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CONTENTS.

THE Illinois State House Commissioners, in their fourth quarterly report, congratulate themselves and the State, because in their agreement with the architect, "for the purchase of all his plans and for his services as supervising architect," they have saved twenty thousand dollars out of the maximum compensation allowed by the State; which they have accomplished by reducing his commission to two per cent, in consideration of their assistance to him in employing a superintendent. Of this agreement we have already given an account (*American Architect*, for April 27, 1878). As a matter of business it concerns only the Commissioners and Mr. May; but as an example, which if it should be used as a precedent would be a disastrous one, it concerns the whole profession. The commissioners find reason also for self-gratulation in the fact that "every possible precaution was taken during the long and tedious examination of the many excellent plans presented to arrive at a decision that would command the approval of the most careful critic." "After such thorough and careful examination, in which all the tests known to the profession were employed," it is but natural for them to trust, in spite of the "unjustifiable criticisms indulged in by some, that the State Capitol of Indiana, when completed, will be a monument of grandeur as permanent in its construction, elegant in appearance, and complete in all its appointments at a less cost than any similar building in the country;" and their confidence "has been most thoroughly confirmed by subsequent developments of a highly gratifying character." A subject for gratulation about which there can be no question is letting the excavation at nine and a half cents per cubic yard, which is less than half the architect's estimate; this part of the work is to be finished by the middle of August. At the date at which the report was made up (June 30) proposals had been invited for the 945,166 cubic feet of stone required by the architect's schedule. The Commissioners report that they have visited the principal stone quarries in their State and its neighbors, and have procured and tested sample blocks of their various stones. It is to be hoped that the results of their experiments may be made known for the benefit of other people. The public is greatly in need of trustworthy statements of the qualities of our building stones, particularly in the West. To put on record a series of intelligent and accurate tests of them would be a service as great, if not as ambitious, as supervising the Indiana capitol.

ANOTHER sentence or two may be quoted from the report, which curiously illustrate the position of the Commissioners. They have been examining buildings as well as quarries. Their examination has "developed many highly important features of interest that the Commissioners have been utilizing," and they have "obtained many useful suggestions in regard to the beauty, utility, and economical use of improvements in style of finish, as well as material to be used." The truth is that the Indiana business is quite a new experiment in public building, though something approximate to it has been tried before. It is an attempt to put not only the financial but the technical management of a great edifice into the hands of a commission of amateurs, controlling an architect whose functions are simply ministerial, — who is in fact virtually a head-draughtsman. This is analogous to the methods introduced into the English Department of Public Works by the late commissioner, Mr. Ayrton of blessed memory; the legitimate conclusion of it is, according to the tradition which he has left behind him, to discard architects altogether, and employ only draughtsmen. Inasmuch as nobody but the disappointed architects seems to have tried to disturb the Indiana commissioners, we may assume that they are doing only what the Legislature which appointed them intended they should do. But we doubt if the next generation will find reason to be grateful for their experiment.

THE general strike which was to have interrupted all the railroad commerce of the country on the 15th of June has been reappointed, as the public is carefully informed, for the 15th of August. Whatever the chance of there being any serious attempt to carry it out, the proposal is exciting a good deal of alarm in Pennsylvania, the natural headquarters of railroad laborers and miners, who are said to be united in their purpose, and to have hopes that the workmen of the large manufactories throughout the United States will join in the strike. The communists over the country naturally hail the story with delight, and their talk of plunder and division is louder than ever. It is not likely that the labor-unions are yet ripe for any such extended combination as the plan would require, or that if it were tried it could have anything more than sporadic success; but the fact that it has been so paraded shows an uncomfortable degree of confidence. Now that Kearney has left California and has come East, the newspapers make haste to say that the workingmen of the Atlantic States are too sensible to listen to the orator of the sand-lots. But on the other hand we find committees of workingmen preparing to receive him, and at a meeting held in Lynn to invite an address from him the newspapers were "denounced" for calling him a communist, while it was declared that so long as he showed himself to be acting in good faith he would be unanimously supported.

ALTHOUGH the new English Society for the Protection of Ancient Buildings, which has just published its first annual report, cannot yet furnish any great record of actual achievement, there is no doubt that it has already accomplished something of value in giving, as the report claims, a rallying point for a good deal of feeling, which has been growing stronger of late years, but for want of combination could not make itself felt. The tirades of Mr. Stevenson against architects' restorations, to which we called attention when they were delivered, though unduly impetuous, will doubtless be of service as a wholesome warning to architects, who in the zeal of an honest attempt at restoration may easily overshadow, if they do not destroy or pervert, the old work which they should maintain. Essays published by Professor Colvin and Mr. Loftie have well seconded Mr. Stevenson. One useful work which the Society has undertaken is to collect information about all the unchanged old buildings in the kingdom. It has printed a tabular blank form for the description of churches, which is to be distributed among all its members, to be filled up by whomsoever may find a church to describe, churches being the most numerous and important of old buildings. Already it has information of nearly seven hundred and fifty old churches in England and Wales which are quite unrestored. Mr. Coventry Patmore proposes that the information so collected shall be published in a pamphlet, which would be much to be desired even though it should make a volume, and supports his proposal with a subscription of fifty pounds. The report says rightly that the work to be done is heavy, and that "mere cynically brutal destruction, not veiling itself under any artistic pretence, is only too common." The truth is, probably, that notwithstanding the great awakening of interest in art and archæology among students and amateurs, the great mass of people in England, as well as elsewhere, are, just as they always have been, indifferent to everything but what they are directly engaged in. The continual destruction of the London churches, which the report bewails, goes on unaffected by remonstrances. Concerning this Mr. Carlyle writes to the Society: —

I can have but little hope that any word of mine can help you in your good work of trying to save the Wren churches in the city from destruction; but my clear feeling is that it would be a sordid, nay sinful, piece of barbarism to do other than religiously preserve these churches as precious heirlooms; many of them specimens of noble architecture, the like of which we have no prospect of ever being able to produce in England again.

The Society does not limit its ultimate intention, though as yet it has its active effort, to the care of buildings in its own country. Its report suggests that it may lend its hand to the defence of ancient monuments in the rest of Europe. Many people will sympathize with this aspiration who will not be surprised to learn that "the magnitude only of this undertaking has prevented the committee from taking active measures in this important matter." Missionary work of this kind is needed enough wherever civilization is old, and if an English society should find that the foreign nations of Europe are not so open as it could wish to its influence there is still a pretty ample field in British India, where a great deal of venerable architecture is going to destruction. There is in fact a still more important field, sadly in need of care, to which, if England is disposed, as she seems, to extend her protectorate over the half-civilized powers, the conservators among her people might be turned, — a field in which they have already done good service. The whole of Asia Minor and the Mediterranean shore of Africa are strewn with the remains of classic and Semitic architecture, where is material, if anywhere, out of which to build up the most important missing chapters of the history of art. It is perishing every day in the hands of Mahometan people, savagely contemptuous of whatever does not bear the seal of Islam, but whom Englishmen seem nowadays moved to instruct in the ways of modern life. "Sometimes," said the late M. Beulé, in his account of his Carthaginian explorations, "I stop before an Arab who is destroying a tomb to make lime. I tell him that those whose last resting-place he is violating were of his own race, perhaps his ancestors. He looks at me doubtfully, reflects a moment, then asks me if these fathers of his fathers knew Mahomet and the true God. When I answer no, he emits a guttural exclamation, resumes his pick-axe, and continues, with tranquil mind, his work of destruction." If missionary work is to be done, here is opportunity enough and to spare.

The most noticeable contribution to our knowledge developed in the Conference of Architects held in London in the middle of June may be found in the discussion regarding the use of iron as a building material. Professor Barff explained his system of creating upon the surface of this metal a preservative oxide. Various fire-proof inventors discoursed upon the protection of iron from destruction by fire; prominent among the preferred devices were those of our countrymen Messrs. Drake & Wight, of Chicago, for encasing iron columns with terra cotta, concrete, and other fire-proof materials, an invention which the Englishmen claimed to be very similar to what was done by Mr. Whichcord, some four years ago. Mr. Hyatt's volume on fire-resisting construction was also referred to as the most important contribution to the recent literature of the subject, although his main conclusion that fire-proof floors cannot be made if the bottom flanges of the iron beams are left exposed or are too lightly covered is said to have been "already attained by Whichcord, Hornblower, and others." Mr. Hyatt's patents for the use of timber in fire-proof construction, which are said to be essentially like those of his English contemporaries, Messrs. Evans & Swain, the systems of both parties being based upon the property possessed by solid timber of resisting fire for a long time, provided it is so disposed that the fire will attack it only on one surface and is not allowed to play around it, were also highly commended. Although American ingenuity in this department, as in all others, was not allowed to make a claim for priority of invention without an English challenge, it was evident that the activity and intelligence of Americans could not but be important elements in any advanced discussion of the subject of fire-proof building. Mr. E. M. Barry, Professor of Architecture in the Royal Academy, wound up the whole with an expression of his confidence that "iron is the material of the future."

Not a little evidence, however, was gathered together that this confident prediction is not destined to receive universal acceptance; for as regards the great tubular bridge of Robert Stephenson, it was stated by high authority that "no such structure will ever be built again," and certain engineers testified that they saw "tons upon tons" of ruinous red rust which had been shaken from its sides. It is claimed that no coating of enamel, or oxide, or concrete, or paint has been yet discovered to permanently protect iron construction from this insidious agent of decay. In all its joints and articulations, in all its bolts and rivets, wherever there is movement by contraction or expansion or vibration, wherever the smith's hammer or wrench has forced the work together, there must sooner or later be naked metal open to the invisible and motionless vapor of the air, which slowly and surely must disintegrate the structure in its most vital parts and render its ultimate dilapidation and fall only a question of measurable time. This fatal vesture of decay, it would seem, must needs vitally affect the validity of all claims for iron as the building material of the future. On the other hand, various letters have been published since the Conference, from which it would appear that in the case of the tubular bridge the accumulation of rust is to be measured rather by *ounces* than *tons*, and that even now the resources of science are sufficient to protect the joints of iron structures from the adverse influence of the weather, and that constant watchfulness and frequent renewal of preservative coats in the vulnerable parts will effect the same object. It is also claimed, notwithstanding the assurance of Professor Barff that wet Portland cement or concrete will set up an oxidizing action upon the iron which is embedded in it, that as the interior platings of iron ships are coated with Portland cement, which succeeds in protecting them from the deleterious action of foul sea water, and that as a similar coating will protect iron from fire, it must, when properly applied, render any iron construction very safe indeed from any ordinary changes of temperature.

Although the pamphlet before us is the sixteenth issue of a journal that has entered on its second volume, yet it seems proper for us to speak of the *Building World* as a new periodical, for probably but few examples of it have found their way to America. Published monthly in London, this pamphlet of twenty-four crown octavo pages, illustrated by two full-page wood-cuts, has that distinctively scholarly and attractive appearance that English printers so well know how to impart to their handiwork by their choice of type and style of make-up. That the proprietors of this journal should enter it upon a field already so well cultivated by the weekly journals seems to be a most promising indication of the growth of architectural education in England. That it is intended to meet any crying want, or to cover any ground not already covered, does not appear from the one number we have seen; but seemingly it is intended to have a somewhat wider literary scope than is usually the case with technical journals, for we find the first thing here treated of to be the all-absorbing subject of the late treaty at Berlin. The other articles are, with one exception, however, either upon architectural or engineering and scientific matters.

MODERN PLUMBING. VI.

WASH-BASINS. — PANTRY SINKS. — FILTERS — BATH-TUBS.

A certain amount of taste may be exercised in choosing among the different patterns of wash-bowls and the modes of fitting up the slabs. The most agreeable apparatus in appearance is certainly the combined bowl and slab in one piece of porcelain, which is common in England but rarely seen here. Few things can be more inviting than the white basin, with the water issuing from the mouth of a small lion's head modelled in the porcelain of the basin and controlled by cocks above the slab, and the spotless slab itself, with its soap-cup and brush tray, the whole of which can be cleaned in a moment with a sponge, and will remain always free from the grease spots and stains, and the black and gaping joints, which in time overtake our marble set wash-bowls. But as they are easily broken, and not very easily replaced, although not very expensive, they are little used in this country.

With our common basins it is important that the top should be of hard, compact marble. The so-called blue-veined Italian is most used, and is very suitable, both in color and hardness. The fancy colored marbles are hard, but expensive and unsatisfactory in appearance, and the pure white statuary marbles, though beautiful, are so open in grain that they soon get stained, beyond possibility of cleansing, by grease and colored soaps. There are some American marbles which resemble the blue-veined Italian, but they are coarser and less agreeable in color.

The figure considered most desirable in the marble is an evenly distributed mottling, rather than lines or streaks. The appearance of the work is much improved by having the slab $1\frac{1}{4}$ inches thick, instead of $\frac{7}{8}$, and counter-sunk, or "dished" $\frac{3}{16}$ of an inch or more in depth, and the edge moulded to an ogee section, which gives more finish than a plain rounding and avoids the dirt-harboring angles of

more elaborate mouldings. The wall-plate or slab of one inch or ¾ of an inch marble, which is placed against the wall, should be of liberal height; fifteen inches is not too much, and its edge may also have an ogee moulding.

The stoneware basin itself is commonly streaked with a rude imitation of marble, but is often decorated with gold and colors, sometimes very richly, but rarely with much artistic success. A basin may be ornamented in some simple way for three or four dollars, or any design can be executed to order, and for the best class of houses some decoration is desirable.

For certain purposes special varieties of bowls are made, which are sometimes useful. One of the best of these is Schweikert's folding wash-basin, which, when open, displays a small bowl, hot and cold water faucets, and a little shelf for soap and brushes, all nicely enamelled and the faucets plated. The basin is emptied by turning it up, when its contents run into the small sink forming the lower part of the apparatus, which is provided with a bell-trap. The whole is of iron, white enamelled inside and painted outside, and is provided with couplings for the two supply pipes and the waste. When folded up the faucets are inclosed by the bowl, and the whole projection from the wall is only about four inches.

For use in public places and on board ship, double basins are made, which are emptied by turning the inner basin upside down, thus throwing the contents into the outer basin, from which it escapes into the waste, this mode of discharge preventing sediment from being left to accumulate, as it often does about the strainer of an ordinary bowl. Some of the Jennings bowls are made in this way, — the "tip-up" basins as they are called. But there are other kinds. One variety is supplied through the pivots on which the inner basin turns, and can be flushed while inverted, but they may have any form of supply.

For cheap work, basins and slabs can be had of any dealer in plumbers' materials, made wholly of cast-iron, enamelled, galvanized, or painted. The enamelling is now very well and thoroughly done, and such apparatus may serve a good temporary purpose; and the best ones, complete with their stand, are rather ornamental. The greatest variety of this kind of work is done by the J. L. Mott Iron Works, in New York, but most of their patterns can be had of any dealers.

The fitting up of pantry sinks is similar to that of wash-basins. The supply and waste-pipes are of similar sizes; the sink is usually covered with a marble top, and the attachment of the fittings is similar.

For a trap a 1¼ inch S-trap is very commonly used, and, if ventilated, is perhaps the best form; if unventilated, the worst. A considerable amount of grease and solid waste comes from the washing of the dishes, and interferes with the working of the valve traps, which alone, if unventilated, possess any power of resistance to gas under pressure, while the S-traps, in which the flow is rapid and unobstructed, can be depended upon to keep themselves clear; but the ventilating pipe is essential to prevent siphonage and back flow of gas. Many plumbers put in reservoir traps, Adee's, or home-made round or D-traps, to separate and collect the grease. If these are used they must be opened and cleaned at intervals, as they will not keep themselves clear so well as an S-trap, but the necessity for using them will depend upon the habits of the house in regard to the amount of grease thrown down the sink, and on the length of waste-pipe beyond the trap. If this is of small calibre and laid nearly level, whatever passes the trap will congeal before it reaches the main soil-pipe, and the only way to avoid this is to have it collected in the trap itself, where it can be reached and removed. Where ventilating pipes are used they must be connected at the very top of the bend, and should be cleared out occasionally through the trap screw opening, as they sometimes get choked by greasy scum lodging in the mouth, and when this has happened the trap begins to siphon out as if unventilated.

The pantry sink itself is made of tinned copper, generally about fourteen by twenty inches for private houses, and either round or flat-bottomed. The flat-bottomed sinks hold less water, but the dishes are not so likely to slide down the sides and come into collision, hence they are generally preferred.

The socket, plug, and chain form the cheapest arrangement for closing the waste, but the long chain with the heavy plug at the end is very apt, in careless hands, to overturn and break dishes, hence in the best class of work a "waste cock," consisting of a large brass stop-cock on the waste-pipe, worked by a long spindle and lever above the slab, is used instead of the plug and chain; or some form of valve may be employed similar to those used for wash-basins.

The supply is usually, but not always, through pantry-cocks so high as to be out of the way of the dishes. Water for drinking is usually drawn here, and for this reason, even when the other plumbing apparatus in the house is supplied from a tank in the attic, filled by a "rising main" from the street and a ball cock, as is usual in the best work, the pantry cold water should be taken directly from the rising main, not from the tank. The cold water cock is usually specified to have a screw, so that a filter can be attached in case of need.

Filters of various kinds can be procured, ready to attach to the faucet, or one can be made out of simple materials by tying a bag of flannel, with a clean sponge tightly stuffed into it, to the cold water cock, which will serve a good purpose. A neater appearance is presented by the small brass nozzles, with some filtering medium inclosed, which fit the screw of the faucet, such as the Houghton filter, made by the Walworth Manufacturing Co., of Boston, in which the water passes through coarsely powdered charcoal, or others which employ compressed sponge, sand, etc. The cost varies from twenty-five cents to two or three dollars, and the efficiency is about in proportion to the price.

Bath-tubs are made of a variety of materials. Occasionally one is seen in a lunatic asylum, or some other place where it is liable to rough usage, in form a hollowed block of stone, natural or artificial; and baths of marble or slate slabs grooved together and cemented are still used in England.

In this country metal is preferred, and iron, zinc, lead, and copper are used. Cast-iron tubs are found in old plumbing, and are still sometimes employed for the sake of strength or cheapness. The enamelled ones are much the best, but the expansion of the metal by the hot water will in time cause the enamel to scale off. If not enamelled, they must be painted, but the paint gives a slimy, disagreeable surface, and needs to be often renewed. Zinc-lined tubs are sometimes used for economy, costing only about half as much as the ordinary kind, but they are not durable. Lead linings were once common, but have been superseded by tinned copper, which is in this country the material most commonly used.

A wooden box, the length of the bath desired, is blocked up inside to the required form, and lined with the copper, which may be had of any weight, from ten to twenty-four ounces per square foot. Sixteen-ounce is the weight usually specified; if lighter than that the copper will cockle from the expansion caused by the hot water. Near the top a perforation communicates with a short overflow tube. The regular sizes for tubs are five, five and a half, and six feet long, and the price is the same for all these lengths. Any desired size can, however, be made to order. The rough boarding which forms the outside of the tub is cased over with panelling after the tub is set and connected, and a cap of wood is put on top. When thus finished the whole width is about twenty-five inches, and the height about twenty-three inches. Tubs of the French pattern, which are rounded at both ends, and an inch deeper and wider than the common kind, but only four and a half feet long, are often used where the space is limited; and any kind can be bought ready cased instead of being put in rough and cased by the joiner afterward. Where hard-wood is used for finishing around plumbing work, as is now customary, black walnut is to be preferred. Other hard-woods contain sap or albumen, which the warmth and moisture affect, but black walnut seems to be free from anything of the kind.

The modes of supply and waste adapted to baths vary according to taste. The common arrangement for supply consists of separate bib-cocks, plated or not, for hot and cold water; and special bath-bibs are made, projecting but little over the edge of the tub. They may be compression or ground cocks, or on the Fuller principle, and can be had with separate levers and a common outlet, so that the water is mixed as it flows; but this is more expensive, and may not work perfectly where the hot and cold water enter at very different pressures.

For waste, some form of valve, operated by a lever or lifting handle above the tub, is used with the more expensive fittings; but in ordinary cases a brass socket and strainer, with plug and chain, are considered sufficient. To connect the waste to the tub, instead of using a coupling attached to the socket, a circular depression is made in the copper of the bath, some three inches in diameter, and in the middle of it is cut a hole large enough to admit both the waste-pipe and the socket. The end of the waste-pipe is put through the hole, scraped bright, and flanged out; the brass strainer set in and solder poured in until the circular cavity is filled up level with the bottom of the bath, uniting lead waste-pipe, copper bath-lining, and brass socket, all firmly together.

A better method than this is to use the Scrimgeour bath plug, which screws down through the bottom of the tub into a socket below, this socket forming the end of a brass pipe connected with the lead waste-pipe. The tub can thus be disconnected from the waste without cutting any pipes.

It is often desirable to avoid the noise of the falling water, especially where the bath is situated near a bedroom. For this purpose the tub is made to fill from the bottom, and this is effected in various ways. The usual arrangement is to put in a strainer to the waste-pipe, without socket or plug, and carry the pipe a few inches horizontally under the tub, till it reaches a large brass waste-cock, or a valve of some kind. Into the short piece of pipe between the waste-cock and the strainer the hot and cold supply pipes are entered, with ground stop-cocks, having long spindles extending to the top of the tub, the levers being put on above the wooden capping. The lever of the waste-cock or handle of the valve is also brought out above the cap of the tub, usually between the hot and cold levers, and under each lever is a plate, engraved "Hot," "Cold," or "Waste," as the case may be. Sometimes a large four-way cock is used, with a single lever and plate on top of the bath. The plate is engraved "Hot," "Cold," "Shut," and "Waste," at different points on the circumference, and as the index on the lever is turned to the respective points the water is admitted at the bottom, hotter or colder as the index inclines to one side or the other, is shut off, or allowed to run to waste, as desired. This is a very neat arrangement, but takes up four or five inches more in length than the

common mode, which may be a disadvantage in a restricted space. Blessing's patent tubs, which are sold at the Jennings Sanitary depot in New York, are supplied in this manner, but four-way cocks of the same kind are made by Joel Hayden & Co., and probably by other manufacturers, and can be applied by any plumber.

Where the same pipe serves for a short distance both for supply and for waste, as usually arranged for bottom supply, the first water that is drawn in filling the tub is apt to bring with it a soapy scum, which remains in the waste-pipe from the last use of the tub; and many plumbers prefer to introduce the water by a separate inlet close to the bottom of the tub, with a fan to mix the hot and cold water, leaving the waste-pipe for its own work, and this can then be arranged with plug and chain, or valve, as desired. "Adee's Bath Supply" is an arrangement of this kind, using a neat plated cap over the inlet instead of a common fan of sheet copper soldered to the lining of the tub.

It is needless to say that no bath should be without an overflow, connected with the waste above the trap. The bath supply-pipes are five eighths or three quarter inch, according to the pressure, and for the waste one and one half inch is large enough, though two-inch lead or iron pipe is often used. The waste-pipe is very often connected with the trap of a neighboring water-closet, entering it below the surface of the water in it. This is not very objectionable, — at least it is better than to use a separate trap which siphons itself out, — but a good, independent trap is to be preferred. There is little sediment to be feared, so that a well-ventilated S-trap is quite sufficient. Where ventilation is impossible, a valve trap, Waring's or Bower's, will be necessary to resist back pressure of gas, and will be here under favorable conditions for working well.

Safes of sheet lead, turned up at the edges, should be put under bath-tubs in upper stories, where a leak would injure the rooms below, and the wall should be lined up with two-pound sheet lead some twelve or fifteen inches above the tub, the lower edge lapped over the edge of the tub, and the wainscoting or other woodwork put on over it, to prevent water from being splashed between the tub and the wall.

Shower-baths are arranged in many ways, for horizontal or vertical delivery, or with several horizontal jets meeting in the centre, but they are not very much used now. A diminutive form of shower known as a "shampoo cock," consisting of a small, plated rose attached to a rubber tube, and supplied with hot and cold water, is generally used as a substitute for the large shower, and is often fitted up over wash-basins as well as baths.

THE ILLUSTRATIONS.

LODGES AT THE EAST ENTRANCE TO GREENWOOD CEMETERY. MR. R. M. UPJOHN, ARCHITECT, NEW YORK.

The problem was simply to provide a porter's lodge, but as a balancing piece on the opposite side of the road has been put up a visitors' house. The road from the outer or street gate to the inner or cemetery gate proper is one hundred and fifty feet in a straight line, and two thirds of this distance from the outside the buildings are placed. To the right is the visitors' waiting-room, with retiring-rooms, built on the plan of a Greek cross; the main room, 17 × 17 feet, occupying one of the arms, while two smaller anterooms lead to the toilet-rooms in the most retired arm. A hexagonal outline is given to the front room by truncating the corners. The floor is tiled, and the finish and furniture are of black walnut.

The ceiling is finished in bays of black walnut showing stout beams, while about the room runs a cornice of the same.

At either of the angles of the cross-plan looking upon the road are porches in stone, with triple columns at the angle and engaged columns against the wall of the building. Above the four approaches thus created are sunken tympana, on which are represented allegorical sculptures of youth, infancy, manhood, and old age, carved by Moffat. The exterior is entirely in Belleville brown stone, cut in coursed rock face work, and about the cornice runs a bold sculptured moulding in foliage. The central point of the building is an ornamental chimney-stack, while dormers light four sleeping-rooms in the upper part for laborers or others. The main waiting-room has stained-glass windows. In the central one is a figure of St. Cecilia, the saint of sacred song and praise.

Directly across the road from this building is the keeper's lodge, a much more pretentious structure, though following the same plan. The arms of the plan measure 48 × 44 feet. In the central portion is the hall, with stairs leading from the first story, which is fourteen feet high, to the second, which is nine feet in the clear. Above this hall the building is carried up into a stout, solid-looking tower, with windows above, topped by a slated roof, the whole rising nearly sixty feet. Belleville stone is used throughout, although wooden piazzas are built in places corresponding to the stone porches of the visitors' building. The interior plan gives a main room about twenty feet square on one side of the main hall, and two rooms on the other. These last rooms have square bays, which are carried out in stone, with crocketed parapets. The carving is very finely done, though it is confined entirely to foliage and architectural carving. The finish within is of black walnut.

The gate posts are also in Belleville stone, and upon these special care has been bestowed, and their massive bulk has given opportunity for some fine sculptured work. The gates in iron wrought at the anvil are worth a special visit for study. The entire cost of the work at this entrance aggregates some $30,000.

GALVESTON COTTON EXCHANGE. MR. JOHN MOSER, ARCHITECT, GALVESTON.

The building is 67 × 125 feet. The first floor has the halls and stairways and offices for a bank, and the second floor has the Secretary's and Directors' rooms and the exchange hall. The latter measures 62 × 84 feet and is 38 feet high. The building is built of Philadelphia pressed brick relieved with Austin stone. The cornice is of galvanized iron, and artificial stone finish is used on the breasting. All the carved decorations throughout the building are designed from the *motif* of the cotton-plant; the crown ornaments of the front are a cotton bale with a crown on it, "Cotton is King." On the side of the building the main point in the cornice is accented by two shields with a bull and a bear respectively on them. The building will cost $80,000.

THE HOTEL CLUNY, BOSTON, MASS. MR. J. P. PUTNAM, ARCHITECT, BOSTON.

This apartment house, which was finished last spring, faces on the triangular space which is made one of the architectural centres of the city by the contiguity of Trinity Church, the Museum of Fine Arts, the New Old South Church, and other new buildings.

A MONUMENTAL DOORWAY DESIGNED BY MR. BERNARD VONNEGUT.

This design was prepared as a part of the regular work of the architectural class at the Massachusetts Institute of Technology at Boston.

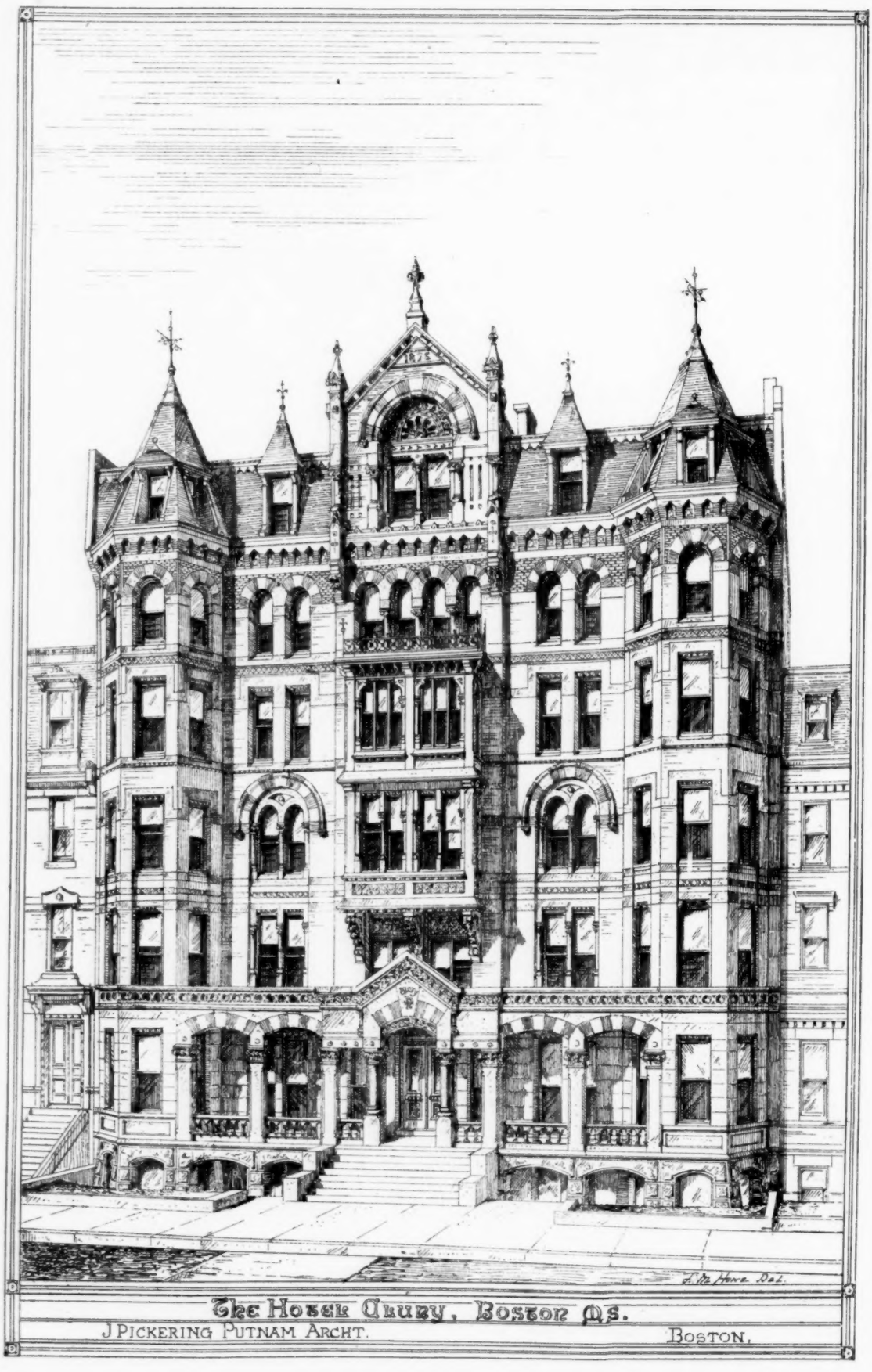
THE ANTI-RESTORATION MOVEMENT.

Baby's first birthday is always regarded with a peculiar interest; and the presentation of the first annual report of a new society, whether learned, sentimental, or social, is an occurrence of precisely corresponding importance. The infant phenomenon has by this time got beyond mere crowing and crying. It exhibits teeth. It is large for its age. It after a fashion walks — possibly talks. It is capable of being good, or naughty — certainly dear. It has developed a likeness to its mother, or its father — perchance its grandfather if the old gentleman is very much looked up to — or its great-aunt if the old lady is casting about for a legatee. Perhaps the simplest idea connected with its first birthday is that it has succeeded in getting through one year of this world's joys and sorrows, and may therefore be expected to go on getting through an indefinite number more. So the "Society for the Protection of Ancient Buildings" has lived one year of a society's life, and commemorates the occasion by the delivery of its first Report of the Proceedings.

It is pretty well agreed on all hands that the *raison d'être* of this new association is a reality of some kind. No doubt it has its little pretences and pretentiousnesses, like all things else in our day. The time has gone by, if it ever existed, when a public movement could be sustained without a certain modicum of clap-trap. But we are accustomed to be content if the amount of this alloy be reasonably small in comparison with the weight of real metal, and it cannot be said as yet that the new society is mixed up with nonsense (to speak plainly) in any such degree as to arouse public suspicion, far less public displeasure. Accordingly, in the Report now published, although there is perhaps a little strong language to be found, there is quite as much good sense as we could have expected. In the following years there may be more.

It is not to be supposed that this particular confederation — based upon enthusiasm as its first principle — should be altogether sober-sided. Serene it may be, and even severe, but of necessity it is indignant. Anger, indeed, would not be too strong a word to signify the feeling which has given it birth and which still affords it sustenance. Not a few of its leading men may even be thought to sulk; some appear to go so far as to pant with suppressed wrath, as if, like the prophet of old, they did well to be angry with destiny. "The work to be done is heavy," says the Report; "mere cynically brutal destruction, not veiling itself under any artistic pretence, is only too common." From a fraternity of artistic intellects, impelled to the protection of artistic treasures, these words come with the true old ring of what used to be called generous rage; and not only are they entitled to public consideration, but it must be borne in mind by cooler critics that they would never receive it if they were not somewhat urgent in their earnestness.

"The Society," we are further told, "has already been much noticed by the Press, always with respect, and generally with unqualified approval." This, we think, is very fairly put, and it is to the credit of public opinion, quite as much as of the Society itself, that this is so. Ancient buildings have long, if not always, been held in instinctive esteem amongst us. Since the zealous times of the Reformation, which were quite exceptional, the common people of the country at large have regarded them — whether churches, castles, houses, or even tumble-down taverns — with filial reverence everywhere. The gentry were never of any other mind. The middle classes in the bustling towns, and their busy work-people, may have been too much occupied to think of such matters; but even they, we are inclined to suppose, have never really been quite unim-



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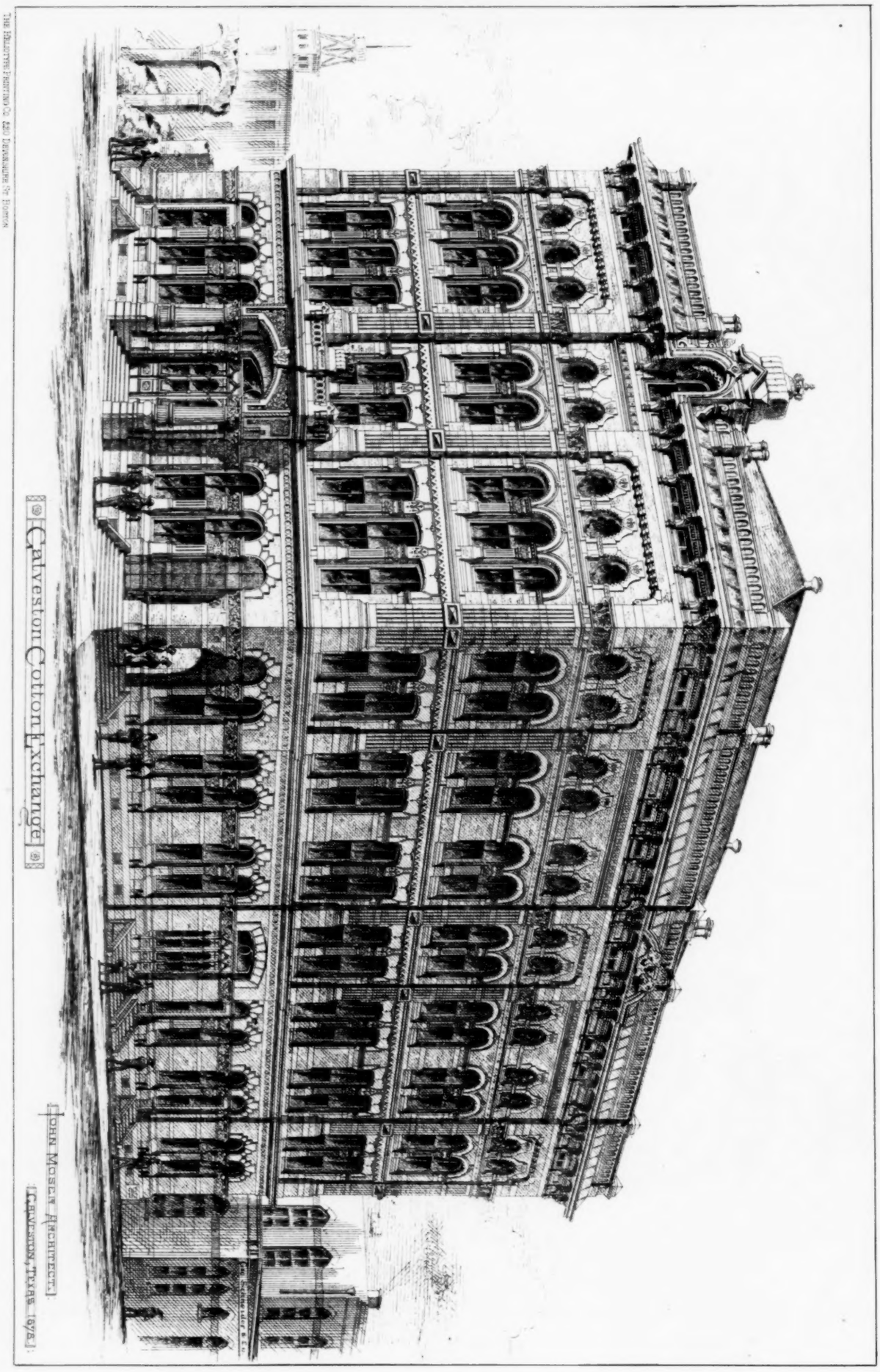

GALVESTON COTTON EXCHANGE.

JOHN MOSER, ARCHITECT.

GALVESTON, TEXAS. 1878.

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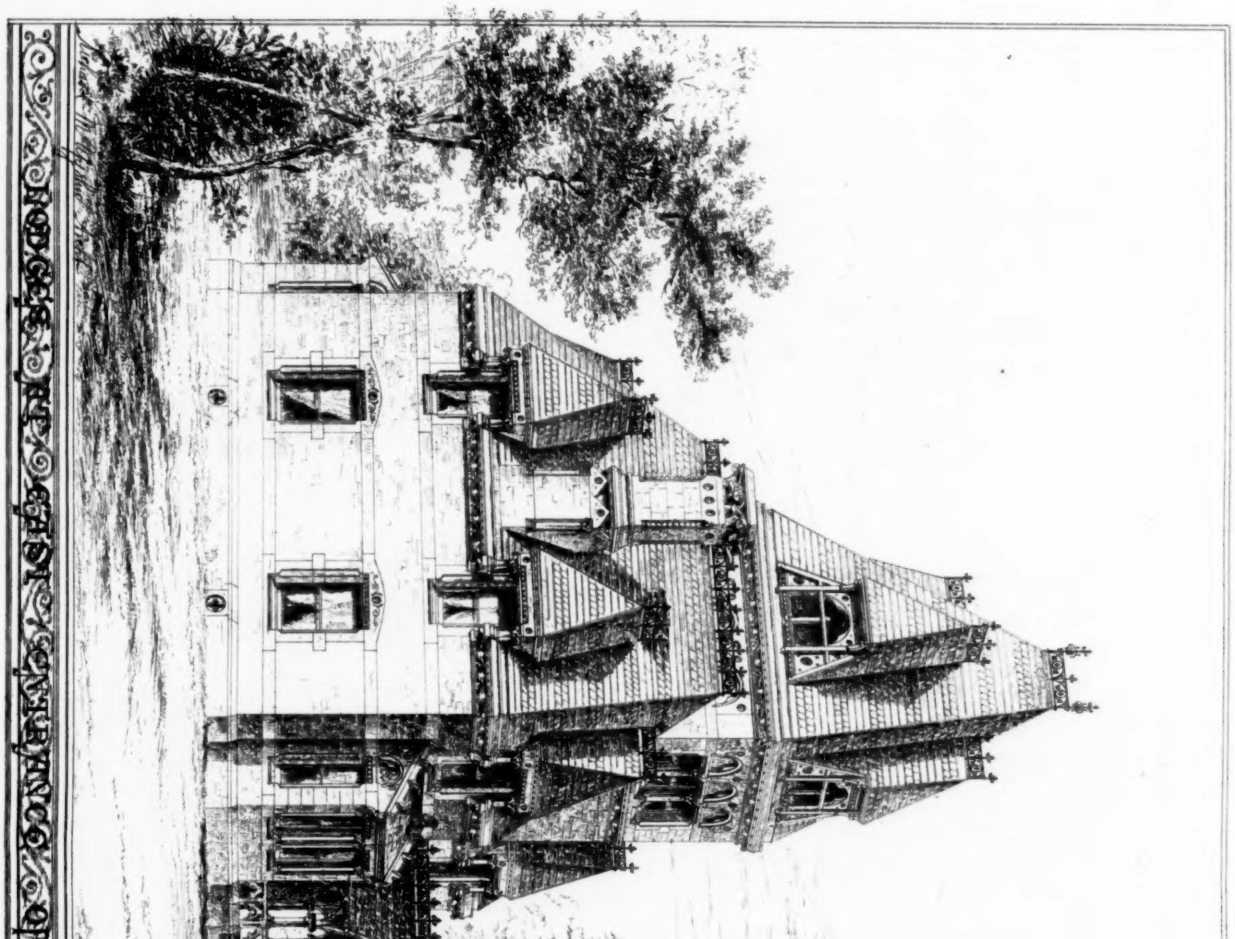

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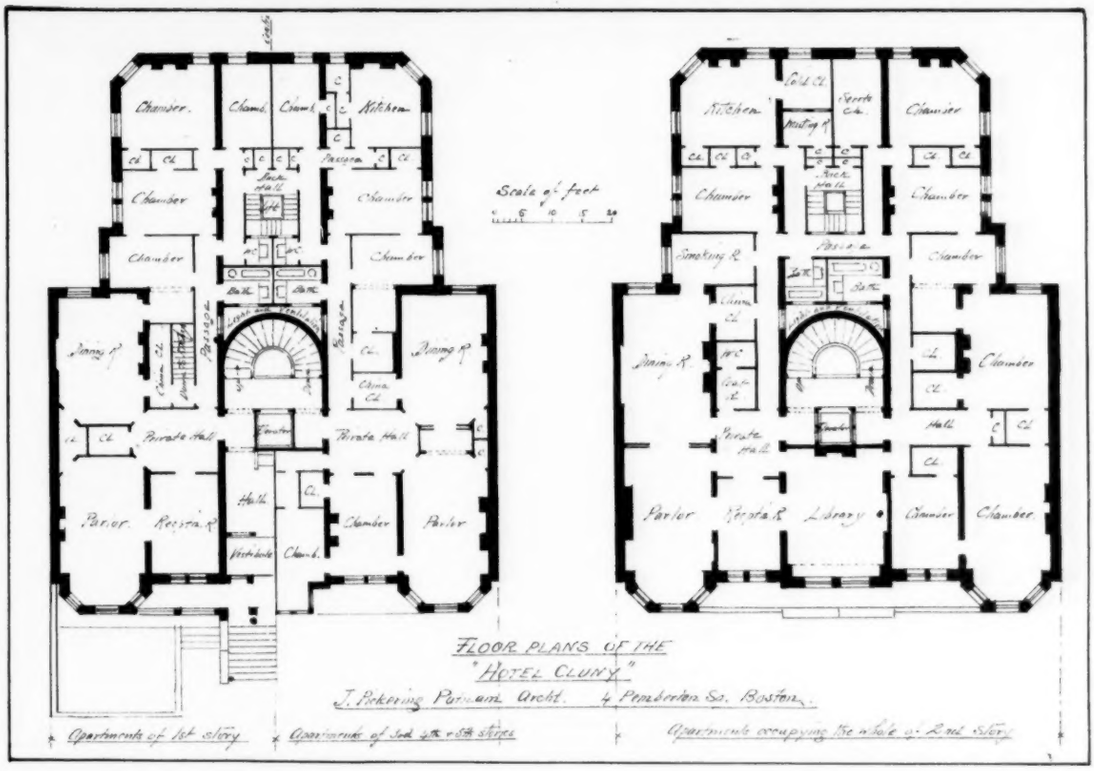

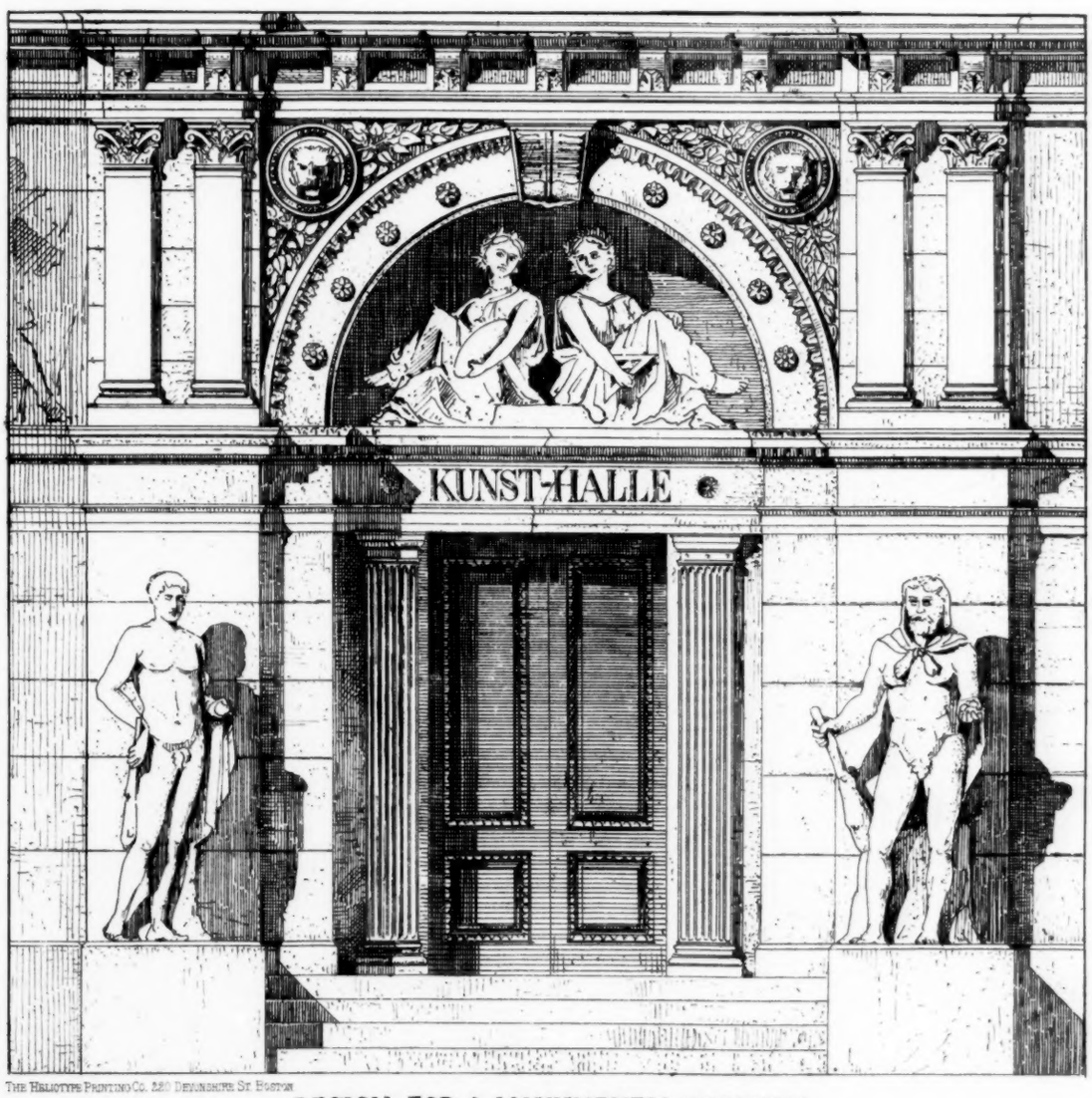

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DESIGN FOR A MONUMENTAL DOORWAY

By BERNARD VONNEGUT

pressed by the occasional sight of a ruin of the past. Who, then, are the people of whom the Society complains as the wreckers of our old and venerated monuments of building; and do they err through ignorance or of set malice? To these questions the Report, although only the first of its kind, ought to afford an answer.

The answer, as we understand it, is that the English people of the better class are apathetic. Nobody seems to be chargeable with a positive desire to destroy. The Report speaks of "mere cynically brutal destruction," it is true; but this is a figure of speech. We have not even a class of fanatical non-conformists who regard an old church with holy aversion; all that remains of a moated grange fails to awaken in the breast of an advanced liberal one pang of combativeness; and the toppling gables and creaking timbers of a dilapidated ale-house scarcely remind the assembled topers of any more practical consideration than ghosts. But people who ought to know better are apathetic.

There are, at any rate, as many as seven hundred and forty-nine ancient churches in England and Wales which the Society has its eye upon, being happily, as yet, "quite unrestored;" and (to come to business) these are the sort of remains that the Society desires to deal with in a practical manner. Thousands of such churches have been "restored," more or less, with a vengeance; but "it is encouraging to remark that so great was the mass of fine architecture left us by our ancestors, that in spite of all the damage done by restoration and destruction there is still much left quite untouched, besides what has been left not utterly falsified." For the Society has good reason to hope that, the seven hundred and forty-nine being situated, for the most part, in six counties named, there may be discovered in at least twelve others some corresponding average of equally unsophisticated relics in England alone, leaving almost the whole of Wales, with Scotland and Ireland, to be still explored. The argument is therefore clear; the society for the protection of these ancient edifices from that destruction which is called restoration has not been set on foot a day too soon, but a good many years too late; the utmost enthusiasm which it can bring to bear upon its task will not be too much for the occasion, nor the utmost attention which it can persuade the public at large to bestow upon its work. Postponing for the moment, as beyond its reach, all action on foreign soil, and leaving comparatively unwatched those remains which are the property of private individuals, here we have a goodly number of hundreds of old churches alone, which, if the public in general, who virtually own them, do not very emphatically take into their direct custody, will be foolishly adulterated by architects and parsons, by means of a vile process of dandifying, until in effect nothing of them all will be left for the admiration of the patriotic student, or even the gratification of curiosity in the mere passer-by. Most people of intelligence will be disposed to hazard the assertion that an appeal of this kind will not be made in vain at the present day to Englishmen and indeed Englishwomen of average education. At the same time it does not follow that we can clearly see in what way the preservative or protective influence of the Society is to be actually exercised in practice.

There are two great classes of offenders against the principle for which the Society is contending, namely, ecclesiastical architects and parsons, that is to say, the working church designers and the working clergy. These persons are the positive destroyers; the only fault of their abettors is apathy, rather than direct encouragement. In other words, the general public are charged with the negative offence of standing by while the crime is committed. It is the architect and the parson who commit the crime.

It interests us of course to inquire in what way the architectural profession are receiving the Society's appeal, and it is to be feared they are not receiving it well. The commonplace English architect is not to be expected to do so. Artistically, he lives from hand to mouth, waiting upon Providence. He does not proceed very much upon first principles. He is a somewhat anxious, hard-working man, who reads very few books or even newspapers, and writes a great many letters, — partly to keep his builders going and partly to hunt up work. He cannot afford to be too particular; he professes artistic enthusiasm as matter of business, but he knows well that fastidiousness and five per cent might clash. He goes, therefore, for the most part, in a ring, like Dobbin at the mill, and it is a misadventure for him if things do not work smoothly. Of what avail is it, then, to appeal to the patriotic soul of such a practitioner? Not much.

Turning, therefore, to the average parson, let us inquire what is to be done with him. It need scarcely be remarked that, professionally, he is not a very strong man. His chief rule of life is to be "nice" — to steer a harmless course amidst the manifold temptations which provoke him to become unpopular. As regards his church, all he wants to do is to make that, also, as nice as he can, in order to please those people, the salt of the earth, who are nice like himself. He likes archæology, because it is popular with nice people. It is not to be doubted for an instant that the broad maxim of a society for the protection of imaginary ancient buildings from imaginary destruction by restoration will meet with his warmest approbation, and he will be found to make himself, as usual, exceedingly agreeable over the subject to the very nice old lady he takes in to dinner. But, by the time he has become better acquainted with the Society's actual purpose, and has listened, perhaps, to an impassioned speech delivered by some one of its principal enthusiasts to a gaping audience of his villagers, he probably comes to doubt the niceness of a doctrine which requires so much heat for its development, and will hesitate very considerably before he commits himself openly to the abandonment of a long-cherished purpose to restore his church, simply because a new-fangled notion has sprung up for the preservation of ruin at the expense of both that comfort and that sightliness which are so dear to all the nice people he knows.

It is said, however, that the new Society has certainly begun to make its influence felt, and that, in fact, there are cases to be quoted in which destructive restoration has been averted through judicious representations. This of course is practical business, and nothing else is so. But the Report may well say "the work to be done is heavy," for the work in reality is nothing less than to keep a watch over the whole of England, so as to anticipate disaster before it has taken the actual form and substance of a nice restoration and an architect's fee. To attack the enterprise after it is matured will always be most ungracious. Even when successful — as it frequently may be — it must give rise to popular commotion, which will be regarded as a cure that is worse than the disease; and if popular architects, and still more popular clergymen, are to be driven to the alternative of either defending their schemes of restoration or submitting to be snubbed and even vilified, the work of the Society will be indeed heavy. Nevertheless, we wish it success heartily, and will only add that it will do well to perform its function discreetly. To put an entire stop to destructive restoration by intellectual violence may be impossible, but to secure an equivalent result in a great measure by ceaseless persuasion of the public mind is what may be accomplished, perhaps, more effectually and more quickly than is expected. — *The Architect.*

THE SEWAGE SYSTEM OF PARIS. — I.

THE area enclosed within the fortifications of the city may be put down at 19,000 acres. The quantity of water distributed for miscellaneous service over this area per day is about 46,000,000 gallons, and the average daily rainfall is some 22,000,000 gallons. About twenty per cent of this quantity is absorbed by evaporation, leaving 54,400,000 gallons to be dealt with. This water is loaded with the *débris* from the streets, and the impurities from manufactures, house refuse, stables, etc. The sewage, properly so called, does not enter the sewers, as it is dealt with separately. Roughly speaking, there are about 100,000 water-closets in Paris, of which a small proportion is provided with separators that retain the solid excreta, while permitting the liquid portions to pass into the sewers; the remainder are chiefly emptied into cesspools. The present system is of very recent date, but partial drainage works for conveying the sewage into the Seine were constructed at a very early period. In 1831 the remains of sewers dating from the time of Philippe le Bel were found underneath the Palais de Justice; but the conduits then formed were only for the service of a few palaces or other important buildings. In early times the city discharged its sewage into the Seine, the university quarter on the left bank into the Bièvre, and the town, properly so called, into the Ménilmontant brook. As for the neighboring slopes of Charonne, Ménilmontant, Belleville, and Montmartre, the porous surface soil absorbed a large proportion of the sewage, which — partially filtered — found its way into the Seine. The brook of Ménilmontant was through several centuries known as the main sewer of Paris, and many roughly constructed channels were made from time to time to converge into it. About 1550, under the reign of Henri II., a very important effort was made to improve the condition of the city. A scheme was prepared by an engineer of the period, Gilles Desfroissis, to divert the water of the Seine into the sewers and channels, natural and artificial, and by means of sluices to create a constant current of water, which should carry away all obnoxious matter down to a suitable point of discharge. This project, however, was opposed by the city, and nothing came of it. In 1605, under Henri IV., Prévôt François Miron arched over at his own cost the Ponceau sewer, which extended from the Rue St. Denis to the Porte St. Martin. In 1611, Hugues Cosnier, director-in-chief of the Loire Canal, revived the project of Desfroissis, but failed; in 1631, engineer Pierre Pidou was charged with the work of enlarging the city by enclosing within the *enceinte* of the Tuileries the Faubourg St. Honoré as far as the Rue Royale, and the Faubourg Montmartre as far as the present boulevards. In the course of this work he made the sewers navigable from the Arsenal to the Porte de la Conférence, and constructed near the walls of the city a large sewer twelve feet in width. At this time there were about 12,000 yards of sewers of all kinds in and around Paris, the greater portion in so bad a condition that many workmen employed in repairing them were killed. It may be worth noticing that the physicians of the period, on inquiring into the cause of these deaths, so far from recognizing the real reason, reported that the men in question were killed by the stare of a basilisk which they asserted inhabited the sewers. In 1667 the service of police was created, and shortly after a municipal ordinance enjoined an annual inspection of the sewers by the various prévôts, who were to take steps for their maintenance. But in spite of this, matters went from bad to worse, the sewers became choked and absolutely useless, even to convey the sewage into the Seine, where it had so long been a grievance to the water-side population; and on the 24th of April, 1691, a decree was issued for the formation of a commission to study

the whole subject and devise a remedy. In a map of Paris dated 1592, the brook of Ménilmontant as it then existed is shown. The banks were sloped and planted with trees, and its principal tributaries were the sewer from the Rue des Égouts, between Rue St. Martin and Rue St. Denis, the Montmartre sewer, and the Gaillon sewer, which afterwards was converted into the Rue de la Chaussée-d'Antin. The land in its vicinity was deserted, for no houses could be occupied near it. But it was not till about 1730 that extensive operations were undertaken to ameliorate the condition of the city. Michel-Etienne Turgot, father of the great minister, engaged seriously in the work; he constructed an open channel in stonework, and provided means for its easy cleansing, and he formed also a reservoir at the end of this canal to receive the contents of the Belleville sewers, which then flowed through the canal. A map, dated 1765, shows the extent of the works carried out by Turgot. The canal followed the Rue des Fosses-du-Temple, where for part of its length it was arched over, but was left open between the Porte du Temple and the Porte St. Martin to receive the Sewer du Temple and the Sewer de la Croix; it then passed through the faubourgs of St. Martin, St. Denis, Montmartre, and Poissoniere, and was there partially covered over and planted with trees. It was left open again to receive the sewer of the Rue St. Lazare, and passing beneath Rue de la Chaussée-d'Antin, it penetrated through the Faubourg St. Honore, and the middle of the Champs Elysées, to fall into the Seine. Gradually the work of extending and improving the sewers was carried on, and in 1806 there existed about 79,700 feet covered, with the exception of 5,200 feet. During the reign of Louis Philippe about 80,000 yards of additional sewers were made; but their usefulness was only partial, and the sanitary condition of the streets was bad in the extreme.

In 1855 the works which were to transform the whole system of sewage collection were commenced, the projects having been previously elaborated by the late M. Belgrand, Ingenieur des Pontes et Chaussées. At that time there were about 145,000 yards of sewers for 425,000 yards of streets, while at present there exist some 775,000 yards of sewers for 860,000 yards of streets. About 148,000 yards is the length of the service drains of the dwelling-houses. The system as now carried out is divided into two classes, the sewers and the collectors; the former receive the street and house water, and conduct it to the collectors. The latter are constructed along the lower levels of the city to receive the natural drainage, as well as the contents of the sewers. They are three in number. The first is on the right bank of the Seine, and is known as the Departmental collector; it commences at the point of intersection between the Rue Oberkampf and the Rue Ménilmontant, and passes under the old boulevards. Its course is broken by three bends, by which it crosses the basin of La Villette, the fortifications, and the Grande Route St. Denis, until it falls into the Seine near the Ile St. Ouen. The sewage dealt with by this collector is of the worst kind, containing as it does the impurities from the abattoirs, the gas works, the factories of La Villette, Montmartre, etc., and even the overflow from the Bondy *dépôt*. The second collector on the right bank of the river commences at the Arsenal basin, following the quays, and running under the Rue Royale, the Boulevard, and Rue Malesherbes, it traverses the Route d'Asnières and falls into the Seine above the railway bridge. At the Place du Châtelet it is increased to receive the contents of the collector of the Boulevard Sébastopol; at the Place de la Concorde the sewer of the Rue de Rivoli joins it; at the Place de la Madelaine it absorbs the sewer of the Petits-Champs, and at the junction of the Boulevard Malesherbes and the Rue de la Pépinière, a sewer following the course of the brook of Ménilmontant flows into it. On the left bank there is only one collector, which at its commencement absorbs the river Bièvre, that at one time used to flow into the Seine above the Pont d'Austerlitz. The collector taking this stream runs behind the Jardin des Plantes, towards the Boulevard St. Michel, when it passes along the quays as far as the Pont d'Alma; here a double siphon takes it across the river, when the gallery passing under the height of Chaillot and the Avenue Wagram, crosses the village of Levallois-Perret, and joins the collector on the right bank last described, about 550 yards from the point of discharge. Near the Pont d'Alma on the left bank, it receives the Montparnasse sewer, and the Grenelle collector; on the right bank the Auteuil collector falls into it.

As an indication of the form and arrangement of the galleries, we may give a few particulars of the great collector on the right bank, the course of which has been already indicated. The section is a gradually increasing one to accommodate the discharge from the various tributaries flowing into it. The sewage water flows in a channel, on each side of which is a paved sidewalk, the whole being enclosed within a semicircular arch. The collector is composed of four different types, Nos. 6, 5, 3, and 1. The total length is 27,207 feet, and the lengths of the different sections are respectively 2,296 feet, 2,853 feet, 7,019 feet, and 15,039 feet. Type No. 6 extends from the canal St. Martin to the Rue St. Paul; type No. 5 from that point to the Boulevard Sébastopol; type No. 3 from the Boulevard Sébastopol to the Place de la Concorde; and type No. 1 from this point to the discharge at Asnières. Type No. 6 is 8 feet $2\frac{3}{8}$ inches wide at the point of springing of the arch, the height from the side galleries to the point of springing is 4 feet $11\frac{1}{8}$ inches, and the side walls are curved with a radius of 18 feet $9\frac{1}{8}$ inches; the width of the side galleries is $35\frac{1}{2}$ inches on one side, and $15\frac{3}{4}$ inches on the other, and the width of the channel is $31\frac{1}{2}$ inches. The depth of the channel in the middle is $15\frac{3}{4}$ inches, the invert being curved. The thickness of masonry is $10\frac{5}{8}$ inches inside the invert, the bottom of the structure being flat, 7 feet $6\frac{1}{2}$ inches wide. The thickness of the side walls and arch is 13 inches, and the interior of the sewer is covered throughout with a lining of cement $1\frac{3}{16}$ inches thick. The outside of the arch is also protected with cement. Type No. 5 is 9 feet 10 $\frac{1}{16}$ inches wide at the springing of the arch, the height of the side walls to springing is 4 feet $11\frac{1}{8}$ inches, and the radius to which they are curved is 12 feet $9\frac{1}{8}$ inches. The widths of the sidewalks are $27\frac{9}{16}$ inches and $19\frac{11}{16}$ inches respectively, and that of the channel is $47\frac{1}{4}$ inches. The depth of the latter is $31\frac{1}{2}$ inches in the centre and $27\frac{9}{16}$ inches at the sides; the thickness of walls and arch is 13 inches, and the thickness underneath channel is $11\frac{13}{16}$ inches. The underside of the structure is flat and about 6 feet wide; this, like all the other sections, is lined throughout with cement. Type No. 3 is 13 feet $1\frac{7}{16}$ inches wide at springing; the height from sidewalks to springing is $35\frac{7}{16}$ inches, and the side walls are curved with the same radius as the arch, so that the section of this type is more than a semicircle. The sidewalks are both $27\frac{9}{16}$ inches wide, and the channel is 7 feet $2\frac{1}{4}$ inches wide. The depth of the latter is $39\frac{3}{8}$ inches in the middle and $31\frac{1}{2}$ inches at the sides, the thickness of masonry under the channel is $17\frac{11}{16}$ inches and at the sides it is $23\frac{5}{8}$ inches. The under side of this section is curved on the exterior. Type No. 1 is 18 feet 3 inches wide at springing, and 23 feet 7 inches wide on the outside of the masonry, the arch is elliptical and the height from springing to centre is 6 feet 4 inches; the side walls are curved and are 3 feet 5 inches high from the sidewalks to the point of springing. The walks themselves are 2 feet $11\frac{1}{2}$ inches wide, and the width of the channel is 11 feet 5 inches. The depth of the latter is 6 feet 11 inches. — *Engineering.*

THE COMPETITIVE DESIGNS FOR TRINITY CHURCH, ST. JOHN, N. B.

St. John, N. B.

The readers of the *American Architect* are aware that, as the result of a close competition, Messrs. Potter and Robertson, of New York, were appointed architects for the new Trinity Church. The work was advertised for tenders, and the excavations for the foundations were begun, but for some reason or other (report has it on account of the tenders received being considerably higher than the estimates of the architects) the work has been taken out of their hands. Some time ago circulars were received by several architects in town, inviting them to send in drawings in competition; and in reply to this, notwithstanding there was no inducement held out in the form of premiums, ten sets of drawings have been received, all representing a certain amount of labor and time, if not thought, in their preparation. If we fix the moderate sum of one hundred dollars as the value of each, the whole would represent one thousand dollars worth of work. It is humiliating to the architectural fraternity, that in order to get work they have often to give so much for nothing; but competition here is somewhat keen, and the profession is not held in the highest respect.

With few exceptions the designs exhibited are of a very mediocre description. As a general rule the architects on this side of the Atlantic fail to get the true spirit and feeling of English Gothic in any work of this kind they attempt. The lack of study and the absence of examples of old work in a great measure account for it. There is a constant tendency to run off into vagaries and inventions that are hideous.

For instance, in the set of drawings marked No. 2 there is some tracery of the most fantastic form; it is original, but no improvement upon anything seen in old work. The roof in this design is formed in very rigid lines, which would not look well in execution. Much labor has been bestowed on the plan, even to indicating the position of the gas fixtures. One good feature it certainly has: the wooden posts, in the position where nave columns or piers would come, are placed close to the side walls of the church, and form no obstruction to sight.

In No. 9 we have a carefully drawn design in a late period of Gothic, perhaps too elaborate. The height from the ground line to the apex of the spire is 250 feet, by scale; and how such a church and spire can be built for the money appropriated is past all comprehension.

No. 4 exhibits a very weak-looking design. It does not err like No. 9 in being too costly, for the windows are devoid of tracery, being simply oblong openings with pointed arches pierced through the wall. The tower and spire are badly proportioned.

Design No. 10 is represented by highly colored drawings. Though the proportions are somewhat good the style is not very pure. In the tower and west end there are some openings 20 feet long and 6 inches wide.

No. 8 is on the whole superior to the other designs; the proportions are good, and there is a better conception of what Gothic art is. Some of the detail has not been studied; the buttresses to the tower look thin, and the clock has the appearance of an adjunct to the design.

The design marked No. 1 is the only one represented by elevations finished in pencil, and does not attract much attention. It is

in the Early English style, and shows a thorough acquaintance with Gothic work. The school and lecture room are particularly well designed, but it is probable that this design is not florid enough for the public taste.

It will be somewhat curious to watch the result of this competition. So far, no sign of calling in professional assistance has been shown. Will the building committee consider themselves the best judges, or will the work be given to the competitor who can bring the most influence to bear on the committee, irrespective of artistic merit in his design? R. B.

THE DECORATION OF THE PROVIDENCE CITY HALL.

BOSTON.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir, — There has recently been held in our neighborhood an unusual and extremely interesting competition, namely, that for the interior decoration of the Providence City Hall.

Having had the pleasure of seeing some of the drawings offered, I can say that they were of a high order of merit. The fact of the competition having been entered into by Messrs. McPherson, La Farge, Rinn, Frank Hill Smith, and others, is a sufficient guarantee of the varied character and treatment of the subject.

Now, sir, as such an opportunity seldom occurs, and as the competitors would doubtless be willing to loan their sets of drawings, why could they not be hung for a few days in, say the gallery of the Art Club, for inspection? I am aware that it is now the "dead season," but before the autumn the drawings may have become scattered, interest lost, and the matter forgotten. Can we not see them *now?* W. G. P.

THE DRAINS AND TYPHOID FEVER.[1]

THERE is no longer any dispute concerning the chief vehicles by which the specific contagium of typhoid fever is conveyed. These are the air that we breathe and the liquids that we drink. Perhaps we may narrow the question still more, and ascribe to the action of the air only the indirect conveyance of the contagium to the stomach; for there are indications that as the contagium of typhoid fever proceeds from disorders of the alimentary canal, so it is only the surfaces of the alimentary canal which are susceptible to its attack.

The poison of the air may be direct or indirect. That is, it may be due to the exhalations of decomposing matters in dung-heaps, pig-sties, privy vaults, cellars, cesspools, drains, and sewers; or it may be due (according to Pettenkofer) to the development of the poison deep in the ground, and its escape in an active condition in ground exhalations. The water, milk, etc., which we drink may be contaminated by the absorption of foul odors from air with which they are in contact, or by the direct admixture of organic matters bearing the elements of infection. There is such a multitude of possible sources and channels by which the infection may be brought to us that it is often almost impossible, in first cases, to determine which has been actually in operation; but the original case being established, it becomes comparatively easy to trace the channel of its influence in the production of further cases.

All the learning of the ages has taught us no better formula to express a perfect sanitary environment than the old one of Hippocrates: "Pure air, pure water, and a pure soil."

If we would turn typhoid from our doors, and literally stamp it out as an epidemic, we need only to insure this condition in its integrity. We may still import single cases from less cleanly neighborhoods, but it will be our fault if we permit it to attack even one of our own community.

I have previously cited the case of the outbreak at Over Darwen, in England, as follows: —

"There has recently been an investigation into the origin of an outbreak of 'filth fever' in Over Darwen, England, the origin of which for a long time eluded the careful search of the authorities. It was finally worked out by a sanitary officer sent from London. The first case was an imported one, occurring in a house at a considerable distance from the town. The patient had contracted the disease, came home, and died with it. On first inquiry it was stated that the town derived its water supply from a distance, and that the water was brought by covered channels, and could not possibly have been polluted by the excreta from this case. Further examination showed that the drain of the closet into which the excreta of this patient were passed emptied itself through channels used for the irrigation of a neighboring field. The water-main of the town passed through this field, and, although special precautions had been taken to prevent any infiltration of sewage into the main, it was found that the concrete had sprung a leak and allowed the contents of the drain to be sucked freely into the water-pipe. The poison was regularly thrown down the drain, and as regularly passed into the water-main of the town. This outbreak had a ferocity that attracted universal attention; within a very short period two thousand and thirty-five people were attacked, and one hundred and four died."

Liebermeister says that typhoid dejections, conveyed in night-soil spread as manure upon the gathering ground of an aqueduct, so contaminated the water supply as to produce an epidemic of typhoid fever among the population using the water. Similar instances might be cited almost without number. Indeed, there is among investigators no difference of opinion as to the communication of the disease by means of drinking-water thus polluted. There are many instances recorded of the contamination of the water of wells by the transmission of fæcal matters through the soil from adjacent privy vaults and cesspools.

Not only does the infection follow the course of water to which it has gained access, or find its means of dissemination in the exhalations of decomposing filth, and thus contaminate the air which we breathe, but these exhalations are readily absorbed by water, which is capable of holding the poison, to the detriment of those who may drink it, and of transmitting it again to air with which it may be in contact. Many cases have been reported similar to that cited by Dr. Carpenter, health officer of Croydon, who traced the origin of an outbreak to the drinking of water from a house cistern, to which air from the public sewer had been led by the pipe serving as an overflow for the cistern.

Especial danger attaches to the use of water-traps, or water held in the bends of waste-pipes, soil-pipes, etc., when these are the only barrier between the interior of the house and a sewer or cesspool containing typhoid dejections. The retained water absorbs the poison at its outer or sewer end, becomes saturated with it, and gives it off to the air in the house end of the pipe.

There is reason to suppose — reason almost sufficient to secure reliability — that the poisonous element is developed and made effective only when the decomposition of the fæces containing it takes place in the absence of a supply of fresh air sufficient to carry it on in the most rapid and healthy way. In other words, active oxidation, whether produced by oxidizing disinfectants, by the operation of atmospheric oxygen, or by the intensified oxidizing power of the contained gases of porous material, seems to prevent decomposing fæces from assuming a condition favorable to the development of infection. The evidence in support of this theory is of course of a negative character, but it is extensive, and, so far as the writer knows, it is accepted by leading physiologists.

Typhoid fever is not produced by exhalations from the surface of lands irrigated with the discharge of such sewers as have a rapid and continuous flow, and thereby deliver all they receive before it has had time to undergo decomposition. There is no evidence that typhoid fever is caused by the contained air of thoroughly ventilated soil-pipes. The most active professional enemies of the earth-closet system have never adduced an instance where typhoid fever, or any other cognate disease, has followed its well-regulated use. In *The Lancet* of March 6, 1869, Professor Rolleston, setting forth his objections to the earth closet, said: "If I am told that the earth closet is inoffensive, and that the privy is fœtid, I answer that a rattlesnake is none the less dangerous because its rattle is removed; and that, for anything shown or known to the contrary, odor is to infection, deodorization to disinfection, what the noise of the serpent is to its bite." It is nine years since this was written, and amid all the voluminous reports upon the dry-earth system there is no word to sustain Dr. Rolleston's fears. On the other hand, together with much else of similar purport, the evidence of Dr Monat reports that in those jails of India where the earth system is used, even at the time of the most serious cholera epidemics, this disease, which is so like typhoid in its mode of transmission, never gains a foothold One would almost be justified in replying to Professor Rolleston that it is not a question of removing the rattle, but of killing the snake. Investigations made to determine the manurial value of closet earth used many times over indicate a total and absolute destruction, not only of the odor but of the whole combustible material of the added fæces. The result has shown as complete destruction as would attend burning in a furnace.

The physician in considering the treatment of the material in question has one of two sets of conditions to deal with. The fæcal wastes of the household which he is attending are either removed by water-carriage, or thrown into privy vaults. If by water-carriage, they are delivered into a public sewer or into a cesspool. Sewers, as they usually exist, and cesspools always and invariably, are so circumstanced as to favor the thorough development and multiplication of the morbific material under consideration. Unfortunately, sewers and cesspools are so connected with the interiors of houses, with others as well as with that where the disease originated, as to make them too often the means for converting a sporadic case into a centre of infection. Even the house drains and soil-pipes through which the excrement passes on its way to the cesspool or sewer are very generally as bad as these final receptacles themselves.

Where water barriers are supplemented with one of the many mechanical check valves recently introduced, this means for the return of the infection is shut off. Where the soil-pipe and drain are freely open at both ends for the transmission of a current of atmospheric air, the danger of the development of the poison is greatly reduced, if not entirely removed. But even here, although we may feel secure so far as the immediate household in question is concerned, it is to be remembered that, at least in the case of a public sewer and of a cesspool common to several houses, the matter deposited may produce its injurious effect in other families which are less well protected against it. Even where the cesspool is con-

[1] From a Paper on "The Causation of Typhoid Fever," by G. E. Waring, Jr., C. E., published in the *Boston Medical and Surgical Journal*, to which was awarded the prize of the Rhode Island Medical Society

nected with one house only, to permit the specific poison of typhoid fever to enter it and to spread itself through its accumulated filth is to incur a danger akin to that of establishing a gunpowder vault in one's back yard.

It may be advisable to refer briefly to the manner in which, and the degree to which, the general health is influenced by exhalations from decomposing organic matters in sewers, house-drains, vaults, cesspools, and cellars. It must have been the frequent experience of all physicians that every question as to the tainting of the air of a house from these sources is met by the assertion that no bad smell has ever been perceived. In the first place, the accustomed nostril is dull to detect a constant odor, and in the next it is hard to make people believe that where they can smell no offence there still may be danger. We ourselves know that the juices of the cadaver are most fatally dangerous before offensive decomposition has set in. Those who have given attention to the influence of drain-air in causing disease know very well that the action of this upon the health bears no relation to the intensity of its accompanying odors.

The only safety is to be sought in the absolute freedom of the air that is breathed and of the water that is drunk from every species of contamination due either directly or indirectly to organic decomposition. A little rift in the waste-pipe of a wash-basin, so slight as to be detected only by the application of tissue-paper, has kept a whole family miserable and complaining, and susceptible to every species of contagion, for years together. Decaying vegetables in a cellar, and decaying filth in the waste-pipe of a kitchen sink, may be regarded as the bane of the existence of half the women in America. Those more serious defects which come of ignorantly arranged plumbing work — by no means of good plumbing work, which is the sanitarian's best aid — are responsible not only for most of the zymotic diseases appearing in the better class of houses, but in like degree for the generally ailing condition of so many of those who pass most of their days and nights in these houses.

The fundamental principle should always be borne in mind that neither in a sewer, nor in a cesspool, nor in a house-drain, nor in a soil-pipe, nor in the smallest waste-pipe should decomposition be allowed to proceed without such an abundant presence of fresh air as will secure its most rapid and complete progress. The same condition of obstructed decomposition which fosters the development of infecting agencies is precisely that which leads to a generally unwholesome and debilitating atmosphere. All investigation of this subject, and all discussion of the *modus operandi* by which unwholesome influences lead to the spread of epidemic diseases and to the lowering of the general health, bring us at the end to a firm belief in the principle covered by Hippocrates's prescription: pure air, pure water, and a pure soil.

NOTES AND CLIPPINGS.

The "Blue" Copying Process. — Some time ago we were shown by Mr. P. Barnes (who afterwards read a paper on the subject before the American Institute of Mining Engineers) a process of duplicating drawings, which architects may find of great use in those cases where it is necessary to supply several contractors with copies of the same drawing. The process is essentially a photographic process, in which an ordinary tracing on tracing-cloth takes the place of the negative, and the result is shown in white lines on a background of deep Prussian blue. The process is so simple that the prints may be easily made by almost any office-boy. It also saves one step in the ordinary process of making drawings, for the inked tracing may be made over the first pencil drawing on paper, and so obviate the necessity of inking-in the original drawing. The only apparatus needed are a drawing-board, a piece of clear plate glass, say three eighths of an inch thick, of the same size, and a piece of felt or blanket. The paper on which is to be printed the copy may be of any kind that will endure a thorough wetting at the time when it is prepared with the sensitizing solution. This solution is made by dissolving in separate vessels 1⅔ oz. of citrate of iron in 8 oz. of clean water, and 1¼ oz. of red prussiate of potash in a similar quantity of clean water. When dissolved, the two solutions are mixed, and must be kept protected from the light, if possible in a yellow glass bottle. To prepare the paper, wet it thoroughly on one side with the solution, applying the first coat with a full wet sponge, and the second with a sponge almost dry. The paper should then be laid away in a dark drawer to dry. When dry it is of a good yellow or bronze color. To make the copy, the sensitized paper is placed upon the board with one or two thicknesses of blanket under it. Over it is laid the tracing which is to be reproduced, and this in turn is covered by the glass plate, which may be brought to an even bearing by joiners' screws if necessary. To print the copy it is only necessary to expose the apparatus to the light, for half or three quarters of an hour if clear sunlight is to be had, or if the day is cloudy the exposure must continue for an hour and a half. When the glass is removed the body of the paper will be found to have changed its color to a deeper bronze, while the lines of the tracing are found to be darker still. As soon as the glass is removed the copy should be thoroughly washed for a minute or two in clean water, the effect of which is to turn the background blue, leaving the lines in white. If the copy needs any correcting touches, these may be added by using a solution of the carbonates of soda or potash applied with a brush or pen. The process is of French origin.

Political Caricature in Architecture. — It is said that the stone-masons have amused themselves with cutting on some of the new work of the Cathedral of Cologne a grotesque figure representing Hoedel, the would-be assassin of the Emperor William. The caricature has the body of an animal, in one of whose fore paws is grasped a revolver, while the other flaunts a newspaper.

Fire-Proof Doors. — The incombustibility of wood, in itself a poor conductor of heat, under certain circumstances is the basis of several methods of fire-proof building, as for instance in those floors which are built of joists closely bolted together, so that there can be no circulation of air, and consequently no draught for fire between them. There are other modes of using it which show that when properly protected wood is one of the most fire-resisting of materials. Perhaps the best example of this property is found in cotton-mills, where wood is often used in making the doors which separate the picker-rooms, which are particularly likely to take fire, from the rest of the mill. These doors, built of solid plank, are with their jambs simply covered with sheet tin, and, as the following letters show, are much better able to resist fire than iron doors in the same situation. The action of the fire may slowly carbonize the wood and convert it to charcoal, a poorer conductor even than wood; but as the warping or shrinking of the tin is not enough to affect the form of the door, it maintains its shape and effectually excludes the flame. The letters mentioned form part of a circular issued by the Manufacturers' Mutual Fire Insurance Company, of Boston: —

"Boston, April 9, 1878. The undersigned has usually visited the scene of all fires reported to this office, in which we are interested as underwriters, whether the damage were much or little; and one principal object of the visit was to study the fire as to cause, progress, and results, and I may say that I have never yet seen a well-made wooden tinned door which gave to the fire; and I have no recollection of any case in which an iron door of ordinary construction, subjected to a heavy fire, has proved reliable. Among the many picker fires which have happened in mills insured by this company since 1862, only one has proved destructive to the mill, and the door in this case, dividing the picking-room from the mill, was of iron, and did not hold the fire at all, but immediately softened and warped out of shape, allowing the fire free passage to the mill.

"Wm. B. Whiting, *Secretary.*"

"Boston, Mass., April 8, 1878. Upon examination of the burned portion of the Pacific Mills, in company with Mr. Rideout, the overseer of the watch, I learned the following respecting the efficiency of iron and tinned wood doors in resisting the late fire: —

"I. At the west end of the steaming-room, where the fire originated, is an eighteen inch brick fire-wall, in which are double doors made of two inch plank and tinned on both sides, put in, as I am informed, at the instance of Mr. Whiting, within five years. The flames were in direct contact with one door during an hour or an hour and a half, in which time the building on fire was destroyed; but no flames entered the other room, and only a portion of the paint on the other door, eighteen inches distant, was blistered. Upon removing the tin from the door which resisted the fire it was found that the wood had been charred to the depth of three eighths of an inch.

"A tinned wood door on the same floor, at the entrance to the packing building, subjected to a somewhat less degree of heat, resisted all action of the fire.

"In the second story, at the east end of the folding-room, are a pair of wrought-iron doors, constructed of 5.32 iron, with a frame made of three eighths inch band iron three and one half inches wide. One of these doors warped about six inches; the other was held by bolts at top and bottom.

"In the opinion of Mr. Rideout the iron doors were not exposed to as severe heat as the tinned wood doors referred to.

"On the northerly side of the pressing room (the corner room) is a sliding iron door, constructed of one fourth inch iron and heavily backed by seven sixteenths inch iron. The panels are about six inches in width, so that most of the door is eleven inches in thickness.

"This door is hung on trucks, and, when shut, three sides are in iron grooves; the fire department of the Atlantic Mills threw a large amount of water into this room soon after the alarm was given, and only a portion of the door was burned; yet this door is so badly warped that it can be moved only with great difficulty.

"II. The appearance of the doors and the statement of the experienced persons present at the fire are to the effect that wood doors covered with tin successfully resisted intense heat for a long time, and that iron doors, of exceptionally good construction, warped under a comparatively slight degree of heat. Respectfully, C. J. H. Woodbury, *Inspector.*"

A Steeple-Jack's Feat. — The *Sussex Daily Post* says that the vane on the steeple of Hurst Church being out of order, the rector offered ten pounds to any one who would climb up (a height of 130 feet) and send it down for repair. The offer was accepted by John Bishop, formerly a sailor, who, having got into the clock tower, lassooed the pinnacles of the windows at the base of the steeple, and, having by this means passed a rope round the building, actually walked up the steeple. The feat was accomplished by a method well known to sailors, the climber holding the free ends of the rope, and planting his feet firmly against the object to be climbed, keeping the rope at a safe tension. As the climber advanced he jerked the rope upwards, and so progressed to the top. He safely reached the top and sat there four hours while the vane was being repaired. He then replaced it, and came down in safety.

Climbing Washington Monument. — A feat of daring equal to that above mentioned was done a short time ago by the rigger who volunteered to climb to the top of Washington Monument by the rope which, at the time work on the shaft was abandoned a score of years ago, was left hanging down from the summit on the inside of the shaft, so that when work was resumed it would be possible to reach the top without rebuilding the scaffold. The adventurous rigger reached the top in safety, although he was weighted by the ever-increasing weight of the new rope, to attach which was the object of his climb. The new rope secured he cast off the upper end of the old rope, which fell to the bottom of the shaft and was broken into innumerable fragments, so rotted was it by exposure to the action of the weather.

The London Opera House. — It is once more reported that work upon the new National Opera House on the Victoria Embankment is to begin again. These reports, however, seem to lack confirmation. It is also reported that an apartment house, in design similar to the adjoining St. Stephen's Club, is to be built on the already finished foundations.