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THE Boston newspapers are quite excited over a project for the expenditure of "millions of dollars" in demolishing the houses in the neighborhood of the State-house, and erecting, in connection with the latter, three additional State buildings, one to be the official residence of the Governor, a second to be occupied by the offices of heads of departments, while the third is to accommodate some of the enormous number of Commissions, with which the State of Massachusetts is, we had almost said, infested. A drawing ten feet long and eight feet high is to be made, to show adequately this startling scheme, and the reporters seem to be as full of anticipations as the taxpayers are of apprehensions in regard to the affair. Considering the smallness of the population of Massachusetts, its State house is already a rather unwieldy matter. The extension, which hides itself meekly behind the older part of the building, is said to have cost five million dollars, and it will hardly be possible to buy and lay waste the territory around it, and erect there more buildings, for a less sum, while the advantages, æsthetic or otherwise, of doing so, have yet to be made evident. For years we have been told about the hallowed memories which attached to the State-house, about its merits as a work of architecture, and the importance of keeping it and its surroundings inviolate. It was with this idea that the five-million-dollar extension was hidden in the rear, at great expense and inconvenience, and it is rather startling now to be informed that the State proposes to make the building and its site practically unrecognizable by further enormous additions; while, if the State of Pennsylvania, with more than five million inhabitants, finds it necessary to limit its expenditure for State-house purposes to ten cents per head of population, it certainly seems as if Massachusetts, with less than half the population of Pennsylvania, should think twice before taxing its inhabitants forty times as much as the Pennsylvanians for the same purpose.

WE have had our attention called twice to a circular to architects, issued by the University of West Virginia, inviting competitive designs for a group of buildings. Competitors are required to state what their charges will be for their services, and it is stipulated that the accepted plans will not be paid for until bids have been received within the limits set for the cost of each building of the group. The limits set are low, and we imagine that prudent architects would hesitate before doing much work, payment for which would depend on getting a building erected in a locality far away from the great material-markets, at a price for which it could hardly be carried out in a more accessible place; while very few, even of the imprudent ones, are likely to trouble themselves about a competition in which, as it appears, the one who will do the work cheapest has the best chance of being employed. We have always held that it is bad policy on the part of architects to complain of the terms of competition programmes. If the

terms are not fair, according to professional standards, the best way is for them to let the competitions alone, waiting until they are asked for an explanation of their course before giving it. As most people, except public officials, would rather have their buildings carried out by a competent and honest architect than by a builder's apprentice or by a thief, the result would be that if the architects did not come to the bait held out promoters would make the bait more inviting; and most persons would be more inclined to this course if the architects simply ignored their invitations than if they saw them hanging reluctantly about the dangling morsel, grumbling and quarrelling, nibbling and scolding, as is too much the practice now. However, the authorities of the West Virginia University appear, from the precision with which they have explained their wishes, to be sensible men, and they are likely to take in good part a suggestion that the ordinary fees of architects are none too large for honest and efficient service, and that, in the opinion of the profession, a person who works for less is presumed to be at least under temptation to make up a suitable compensation for himself by unavowed means, of course at the ultimate expense of his employers; so that a request to bid against one another in the matter of fees signifies simply, to a reputable practitioner, that he must compete for the work in question with unscrupulous persons, who have secret understandings with contractors, such as he does not have, and would not have if he could; while, further, an architect who is asked to bind himself to forfeit all claim to compensation if his design cannot be carried out within a given sum, which he has reason to consider too low, is, particularly in these times, when prices are rising every day, taking an unjustifiable risk. We can quite understand the positions of officials who must keep their outlay within a given appropriation, and prudent architects are always ready to respect these conditions, but it is not fair, when the owners have themselves stated the accommodation that they require, to throw all the responsibility on the architect for carrying it out for a given sum. A good practice in such cases is, as is often done, to stipulate that designs will be excluded the estimates for which exceed the limit by ten per cent. Then the author of the best design has a chance to avail himself of local circumstances, and more detailed knowledge of the requirements, to reduce cost to the desired limit, and the result is sure to be more satisfactory than to try to get everything at once from busy professional men, only half informed of what is needed.

THE disastrous fire in the Windsor Hotel, in New York, has called attention to the risks of hotels in general. So far as New York is concerned, every hotel built of late years is of fireproof construction, but some of the largest of the old ones have wooden floors and partitions, and catastrophes similar to that at the Windsor may be looked for, unless provision is made in time for the escape of their occupants. Under the New York law the Commissioner of Buildings is authorized to require anything in the way of additional stairs or fire-escapes in hotels that he may judge necessary, and public opinion will sustain Mr. Brady in almost any measures that he may take. The proprietors of hotels object, naturally, to the provision of numerous stairways and fire-escapes, by which their patrons sometimes depart without paying their bills; but this consideration is of no importance in comparison with the safety of the honest inmates of the house.

M. HENRI BUNEL, architect of the Préfecture of Police in Paris, and a very well-known expert in fire-resisting construction, in talking over the burning of the Windsor Hotel with a *Tribune* correspondent, made the sensible observation that, besides strict building-laws, strict inspection, to see that the building-laws are carried out, is absolutely essential. Without such inspection, laws are of little avail, and the history of most Building Departments consists, in great part, of accounts of the struggles of their heads to secure the appropriations necessary to pay enough deputy inspectors to keep up even a moderate degree of supervision. It is hardly necessary to observe that dishonest builders, if they know that their turn for an official visit of inspection will come only once in a month, have no difficulty in committing with impunity sins of construction, which are immediately concealed by plastering or woodwork; and it is a curious fact that many workmen, especially if they are employed by a "skin contractor," seem to

take a malicious pleasure in leaving behind them dangerous pieces of work, which could hardly have been the result of accident alone. We have been strongly inclined, at times, to attribute to the influence of socialistic teachings, and a desire to be surreptitiously revenged on "the privileged classes," the holes left in the brickwork of chimneys, behind wood furring; the deliberate choking of flues with bricks in inaccessible places, and the many other pieces of pure mischief which workmen sometimes take considerable trouble to commit, where they think that their tricks will not be detected. We have seen, when a wooden mantel was taken down, a hole six inches square behind it, opening directly into the fireplace; and all architects must have had similar experiences. A few convictions of workmen of this sort for manslaughter, where such misdeeds were the cause of fatal injury to some "monopolist" victim, would have an excellent effect; and we have long thought that provisions in the building-laws, making individual workmen criminally responsible for some of the grossest violations of safe building, would do more good than the accumulation of penalties against contractors.

THE Report of the Boston Fire Commissioner is of interest, as showing, probably, the influence of new methods of construction on fire-losses. For example, the "defective flue," which was once almost the main source of fires, shows a decided loss of harmful power, the number attributed to this cause in 1898 having been only eleven, out of a total of very nearly fifteen hundred fires. There can be no doubt that the regulations, which have for something like fifteen years required flues from boilers, furnaces and ranges to have either eight-inch walls, or fireclay linings, have contributed greatly to this change. Sixty-five fires were caused by electric wires, and sixty-seven by lamp-explosions. Matches, in the hands of children and careless persons, or exposed to the gnawing of rats, caused two hundred and fifteen fires, — more than twenty times as many as were due to defective flues; and spontaneous combustion, and explosion or ignition of chemicals, caused one hundred and thirty-two. Another noticeable fact is that, out of the whole number of fires, only thirty-nine extended to other buildings. Considering the fearfully dangerous crowding of wooden houses in the Dorchester, Roxbury and South Boston districts, this is a remarkable showing, and nothing in the way of silent evidence could say more for the efficiency of the Boston Fire-department.

THE Boston artists are grieved, and with some reason, at the discovery that the work of decorating the Memorial Hall, in the new State-house Extension, was practically given to Mr. Simmons, of New York, by a member of the State-house Commission, more than a year ago, without any public notice, and, apparently, without any authority. When it was definitely announced that the Memorial Hall was to have artistic decoration, a large number of Boston artists joined in the request that the work should be opened to competition, to be unlimited, if the Commission so desired; and they then learned, for the first time, that one or more New York artists had been privately engaged for the work. With a sense of honor which is very creditable, they immediately withdrew their request, but it seems to us that the public, which is under no professional obligations to New York artists, has something to say in the matter. Whether the State-house Commission had any legal right to assign in this way the most important piece of public decorative work in Massachusetts, we do not know, but no such authority should be given to similar bodies in future. We are far from believing in the principle of shutting out competition in matters of art, but it is one thing to shut out competition, and another thing to encourage the development of such talent as any community possesses. Every step in advance in art that the world has ever seen has come about through the emulation of local schools, rather than that of individuals. Perhaps the peculiar spirit which has characterized each great school of art is too subtle to be grasped by any one mind so that it must be developed by a succession of masters and pupils, friends and rivals, living together among the same surroundings, and under the same inspiration; but, however that may be, it is certain that all that is valuable in art has come through the Tuscan, the Umbrian, the Venetian and other distinct schools in painting, and similar local movements in architecture and sculpture, and that everything in the shape of artistic cosmopolitanism has been a total failure. If the Boston artists who begged for an opportunity to decorate their own

building were ignorant or incapable, there would be some excuse for sending abroad for a competent man, but the reverse is the case, and we can think of some of them who only need such an opportunity to do credit to themselves and to the community of which they form a part.

MR. CHARLES EVERETT CLARK, one of the best-known builders in the Eastern States, died a few days ago, at the age of sixty-three. Mr. Clark's most noted buildings are the two Vanderbilt houses, and the Goelet house, at Newport, but he carried out several other large Newport houses, and built a great number of important structures in all parts of the country. Personally, Mr. Clark was quiet and unassuming, but was much liked and respected by architects and other builders. He had been President of the Boston Master Builders' Association, and was, at the time of his death, a member of the Massachusetts State-house Commission.

THE acetylene-gas industry has not reached, in this country, anything like the proportions which it has attained abroad, but it is being steadily extended, and we shall probably be none the worse for having been a little conservative in the matter. In Budapest, an International Acetylene Congress, with an International Acetylene Gas Exhibition, is to be opened on the fourteenth of May, to remain open two weeks. Apparatus for the use of the gas will be tested, and awards made before the close of the exhibition, under the direction of a jury, in which the Vienna Society of Engineers and Architects is represented; and the Congress will discuss improvements in the manufacture of acetylene, and in the apparatus for using it. Meanwhile, the Boston Manufacturers' Mutual Fire-insurance Company, in response to many inquiries from its members, has had the subject of acetylene lighting, including its advantages and dangers, and the proper appliances to use for the purpose, carefully examined, and, as a result of its examination, advises its members not to try the experiment of using it at present, until better methods and appliances are available than any yet put on the market. Of course, a caution which is necessary for textile factories would hardly be needed with small domestic installations; but there can be no doubt that care and knowledge are still required in handling calcium carbide and its products.

LE GÉNIE CIVIL gives an account of a new bridge, at Briare, by which a canal is carried over the River Loire, and incidentally furnishes some interesting information in regard to canal navigation in France. Very few people in this country have any idea of the enormous traffic conveyed by canal on the Continent, and particularly in France. Paris is said to receive more water-borne freight, nearly all of which is brought to it by canal, than any seaport in the world; and the network of French canals is hardly inferior in importance to the railway system. In constructing these canals, great engineering difficulties are surmounted. One of the two canals uniting the Seine and the Saone has two hundred and twenty-eight locks, in a distance of about four hundred miles, and every one has heard of the French canal which passes by a tunnel under a mountain. The bridge of Briare was undertaken to supersede an awkward transition, at the level of the river, between two portions of the canal which connects Paris with Lyons. In order to raise the canal to a sufficient height to cross the river by a bridge it was necessary to lift the land portions for a long distance on each side, the bed of the canal being now in some places twenty-five feet above the natural level of the ground, so that very skilful embanking has been necessary; but the plan, which is the work of M. Mazoyer, Chief Engineer of Roads and Bridges, has been carefully and successfully carried out.

PROF. J. B. JOHNSON, of Washington University, St. Louis, has made some interesting tests of the behavior of iron or steel stirrups, as used for hanging floor-beams from brick walls, when exposed to fire, and finds that, under such circumstances, they soon become red-hot, and then burn their way rapidly through the end of the beam, while, at the same time, they soften and bend down, the result being that the beam drops out of its bearing in fifteen or twenty minutes after the fire reaches it. Most architects are careful to see that such supporting members are fireproofed with wire-lath and plaster; but it may be well to call attention again to the imperative necessity for doing so.

We retraced our steps to Tours and then with one more day behind us steamed on to Loches, a distance of thirty miles. This castle acquired a terrible reputation as a State prison under Louis XI and blood curdles at the recital of cruelty committed in this den of infamy. We steamed past Saumur, which is beautifully situated on the left bank of the Loire, and made a short stop at Angers, where, among its ancient structures, are the ruins of a castle once the stronghold of the Dukes of Anjou. It is now a prison and powder-magazine, and considering its size and present condition, is in a fine state of preservation; it is surrounded by a broad ditch and the gateway and portcullis are almost perfect. The Cathedral of St. Maurice, situated in an elevated part of the town, is very conspicuous.

At Nantes we were greatly impressed by the beauty of its public squares, which were, as usual, filled with a gay crowd of pleasure-seekers. It is connected by twelve bridges with its isles and its suburb, Madeleine, on the left bank of the river. Here again is a magnificent cathedral, some portions of which date back to the eleventh century, and the castle of Nantes, a massive structure flanked by bastions, the residence of all the French kings from the time of Henry IV down to the Revolution, the birthplace, too, of the famous Edict of Nantes, which gave protection to the Protestants. The city is noted for its butcheries during the Revolution when over 30,000 souls, principally women and children, were murdered in cold blood. Carrier, the most detestable monster of the Revolution, when tired of the guillotine invented the "Noyades" and "Republican Marriage." By the first process, boats filled with miserable victims were rowed into the stream and sunk by the opening of a valve in the bottom, and by the second couples were bound together and plunged into the river there to struggle and amuse the crowd. Nearly opposite the Oudon Station on the road from Angers to Nantes is the small village of Champtoce, noted for its feudal castle, the residence of the famous Blue Beard of our childhood.

It is a temptation to dwell on the cathedrals which come up before us in every town, the gay *hôtels de ville*, the tumble-down and extremely picturesque houses at Chinon, Lisieux, and in fact everywhere, the small châteaux and ruined castles which here and there dot the landscape and which are always interesting, the quaint city gates, many with their little drawbridges and moss-covered moats, the squares full of gay children and white-capped nurses, and the picturesque wine-shops with a jolly crowd of revellers in front, among whom it is always pleasant to waste a little time or take a few minutes' rest.

Chantilly should come in for its share of praise: situated not far from Paris, it is famed as the stopping-place of the mob who, bent on vandalism at the time of the Revolution, razed to the ground almost the entire château, leaving standing only the mammoth stables, from the entrance to which the beautiful sculptured horses in high relief look down upon us.

To the northwest of Caen is the Château Fontaine-Henri, interesting in many ways and with both Gothic and Renaissance detail and a roof vying with the Tower of Babel in its attempt to reach the skies. The Château of Bussy, near Bussy-le-Grand, Burgundy, is simple and refined, in the style of Francis I.

Aside from these monuments to the great monarch of whom we have been speaking we cannot leave the subject without a glance at Pierrefonds, which looks down on us, situated, as it is, high above the town, nine miles east of Compiègne, with its massive walls, turrets and ramparts, drawbridge and moat. Its complete restoration was attempted under Napoleon III, so that a visit to-day discloses the same rectangular plan flanked with massive corner-towers 100 feet high and which Viollet-le-Duc has so ably described in his "*Dictionnaire de l'architecture Française*."

Fougères and Vitré in their grandeur and decay tell a story of centuries ago. Here the workman's hammer has not marred the

beauty of decay, and, covered with ivy and moss, they are picturesque in the extreme. When the Château de Josselin piles up before us just across the river, in whose waters we see so clearly reflected its high rough walls with their handsome towers and ramparts, when we come suddenly on the Château de Maintenon, also near Paris, with its beautiful combination of brick and stone, almost a modern country residence in appearance, we are forced to acknowledge the beauty of these architectural monuments. So there is variety and to spare from Pierrefonds to Blois, and from Vitré to Chambord we have

motives enough to delight the eye of the most fastidious. We have feudalism in the extreme on the one hand and all the beauty and grandeur of a most sumptuous nineteenth-century home on the other,

an inspiration to the architect of whatever school; if a lover of the tall graceful spires of the Gothic, let him turn to Châteaudun or to Rouen; if a disciple of modern French, certainly he will not fail to find much to delight his eye, and if a lover of that unique transitional



Tour St. Laurent, Chateau de Vitre.

style, let him but turn to Blois and Chambord and he will laud Francis I to the skies.

All good things must come to an end, and so at last gliding through the valley which was every hour bringing us nearer to the dreaded channel, we were on the watch for the numerous thatched cottages which here and there dotted the landscape. If we could only stop here a while, and there and here again, but almost too soon in rounding the corner in the road the spire of Rouen came in to view and we knew we were nearing our last stopping-place. The cathedral is the most conspicuous object in the valley, and towers high above the surrounding house-tops. Alighting from the train, we wandered about the city and were much impressed by its spacious boulevards and the deep waters of the Seine, covered with the ships of all nations, which add greatly to the picturesqueness of the town.

Of Rouen and St. Ouen of course nothing but praise can be spoken. The central spire of the cathedral, constructed of iron, hardly seems in keeping with the delicately carved stonework below. Though the other towers, notably the Tour de Beurre at the southern end of the façade, though unfinished, compares very favorably with the most stately of the French cathedrals. St. Ouen can be seen to far the best advantage from the gardens at the rear of the church. St. Maclou comes in for its share of admiration with its beautiful five-arched entrance, but we hasten on to the Tour de la Grosse Horloge, and search for the oldest part of the town.

The Hôtel de Ville well deserves our attention, dating back to the fifteenth century and built for the *parlement* of France. Here within a short space is much of the old beauty of the town. Modern restoration has taken away to a certain extent its quaintness, but the Tour de la Grosse Horloge and the tower-arch tell a story of a kind of beauty which is too fast giving way to modern improvement, especially in the larger cities. The Palais de Justice, one story in height, with its beautiful and delicately carved dormers, is familiar to all students.

Many objects about the city bring to mind the part it has taken in history, and we recall the wars of Henry V and VI of England, and when, during the occupation of the English, Joan of Arc was burned alive, of which numerous monuments give evidence. Here has long been the centre of the architectural interest of France.

The Château de Gaillon, near here in Normandy, was partially erected by George of Amboise, and is one of the best examples of its kind — a fragment forms a portion of the École des Beaux-Arts.

With a last good-bye we steamed away to Dieppe, getting a glance at the cathedral as we rounded the bend in the road. Soon the shores of France were fading away in the distance. After a few days spent in England we turned our faces homeward, but little did we think that we would be met at the Nantucket Shoals by the "Columbia," who with a shot across our good ship's bow called us to a halt. Then, for the first time, we realized that we were back in our native land, and war, which had been to us a mere speculation, had become a stern reality.

FREDERICK H. BRIGGS.



Stable Entrance, Chantilly.

ANNUAL COST OF THE FORTH BRIDGE. — The Forth Bridge costs for interest and up-keep £138,000 per annum. — *Exchange*.

PUBLIC BATHS AND WASH-HOUSES.¹—I.

MY many years' experience in planning, erection and administration of these establishments will, I trust, be some excuse for my temerity in submitting the following observations: . . .

What I think is required to correct the faults complained of is the practical adoption of some system of central and branch establishments, classified and distributed to suit the special needs of each district. The visitors to our swimming and the best of the ablutionary baths may very reasonably be expected to go any distance within a mile or so for their bath, whereas those using the public wash-house are seldom found to come from within a greater distance than a quarter of a mile, and never beyond half a mile. The cleansing-baths, especially those for the very poor, should be within an equally convenient distance. This being so, it would appear as if the ablutionary-baths and the public wash-houses should be decentralized and located at much more frequent intervals throughout those districts requiring them, forming really a series of branch establishments; while the swimming-baths, providing larger and even better accommodation than at present obtains, should constitute centralized establishments at one or more points, equally dividing up the whole district.

The central establishment thus suggested would be the chief and most attractive of the establishments of the district. Its accommodation would consist of four swimming-baths, and possibly a small teaching-pond, to be used alternately by either sex of bathers; and with these might be associated a number of slipper-baths, and a suitably arranged installation of hot-air baths. It would also accommodate the head offices of the general district administration, as well as the towel-laundry for the cleaning of the towels, drawers, etc., of this and all the smaller establishments. Its site would naturally call for some prominence in one of the chief thoroughfares, and all extraneous advertisement of the central and branch establishments might very well be concentrated upon it.

I have divided the branch establishments into one of two given types, which I shall call, for convenience, "A" and "B." The buildings, accommodating establishments of either type, differ in almost every particular from the central one. In the first place, they are much smaller in size, and are very compactly arranged, requiring sites of small area and of no special prominence. They should be placed at such frequent intervals as not to exceed a distance of half a mile of any bather or washer throughout the poor and populous districts.

Branch Establishment, Type "A" (Baths and Wash-houses).—This would consist of buildings accommodating from 30 to 50 slipper and douche baths, and a public wash-house of from 30 to 50 washing compartments. Its business would be carried on at very similar rates, as in corresponding departments of our present establishments. Generally speaking, the public wash-house (and possibly some of the women's slipper-baths) would occupy the ground-floor, and the men's slipper-baths the first floor.

Branch Establishment, Type "B" (People's Baths).—These would consist of small buildings arranged in a very similar manner to the Continental type of people's baths. The accommodation would consist almost entirely of the warm and cold douche or shower bath (from twenty to thirty in number) of the so-called Lassar type now being so largely adopted throughout Germany, Austria, and the United States.

The branch establishments of either type could readily be put upon the site of from two to four small houses of many of our by-streets. Such sites would, comparatively speaking, be neither costly nor difficult of acquisition. Many of you will know what a very costly, dilatory, and troublesome proceeding it is to secure sites for our present establishments.

It will be seen, I hope, that with establishments of varying scale, and of three different principles of arrangements as here suggested, the wants and means of all classes of visitors to our rearranged bathing and washing institutions are properly provided for, and, as in the branch establishments, the buildings are placed within very short distances of the homes of the working and poorer classes, and are, moreover, small in size, and would, I feel confident, be found economical in working. Our present large and ornate establishments, placed at great distances apart, and in very prominent positions, do not by any means sufficiently attract the very poor bather, who more often than not fights shy of being seen to enter them. . . .

The United States of America have recently awakened to the great importance of this question to their own country; and a committee of medical and other experts, called "The Mayor's Committee for Public Baths of New York," recently, after careful investigation, rendered a most exhaustive report upon the system employed in the public bathing establishments in the various European countries. Their views, as stated in a report of great length, are not entirely favorable to our pretensions in this matter; and, in the result, their general preference is for the arrangement and administration of the new form of German and Austrian people's baths. They specially commended the new "rain douche-bath" as almost universally practised in these countries. One of the resolutions of their report is to the following effect: "That the spray or rain system of baths

be adopted because, primarily, there is no waste of water; in the second place, the cost of erection is very moderate; and lastly, it is characterized by cleanliness and simplicity." The bath referred to is simply a gentle shower of water, the temperature and force of which are easily regulated by the bather, the water at once running off into the open drain under footboards. On the walls are copies of the plans of one of the new public baths now being erected in New York in accordance with the recommendation of the report.

The distinguishing features of the German and Austrian baths may be briefly summed up as follows:—

Open-air river-baths are very largely adopted, some of them being upon a very large scale. On the walls will be found drawings of a very good example of one at Hamburg. The general establishments, especially the most recent one, are much smaller than our own, and are placed at much more frequent intervals. A small proportion of these only have swimming-baths attached, and in these cases the ponds are fewer in number and smaller in size. No bather, be he rich or poor, is permitted to enter a swimming-pond until he has carefully washed himself, from head to foot, under the warm douches, and, if necessary, used the foot-bath. The dressing-boxes are almost invariably arranged upon what I call the "back-corridor" system; an arrangement, however, that to my mind possesses no single advantage, while it adds unnecessarily to the size of the swimming-hall, and, moreover, for any large attendance of bathers it is very difficult of supervision. These dressing-boxes are placed upon both the lower and the upper floors (when there is a gallery); and there is an abundance of open dressing-places provided for school children in addition. Altogether this dressing-space accommodation in proportion to the superficial area of pond surface is much greater than in our own swimming-baths. The ponds are neither by size, shapes, nor fittings suitably arranged for swimming-contests, which I was told usually took place in the much larger ponds in the river-baths.

The lighting generally is not so good as that of our own, but the warming and ventilation are far in advance; and the same may be said of the general and mechanical engineering work of the establishments. These ponds are kept open all the year round; but this is rendered easy by their small size, and the general excellence of the warming arrangements both in and out of the water.

It was stated very recently in one of the leading daily papers that the water in the ponds of the German baths was invariably cleaner than that in our own. This does not agree at all with what I saw. Owing to the ponds not being lined with white glazed bricks or tiles, but more especially to the difference in the practice of filling them, the water is not so clean in appearance, and is therefore very much less attractive than the beautiful pellucid water of many of our London bath-ponds. A very curious effect, different from anything I have seen or known, is to be found in the swimming-ponds of the beautiful new public baths at Frankfurt. The inside of these is lined throughout with tiles of a bright cobalt-blue tint, from the top water-line downwards. This gives to the pond the appearance of a large vat of liquid starch; and the effect was by no means pleasant to my mind. I was told the reason of the adoption of such an expedient was that the color of the water when turbid should not be perceptible; a reason that in England would, I venture to say, have secured the immediate rejection of such a tricky treatment of the pond-lining.

In many of the establishments there are installations of hot-air baths of the kind commonly called with us "Turkish baths," but in these countries denominated "Roman-Irish baths." These hot-air baths were usually supplemented by a Russian (or vapor) bath-room, opening out of the same cooling and douche rooms as the former. In Germany the process of these baths is very similar to those of this country, but in Austria and Hungary the shampooing is omitted (unless specially asked and paid for), a second plunge of intermediate temperature being substituted for it.

The public wash-house as we know it scarcely exists anywhere out of England. In Germany all I could hear of or see were four rather old establishments at Hamburg, Berlin, Augsburg and Metz.

The general warm-water bath of these countries has been, until very recently, that of the ordinary tub or slipper form. These are made of copper, enamelled-iron, polished concrete, white tiles and marble; but very seldom of the glazed earthenware now so largely in use with us. These baths vary in size and shape, and stand above the floor, or are wholly or partially let into it. In every one of these slipper compartments there is almost invariably a warm and cold douche apparatus.

In Berlin, Vienna, and many of the other principal cities and towns of Germany and Austria the use of these slipper-baths, in the reorganized public baths, is being largely discontinued in favor of the "rain douche-bath," a form of shower-bath introduced to notice and strongly advocated, in preference to the former, by Dr. Oscar Lassar, a well-known skin doctor of Berlin, whose writings upon this question of baths for the poor are not so well known in this country as they should be. Dr. Lassar claims for the "rain douche" that, apart from its lower cost and economy of space, it possesses the following general advantages for the bather himself: its physiological influence upon the organism is a quickening and refreshing one; at every season it is pleasant and never weakening to spray the well-soaped body with warm water and then to finish off with moderately cool or even cold water. The cleansing is absolutely thorough, and is essentially promoted by the fact that all the dust and dirt with which the water becomes soiled is immediately carried away and

¹ Portions of a paper read by A. Hessel Tiltman [F.] before the Royal Institute of British Architects, Monday, February 6, 1899, and published in the *Journal of the Royal Institute of British Architects*.

continuously replaced by clean water. In the case of the ordinary tub or slipper bath, the bather always finishes up finally in dirty water, more especially the workman, who leaves all the accretions of an entire week in the tub. Moreover, the individual using a public shower-bath is better guarded from infection, and from contact with the vestiges of his predecessor, than in the tub, as he can himself, without trouble, secure the cleansing of his cubicle by turning the shower-nozzle over it. In addition to this, the bath itself calls for but little time or personal service from the attendant in charge, and permits of a greater number of persons bathing quickly one after another without insanitary results. The continuous use of the slipper-bath by a large number of bathers rapidly following one another entails much labor and some difficulty to keep clean, requiring the attention of the attendant after each bather's visit. With the "rain-bath" little or no attendance is required, while the whole principle of the bath is cleaner and less liable to transfer skin complaints than in any other form of bath. It must also be remembered that it presents far less danger of catching cold in comparison with the warm slipper-bath, with its relaxing influence upon the vessels of the skin; and that the hardening effect of the bath can scarcely be obtained in a more rational way than through the successive warm and cold ablutions.

These arguments for this new form of bath have been obtained from Lassar's books, and from the officials of bathing-establishments in which they are in use; and it must, I think, be admitted that a good case is made out as to their general superiority as quick, cheap and efficient baths for the poor. A thorough inspection of their working convinced me as to the justice of these claims, which are practically endorsed by the New York committee before referred to.

In Berlin and many other parts of Germany there are now numerous very small establishments fitted up with this apparatus and no other form of bath. They are arranged in a number of cubicles, arranged for the double purpose of dressing and bathing. Each compartment in its back division is provided with a rain-shower apparatus, which by pulling a lever gives unlimited supply of warm and cold water.

Although the same enthusiasm for this rain-bath is shown at Vienna and other Austrian centres, the application of its principle to the plan and arrangements generally is altogether different. Here the three operations of undressing and dressing, hot and cold water douches are provided for in three separate apartments, instead of one double one, as in the German examples.

Vienna has already erected eleven of these people's baths, and the erection of several more is contemplated. A similar number of these revised establishments have also been erected, or are in course of erection, in Berlin. Of the two systems of administering these people's baths, that of the Austrian is said to allow, under pressure, a larger attendance of bathers, as the number of dressing-spaces may be from 25 to 33 per cent greater than the number of bathing-cells. The separation of the warm from the cold water compartment enables the attendant to see that each bather properly follows his warm ablution with the cold shower; and, lastly, it is said the separate divisions are more readily kept clean. Its disadvantage, to my mind, is that the separation of departments requires the adoption of bathing-dresses by every bather, and there is, of course, less privacy about the Austrian system than in the German.

After careful consideration of the two systems I must say that my preference is for the German, as being more suitable to our habits; and I am now arranging its introduction into two new establishments.

I think this somewhat lengthy *résumé* of the principle and practice of these new shower-baths requires no apology from me, as I feel that it will be full of suggestions to those of you who may not have seen them working. . . .

The site for a central establishment should have a superficial area of from 30,000 to 40,000 square feet, and, if possible, frontages abutting upon two roads or streets. Its position should be prominent, in a good public thoroughfare, and easily accessible from all parts of the town or parish by omnibus, tram, etc. It should admit of the perfect drainage of all portions of the establishment without necessitating an expensive treatment of levels of the building generally.

The next point of importance is that there should be an abundant supply of water, and that it should be pure and soft. We all know that soft water is appreciated for its great detergent property, and that hard water, apart from its lack of this quality, acts injuriously when used for either washing or bathing; and, when employed for the generation of steam, forms troublesome and dangerous incrustations in the boilers. For laundry purposes, the use of soft water in lieu of hard effects a very material difference in the cost of soap; in addition to which, the operation of washing is itself far less disagreeable, and the clothes considerably less subject to wear and tear by it.

The supply at command should be sufficient to meet the largest demands at the busiest period of the season, and should include a storage for some 15,000 to 20,000 gallons of water.

One of the largest items of expenditure in the maintenance of these establishments is that for water. Its importance upon the possible financial results of these undertakings will be appreciated when I tell you that the annual water bill of the Hornsey Road Baths is considerably over £1,200. Two wells have now been bored adjoining the public wash-house of the establishment, from which, with

the necessary machinery, a supply of some 20,000 gallons of water per hour will be secured, and which will amply suffice to supply the needs of the buildings, which are now in course of considerable enlargement. The cost of the water thus obtained, it is confidently expected, will not exceed from 35 to 40 per cent of that from the New River Company's mains. The saving thus effected will convert what has hitherto been a very small deficit into a yearly profit upon the whole undertaking.

In Glasgow and many of the great Continental cities and towns the municipal authorities make no charge for water used for their public baths. It will not, I hope, be too much to expect that the London County Council, when they have secured the control of the water-supply of the Metropolis, will willingly so supply those of our own establishments. . . .

As it is proposed to concentrate all the swimming-baths of the district in one or more of these central establishments, the new treatment of this, the most remunerative of all departments of public baths, will permit of many improvements in their arrangement and fittings not possible under the present system of administration.

I cannot say that the ponds may be larger, for we have already reached in many of our establishments the limit of size beyond which it would certainly be, in my opinion, very unwise to go. It is only parishes like Lambeth or Islington, with sites like those of the Kennington Road and Hornsey Road respectively, that can expect to provide and maintain ponds of the dimensions of 132' x 40' adequately and without waste. The Vestry of Battersea are, however, I believe, building a swimming-bath with a pond larger even than this, i. e. 150' x 50', to be used alternately by men and women. I very much fear such a bath will be unwieldy and extravagant in management. A pond of this size holds just upon 250,000 gallons of water, which alone, at 7½d. per 1,000 gallons, will cost £7 13s. 9d. to fill it each time, and will not in all probability be adequately used two months of its season of six.

Personally I deprecate the general adoption of ponds of such large size. It is far better, in my judgment, to increase their number in any establishment, rather than their dimensions when the latter exceeds 90' x 30'. By this means only can the consumption of water and the amount of heating, etc., be adapted in any way to the current attendance of bathers.

A very ordinary and useful number of ponds for one of these central establishments will be five. These will consist of two baths for each of the two sexes, and a fifth or small pond which may be used alternately from either the male or female corridors for several purposes, but which is principally provided as a teaching-pond. This latter provision, although common enough abroad, is almost unknown in England. There are two at the Kent-street Establishment, Birmingham; and I know of no other in this country. The pond to this bath should be about 20' x 12', and it should be specially arranged and fitted up for the private teaching of swimming. From the convenience of its position and its small size it will doubtless be found useful for small schools, clubs, etc., when not required for teaching, in which case the bridges and other fittings must be removed.

The dimensions of the ponds of the other four swimming-baths are as follows:—

Men's	first class	100' x 35'	Depth, 7'	to 3' 6"
	second	90' x 30'	" 6' 6"	" 3' 6"
Women's	first	75' x 25'	" 6'	" 3' 6"
	second	50' x 20'	" 6'	" 3' 6"

It is the general practice in England to close the swimming-baths during six months of the year, with the exception of the smallest one. I, however, cannot but think this is to be regretted, as the pleasure and benefit of swimming could very well be maintained throughout the year were we not so wedded to the large size ponds, and if only the warming and other arrangements were more adequate for their purposes. Germany, with a much colder climate, keeps open its swimming-ponds throughout the year. . . .

SWIMMING-BATHS.

As a very rough rule, it is assumed in Germany that there should be a swimming-bath for every 25,000 inhabitants, and that of this number about 2 per cent bathe in them daily. As nearly as I can ascertain, the proportion of persons using the swimming-baths in England is about 3½ per cent. It is found that swimmers, upon an average, bathe once in every four days throughout the season, and that the proportion of male to female bathers is at present 10 to 1. The proportion of the first-class to the second-class men bathers varies from 2 to 1 to about an equal proportion, according to the character of the district.

The foregoing figures must be taken as a very rough approximation to general working data, but they will be doubtless some guide in deciding what the collective accommodation of swimming-ponds shall be for a given district, and in proportioning their individual dimensions. What is now very much wanted is a good working unit of pond surface per bather. I have made many inquiries during the last four or five years throughout our own and other countries among swimming-masters and bath-superintendents, and so far I have obtained no satisfactory answer.

Men's first-class Swimming bath.—The men's first-class swimming-bath is here presumed to be arranged so as to be adaptable for entertainments during the winter. At its chief entrance it has an

entrance-hall, cloak-room for gentlemen and ladies, and at the opposite end the necessary performers' retiring-rooms, which are ordinarily in the summer months converted into one large room and used thus as a club and dressing room by members of swimming-clubs using the bath.

The hall usually consists of two stories—that is, a ground-floor with a gallery over. The floor of this latter should be constructed of steel and coke-breeze concrete, and its upper surface should be stepped so that at least three rows of spectators (two seated and one standing) may see the surface of the pond during a swimming-contest.

One fault to be found in most of our swimming-baths is the insufficiency of the dressing-box accommodation in proportion to the superficial area of pond surface. No consideration appears to be given by architects to this necessary relation between the number of dressing-places and the area of the pond; and indeed oftentimes an unnecessary liberality in the dimensions of the boxes adopted has the effect of still further accentuating this blunder. The almost universal arrangement of placing our dressing-boxes down two sides, and possibly one end of the hall, must be improved upon if it is desired to correct this defect. There are two ways of doing this: first, the Continental method of placing an equal proportion of the dressing-boxes or places upon the gallery-floor; and secondly, to arrange them in a series of transeptal bays upon one or both sides of the bath.

I confess to having a strong objection to placing dressing-boxes upon the gallery-floor, as it entails a direct communication between the two floor-levels, which arrangement, at all events, would not be permitted by the County Council under their Music and Dancing License. There is also a risk of some accident to young bathers in their running up and down such staircases with wet feet. Examples of this arrangement will be found on reference to the gallery-floor plans of the new baths at Stuttgart and Frankfort, and other of the German baths, of which plans are shown upon the walls.

The second arrangement, viz, the dressing-boxes arranged in bays, can hardly be said to have been properly tried anywhere. I have adopted it in a tentative manner in two of my establishments in order to overcome the difficulties of a restricted site, with the result that I recognize it as one way of obviating the difficulty of the scarcity of dressing-boxes.

I have already alluded to the "back-corridor" arrangement of dressing-boxes in use in Germany and other parts of the Continent. This system was adopted in England with many of the first sets of swimming-baths, but, as the arrangement has been practically abandoned everywhere, it is unnecessary for me to say more about it.

The pond should be rectangular in shape, and in the proportion generally of length to width as 3 to 1. Its internal angles should not be rounded, and the whole surface of the water must be free from all permanent projections or obstructions, so that in swimming-races every competitor has equal opportunities as to space, etc.; all steps therefore for access to the water should be of wood and made removable. One or two sets of these are provided at each end, fixed generally to the safety-rail or by other equally convenient means. An open self-draining channel, close to the top of the pond and running continuously round it, serves as a scum-overflow and spitting-trough; and at a suitable height above the water-line an iron or copper safety-rail 1½ inches in diameter should be run all round the pond for the use of tired swimmers. At the shallow end a portion of this pipe is usually converted into a spray-pipe, extending the whole width of the pond. By raising or depressing the direction of the perforations in this a very useful and pleasant means of freshening and clearing the top surface of the water may be obtained.

The depth of water usually adopted in this country is 3' 6" at the shallow end, sloping down in one line to a depth of 6' to 7' at the deepest point; and, considering the heavy burden the cost of water and its warming is to the authorities, these depths should be considered sufficient for all practical purposes.

The Continental ponds have frequently much greater depth, as, commencing at the shallow end at about 3 feet, and sloping gently to a point at about one-third or a half the length of the pond, the inclination then changes into a much steeper gradient, in order to reach a maximum depth of anything from 8' to 12'. When this practice, however, is adopted, a rope has to be stretched transversely across the pond at the junction for the safety of the non-swimmer.

At every foot of difference in the depth of the water throughout the whole length of the pond there should be indelibly indicated upon the wall just above the safety-rail, in plain figures, the depth of the water. Remember that the level of the overflow is not the general level of the water by some two or three inches, and allow accordingly.

The gangways round the pond should be at least 4' in the clear width at the sides, and from 6' to 8' at the ends. The material for the flooring of this gangway is of great importance. I have myself tried, I think, every possible material, including wood; but there is nothing so good, to my mind, for a paving in this position, and for non-slipping quality, as a well-rubbed, hard, fine-grained York stone. In appearance the color is not very decorative; but where something better than this is desired, there are one or two good-colored mosaic pavements which are not slippery, and which may be safely used.

The gangways should have quick self-draining falls towards a form of surface channel that shall not injure the bathers' feet.

Some of the Continental ponds have an ornamental railing down the entire length of the two sides close to the edge of the curb, so that no bather can enter the pond except from either the shallow or deep end, and in many instances, either as a part of this railing or independently, there is an arrangement for suspending bathers learning to swim. Both of these ideas are good and might very well be adopted by us.

It is as well to remember, perhaps, that the space required in the pond for water polo is from 75' x 35', and the depth from 4' 6" to 7'.

The temperature of water in the ponds should be for men from 70 degrees to 72 degrees Fahr., and for women and children 72 degrees to 75 degrees. That of the room outside of the pond, and including the douche-room, should never be less than 68 degrees, and for women and children it should equal that of the pond.

If the dressing-boxes are to be accommodated in the ordinary manner—that is, down each side of the bath—3' 6" x 3' 6" is ample room, and any greater size simply increases the difficulty already referred to. In the event of the hall being used for entertainments, these dressing-boxes should either be made removable, collapsible, or, what is simpler and preferable, left fixed with the openings over their doors securely closed by suitable shutters.

The fittings required for the boxes are—a seat, footboard, brush-and-comb shelf, and two coat-and-hat pegs. In some arrangements, where larger and better-lighted boxes can be secured, the addition of a mirror combined with the brush-shelf, with a small lock-up drawer under, is to be recommended. There is always a certain amount of theft taking place in the dressing-boxes of public swimming-baths, and many efforts have been made to stop the practice. Mr. Grahame Plumber, the superintendent of the Hornsey Road Baths, has lately devised a system of insurance by which, if valuables are left in a certain manner in the ticket-office, any loss then occurring is made good by the company covering the insurance. I have seen many devices, both in this country and abroad, but none perfectly satisfactory.

An attendant's box should be provided, and adjoining it a room for hanging-up and storing in lockers the bathing-dress of bathers possessing season-tickets.

Among the fittings required for the swimming-bath are the diving-stage, judges' platform, press-gallery, water-chute, for all of which you can do nothing better than adopt the patented arrangements of Professor Newman, the superintendent and swimming instructor of the Westminster Baths.

[To be continued.]



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

MOUNT VERNON CHURCH, BEACON STREET CORNER OF MASSACHUSETTS AVE., BOSTON, MASS. MESSRS. WALKER & KIMBALL, ARCHITECTS, BOSTON, MASS.

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

CHÂTEAUX IN THE VALLEY OF THE LOIRE.

SEE article elsewhere in this issue.

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MAIN ENTRANCES: MOUNT VERNON CHURCH, BOSTON, MASS. MESSRS. WALKER & KIMBALL, ARCHITECTS, BOSTON, MASS.

[Gelatine Print.]

MAIN ENTRANCE: NEW CITY-HALL, HALLE, PRUSSIA.

(Gelatine Print.)

THE new City-hall, occupying the south side of the Market Square, which was built between 1891 and 1893, is the result of an open competition among German architects in 1888, in which Herr E. Schreiterer, of Cologne, won first honors. The façades are of a fine-grained, light-colored sandstone. The style of the building is German Renaissance. The design of the handsome portal reminds one of the doorways of those quaint, old buildings the traveller sees in Franconia, Bavaria and other parts of Southwest Germany.

NOS. 15 AND 16 STRATTON ST., PICCADILLY, LONDON, ENG. MR. C. J. H. COOPER, ARCHITECT.

THE DRAWING-ROOM: CREWE HALL, CREWE, ENG.



THE SECOND FOUNDER OF THE ASHMOLEAN MUSEUM.—We recently recorded the death, in his eightieth year, of a man who will be much missed by the older generation of art collectors. Mr. Drury Fortnum of Stanmore had for fifty years been passionately devoted to the art of the Italian Renaissance, and had proved his desire to give his country the benefit of his knowledge and of his noble acquisitions. He was of a type that was never common and that is becoming very rare. It is true that for one person who collected when Mr. Fortnum was a young man there are now fifty, and that some kind of knowledge of art and bric-à-brac is universal. But, leaving out of count the pretenders to knowledge and taste, the modern votary of old art is different from his predecessor of a generation or two ago. Nowadays we have the student and we have the rich collector; Mr. Fortnum was both in one—he was the studious rich man. He did not, indeed, buy like a millionaire, nor were his researches of an epoch-making kind, but he could afford to gratify his taste—a rather costly one, even in those distant days when he was actively buying—and he loved to hunt up facts and theories about his favorite subjects, the minor arts of the Renaissance. He established a claim upon the regard of his generation by his papers in *Archæologia* and elsewhere, and by his South Kensington handbooks; but he established a far stronger claim, not only on the regard of this generation but of posterity, by his splendid benefaction to Oxford. He was the second founder of the Ashmolean Museum. Before he came to the rescue the old collections of Elias Ashmole and of Tradescant had been stored in the architecturally admirable but inadequate building in Broad Street, where, till the present director put them in order, they lay about anyhow, confused and confusing. Mr. Fortnum admired Mr. Evans's efforts to reorganize the collections and to make them educationally useful; he came forward and offered not only his own large and beautiful series of Renaissance objects but a very considerable sum of money to enable the university to build a new Ashmolean elsewhere. After many difficulties and no little snubbing on the part of certain eminent academical authorities he carried his point; the new galleries were put up, adjoining the Taylor Building, and the director was able to arrange and show a collection of majolica, Della Robbia ware, bronzes, Hispano-Moresque dishes, and the like, which has no rival in England outside the great collections of the British and South Kensington Museums. Mr. Fortnum, who had not been a university man, was persuaded of the utility of such adjuncts to a university education as a carefully chosen collection may give. He was proud, too, of the recognition which the university gave his work, when the honorary D. C. L. degree was voted him, Oxford thus adopting the man who had more or less educated himself.—*London Times*, March 11.

COMBUSTIBLES THAT ARE IGNITED BY WATER.—As water is the substance generally used to extinguish fires, compounds that give off inflammable gas in contact with water become very dangerous when stored in considerable quantities in a burning building, since they render the very agent used to quench the flames a means of increasing their fury. Such a substance is the calcium carbide now largely used for the production of acetylene gas. Every one who has used it in a bicycle lamp knows that even in very small quantities it gives off, when moistened with a few drops of water, gas in sufficient volume to make a large and bright flame. It may easily be imagined what a few barrels of it would do under the influence of a spouting hose. Our city fire-departments are waking up to the realization of this new danger. In New York strict rules have been adopted regarding the sale and use of the carbide. To quote from the *Engineering and Mining Journal*: "According to the new rules, all calcium carbide in transit through the city and on storage must be enclosed in hermetically sealed iron receptacles, and plainly marked 'Calcium carbide; dangerous if not kept dry.' No single package must exceed one hundred pounds. As to the sale of the carbide, not more than twenty pounds either in bulk or in cartridges can be stored or kept in any building used for dwelling or mercantile purposes, and this amount can only be kept on a permit obtained from the fire-department. This permit will provide that all quantities in excess of two pounds shall be in tight metal packages, and kept elevated at least six inches from the floor, in a fireproof safe located above the street grade. The manufacture, transportation, storage, sale, or use of liquified acetylene is absolutely prohibited within the limits of New York. Provisions are made for the storage of calcium carbide in sealed receptacles, in quantities not exceeding one hundred pounds, in isolated buildings of fireproof construction, and the storage must be with a permit from the fire-department, and the entire quantity stored not exceeding five hundred pounds in the aggregate."—*Exchange*.

QUICK GROWTH OF AN OAK.—On Mr. J. W. Overstreet's place, near Tifton, Ga., is an oak 12 feet 4 inches in circumference 15 inches above the ground, and 11 feet in circumference as high up as a man can reach. It has a spread of branches of about 75 feet. The oak was set out just twenty years ago.—*Savannah (Ga.) News*.

SIR JOSHUA ON THE DECORATION OF ST. PAUL'S.—Just now, when the decoration of St. Paul's Cathedral is being actively carried out, a letter written by Sir Joshua Reynolds, which will shortly be put up at auction in London, is of special interest. "I fear," he writes, under date of October 16, 1773, "our scheme of ornamenting St. Paul's with pictures is at an end. I have heard that it is disapproved of by the Archbishop of Canterbury and the Bishop of London. For the sake of the advantage that would accrue to the arts by establishing a fashion of having pictures in churches, six painters agreed to give each of them a picture to St. Paul's, which were to be placed in that part of the building which supports the cupola, which was intended by Sir Christopher Wren to be ornamented with pictures or bas-reliefs, as appears from his drawings."—*Springfield Republican*.

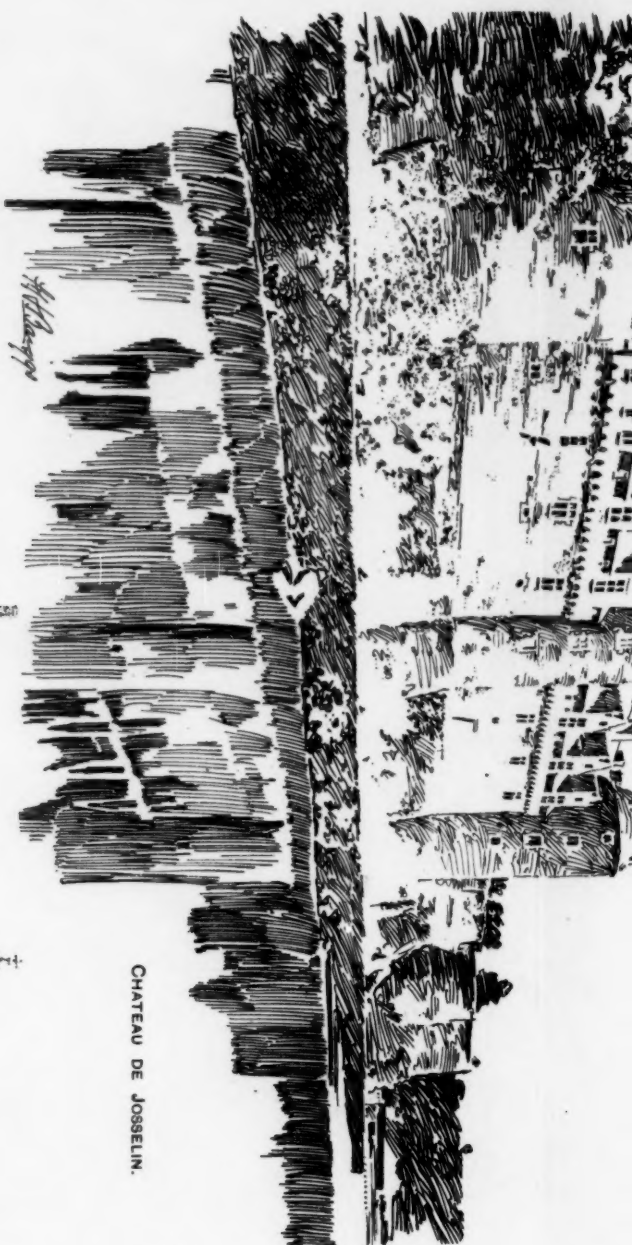
ARCHÆOLOGY IN THE SOUDAN.—The opening-up of the Soudan offers a rich field for the archæologist, and Egyptology will be enriched by many important "finds." A large number of monuments of Egypt's power which have never been thoroughly investigated lie scattered about Upper Nubia. The temples of Soleb, the ruins of the great Cushite cities Napata and Meroë, of which the latter is 560 miles above Assouan, between the fifth and sixth cataracts, the antiquities at El-Messaourat, eight hours' journey from Shendy, are all waiting for the archæologist. In fact, it is almost a virgin country, for its antiquarian treasures have not been investigated since Cailliaud, the French traveller, studied them in the early part of this century. His work, "*Voyage à Meroë, etc.*," published in 1826, is still the main authority for a country which, if not the cradle of Egyptian culture, as was at one time supposed, is full of memorials of the power of the Pharaohs. English archæologists have not been idle in following the Sirdar's wake. Dr. Wallis Budge, the keeper of the Egyptian and Assyrian departments at the British Museum, was there last year, and has been visiting some of the antiquities in the neighborhood of Shendy this year. He returned to Cairo a few days ago from the Soudan. His discoveries have not been made public, and the result of his important investigations are impatiently awaited by all who take an interest in Egypt's wonderful past.—*Cairo Correspondence of the London Chronicle*.

SURVEYING BY MEASUREMENT OF SOUND.—Sound is supposed to travel at the rate of 1,090 feet per second, and the calculation is believed to be as applicable to a cry by the human voice as to the report of a cannon. Travellers and colonists can make themselves be distinctly heard at long distances, but audibility is only a question of power. Although the connection between the sounds emitted by a man can have a relation to distance, yet the voice has not been used as a measure of length. Apparently the first attempt to utilize cries was made by a surveying party attached to the Inter-Continental Railway Commission while at work at Costa Rica. In the report the following description of the process is given: "For the survey we were obliged to extemporize an acoustic method, bandying 'yaups' to and fro three to five times at each station by the watch second-hand, thereby ascertaining both direction and distance. Testing the method on open ground it never differed more than 6 per cent fromstadia measurements; the averages of the two methods would probably be about the same. Our experience gave us great confidence in it. Indeed, no other, no better, device at least could be thought of if we were to make reasonable progress in such a country. Drums, gongs or the like thump-sounders might be an improvement on the voice and carry farther, but the voice has the advantage of being itself lighter to carry, an advantage very considerable. For long shots blank cartridges might be used, but we had none of these to spare." The experiment is interesting, but we suppose it would not be of much use if repeated in an inhabited country. But for pioneers so simple a method would possess many advantages.—*The Architect*.

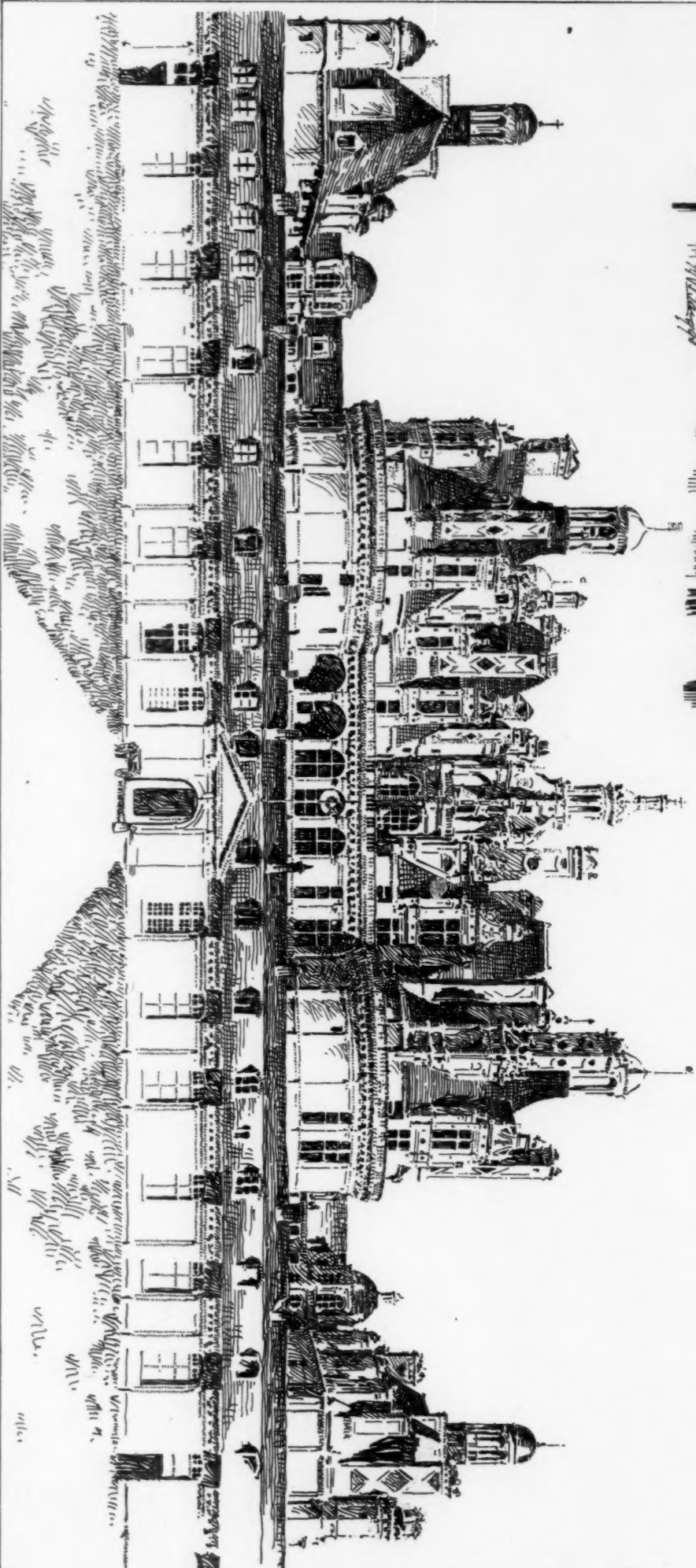
A NOVEL REFRIGERATING PLANT.—In a recent issue of the *Zeitschrift des Oesterr. Ingenieur und Architekten Vereines* is given an illustrated account of the interesting plant installed in the great market buildings at Vienna, which, though there are other and as important plants elsewhere, possess features that render it worthy of notice. As the plant is intended merely to maintain a low temperature without reaching the freezing-point, thus providing storage-rooms cool enough to ensure the proper preservation of meats and other market articles, and at the same time avoiding the objections of too low a temperature, the indirect system is adopted, cooled air being distributed through the storage-chambers by a forced circulation. The refrigerating machines used in this especial case operate with carbonic acid gas, the gas being compressed to liquifaction and the heat of compression removed by water, after which the liquified carbonic acid is permitted to expand again to the gaseous state in coils placed in tanks of brine, the brine thus being lowered to the desired temperature, while the expanded gas is returned to the compressors to complete the cycle. It is evident that any of the accepted forms of refrigerating machines might be used in this manner, the choice depending upon local conditions. The cold brine, instead of being circulated through coils of pipe in the storage-chambers, is permitted to flow over a series of pans or trays arranged in layers in a special chamber, and the air is drawn through the spaces between the trays and thus cooled before being delivered to the storage-vaults. The circulating-fan, placed at one end of the chamber in which the cooling trays stand, draws the air from the storage-rooms through the spaces between the trays and delivers it again into the vaults, the same air thus circulating continuously, in a direction opposite to that of the cold brine over the trays.—*Engineering Magazine*.

CHATEAU D'AMBOISE.

Frederick M. Briggs



CHATEAU DE JOSELIN.



CHATEAU DE CHAMBORD.

CHATEAUX IN THE VALLEY OF THE LOIRE.

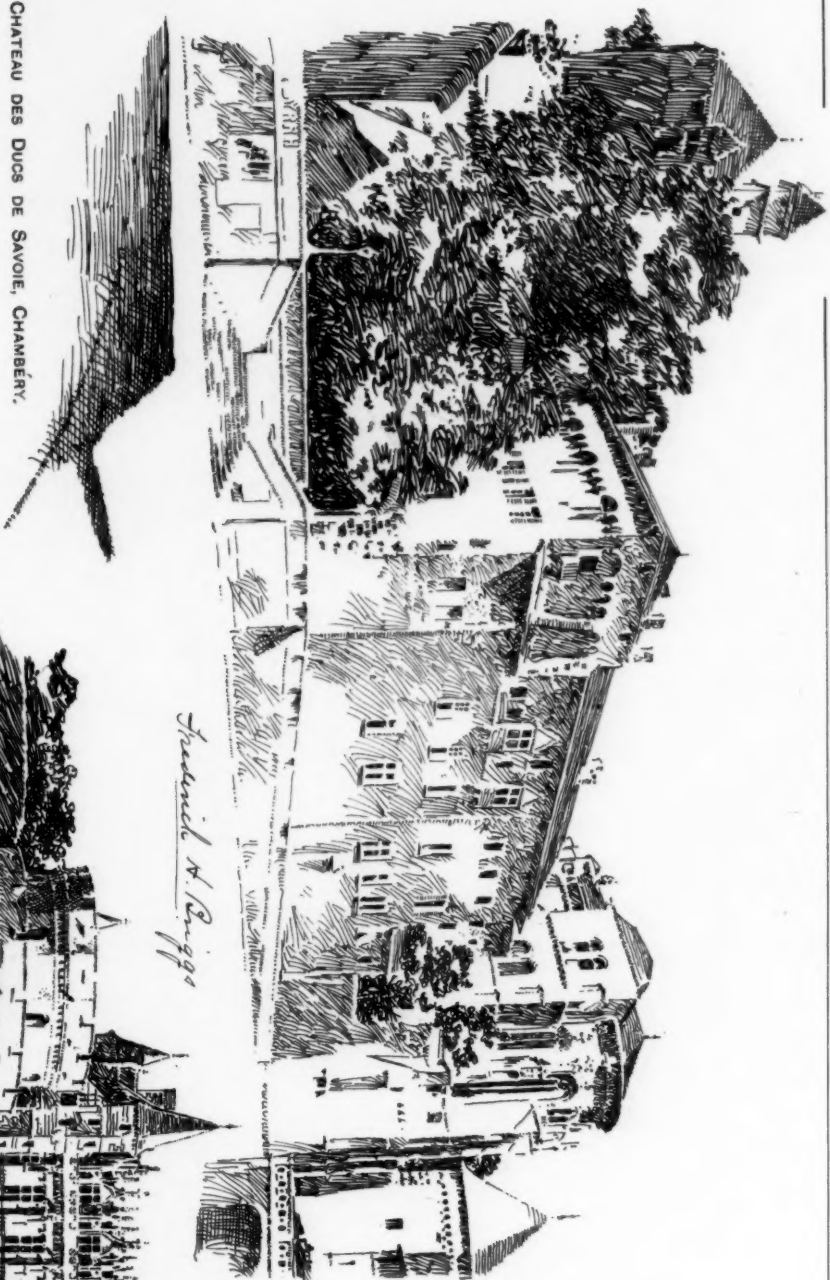
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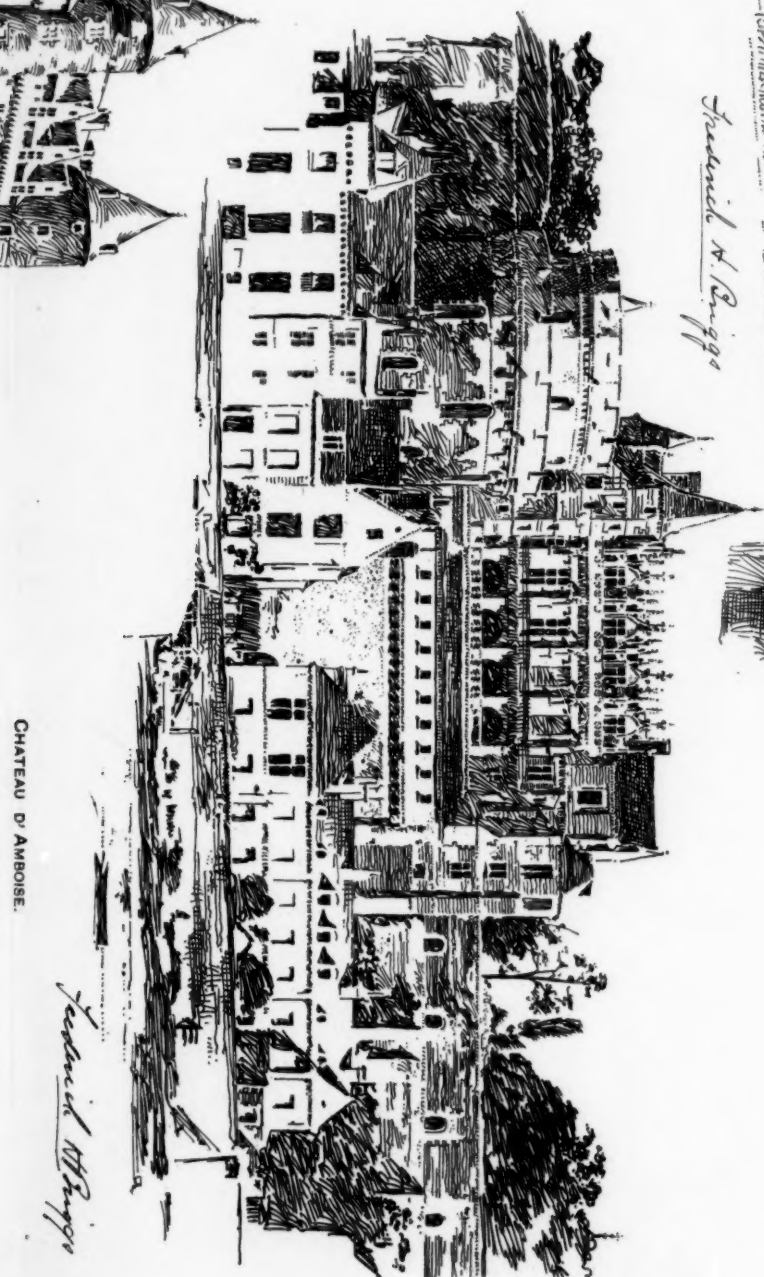
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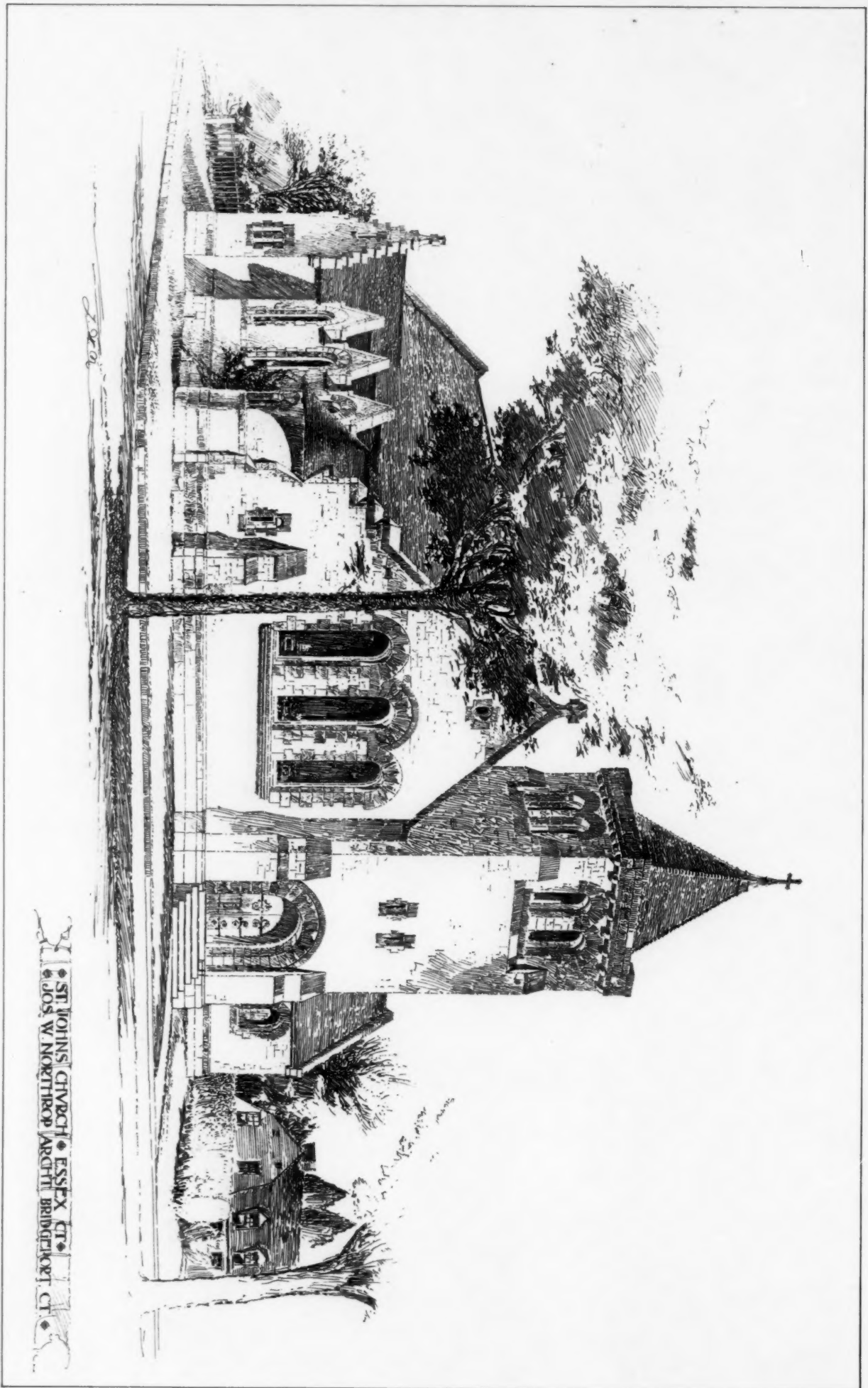
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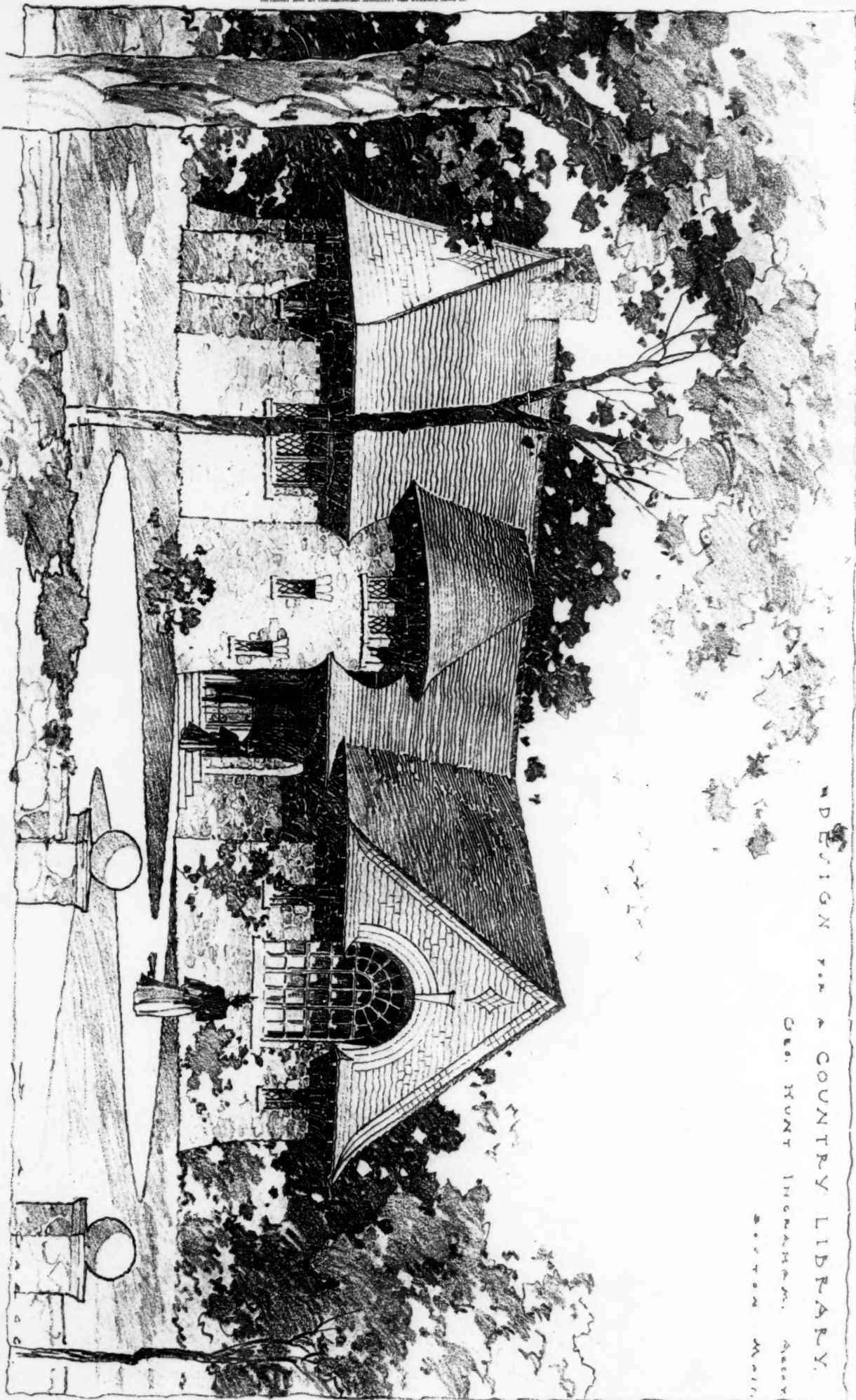
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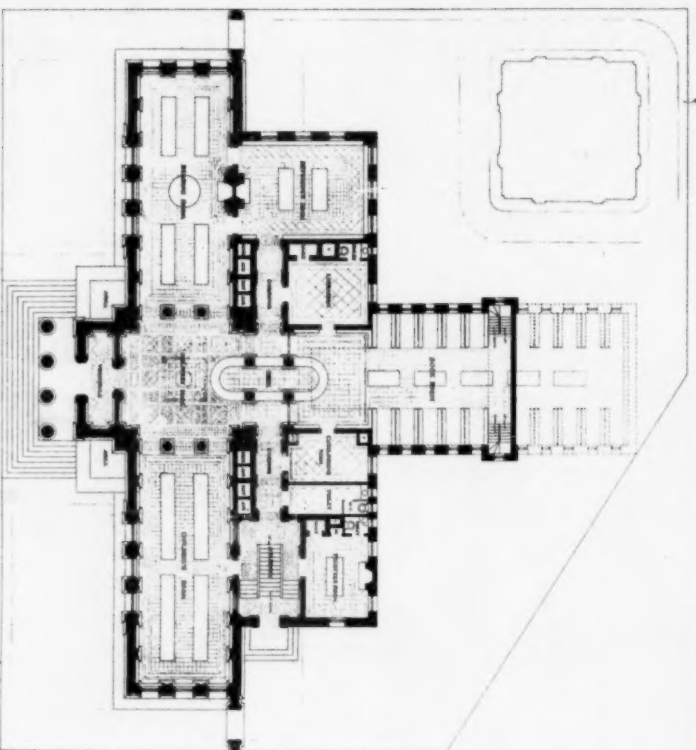


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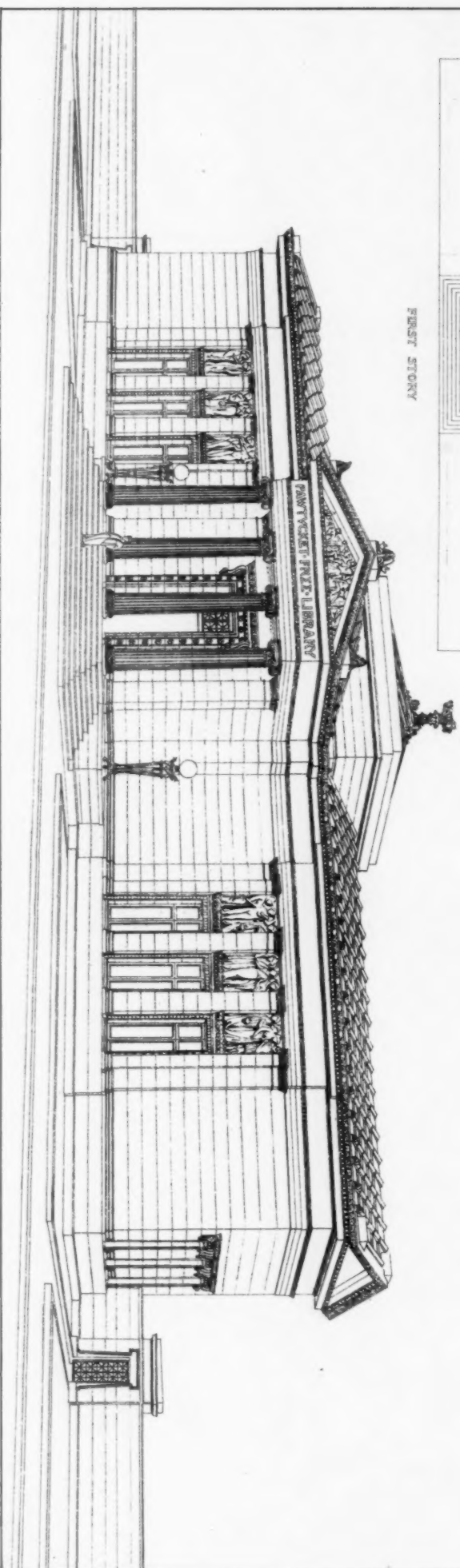
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