, but they will place the matter in a clearer light before the public, and will be of material help to both the architect and the engineer.

I trust, therefore, that the matter will be fully discussed, and that such action will be taken as may seem to you most desirable.

SOCIETIES

THE ARCHITECTURAL LEAGUE OF NEW YORK.

THE Architectural League of New York held its second regular monthly meeting of the season on Tuesday evening, November 1st, at the League rooms, Mr. Bruce Price, President, in the chair.

This was one of a number of subscription dinners to be held during the winter, and was participated in by members of the American Society of Civil Engineers and the Engineers' Club.

The embellishing of the water-fronts of New York and their use as places of recreation was the topic discussed. A number of schemes for structures to be erected over the docks and marginal streets for use as pleasure-grounds were both favored and opposed with much earnestness.

Mr. G. S. Morrison, the distinguished bridge-engineer, opposed any attempt to evolve a general scheme for improving the docks and their approaches, contending that our Anglo-Saxon character forbade any such overwhelming meeting of problems for the solution of which there is now no crying need.

Mr. G. S. Greene, Jr., ex-Chief Engineer of City Docks, told of the great improvements of our system of docks made during the last three decades and seemed to feel that the question of embellishment should be approached only after careful consideration of the growing requirements of our import trade.

Major Hollis Wells, First Engineer, U. S. Volunteers, deplored the unsightly appearance of our docks, but confessed the difficulty of undertaking to beautify them.

Prof. Wm. H. Burr, of Columbia University, who was consulted by the City when the Harlem River Speedway was in course of construction, described that important work. Professor Burr anticipates that much will be done to develop the already beautiful water-front of the upper part of Manhattan Island.

Captain Taylor, of the U. S. S. "*Indiana*," received a warm greeting when he rose to tell of the views of "a plain seafaring man" upon the subject of the evening.

Messrs. Julius Harder, E. B. Tilton, F. Wellington Ruckstuhl, H. K. Bush-Brown, and Alex. Rice McKim, all of whom are members of the League, were among the speakers. Mr. McKim criticised the present system of sewers, which empty into the rivers both east and west of the City, and described a system by which all the waste could be carried out to sea.

The whole question being one of such magnitude, in the short space of one evening, even with the assistance of the learned guests present, little more than a general survey of it was attempted; but the great possibilities of the future of our interesting water-front were brought to light and the inevitable union of the engineer and the architect in the great problems involved was happily brought to light.

THE WASHINGTON ARCHITECTURAL CLUB.

THE Washington Architectural Club held its regular meeting Saturday night, October 29, 1898, in its rooms at the old Octagon House and was entertained by a lecture by Mr. Early on Modelling in Clay. We also had on exhibition sketches by Wilson Eyre, which proved to be a most interesting feature of the evening.

A. B. HEATON, *Secretary.*

SOCIETY OF BEAUX-ARTS ARCHITECTS.

AN exhibition of the drawings submitted in the recent competition of the Society will be held in the room of the Architectural League, Fine-Arts Building, 215 West 57th Street, New York City, from Monday, November 14th to Saturday, November 19th, both inclusive, with the exception of Tuesday evening, when the drawings will be judged.

Members of the Society, students, and all others interested are specially requested to visit the exhibition, and examine the drawings. Admission free.

Committee on Education: Edward L. Tilton, Walter Cook, Edward P. Casey, Thomas Hastings, Thornton F. Turner.

EDGAR A. JOSSELYN, *Secretary.*

PHILADELPHIA T-SQUARE CLUB.

A REGULAR meeting of the T-Square Club was held on Wednesday evening, November 2d, at which the subject for competition was "The Porte-cochère of a Theatre." First Mention was awarded to Alfred M. Githens; Second Mention to Wetherill P. Trout and Third Mention to Oscar M. Hokanson.

GEO. B. PAGE, *Secretary pro tem.*

ILLUSTRATIONS.

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

DOORWAY, FAYERWEATHER HALL: COLUMBIA UNIVERSITY, NEW YORK, N. Y. MESSRS. MCKIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.

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

COMPETITIVE DESIGN FOR "SHATTUCK PRIZE" FOR ARTISANS' HOMES. [OPEN COMPETITION.] B. F. WILLIS, ARCHITECT, YORK, PA.

DESCRIPTION.

TWELVE-INCH brick front, rear and party walls. Eight-inch brick party-walls between front and rear porches and balconies. "Steel and concrete" construction for all floors, partitions and roofs.

Roof concreting prepared for nailing slates directly into it.

Roof slates, unfading green, 7″ x 14″.

Foundation-stone quarried near by. All foundations laid in cement-mortar.

Bricks made on site from clay out of foundations. May be second or third rate as to shapes and sizes.

Common hard brick of all outside walls to receive a thin coat of German buff cement.

All outer brick walls furred on inner side with 1 inch thick, 2½ inches wide white-pine to receive some form of expanded metal or wire-lathing.

All metal and concrete interior partitions 2 inches thick.

All floors to be concrete, floated finish, without wood of any kind.

All interior cement-work to be sand-floated to receive flatted coats of oil and white-lead.

All rooms to have short strong hooks attached to bottom edge of baseboard to receive eyelets that will allow tight stretching of carpet.

Porches and balconies to receive finishing-coat of asphalt. Corner houses to have asphalt deck-roofs.

Interior wood-finish, selected black cypress, finished with a first coat of alcohol white shellac, and two finishing-coats best rubbing-varnish for this class of work, rubbed to a lustreless flat finish.

Central heating-plant constructed of brick, "steel and concrete" finished as for houses, and comprising steam-heating, electric-lighting, cooking, gas and storage-battery plants, artesian well-water supply and air-pressure tank.

General caretaker will keep all hedges trimmed. Front yards and interior park will be under his care. During the season when assistant engineer and firemen have more or less leisure, they will assist the general caretaker in his work.

Interior park gardens to each house will be under direct control of tenants.

The park proper will be for the use of all tenants, and especially the children, under proper and reasonable restrictions.

In season the park walks will be lined with comfortable, capacious seats.

Underground trolley without expense to owner. All wires and piping from central plant to be placed in underground ducts at owner's expense.

NOTE. — The "Cost to Owner" following includes, in addition to houses proper, the following items: sewer connection with main line of street-pipe; asphalt sidewalk, paths, etc.; and all hedge fencing.

ESTIMATE OF COST TO OWNER. — CORNER HOUSES.

907 square feet at $3.23 per square foot, and 32,652 cubic foot at 11½ cents per cubic foot	$3,836

MIDDLE HOUSES.

794 square feet at $3.96 per square foot, and 27,790 cubic feet at 11½ cents per cubic foot	$3,149
Middle-house item as above	$3,149
Fifty-two houses as drawn	163,748
Eight corner houses, additional	5,496
Four acres of ground	26,000
Steam-heating, electric-lighting, cooking-gas, storage-battery plant, artesian water-supply and air-pressure tank	10,000
Total owner's investment	$205,244

TENANTS' EXPENSE.

Taxes, repairs and incidentals	$2,052
Interest on owner's investment at 5 per cent	10,260
Salary, expert engineer, per year	1,500
" assistant engineer, per year	900
" two firemen, per year	1,560
" general caretaker, gardener, rent-collector, etc	900
Coal-supply for heat and light plant, etc. — soft coal with smoke-consuming device	3,000
Fifty-two yearly car-fares	1,560
Total	$21,732

RENTALS.

Corner house, $40.54 per month, per year	$486.55
Middle house, $33.83 per month, per year	405.96
Expert machinist's salary	$1,200
Ordinary machinist's salary	1,000

NOTE. — Central heating-plant, etc., and coal-supply for same, engineers, firemen, general caretaker and fifty-two annual fares make up an item in the above yearly expense to tenants of $224.57 and $187.15 respectively.

PLANS OF THE SAME.

ST. PAUL'S ROMAN CATHOLIC CATHEDRAL, PITTSBURGH, PA. MR. CHARLES BARTBERGER, ARCHITECT, PITTSBURGH, PA.

HOUSE FOR E. F. WILLIAMS, ESQ., ST. LOUIS, MO. MESSRS. BARNETT, HAYNES & BARNETT, ARCHITECTS, ST. LOUIS, MO.

[The following named illustrations may be found by reference to our advertising pages.]

ALL SAINTS' CHURCH: FROM THE SOUTHWEST, NEWCASTLE-UPON-TYNE, ENG. MR. DAVID STEPHENSON, ARCHITECT.

THIS plate is copied from *The Builder*.

A GROUP OF HALF-TIMBER HOUSES.

[Additional Illustrations in the International Edition.]

THE LIBRARY, HAVEMEYER HALL, SCHERMERHORN HALL AND BASEMENT OF UNIVERSITY HALL AND GYMNASIUM: COLUMBIA UNIVERSITY, NEW YORK, N. Y. MESSRS. MCKIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.

[Gelatine Print.]

ST. GEORGE'S CHURCH, STOCKPORT, ENG. MESSRS. AUSTIN & PALEY, ARCHITECTS.

THE STATE BALL-ROOM: THE HAGUE, HOLLAND.

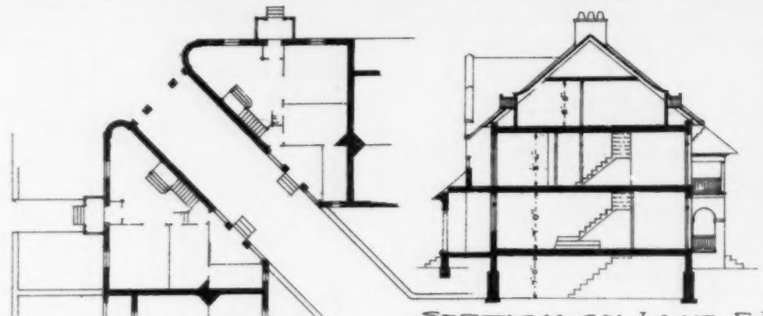
NOTES & CLIPPINGS

LONDON LANDMARKS PASSING. — One of the few remaining landmarks in Whitehall, London, passed out of existence the other day. This was Vanbrugh House, in Whitehall yard, which was built by Sir John Vanbrugh in 1696, and familiarly known as "The Pill Box," in consequence of its diminutive size. Prior to 1831 it was the residence of Lord Stuart de Rothesay, but in that year it was taken over by the then recently established United Service Institution, which, together with its famous museum of naval and military relics, was housed there until 1895, when the Queen granted the use of the historic banqueting house of the Palace of Whitehall. The old building, which stands on the site of the quarters allotted to the officers of the Jewel House, has now been demolished to make room for the erection of the new War Office on ground formerly occupied by Carrington House. — *Exchange.*

ARTISTS ARE LONG-LIVED. — Although Mr. Sidney Cooper has attained the great age of ninety-five, writes a correspondent of the London *Daily Telegraph*, he is still four years behind the old master, Titian, who lived till he was ninety-nine. Mr. Cooper is still hale and strong, and on July 23d last attended the Lord Mayor's banquet "in honor of Art" at the Mansion House, adding to his signature in the visitors' book the optimistic note, "aged ninety-four years." It is interesting to recall the fact that he and Mr. Watts exhibited in the Royal Academy of 1837 — the first year of the present reign. With regard to painters' ages, note should be taken that many of the old masters lived to an advanced age. For example, the following may be quoted: Michael Angelo, 89; Hals, 86; Hobbema, 81; Teniers, 80; Morales, 80; Greuze, 80; Ghirlandajo, 78; Snyders, 78; Tiepolo, 77; Mantegna, 75; Van der Heyden, 75; Vernet, 75; Van de Velde, 74; Poussin, 72; Mabuse, 71; De Keyser, 71; Matsys, 70; Wynants, 70; Dolce, 70. There are, of course, many others, and there can be no doubt that the generality of artists are a long-lived race.

A "CAMPO SANTO" FOR HUMBLE HEROES. — Mr. Watts's scheme for establishing in the Postman's Park a "Campo Santo" for humble heroes has now been definitely adopted by the Vicar and Church-wardens of St. Botolph's, Aldersgate, whose churchyard is the Postman's Park. They write to inform us that, as the result of their letter in our columns two years ago, and of similar appeals, they have now purchased one-half of the new ground for the proposed extension of the park, and are looking forward to securing the rest as soon as sufficient funds come in. The origin of the "Campo Santo" idea is traced by the Vicar back to the letter Mr. G. R. Watts, R. A., wrote in 1887. His suggestion to commemorate the Jubilee by such a scheme was widely approved, and actually resulted (as a correspondent reminded us recently) in the decoration of Red Cross Hall with pictures from designs by Mr. Walter Crane, in the "Ballad of Brave Deeds," by Canon Rawnsley, and Miss Laura Lane's "Everyday Heroes." Mr. Watts has now himself promised (write the Vicar and Church-wardens) to commence in our garden without further delay a covered way, in which memorial tablets may be affixed to the wall, recording the brave deeds of the miner, the fireman, the lifeboat-man, the policeman, the engine-driver, the laborer, and the domestic servant. — *The London News.*

S. J. PARKHILL & Co., Printers, Boston U. S. A.



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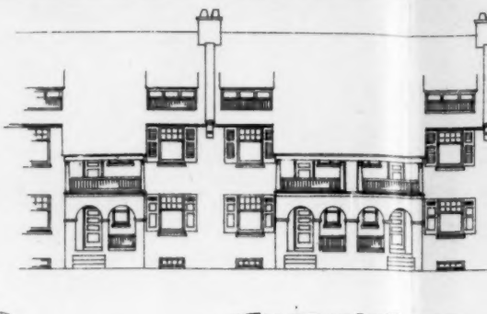
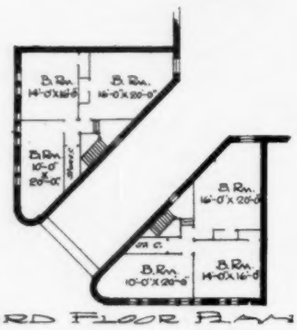
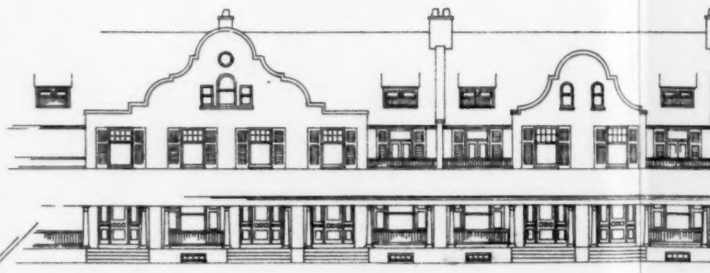


COURT YARD



THIRD FLOOR PLANS.

HEATING & LIGHT



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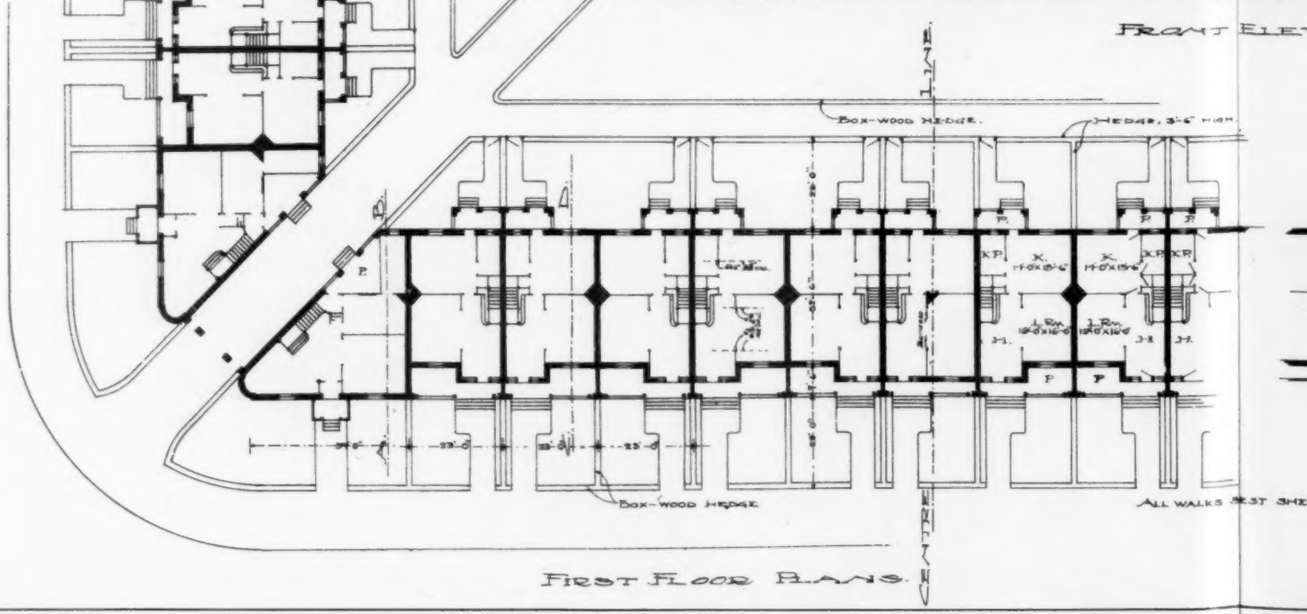
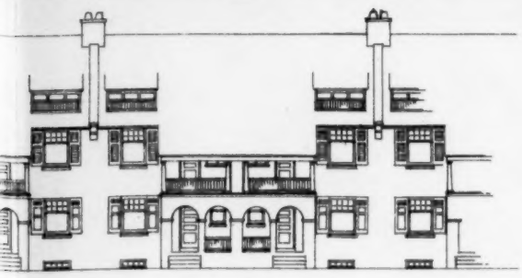


FIRST FLOOR PLANS.

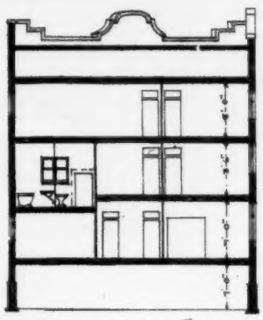
HELIOTYPE PRINTING CO., BOSTON

COMPETITIVE DESIGN FOR "SHATTUCK PRIZE" FOR AR

B. F. WILLIS, ARCHITECT



RD ELEVATIONS.



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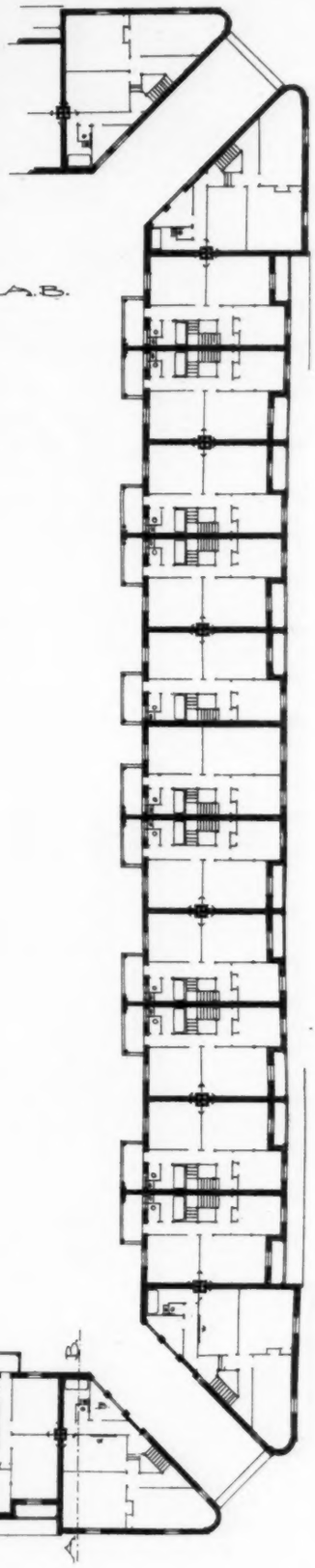
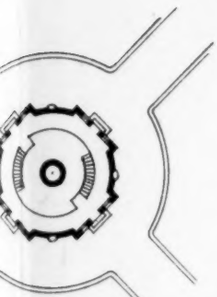
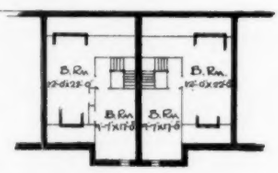


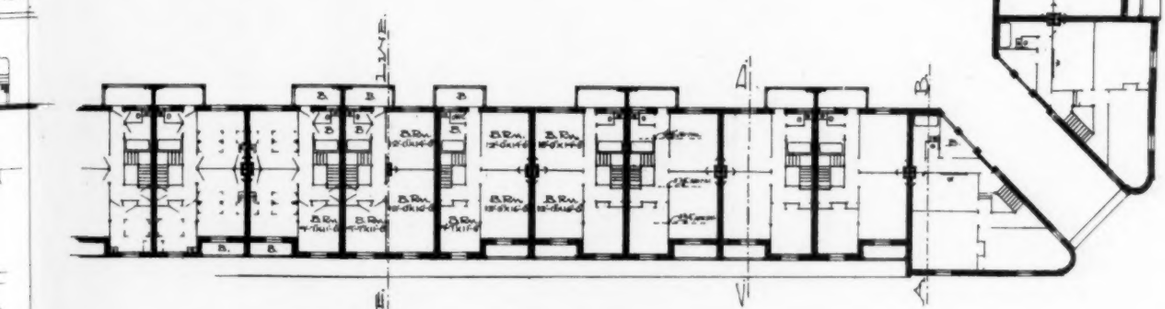


LIGHTING PLANT



ATTIC FLOOR PLANS.

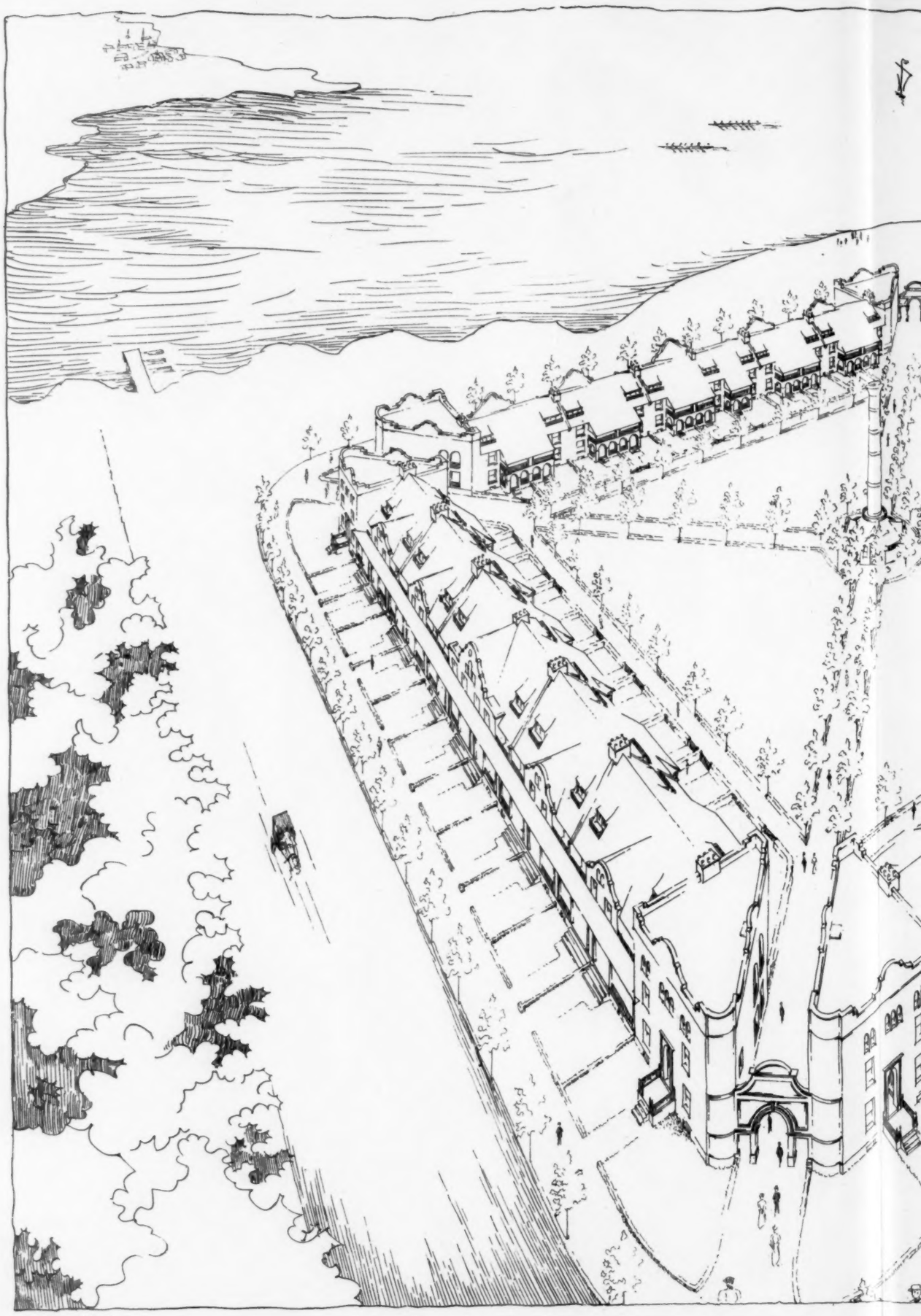
T ELEVATIONS.



SECOND FLOOR PLANS.

S 3R.ST SHEET ASPHALT CONSTRUCTION.

E" FOR ARTISANS' HOMES (OPEN COMPETITION).
IS, ARCHITECT.



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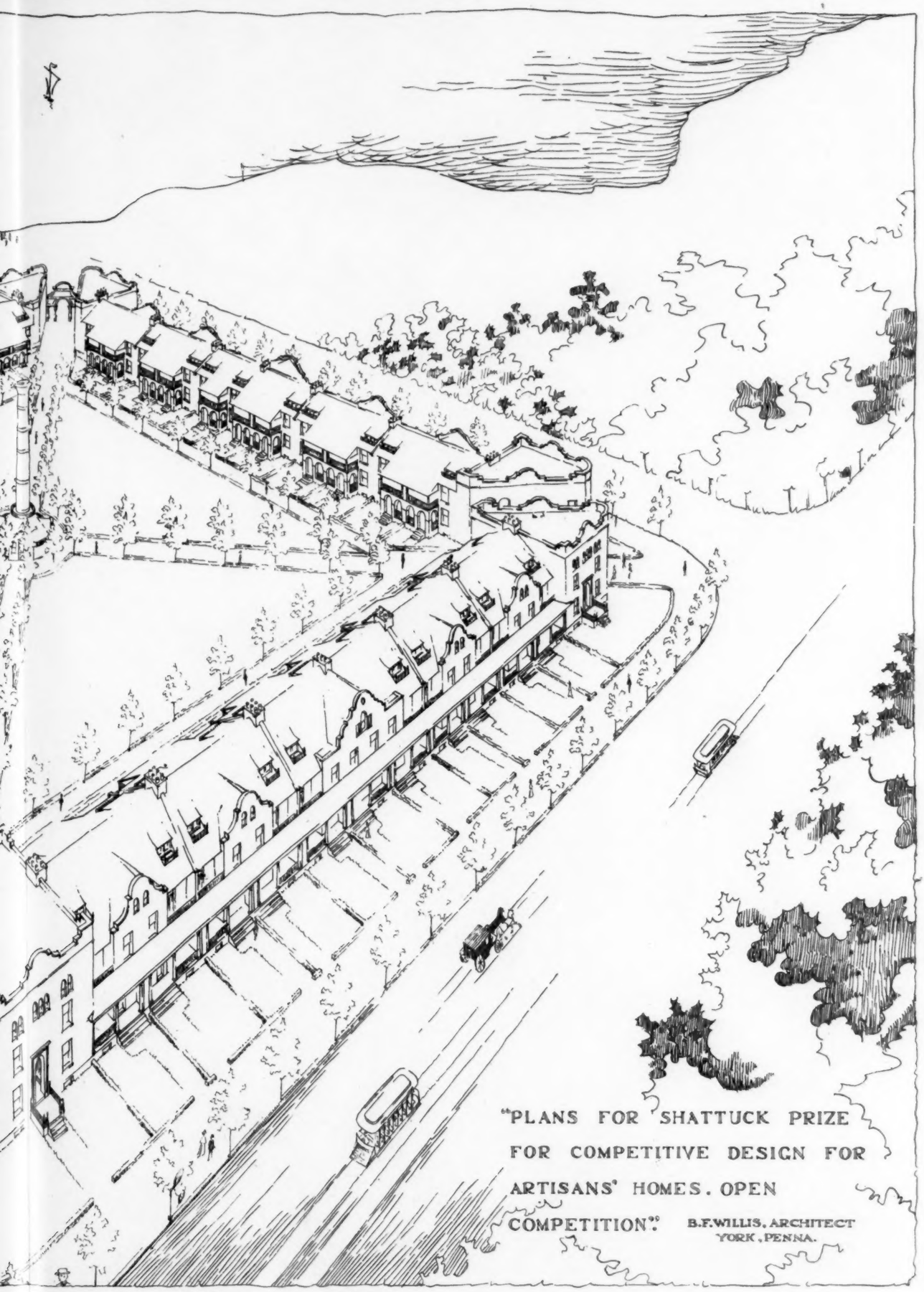
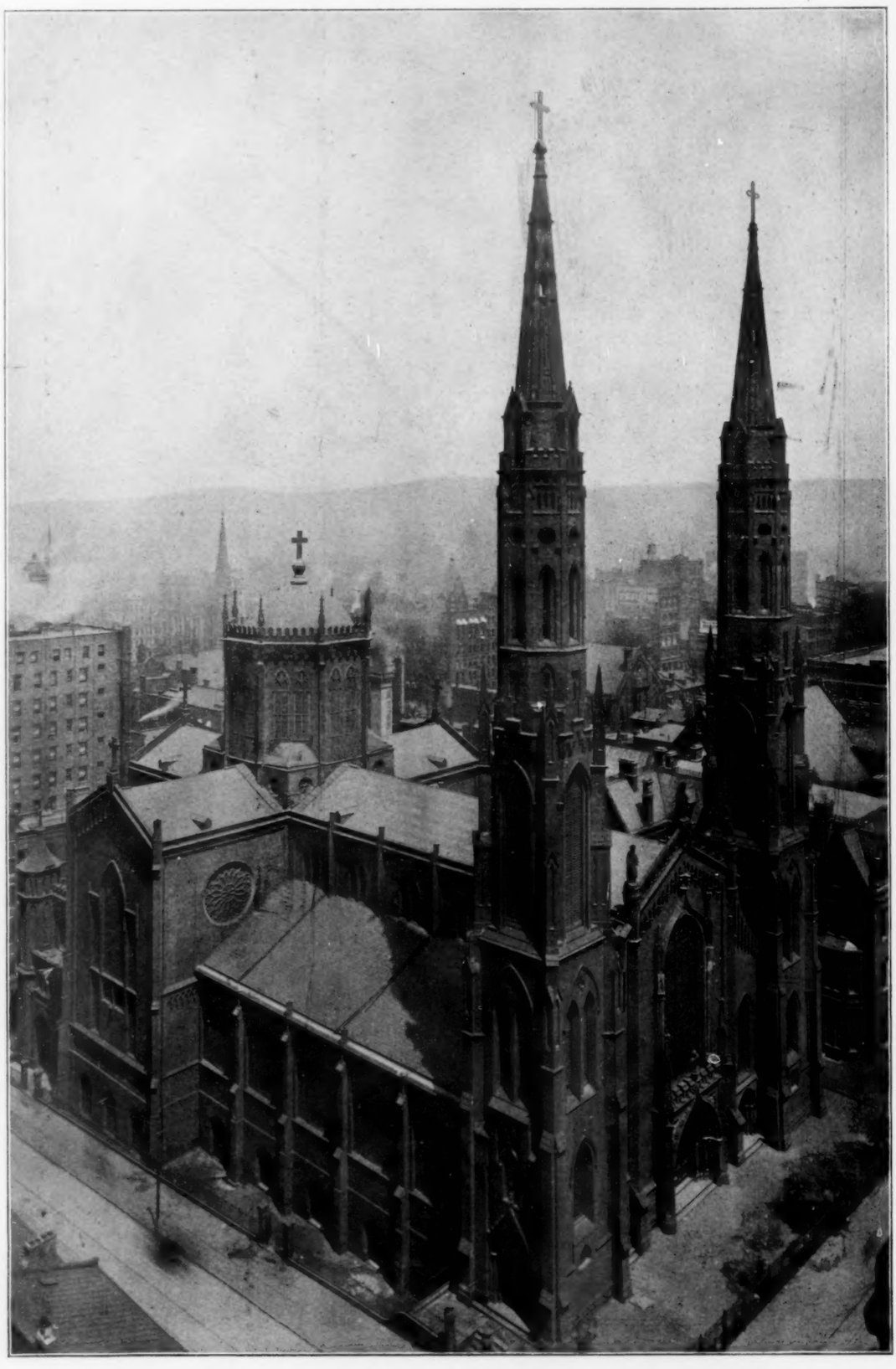


"PLANS FOR SHATTUCK PRIZE FOR COMPETITIVE DESIGN FOR ARTISANS' HOMES. OPEN COMPETITION." B.F. WILLIS, ARCHITECT YORK, PENNA.



St. Paul's Roman Catholic Cathedral, Pittsburgh, Pa. Built 1853-70.
CHARLES BARTBERGER, ARCHITECT.

House for Mr. E. F. Williams, St. Louis.

Barnett, Haynes & Barnett, Architects.