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CONTENTS.

IF those whom fate has placed in the ranks of the laboring classes could but realize how much better off American workmen are than their fellows in other countries, and if they could know how disinterestedly many minds are studying how further to improve their lot in life, it would seem that, in equity, there should be less labor disturbance in this country than there, unfortunately, is. Among the many who have turned their thoughts toward the lot of the laboring man was Dr. George C. Shattuck, of Boston, who bequeathed in trust to the Massachusetts Charitable Mechanic Association a certain fund, the income of which was to be used for the encouragement of architecture and particularly for the improvement of the homes of the artisan class. The income of this fund has been used in various ways hitherto, but this year the Association is to distribute it as prizes in two competitions which are to seek new solutions of that ever-recurrent and always-interesting conundrum: how to house in a suitable manner a certain number of the artisan class. In arranging these competitions — one a limited one for invited architects only, while the other is open to every one — it was felt that to base the programmes on such specific conditions as are known to exist would be to secure merely some slight improvements in regulation methods of planning and but little real advance would be made. If, on the other hand, a programme could be devised that would allow competitors to approach the matter very much as if it were a wholly new and unsolved problem, then, it was felt, it might be hoped that the solutions would be fresh and unhackneyed and a real step ahead might be made. For this reason the programmes have been drawn in such general terms as to seem almost too vague, but in reality their very vagueness is the most generous invitation to each competitor to consider the problem from a new standpoint and to bring to its study and solution whatever individuality and ingenuity have not yet been stifled in him by custom, precedent and rule-of-thumb habits of work. Although the announcement is to be found in our advertising columns, we will say that the programme of the competition may be had by addressing Mr. Henry D. Dupee, Mechanics' Building, Huntington Avenue, Boston.

DR. EDWARD EVERETT HALE, who has a lively sympathy for historical associations, urges the people of Boston to mark the most interesting sites in that city, while they can still be identified, by permanent tablets, or some other suitable means, for the benefit of coming generations, as well as our own. For example, the inhabitants of the Colony built, in the seventeenth century, a barricade, or palisade, along the water front, to keep off landing-parties of pirates or other enemies, and a fragment of this barricade is still to be seen, on T Wharf; and it would be easy to show, by a monument in Louisburg Square, the situation of the farm of William Blaxton, the first inhabitant of Boston, whose house was close by. Dr. Hale thinks that the place of most of the twenty houses which constituted, until 1630, the entire town of Boston, could be ascertained, and marked; and, considering the extreme interest with which strangers study the recognizable features of colonial Plymouth, it is reasonable to suppose that a systematic marking of the similar features of Boston, including, if we may be permitted a suggestion, Weymouth, Quincy, Hanover, Pembroke, and the most notable points on the old Queen Anne turnpike between Boston and Plymouth, would be of great value to the public.

THE public does not, however, spend all its time in studying colonial antiquities, and we would like to amend Dr. Hale's suggestion by proposing that modern points, as well as ancient ones, should receive proper marking in Boston, where street signs are, in the older and more tangled parts of the city, almost unknown; so that a person in search of a particular street at the North End may often walk through the whole length of it without discovering any mark whatever to show him what street he is on. As Boston is now a large and important city, and is supposed to be anxious to secure trade in competition with New York and Philadelphia, it is singular that some one does not call attention to the fact that country merchants, in search of goods, prefer to look for them in towns where the streets are easy to find, and are marked on every corner, where the sidewalks are wide and smooth, and the roadways paved with asphalt, rather than to spend hours in elbowing their way along rough brick sidewalks, four feet wide, or, more probably, hopping, with feet sore from travelling, from stone to stone in the gutters of the ill-paved streets, hunting for addresses which cannot be found, through the lack of street signs, without the delay and annoyance of stopping the passers-by, and making inquiries, which are by no means always correctly answered. The people of Paris, who have practised for centuries, with much success, the art of attracting customers to their town, have an elaborate system of marking streets, very often, in the more frequented portions of the business quarter, adding to their corner sign-boards a map, in blue and white enamel, showing the corner, with portions of the neighboring streets, in such a way as to enable a visitor to find his way with great facility in any direction. The French know well that strangers dislike to appear ignorant of a city, and fear to attract the attention of thieves and confidence-men by asking questions in the streets; and as they are intelligent enough to provide for their convenience, they are rewarded accordingly.

THE Rotch Scholarship for 1898 has been awarded to Mr. L. C. Newhall, of Malden, Mass., a draughtsman in the office of Mr. Arthur H. Bowditch, of Boston. Mr. Newhall is the fifteenth holder of the Scholarship. Although this is the oldest of the great American travelling-scholarships in architecture, and its list of holders is, in consequence, the longest, the other foundations are beginning to show a tolerable array of names, and it will not be many years before a review of the work of the various prize-winners, and their influence on the art in America, will be of great interest and value. Of course, the holder of one of the great scholarships, after his return to this country, must usually spend years in assisting others, before he has an opportunity to impress his own individuality on his work; but the number of those who are free to design as they choose now increases rapidly every year. So far, perhaps the most notable building carried out by such men in Massachusetts is the Tremont Temple, in Boston, which was the work of two Rotch scholars, Messrs. Blackall & Newton, then associated as partners; and we think that the profession will agree that few buildings in this country are more interesting, or more full of thought. Without doubt, this will be followed by many others of similar character in all the States where travelling-scholarships have been founded, and we hope that it gives an indication of the thoughtful originality which the special training of travelling-scholars may be expected to develop in men of capacity. Already, the influence of the artistic education which so many Americans receive from the Paris School of Fine-Arts is very apparent in our architecture; and the distinction between the effect of that influence and the results of the more catholic studies of the travelling-scholars is likely to furnish the theme for one of the most interesting chapters in the future history of American art.

IN another column will be found the text of the Act governing the reorganization of the Art Commission for the City of Boston, which we print in full because in the past we have more than once been called on to furnish the text of the old Act to correspondents who were laboring to establish art commissions in their several cities. In a general way the powers of the new Commission are not different from those which the former Commission has exercised with signal success, a success so great that there seemed at first sight no good reason for making any change. But time and experience had proved that the method of securing the service of proper men was too much at the mercy of mere chance, and that *ex-officio* functionaries might be good, bad or indifferent according to circumstances; for, while the President of the Boston Society of Architects was likely always to be a properly influential member of the Commission, and the Presidents of the Trustees of the Museum of Fine-Arts and of the Public Library were more likely to be than not, the President of the Massachusetts Institute of Technology might at any time be one more versed in pedagogy or administration than in art, while the Mayor was certain to be, at times, merely an able politician. Under such a constitution there was no certainty that decisions worthy of respect could always be counted on, and it was felt that the members composing the Commission should be men whose individual opinions would command respect, and that the rulings should never be the record of the judgment of, perhaps, the one instructed member, the public being deluded into the belief that five good men had decided the point at issue.

THE first prize in the competition for models for a sun-dial, instituted by Mr. Thomas H. Kelly, of New York, and carried on under the auspices of the National Sculpture Society, has been awarded to Mr. Charles A. Lopez, of New York; the second prize to Mr. W. C. Maynard, of Brooklyn; a first mention to a design whose author is not known; a second mention to Mr. Hall Winters Morris, of New York; a third mention to Miss Janet Hall Scudder, of New York, and a fourth mention to Mr. J. M. Kimball, of Brooklyn. The competition was for a sun-dial, standing on a pedestal in open ground; and Mr. Kelly offered five hundred dollars as the first prize, and two hundred and fifty dollars as the second. Twenty-eight designs were submitted, among them being some from abroad.

SOME one, writing in the *Deutsche Bauzeitung* about shingles, says that in certain parts of Switzerland and the Tyrol they are very much used to protect brick buildings from dampness, the walls being covered on the outside with what we should call heavy strap furring, about two inches thick, secured to the brickwork with bolts or hooks, and then with boarding, to which the shingles are nailed. We have seen brick walls in the south of England covered for protection from the weather with slate nailed to the brickwork, but the idea of furring and shingling them on the outside is new to us. Perhaps it was suggested to the Tyrolese by the local insurance men. Speaking of shingles in general, the *Deutsche Bauzeitung's* correspondent says that those ordinarily used in the Tyrol for covering walls are two inches wide and five inches long, with rounded ends. They can be had larger, but the large ones are not at all to be recommended. The rounding of the ends is done with a knife held at an angle, so as to give a conical, instead of a cylindrical, cut. Presumably, the shingles are laid so that the axis of the imaginary cone points toward the interior of the house, and the bevel in this case would form a drip, which must conduce greatly to the preservation of the shingles; while the rounding of the ends of the shingles, which keeps the rain-water away from the joints, has long been known to add much to their durability. Most of the Tyrolese shingles are made of "white fir," and cost, in the standard size, about a dollar a thousand. Larch shingles are also made, and are considered to be of very superior quality, but the supply is limited, and the price high. When these small shingles are used, it is possible, as every traveller in Switzerland can testify, to give much variety and picturesqueness to window-casings and other details, and it is not unlikely that some enterprising shingle manufacturer might, in this country, turn an honest penny, and utilize some waste material, by putting on the market small shingles of the Swiss pattern, of course making his enterprise known to architects, who would, in many cases, welcome such an addition to their resources for country-house work.

AT last, the Metropolitan Railway of Paris is to be built; the plans have been agreed upon, and the first section is to be completed within two years, so as to be ready for the Exposition of 1900. This first section follows, in general, a line very familiar to tourists, beginning at the Porte de Vincennes, on the east, and running underground to the Lyons Railway-station, thence, still underground, to the Place de la Bastille, and by the Hôtel de Ville, the Châtelet Théâtre, the Palais Royal, Louvre and Tuileries, to the Place de la Concorde, and then, crossing the Place de la Concorde diagonally, under the Avenue des Champs-Elysées to the Place de l'Etoile with an extension to the Porte Dauphine, the principal entrance of the Bois de Boulogne. The second line, the construction of which will come later, forms a circuit, crossing the first line at the Place de l'Etoile and the Place de la Nation, and passing through the Parc Monceaux, Batignolles, Montmartre and Belleville, past Père Lachaise, to the Seine; then, crossing the river, close to the great warehouses of Bercy, through the districts of La Glacière and Grenelle, to the Seine again, crossing this at the present Passy foot-bridge, and passing under the Trocadéro to the Place de l'Etoile. Seven other lines are in contemplation, but it will probably be many years before they are carried out.

M. MOREL-LACORDAIRE, who is a clever writer, as well as an expert in matters of furniture, sends to *La Semaine des Constructeurs* an account of the "Misdeeds of an Antiquarian," which contains not only a warning for the public, but a useful lesson for architects in regard to the systematic investigation of suspicious accounts. M. Morel-Lacordaire was once called in by a Parisian notary, one of whose clients had been presented by a furniture repairer with a bill to the amount of three hundred thousand francs. The bill was sufficiently detailed to suit the most exacting customer, covering more than three hundred pages, with thirty lines on each page, and M. Morel-Lacordaire, with the notary's introduction, set about examining it. His new client was a young lady, of high rank and great fortune, but inexperienced in business, and, in consequence, protected to a certain extent by the French law, which permits expert revision of claims against such persons. The first step was to separate the items of charges for new furnishings. There were some slight indications of prices agreed upon beforehand for these articles, so that they could be checked off. Trimmings and materials for covering could also, by referring to the actual objects, be accounted for; but a balance remained of seventy thousand francs, charged for such items as putting up and taking down curtains, and beating carpets, rugs and cushions. The bill covered a period of ten years, so that the average charge per year for these items was seven thousand francs. In order to ascertain the time and reasonable cost of doing the work mentioned, M. Morel-Lacordaire counted the carpets and curtains, and hired men to remove, brush and beat, fold them and put them in the storeroom of the house, take them out, unfold, brush, and put them again in their places. All this was done by four men in about forty-eight days, at a cost of twenty-four hundred francs instead of seven thousand. The unfortunate young lady had settled the bill almost in full, by payments on account, and it appeared that she had given the upholsterer twenty-five thousand francs more than he had any claim to.

THE competition for the Legislative Palace of the City of Mexico has been decided by the award of the first prize, of fifteen thousand dollars, to Mr. Adamo Boari, an Italian architect, for some years resident in Chicago. The second prize is said to have been awarded to another Chicago architect, but his name is not yet announced. The building is to cost five million dollars, and the competition seems to have been carried on with commendable fairness.

THE twelfth-century tower of the Cathedral of Ravello has been condemned as unsafe, and Mr. C. C. Lacaita, of England, and Mrs. Sophia Caroline Reid, of Ravello, ask for the modest sum of fifteen hundred dollars toward making it secure. The local clergy have made a collection, and the Italian Government will assist, but Ravello is now a small, poor place, and unless the insufficient amount now available can be supplemented by outside subscriptions the tower must be taken down. Messrs. Brown Brothers, bankers, of New York and Boston, will receive and forward any subscriptions, however small.

RECENT EXPERIMENTS ON TRAP SIPHONAGE.

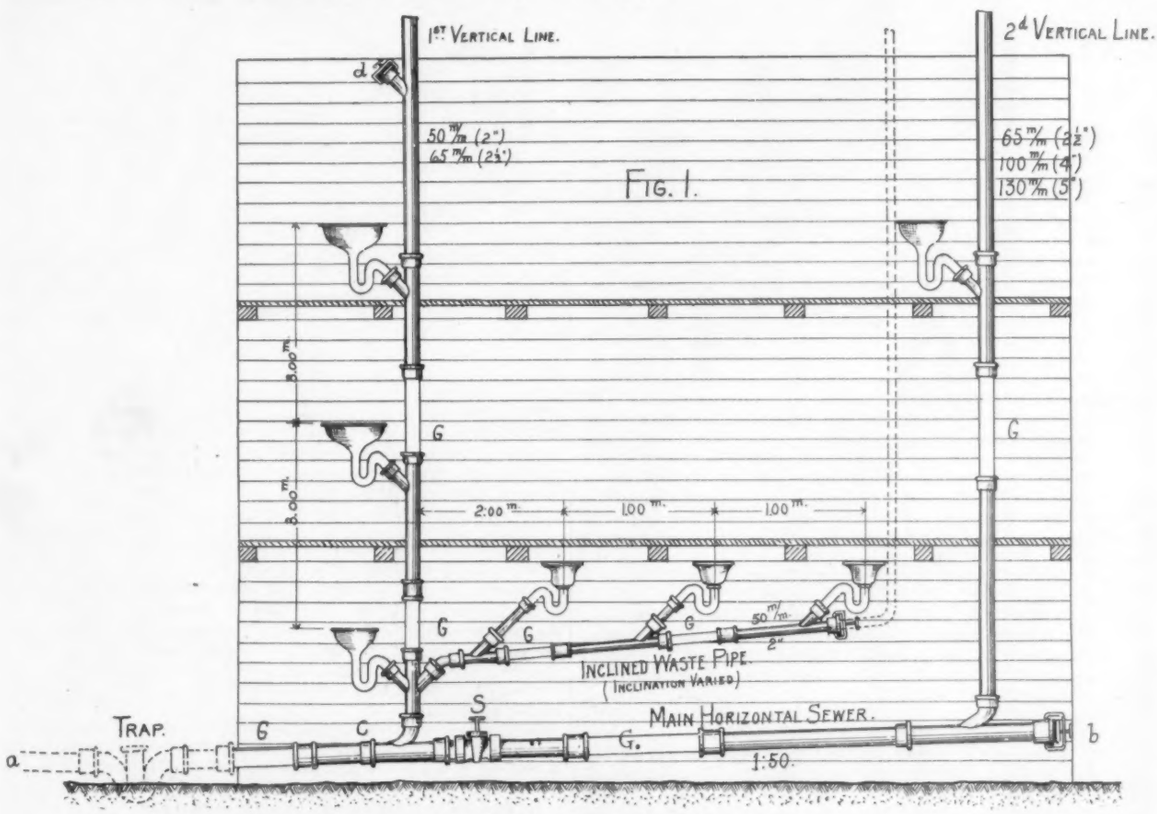
THE plumbing regulations of the City of Cologne, Germany, required until recently "back-air pipes" at the fixture traps for the purpose of aërating the branch wastes and preventing the loss of water-seal by siphonage. A committee, appointed to revise the rules, doubted the necessity or propriety of this rule. Referring to one of the leading principles of house-drainage, which requires the work to be carried out with as much simplicity as possible, members of the Committee pointed out the fact that "back-air pipes" tend to complicate the system and render it liable to leaks at the numerous additional pipe-joints required, a fact which is not surprising, when we learn that the rules in Cologne permitted the use of galvanized sheet-metal pipes for vent-pipes, with joints which were sometimes not even soldered. The Committee argued in favor of simplifying the plumbing because this would also reduce its cost. It is stated that a thorough examination of the places where the vent-pipes were attached to the traps disclosed the fact that the vents were *in nearly all cases* entirely closed and stopped up by grease, coffee-grounds or spider-webs.

While there were some who claimed that back-air pipes should be retained, but that the material should be of heavy lead or iron, others argued in favor of omitting trap vent-pipes because siphonage of traps would not in any case take place.

In order to settle this important question authoritatively, the Municipal Building Department determined to have a series of experiments made, which were carried out jointly by Herr Maniewski, architect of this Department, and Herr Unna, a sanitary engineer of Cologne. These experiments, which are described in detail by Herr Unna in No. 4 and 5 of the *Gesundheits Ingenieur* for 1898, also give incidentally some very interesting information on the flow of water and air in house-pipes. A board fence, about 10 metres (33 feet) high and 8 metres (26 feet) wide, was erected, and provided with three platforms representing three stories of a building, and each 3 metres (9.9 feet) distant from the next (see Fig. 1). The pipe system which served for the experiments was fastened to the board fence by means of pipe bands, and embraced a horizontal main sewer 5 inches in size, and two vertical pipe-lines which in different experiments were made of different diameter, viz. 2, 2½, 4 and 5 inches. A gate-valve S was placed immediately above the junction of the first vertical pipe with the sewer. The first vertical line, a waste-pipe of 2 inches diameter (changed to 2½ inches in some experiments) had three Y-branches, as shown, and was extended full size above the top of the fence. In the lowest story this pipe had also an inclined waste-pipe, with three Y-branches and fixtures, located at distances of 1 metre (3.3 feet) from each other. The main sewer was continued, as shown, to the second line, which was also extended upward in full size and was made 2½, 4 and 5 inches in diameter successively. The unshaded portions G of the vertical and horizontal lines indicate glass pipes, of the full size of these lines, which were inserted to make observations on the flow of water. The bowls and traps were likewise made of glass for the same purpose.

In order to take into consideration in the experiments all possible combinations of arrangement and dimensions occurring in actual practice, the following points were separately considered: —

1. The inside diameter of the horizontal sewer,
2. The inside diameter of the vertical pipe-lines,
3. The size of the connections to the bowls,
4. The depth of water-seal in the traps,
5. The size of strainers in the fixtures,
6. The distance of the fixtures from the vertical lines,
7. The inclination of the horizontal branches,
8. The influence due to enlargement, reduction and full closure of the upper ends of the vertical lines,
9. Modification of the results obtained by omission of the main trap,
10. The action and resistance of traps under fixtures connected with a vertical pipe-line, through which large quantities of water flow quickly and suddenly (corresponding to a leader pipe, or a bath waste-pipe),
11. Resistance of water-closet traps connected with a vertical soil-pipe.



As regards the observation of the flow of water and air by means of the sections of glass pipes inserted, it was seen that a solid column or piston of water was formed only in the case of inclined branch wastes, and when the top of the vertical lines was fully closed. In previous experiments, made by Herr Unna with glass models of small bore, the water poured through the bowls invariably formed into a piston and emptied the traps by siphonage.[1] With an open soil-pipe, water poured into a fixture dashed against the opposite side of the vertical pipe, and at once resolved itself into single threads which assumed a spiral motion along the walls of the soil-pipe (see Fig. 2). In proportion as the amount of water poured into the fixtures was increased the number of threads of water increased from the circumference toward the centre of the pipe, until the entire pipe was filled with threads of water. This breaking-up of a solid body of water serves also to explain the large volumes of air which were drawn in by the water, as each thread carries some air along with it. In order to gain some knowledge as to the amount of air sucked in, an anemometer was placed at the mouth of the vertical pipe, this instrument being made of the same diameter as the pipe and fitting into same tightly. It was found that one bucket of water poured out sucked in from 60-90 litres (2.1

[1] This shows conclusively the fallacy of making trap tests by means of small glass models. W. P. G.

–3.2 cubic feet) of air, according to the time consumed in pouring out the pail. When four pails were discharged in rapid succession nearly 500 litres (17¾ cubic feet) of air were sucked in.

When water was poured in at the top of the vertical soil-pipe it separated into vertical parallel threads. The measurements of air gave results which were about 50% smaller than in the case of the branch waste-pipe, showing, as might be expected, that there is a stronger suction in the case of smaller waste-pipe lines, and in the case of water poured in through lateral branches. When an increaser was placed on the top of the vertical line the results were not different from those with a pipe-line having a full-size extension upward. As soon as a reducing fitting was inserted, which reduced the area of the pipe-mouth 50%, the threads of the falling water became more concentrated, and the water in the adjoining traps became violently agitated and was often sucked out. When the top of the vertical line was closed by a plug the water did not break up into threads. In the larger vertical pipes the water flowed down along the sides of the pipe when it was poured out slowly through the fixture. If it was poured quickly the water formed a solid piston and caused the siphonage of the traps.

Fig. 2.

The water flowing through the main horizontal sewer did not show a level surface, but formed a concave surface (see Fig. 3), which is explained by the friction of water along the sides of the pipes, which causes here a slower velocity than in the centre of the pipe. In the smaller horizontal waste-pipe (2 inches diameter) the flow of water showed the same results, except that when large volumes of water were poured out a piston of water formed which created a strong suction. By extending the waste-pipe at its upper end vertically and keeping the pipe end open the same results were obtained as in the case of the vertical main line.

Inasmuch as the use of a main intercepting trap must necessarily modify the manner in which the flow of water and air in the pipe system takes place, experiments were made both without and with a trap in the main house-sewer.

If the clean-out in the drain-trap was omitted, and large volumes of water were poured through the soil-pipe, the water in the trap welled up considerably, and a strong outward current of air was perceptible, notwithstanding the fact that the first vertical waste-line was open to the roof and thereby acted as a relief-pipe. With the trap clean-out closed, the current of air became so strong as to force traps with 40 mm. (1¾ inches) depth of seal by back pressure. These experiments tend to show that the omission of the main trap favors a more regular flow of water through the pipe system.[1]

Another question which it was important to determine was, how the self-cleansing properties of traps were affected by an increase of the depth of the seal, which renders traps less liable to siphonage. It was argued that it would be undesirable to use in practice traps which, while resisting siphonage, would not be self-cleansing.

To determine the maximum depth of seal at which traps would still be self-cleansing, experiments were made with glass traps of different diameter and having different depths of seal. The traps were entirely filled with mud and sand, and the bowl filled with water until a head of 40 cm. (16 inches) had been reached. The effective area of the strainer was taken as equal to 50% of the area of the cross-section of the trap. The sand was flushed out by the water forcing its way first at the upper point of the lower trap bend (at *a* in Fig. 4). The results of these experiments are summarized as follows: Traps of 1¾ and 2 inches diameter are self-cleansing when they have a water-seal not exceeding 120 mm. or nearly 4¾ inches; and traps of 2½ inches diameter are self-cleansing with a seal up to 5 inches in depth. But Herr Unna very properly states that it should be taken into consideration that the traps used in the experiments were made of glass, which are smoother than lead, iron or brass traps, and he, therefore, considers a trap-seal of 4 inches as the limit for a self-cleansing trap.

Fig. 3.

Fig. 4.

Other experiments were made to determine how long a time it requires to unseal traps by evaporation of the water-seal. Four traps of glass, 1¾ and 2 inches diameter, with 2 and 4 inch seal respectively, were used in the experiments. These were carried on at an average temperature of the air of 20° C. (68° Fahr.), and all experiments agreed in showing that 10 mm. (⅜ inches) of water evaporated per week. A trap with a 4-inch seal would accordingly be rendered useless by evaporation in ten weeks. The evaporation was much retarded when a flannel cloth dipped in oil was placed over the strainer in the fixture, and amounted to 6 mm. (¼ inch) per week. In other words, a trap with a 4-inch seal would take sixteen weeks to evaporate. Nearly the same result was obtained by slowly pouring a wineglass of oil into the trap. The usual length of summer vacation, during which houses remain empty, Herr Unna states, does not, therefore, endanger the seal of traps. It is advisable, however, in houses to be left vacant for a long time, to remove the water from the traps and to substitute glycerine for same.

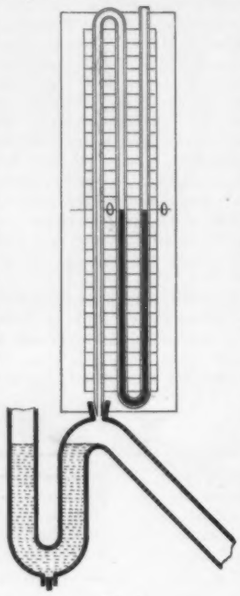


Fig. 5.

In making the experiments on trap siphonage, the vertical waste-line consisted at first of a 2-inch pipe, and afterwards of a 2½-inch pipe. The diameter of the traps and branch connections was made 1½ inches, 2 inches and 2½ inches. The 1¾-inch traps experimented on had 40, 60, 80 and 100 mm. trap-seal; the 2 and 2½ inch traps had a 60, 80, 100 and 120 mm. seal. At the highest point of its outer bend each trap had an opening, into which was inserted a 10-mm. glass tube, 30 cm. high (12 inches) and bent in the shape of the Figure S (see Fig. 5). A paper scale was attached to the glass tube and the tube was filled with water to the zero point on the scale.

Different sizes of strainers were used in the fixtures. The distance of the fixtures from the vertical pipe did not exceed 1 metre (3.3 feet).

The influence which a reduction, an enlargement or the entire closing-up of the upper opening of the pipe-line has was studied by means of reducer and increaser fittings and tight-fitting plugs.

The water was poured through each one of the fixtures on the three floors successively, and the action on the trap-seals of the others was watched. Experiments were also made with the two upper or the two lower fixtures, and also with all three fixtures at one time. The volume of water discharged was one pail of water containing 15 litres, or 3¾ gallons, and afterwards 2, 3 or more pails.

All experiments agreed in showing that there was no appreciable difference when the top of the vertical pipe-line was enlarged, and that a reduction always had an unfavorable effect. The rule requiring the full-size pipe extension is, therefore, practically confirmed by these tests, and it is also shown that an enlargement is desirable to counteract in winter time any possible reduction of the sectional area of the pipe-mouth by hoar-frost or icicles.

Herr Unna summarizes the results of experiments as follows: —

"Back-air" pipes for traps may be dispensed with under the following conditions: —

1. The cross-sectional area of the waste or soil pipe must be larger than that of the trap. For a 1¾-inch (40 mm.) trap the waste-pipe should be 2 inches (51 mm.), for a 2-inch trap it should be at least 2½ inches (60 mm.).

2. The traps must be set directly under the fixtures and must either connect directly with the Y-branch of the vertical waste or soil pipe, or if they are not more than 1 metre (3.3 feet) distant from the vertical ventilated pipe the horizontal branch waste must be increased one size.

3. The depth of water-seal in the traps must be 4 inches (100 mm.).

4. The combined area of the openings in the strainer of the fixture must not be larger than 50% of the cross-sectional area of the trap.

5. Each vertical line of soil or waste pipe must be carried the full size and with as few offsets as possible above the roof; it is better to enlarge the pipes, from a point 20 inches (50 cm.) below the roof, by 2 inches; the minimum size of roof vent-pipes to be 4 inches (100 mm.); no ventilating cap or return bend to be put on the top of the pipe; a wire basket may be used, the openings of which must be at least equal to the sectional area of the pipe (Fig. 6).

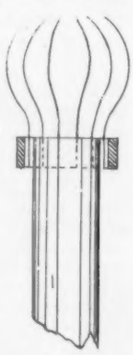


Fig. 6.

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The next experiments were made with a horizontal or graded waste-pipe, of 51 mm. diameter (2 inches), which connected with the vertical line, and had three fixtures connected by it by means of Y-branches (see Fig. 1). The fixture traps were made interchangeable and had 40, 60, 80 and 100 mm. water-seal. The distances of

[1] The new plumbing regulations of the City of Cologne prohibit the use of a trap on the main drain. W. P. G.

the three fixtures from the vertical line were 2, 3 and 4 metres (6.6, 9.9 and 13.2 feet). The three fixtures were either discharged simultaneously, or used singly, while the other two were closed, the latter experiments being made to determine the influence which the various distances from the vertical line had upon siphonage. Inasmuch as the inclination of the lateral branch must have some influence upon the action of the traps under test, the branch was given successively an inclination of 1 in 40, 1 in 20, 1 in 10, 1 in 5, 1 in 2 and 1 in 1. The result of these experiments is summarized by Herr Unna as follows: —

1. If the distance of a single fixture from a vertical ventilated line exceeds 1 metre (3.3 feet) the trap must be vented, unless the horizontal waste-pipe is made 10 mm., or about $\frac{1}{2}$ inch larger, and unless the trap fulfils requirements (3) and (4) above given.

2. A single fixture connected with the main horizontal sewer through a special vertical waste-line does not require a vent, but it should have a gate-valve in the waste-line or in the trap in order to shut off the fixture during prolonged disuse and to guard against evaporation.

3. When two or more fixtures discharge into a horizontal or inclined lateral waste, it is not necessary to "back air" the traps of each, provided conditions (3) and (4) as above stated are fulfilled, when the main lateral waste-pipe is a size larger than the fixture waste, but it is necessary to extend the uppermost end of the lateral waste upward through the roof. Such lateral wastes may be regarded as sub-mains, which of course always require ventilation. If all the conditions named cannot be fulfilled, the back-venting of traps is desirable to prevent siphonage.

Similar experiments were made with the second line ($2\frac{1}{2}$ and 4 inches in diameter, respectively), fixture traps being connected to same, and the action of the traps observed while larger volumes of water were poured through the vertical pipe-line. It was assumed that the vertical line represented a leader pipe, and that 100 square metres (or about 1,000 square feet) of roof-surface would be drained by a $2\frac{1}{2}$-inch leader, and 200 square metres (about 2,000 square feet) by a 4-inch leader. A rainfall of 10 mm. ($\frac{3}{5}$ inches) per hour yields 0.28 litres = (0.01 cubic feet) per second per 1,000 square feet, and double this quantity on 2,000 square feet. The water poured through the $2\frac{1}{2}$-inch pipe corresponded to $\frac{1}{2}$, 1 and 2 litres per second, or 18, 36 and 72 mm. rainfall per 1,000 square feet, and to 1, 2 and 4 litres per second through the 4-inch pipe, or the same amount of rainfall per 2,000 square feet.

In the experiment with a $2\frac{1}{2}$-inch vertical line a flow of water corresponding to $\frac{1}{2}$ litre per second did not affect the trap-seal; a flow of 1 litre per second siphoned the trap completely. The same happened of course with a flow at the rate of 2 litres per second.

The same volumes poured through the vertical 4-inch pipe reduced the seal of the trap when 1 litre flowed per second, and siphoned it out completely when 2 litres flowed in that time.

From this it follows that it is not permissible to connect fixtures with rain-water pipes. If they are so connected, the traps must have at least a 4-inch seal, and also require venting.

The second vertical line was then made first 4 inches in diameter, and subsequently 5 inches, and used to connect water-closet traps. Each branch was 4 inches, and the distance from the centre of water-closet to the soil-pipe was made 3.3 feet (1 metre). The water-closet traps had 1 and 2 inches of water-seal. The amount of flushing water poured through them was 15 litres, or nearly 4 gallons. The results deduced from the experiments were as follows: —

1. Water-closet traps with a trap-seal of 25 mm. (1 inch) always require vent-pipes, even where the soil-pipe is made 5 inches (130 mm.) in diameter.

2. Water-closet traps with a 2-inch water-seal require venting when the size of soil-pipe is equal to that of the trap. They must also be vented if they are more than 1 metre (3.3 feet) away from the soil-pipe, whether the latter is larger than the trap diameter or not.

Back-air pipes for water-closets can therefore be omitted only when the water-seal is 2 inches or more, when the closet is within 3.3 feet of the ventilated soil-pipe, and when the latter is at least 5 inches in diameter. If the soil-pipe is 4 inches, a back-air pipe is necessary. It should be stated in this connection that no experiments were made with siphon and siphon-jet water-closets having a seal of 3 or 4 inches, and the reason given for this omission is that the closets usually fitted in Cologne have a whirl flush, which could not keep a deep trap clean. Herr Unna admits the desirability of making further experiments with siphon-jet closets.

The experiments also showed that the reduction of the size of a 5-inch soil-pipe to 4 inches at the roof acted unfavorably. Furthermore, a single water-closet with 2-inch trap-seal may be connected directly with a 5-inch branch to the main sewer without running a 4 or 5 inch soil vent-pipe up to the roof, provided it is not at the upper end of the house-sewer, and also provided there is some vertical pipe-line connected with the same sewer which runs full size to the roof.

The deduction which Herr Unna makes from the entire series of experiments is that back-air pipes are necessary *only in exceptional cases* and under the following conditions, viz: —

(*a*) Where fixture traps have less than 4 inches of water-seal, and water-closet traps less than 2 inches.

(*b*) Where vertical waste or soil lines are of the same diameter as the diameter of the traps connected to them.

(*c*) Where fixtures are connected with inside rain-water leader pipes[1] not larger than 4 inches in diameter.

(*d*) Where fixtures are located more than 3.3 feet (1 metre) from the vertical soil or waste line.

(*e*) Where several fixtures are connected by an inclined lateral waste with the vertical line. In this case it is only necessary to extend the lateral waste at its upper end the full size through the roof.

If used, vertical back-air lines should not be less than 2 inches in diameter, and only heavy lead or galvanized pipe should be used for the branches, while the main lines may be cast-iron or galvanized wrought-iron. Joints in iron vent-pipes should be lead-calked or else screw-joints, and lead vent-pipes should have soldered joints. Vent-pipes must join the vertical line at a height above the overflow point of the fixture, and be either extended separately through the roof, or connected with the soil or waste line above the highest fixture.

. . . . . .

At the conclusion of his report, Herr Unna gives the results of some experiments made to determine the necessary size of waste-pipes for various rates of flow of water through supply-pipes and faucets. The water pressure used was about 50 pounds, and the results obtained were as follows: —

1. A 1-inch compression-cock supplies more water than a 2-inch waste-pipe, unobstructed by a strainer, is able to remove.

2. A $\frac{3}{4}$-inch compression-cock furnishes water at the rate of 26.4 United States gallons in 70 seconds, or $\frac{26.4}{70} \times 60 = 22.6$ gallons per minute, to remove which quantity a full 2-inch waste-pipe without strainer is required.

3. A $\frac{1}{2}$-inch compression-cock furnishes 15.6 gallons per minute, which stream is taken care of by a 2-inch waste-pipe covered by a strainer with 50 per cent effective area.

4. A $\frac{3}{8}$-inch compression-cock furnishes 5.28 gallons per minute, and a $1\frac{1}{2}$-inch waste-pipe (more correctly 40 mm.) with 40 per cent effective area of the strainer will remove the water without danger of the fixture overflowing.

Herr Unna therefore recommends for the water pressure existing in Cologne, the use of $\frac{1}{2}$-inch faucets for fixtures with 2-inch waste-pipes, and of $\frac{3}{8}$-inch faucets for fixtures with $1\frac{1}{2}$-inch waste.

WM. PAUL GERHARD.

RECENT DISCOVERIES OF BUDDHIST REMAINS IN INDIA.

MR. Vincent Smith, of the Bengal Civil Service, a learned antiquary, has published in the Allahabad *Pioneer* a statement as to the nature and significance of recent discoveries of Buddhist antiquities in India. The first of these is the home of Gautama Buddha, who lived about 500 B. C., and who is known to have been the son of the Raja of Kapilavastu, a small state in the Nepal Terai, bordering on the modern Oudh.

The site of Kapilavastu has long been eagerly sought for, and it is only within the past three years that the accidental discovery of an inscribed pillar erected by the Emperor Asoka, in the third century B. C., fixed with certainty the site of the city. The ruins, which were lately visited by Mr. Smith, are, so far as is yet known, all of brick; they are for the most part buried in jungle, and are so extensive that many years would be required for their exploration. The city was destroyed during the lifetime of Gautama, and when the first of the famous Chinese pilgrims visited the place, in 410 A. D., it was a mass of desolate ruins, and there is no indication that it has since been occupied. This fact gives exceptional interest to the excavations now in progress, for they are bringing to light buildings more ancient than any previously known in India.

More interesting even than Kapilavastu is the discovery of the Lumbini Garden, the traditional birthplace of Gautama. The sacred spot has been found marked by another of Asoka's pillars, on which the inscription is perfect. This is also in Nepalese territory, five miles from the British frontier. The pillar stands on the western edge of a mound of ruins, about a hundred yards in diameter, and on the south side of the mound is the tank in which the child's mother bathed after his birth. Another discovery which was made in a stupa, or brick tumulus, close to the British frontier, is that of relics of Buddha himself. These consist only of fragments of bone, which were deposited in a wooden vessel that stood on the bottom of a massive coffer, more than four feet long and two feet deep, cut out of a solid block of fine sandstone. This coffer was buried under eighteen feet of masonry, composed of huge bricks, each sixteen inches long. The wooden vessel was decayed, and with it was an exquisitely finished bowl of rock crystal, the largest yet discovered in India, and also five small vases of soapstone. All these vessels were partially filled, in honor of the relics, with a marvellous collection of gold stars, pearls, topazes, beryls, and other jewels, and of various objects delicately wrought in crystal, agate, and other substances. An inscription on the lid of one of the soapstone vases declares the relics to be those of Buddha himself, and the characters in which the inscription is written are substantially the same as those of the Asoka inscriptions, and indicate that the tumulus was constructed between 300 and 250 B. C.

[1] Many old dwelling-houses in New York City still have the soil-pipe used as leader-pipe, and in such cases the danger of siphonage is admitted to be greater, particularly when back-air pipes are omitted. W. P. G.

Buddha spent many years preaching and teaching in the city of Sravasti, and a large number of his sayings and parables purport to have been uttered there. The site of this famous city was long sought in vain; Mr. Smith now states with confidence that it is in the jungles of Nepal Terai, about eleven miles from the station of Nepalganj Road on the Bengal and Northwestern Railway. Its remains, like those of Kapilavastu, are buried in jungle; but they seem of great extent, and are found precisely where the Chinese pilgrims of the early centuries of the Christian era stated that Sravasti was. A full account of Mr. Smith's visit to the palace has been sent to the Royal Asiatic Society. Kusanagara, where the aged Gautama died, has not yet been found; but Mr. Smith suggests that it is not very far from the massive ruins of Simranu, north of the Champaran district of Nepal, and thinks it probable that a place called Dewdurpa, thirteen miles north of Simranu and fifty-four miles south of Kathmandu, will turn out to be Kusanagara. As for the great Asoka, who reigned over India in the first half of the third century B. C., and whose inscriptions on rocks and pillars are found scattered over India and on the coasts of the Arabian Sea and the Bay of Bengal, his capital was Pataliputra, the modern Patna and Bankipur. It was at one time thought that the city had been washed away by the Ganges; but the excavations made under the orders of the Bengal Government show this to be a mistake. The railway at Bankipur runs over the ancient city, which is in many places buried under an alluvial deposit fifteen to twenty feet in depth. — *London Times.*

THE BOSTON ART COMMISSION ACT.[1]

Be it enacted, etc., as follows:

Section 1. An art department is hereby established in the city of Boston, to be under the charge of a board of five art commissioners, all of whom shall be citizens of the city of Boston, to be appointed by the mayor of said city, without confirmation. Said mayor shall, in the year eighteen hundred and ninety-eight, appoint one member of said board to serve for the term of five years, one for the term of four years, one for the term of three years, one for the term of two years, and one for the term of one year, each term beginning with the first day of May in said year; and thereafter said mayor shall, on or before the first day of May of each year, appoint one member of said board to serve for the term of five years beginning with said day. The members of said board shall be appointed by the mayor as follows: one from a list of three persons selected by the trustees of the Museum of Fine Arts, one from a list of three persons selected by the trustees of the Boston Public Library, one from a list of three persons selected by the trustees of the Massachusetts Institute of Technology, one from a list of three persons selected by the Boston Art Club, and one from a list of three persons selected by the Boston Society of Architects; and whenever the term of a member of said board appointed from such a list expires, the mayor shall appoint his successor from a list selected by the body which made the original selection as aforesaid. The members of said board shall serve without compensation. Said board may appoint a secretary outside of its own membership, who shall serve without compensation.

Sect. 2. Hereafter no work of art shall become the property of said city by purchase, gift, or otherwise unless such work of art, or the design for the same, together with a statement of the proposed location of the same shall first have been submitted to and approved by said board acting by a majority of all its members; nor shall any work of art, until so approved, be erected or placed in, over or upon, or allowed to extend in, over or upon any street, avenue, square, place, common, park, municipal building or other public place under the control of said city or any department or officer thereof. No existing work of art in the possession of said city shall be removed, relocated or altered in any way without the similar approval of said commission, and any such work of art shall be removed, relocated or altered in any way that may be ordered by a vote passed and approved, in writing, by all the members of said commission, and also approved by the mayor.

Sect. 3. When so requested by the mayor or the city council, said commission may in its discretion act in a similar capacity with similar powers, in respect to the design of any municipal building, bridge, approach, lamp, ornamental gate or fence, or other structure erected, or to be erected, upon land belonging to the city, and in respect to any arch, bridge, structure or approach which is the property of any corporation or individual, and extends in, over or upon any street, avenue, highway, park or public place; but this section shall not apply to structures authorized to be erected under the provisions of chapter five hundred of the acts of the year eighteen hundred and ninety-seven and shall not be construed as intended to impair the power of the board of park commissioners of said city to refuse its consent to the erection or acceptance of any public monument or memorial, or other work of art of any sort, within any park or public place in said city under the jurisdiction of said board.

Sect. 4. The term "work of art," as used in this act, shall apply to and include all paintings, mural decorations, statues, bas-reliefs, sculptures, monuments, fountains, arches, ornamental gateways and other structures of a permanent character intended for ornament or commemoration.

Sect. 5. If said commission shall fail to decide upon any matter submitted to it within sixty days after such submission, its decision shall be deemed unnecessary.

Sect. 6. All contracts or orders for the execution of any painting, monument, statue, bust, bas-relief or other sculpture for said city shall be made by said board, acting by a majority of all its members, subject to the approval of the mayor.

Sect. 7. Chapter one hundred and twenty-two of the acts of the year eighteen hundred and ninety is hereby repealed.

Sect. 8. This act shall take effect upon its passage.

Approved May 11, 1898.

[1] [Chapter 410, Acts of 1898.] "An Act to establish a Board of Art Commissioners for the City of Boston."

BOOKS AND PAPERS

IT is with a certain curiosity that we open a book upon matters of art by so distinguished a practitioner as Mr. Walter Crane, and it is a compliment to the book to say that the preface is the best part of it. By this we mean that the preface gives, very neatly, a clue to the general intention of a work which is, to use the mildest term, discursive, and enables us, perhaps, to discern, in a conglomeration of information about architecture, sculpture, social influence, Norse mythology, Pre-Raphaelite painting, Japanese naturalism, Dürer, Botticelli, Cobden Sanderson and the Kelmscott Press, "the real fundamental connection and essential unity of art," which, as he tells us, it has been the author's "main object to trace," and which, but for this preliminary hint, some persons would hardly have discovered.

We have said that the book is discursive, and a random extract from the index will, we hope, bear us out in this gentle criticism. Under the letter I we find nine items, namely, "Icarius, Ictinus, Igdrasil, Ightham Mote House, Impressionism, Indian Embroidery, Iron-work, Isle of Man, Italian Flasks"; and, under O, "Omar Khayyám, 'Once a Week,' Orcagna, Oxen, Oxford."

A certain reason is to be found for this comprehensiveness in the fact that the substance of the chapters originally formed a series of lectures, delivered at the Manchester School of Art; but this explanation does not help very much to elucidate the "vital veins and nerves of relationship in the arts of design," which, as we are told, it is the main object of the book to trace; and, indeed, according to our experience, students in art schools, so long as their lecturers give them some pretty pictures and other things to look at, do not suffer much mental anguish if the "essential unity" of these objects is not perfectly clear to them; and we imagine that the readers of Mr. Crane's book will be willing to take his word for it that there is such unity, without troubling themselves to trace the "organic" connection between "Protogenes" and "Punch," or "Roof" and "Rossetti," notwithstanding their juxtaposition in the table of contents.

Speaking of unity, however, example is so much better than precept that it is unfortunate that some sort of "organic connection," whatever that may be, should not have been attempted among the illustrations with which the book is liberally furnished. The author explains that, although he advocates the use of line drawings only with type in books "wherein completeness of organic ornamental character is the object," his own work "can hardly be regarded from that point of view"; but it would have been quite possible, even from another point of view, to have avoided the preposterous jumble of half-tone plates from nature; half-tones from drawings; silhouettes; free-hand sketches, of incredible carelessness, as, for instance, a staggering representation of the Arch of Constantine; drawings in ruled lines, and reproductions of wall-papers and stained-glass, which occupy the pages of the book; or, in many instances, only partly occupy them, leaving a blank space of extremely awkward effect.

Mr. Crane, in a disquisition on book-making, in Chapter IV, speaks learnedly, not to say superciliously, about the decline in "the sense of style and harmony in combining text and illustration," and mentions with extreme disapproval the "heavy-toned and realistically treated wash drawings used with a thin and light type, such as we constantly see in newspapers and magazines." It would be interesting to know, from the point of view of "organic ornamental character," what style of type he would think "harmonious" with a collection of four free-hand sketches and a half-tone reproduction of a wash drawing, such as we find grouped together on page 15.

But the fact that we do not like the appearance of a book need not blind us to the merits of its contents, and we will therefore look a little at the chapter which expounds the "Architectural Basis of Design," and may therefore be regarded as coming most within our comprehension. We are disarmed at the outset in considering this chapter by a note, which says that the classification of constructive forms into lintel, round-arch and pointed-arch type "may not be quite satisfactory from the point of view of the constructive and historical architect," so we will not criticise the representation of

[2] "*The Bases of Design.*" By Walter Crane. London: George Bell & Sons; New York: the Macmillan Company. 1898. Price $6.

the pointed arch, which shows it springing from an impost, and furnished with a keystone; but even the "constructive and historical architect" may be excused for wondering a little as he reads of "the Greek temples of ancient Egypt, at Karnac, Thebes and Philæ"; or learns that the Doric frieze is "enriched" by "little dentils" below the triglyphs, while the column, in this order, "is delicately channelled with a series of lines," and is "entasized, or slightly swelled in the middle, to avoid the visual effect of running out of the perpendicular." This remarkable statement is accompanied by a labored diagram of the group of riders in the Parthenon frieze, "enriched" with snaky lines around the feet and heads of the horses, which shows, as we are told, the "wave movement and spiral curves in the frieze," and illustrates the fact that the sculptures of the Parthenon "were constructed on a basis of ornamental lines," and possessed throughout "a certain rhythm, and recurrence of mass and line and form"; and we are subsequently informed that one of the "chiefest" lessons which designers should learn from the Parthenon is that of "the value of recurring and reëchoing lines." We will not venture to dispute what the eye of genius, especially an eye sensitive to "the visual effect of running out of the perpendicular" in shafts destitute of entasis, may have discerned in the Parthenon sculptures, but it is hard to see the usual notion of architects that the Parthenon sculptures present the noblest example in the world of artistic variety, and of the avoidance of the "rhythm and recurrence" characteristic of inferior work, so rudely overthrown.

After these thoughts upon Greek architecture, which were certainly derived from his own consciousness, it is a little surprising, when Gothic architecture comes to be considered, to find that Mr. Crane, instead of treating us to a new and superior explanation of the origin of the pointed arch, brings up the ridiculous old theory of its derivation from the interlacing arcade at Canterbury, giving a cut of this "Transitional arcade," as he calls it, and informing his readers that "we have here the actual birth of the pointed arch." In view of this display of familiarity with Gothic architecture, it is less startling to find an illustrated list of "Typical Forms" of Gothic arches, in which there is no indication of either the three-centred or four-centred arch, their place being taken by an impossible and unheard-of form, labelled the "Ogee."

We try to be mindful of the proverb about the cobbler and his last, and we will therefore refrain from following Mr. Crane into his valuable dissertations upon Cimabue; Punch; the "Sauvastika"; Alfred Stevens; the Philadelphia primary schools, and the "Dance of Death," notwithstanding the light which they throw upon the essential unity of art; but it may be permitted us, as humble devotees of orthography, as well as architecture, to wish that Mr. Crane's proofreader had been more careful to avoid small shocks to sensitive readers. Especially in foreign words do we find slips, and it is not pleasant, after soaring with Mr. Crane in the realms of "imaginative harmony" and organic ornament, to read about the "statue of the Coleoni at Venice," or the "fleur-de-luce" of Florence, or of "Filipo Lippi," or "La Prima Vera," to say nothing of "Grés de Flandres," and the "Temple of the Sibill," at Tivoli, the last being called in another place the "Temple of the Sybil."

BUILDING LAW

PAROL EVIDENCE.

PAROL Evidence. — Where an offer in writing to do certain work and furnish the material for a gross sum is accepted orally, it is proper to receive the testimony of the employer that part of the oral agreement was that the contract price should be paid as the work progressed. Whether the payments made were within the terms of such agreement must be determined by the jury.

[Bruce *vs.* Pearsall (Sup. Ct. N. J.), 34 *Atlantic Reporter*, 982.]

Parol Evidence in the Interpretation of Contracts. — In arriving at the real intention of the parties, as shown by the language employed by them in a contract, and in order to make a correct application of the terms used to the subject-matter and objects referred to, when the same are not clearly expressed, the situation of the parties and the surrounding circumstances may be considered in construing the contract, but it must be borne in mind that it is the language of the contract itself that is to be construed, and when the parties reduce their agreement to writing no other language employed by them in making the contract can be resorted to, except that furnished by the instrument itself.

[Robinson *vs.* Hyer (Supreme Ct. Fla.), *So. Reporter*, 745.]

Admissibility of Parol Evidence. — Where a contract contains no stipulation as to the method by which the quantity of bricks was to be ascertained for settlement, but is silent, or at least ambiguous, in that respect, parol evidence is admissible to show whether there was any agreement between the parties as to this matter, and if so, what it was, and, if there was no agreement between them, then to show what was the custom of the locality where the contract was made, or the usage of trade, and with reference to which, in the absence of any special agreement, they are to be deemed to have contracted.

[Richlands Flint-Glass Co. *vs.* Hiltebeitel (Supreme Court of Appeals of Virginia), 22 *S. E. Rep.* 807.]

SOCIETIES

PHILADELPHIA T-SQUARE CLUB.

THE annual meeting of the T-Square Club was held on Wednesday evening, May 11th, at which there were present forty-eight members. The reports of the various committees were heard, and the Treasurer's report showed the Club to be on a secure financial footing.

The medals for the competitions held during the past year were awarded as follows: Gold Medal, Nicola D'Ascenzo; Silver Medal, Horace H. Burrell; Honorable Mention, Charles Z. Klauder.

The following officers were elected for the ensuing year: *President*, Edgar V. Seeler; *Vice-President*, Adin B. Lacey; *Secretary*, Herbert C. Wise; *Treasurer*, Horace H. Burrell; *Executive Committee*, David K. Boyd, Walter Cope and James P. Jamieson; *House Committee*, Nicola D'Ascenzo, George B. Page and Frederick M. Mann.

GEO. B. PAGE, *Acting Secretary.*

THE NATIONAL SOCIETY OF MURAL PAINTERS.

AT the annual meeting of the National Society of Mural Painters the following officers were elected for the coming year: John La Farge, *Honorary President;* Frederick Crowninshield, *First Vice-President;* George W. Maynard, *Second Vice-President;* D. Maitland Armstrong, *Treasurer;* Herman Schladermundt, *Corresponding Secretary;* J. William Fosdick, *Recording Secretary.*

J. WILLIAM FOSDICK, *Secretary.*

ACADEMY OF DESIGN.

THE annual meeting of the National Academy of Design was held last week. The principal business transacted was the election of officers for the ensuing year, and this resulted as follows: *President*, Thomas W. Wood; *Vice-President*, James M. Hart; *Corresponding Secretary*, H. W. Watrous; *Recording Secretary*, George H. Smillie; *Treasurer*, James D. Smillie.

SOCIETY OF BEAUX-ARTS ARCHITECTS.

AN exhibition of the drawings submitted in the recent competitions of the Society will be held in the rooms of the Architectural League, Fine-Arts Building, 215 West 57th Street, New York City, May 23–28, inclusive, from 10 A. M. to 10 P. M. except Tuesday evening, when judgment will be held.

Members of the Society, students, and all others interested are invited to visit the exhibition. Admission free.

EDGAR A. JOSSELYN, *Secretary.*

ILLUSTRATIONS

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

TRINITY CHURCH, BOSTON, MASS.

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

WHILE this view shows the Galilee porch and the new spires of the western towers, both additioned by Messrs. Shepley, Rutan & Coolidge to Richardson's building, it also shows how grievously the effect of the church is likely to be injured by the high apartment-house that is building on the adjacent corner.

DETAIL OF THE GALILEE PORCH: TRINITY CHURCH, BOSTON, MASS. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.

HOUSE OF G. E. EASTMAN, ESQ., ROCHESTER, N. Y. MR. J. FOSTER WARNER, ARCHITECT, ROCHESTER, N. Y.

STABLE OF G. E. EASTMAN, ESQ., ROCHESTER, N. Y. MR. J. FOSTER WARNER, ARCHITECT, ROCHESTER, N. Y.

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

BORDER DESIGNED BY VIOLLET-LE-DUC.

THIS plate is copied from Baron Taylor's "*Voyages pittoresques.*"

A SUBURBAN CHURCH. MR. E. B. LAMB, ARCHITECT.

This plate is copied from the *Builder*.

[Additional Illustrations in the International Edition.]

DETAIL OF THE GALILEE PORCH, TRINITY CHURCH, BOSTON, MASS.: FROM THE SOUTHWEST. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.

[Gelatine Print.]

THE NEW CHRIST'S HOSPITAL SCHOOLS, LONDON, ENG. MESSRS. ASTON WEBB & INGRES BELL, ARCHITECTS.

This plate is copied from the *Builder*.

NO. 38 BERKELEY SQUARE, W., LONDON, ENG.

THE SOUTH LODGE, RUTLAND GATE, LONDON, ENG. MESSRS. BOULNOIS & WARNER, ARCHITECTS.

NOTES & CLIPPINGS

A Caravansary at Mecca. — The Sultan of Turkey has just built at Mecca the biggest house in the world. It is intended for the accommodation of pilgrims, and is capable of sheltering 6,000 persons. — *N. Y. Evening Post.*

The Marble Stairs of Chesterfield House. — Lord Burton, about the time when he obtained his peerage, purchased the fine old London residence of the former Earls of Chesterfield, now known as Chesterfield House. The great glory of this mansion is the marble staircase, each step of which is formed of a single block of marble more than twenty feet long. — *Exchange.*

Slag Bricks. — The manufacture of bricks from furnace slag is being carried on extensively in Bohemia. The product has been used to some extent in Prague. The *Engineering and Mining Journal* urges American operators of blast furnaces to follow up this hint, and thus reduce their expenses. Economy, by saving "by-products," is the great cry in industry nowadays.

The Ancient Theatre of Taormina. — The famous theatre of Taormina in itself is one of the greatest surviving monuments of the kind, and must surely surpass all in the wonderful charm of its position. The theatre of Syracuse commands a wide, a noble and an historic prospect, but it cannot be compared to the theatre of Taormina seated on its peninsular height. But in one point the merits of the Tauromenian theatre have been decidly overrated. The guide-books all tell us that there is no such perfect *scena* in the world, except that of Aspendos in Pamphylia. We are a little disappointed to find so large a part of the *scena* broken down. But, after all, theatres as well as other buildings sometimes gain by being a little "out of repair," and the imperfect state of the Tauromenian *scena* enables us to look out more easily through its gaps on the sea and the coast beneath us. It thus draws from its very ruin a higher degree of that peculiar interest which in all spots of this kind attaches to the mingling together of natural scenery and the works of man. The theatre may doubtless be an enlargement, recasting or rebuilding of an earlier Greek structure; the seats might well remain in any case, but the architecture of the building itself as it stands is as distinctly Roman as the material. In this point-of-view the comparison with Orange, a purely Roman building, becomes more natural. At the first glance at Taormina we are rejoiced to find so many of the columns of the *scena* remaining in their places. Unluckily all or most of them have not really remained in their places, but have been set up again in later times. Is this process, one which has been so largely carried out in the buildings of the Roman Forum, a legitimate form of restoration or not? Is it an allowable compromise, or is it a guilty evasion, to say that, while we could hardly bring ourselves to recommend that such a course should be taken, we can hardly bring ourselves to regret when we find a case in which it has been taken? We forbear to ask whether the columns which stand up so nobly in the same position in the theatre of Arles, and which, in their contrast, grouped so well with the tower of the metropolitan church, have always stood there, or whether they too have been set up again. Alike at Arles, at Orange and at Taormina we are glad to see, even if they have fallen and have been put back again, these fragments which make us better understand the style and general effect of the building. They help us the more easily to call up some idea of that wonderful theatre of Scaurus which has been so strangely mistaken for an earlier form of the Flavian amphitheatre. There it stands, a mighty fragment, but only a fragment, the blame of whose imperfect state is, in local belief at least, divided between the Saracens in the tenth century and a certain Duke of San Stefano in the eighteenth. It does not call up such direct memories as the theatres of some other cities, but, in the twofold charm of the building itself and of the wonderful position in which it stands, it can hardly find any rivals. — *The Architect.*

To stop Waste of Natural Gas. — One of the most interesting legal decisions that have lately been made in the United States is that arrived at not long ago by the Supreme Court of Indiana and which was unanimous that the plea for an injunction restraining the oil companies from wasting natural gas should be granted. The suit was brought by the attorney-general of Indiana to punish those who were violating the laws of that State forbidding the waste of natural gas. A local court had previously decided that this waste was legal, on the ground that a man had a right to do what he chose with his own, but the Supreme Court reversed this decision and declared such waste illegal on the ground of the general public good. The court's decision is very popular in Indiana, as by stopping the waste of natural gas it is believed that the supply will be prolonged indefinitely and the industrial interests of the State will be served a most excellent turn. Certainly no one who is familiar, through personal observation, with what has for a long time been going on in some of the natural-gas districts of the United States can have any conception of the reckless waste of the gas that has been and is probably still being practised. Not only have grossly inefficient kinds of burners been used, but in many places there have been no burners at all, and the gas has been burned simply from open ends of pipes, with no attempt at an admixture for proper combustion. Gas jets and fires, moreover, have been left burning at all times, day and night, simply to save matches and to avoid the trouble of relighting. Early exhaustion of the gas-wells was to be expected under such conditions. Many of them have, in fact, given signs of failure, and the action that was taken in Indiana seems to have come almost in the nick of time. — *Cassier's Magazine.*

M. Gustave Moreau. — The Académie des Beaux-Arts has experienced a fresh loss by the death of M. Gustave Moreau, professor at the Ecole des Beaux-Arts, at the age of seventy-two. The son of a Government architect, M. Moreau was educated in the *atelier* of Picot. He made his first appearance at the *Salon* in 1852, with a "Piéta" which attracted a good deal of attention. The following year he exhibited a very large picture, the subject taken from the Song of Solomon, which was purchased by the State and presented to the Museum of Dijon. He obtained a great success, or at least excited great curiosity, in 1864, by his picture of "Œdipus and the Sphinx," a mythological work very novel in its idea and treatment. From this date he adopted symbolic and legendary subjects of this kind as his special province: "Jason," "Le Jeune Homme et le Mort" (1865); "Diomède devoré par ses Chevaux" (1866); "Orpheus" (1867); "Prometheus" and "Europa" (1869); "Hercules and the Hydra" and "Salomé" (1876); "Galatea" and "Helen" (1880). After that date he ceased to exhibit, and worked unostentatiously among his pupils at the Ecole des Beaux-Arts, by whom he was greatly beloved and respected both for his ability and his high character. He was never a popular painter, and for the last eighteen years even avoided all public notice, but he leaves the reputation of an artist of great and individual power. — *The Builder.*

Hardening Plaster. — The following process is noted from France for hardening plaster, so that it may be used as flooring, as wood and tiles are at present. About six parts of good quality plaster are intimately mixed with one part of freshly-slaked white lime finely sifted. This mixture is then laid down as quickly as possible, care being taken that the trowel is not used on it for too long a time. The floor should then be allowed to become very dry, and afterwards be thoroughly saturated with sulphate of iron or zinc — the iron giving the strongest surface, the resistance to breaking being twenty times the strength of ordinary plaster. With sulphate of zinc the floor remains white, but when the iron is used it becomes the color of rusted iron; but if linseed oil, boiled with litharge, be applied to the surface, it becomes of a beautiful mahogany color. Especially is this the case if a coat of copal varnish be added. — *Invention.*

Chateau d'Eau at the 1900 Paris Exhibition. — The studies are in progress for a "Château d'Eau" on a grand scale, which is to occupy, at the Paris Exhibition of 1900, the place lately occupied by M. Bouvard's dome for the 1889 Exhibition, now demolished. The base of this monument will be eight metres above the level of the soil, it will be reached by a circular staircase of 150 metres in length, bordering the cascade. On the center-piece of the cascade will be a group symbolizing "l'Humanité conduite par le Progrés et s'élançant vers l'Avenir." The decorative details will be in the style of the Louis Seize epoch. There are to be alleys adorned with fountains radiating from this central object. — *The Builder.*

The Tuileries Garden and Lenotre. — The gardens which mark the site of the Tuileries are one of the charms of Paris, and to some extent compensate for the loss of the palace. But they are about to assume a novel, although a very ancient, aspect. M. Redon, the architect who has charge of the Louvre, and in an official sense, we believe, of the vanished Tuileries as well, has resolved to restore the garden to the condition in which it was arranged by Lenôtre. As the conditions of the place are no longer the same, it remains to be seen whether the old artificial style will be more pleasing than the modern official style. The result has interest for us in England. — *The Architect.*

To remove Old Paint and Varnish. — The following recipe for removing old paint or varnish is from the *Beyerische Gewerbeseitung.* Two parts of ammonia are shaken up with one part of spirits of turpentine, forming a permanent emulsion, which is applied to the paint to be removed. In a few minutes, it is stated, the paint will be so softened that it can be scraped or rubbed away.

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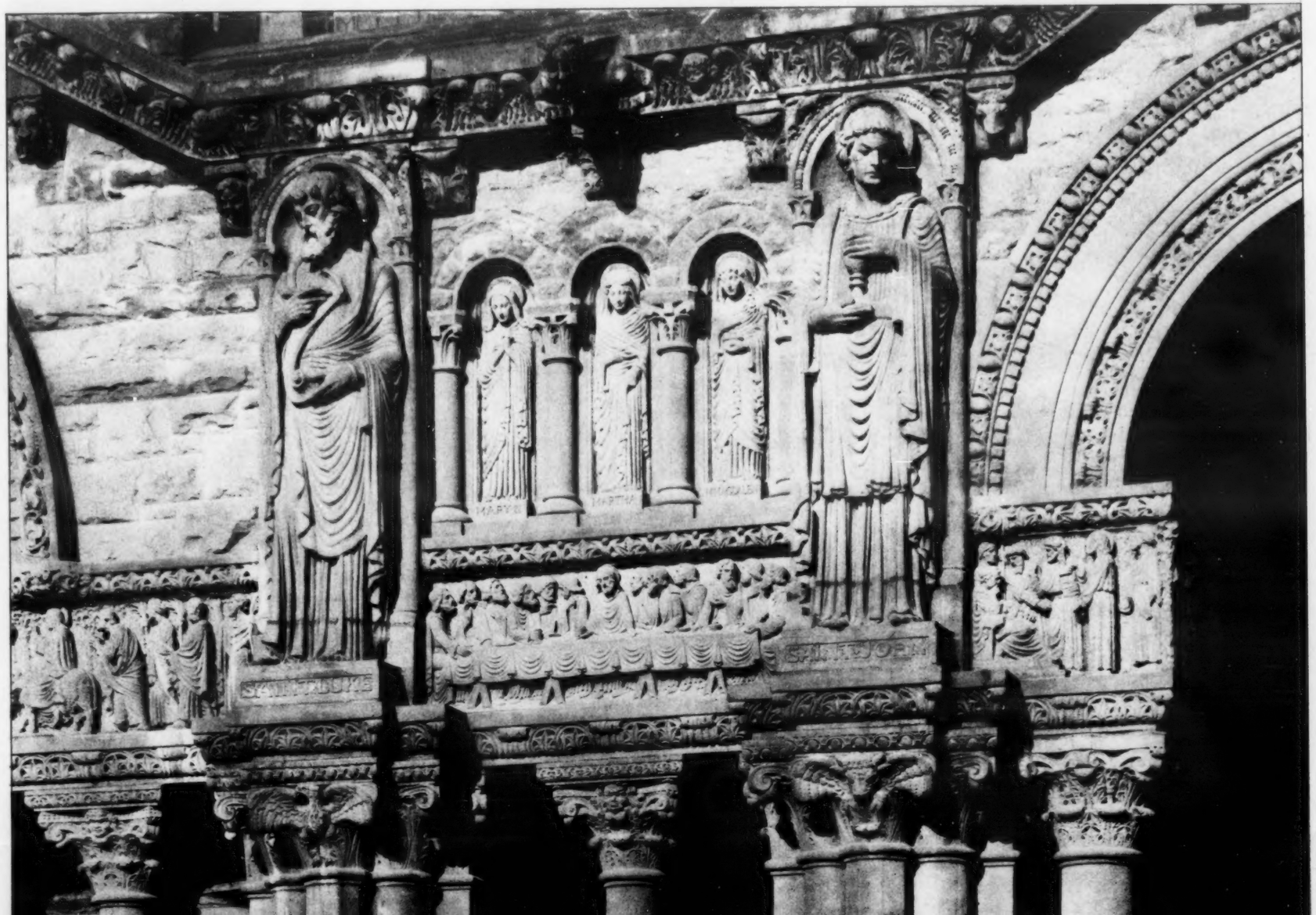

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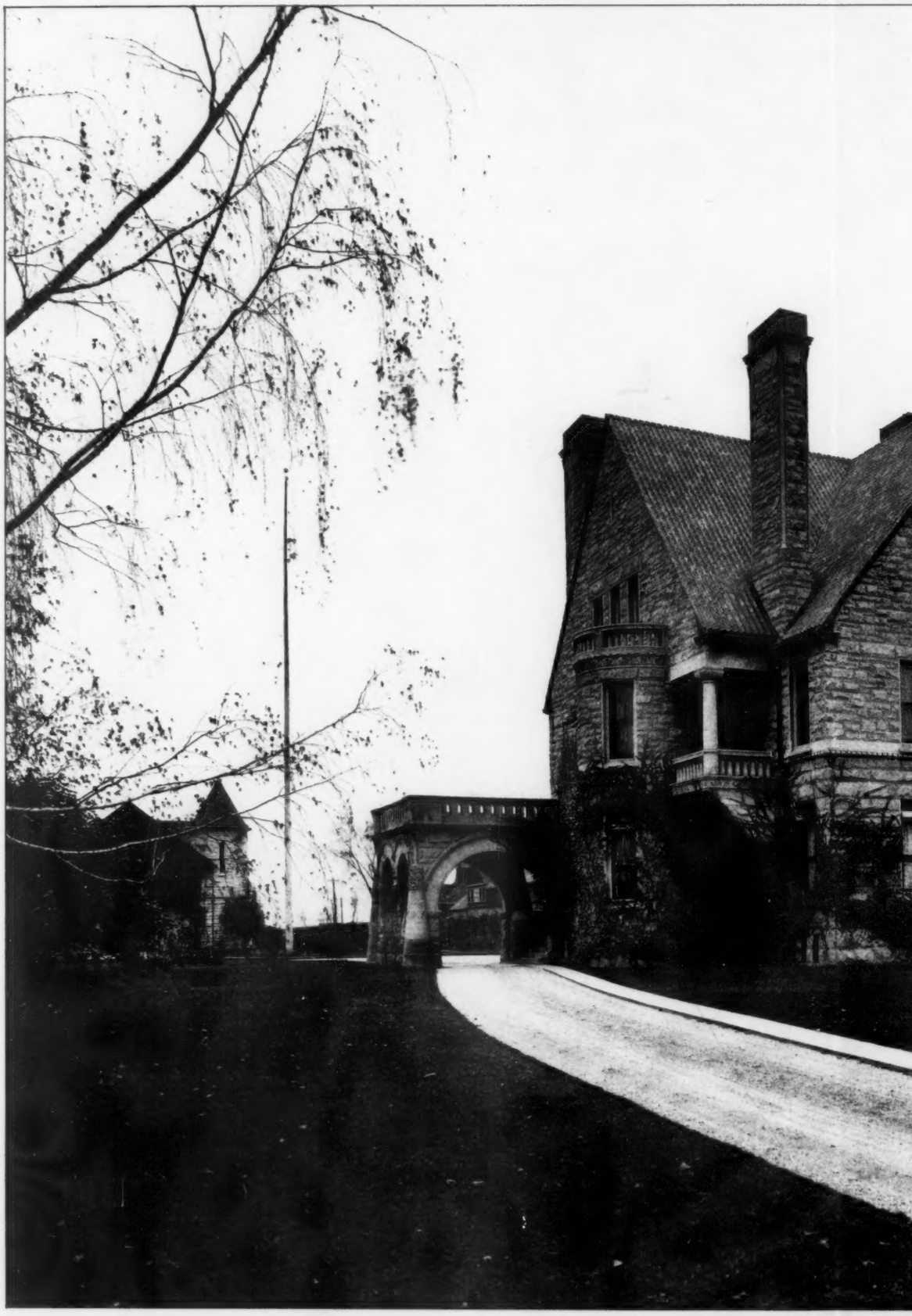

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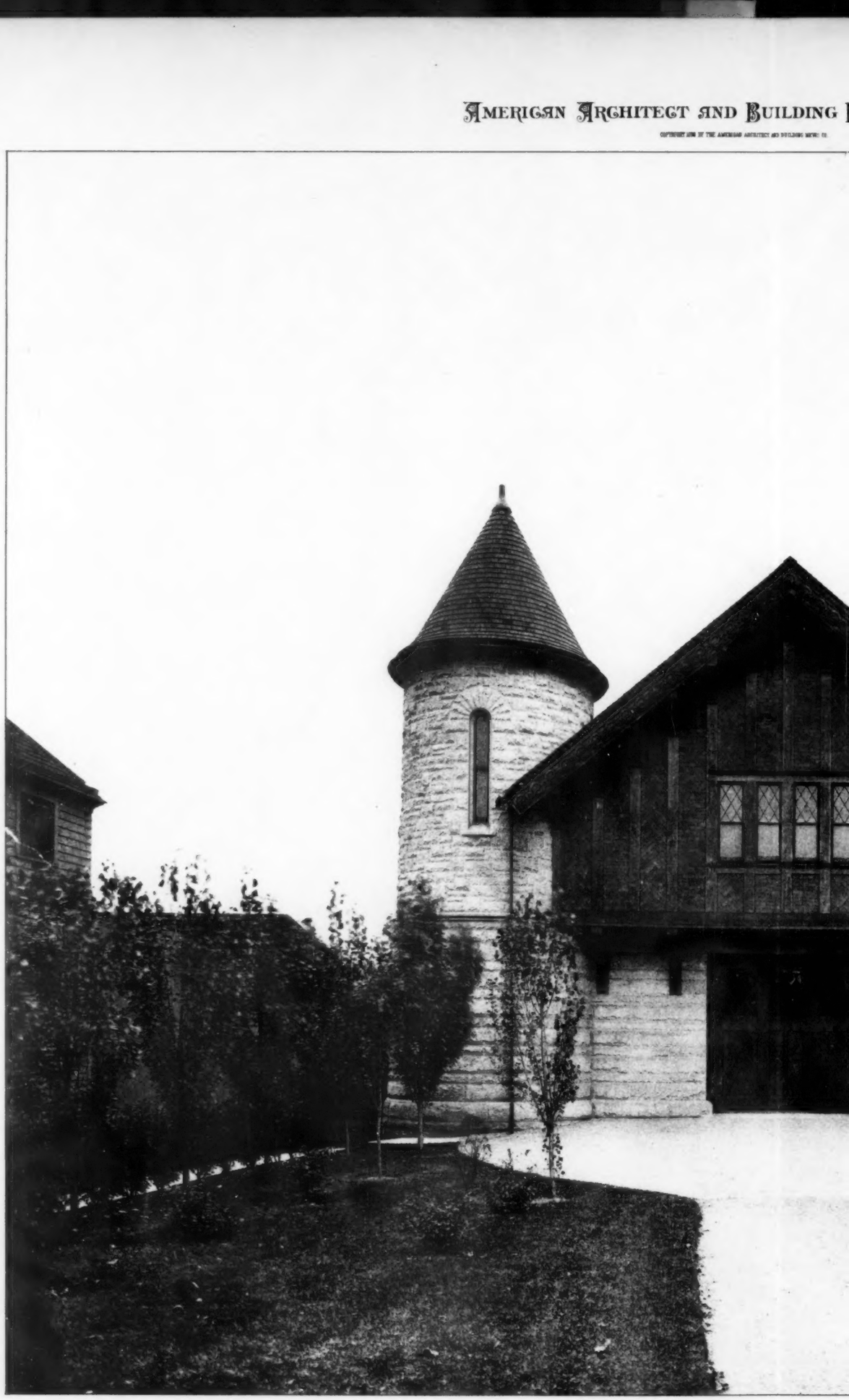

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