

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XXXIX.

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No. 893.

Entered at the Post-Office at Boston as second-class matter.

FEBRUARY 4, 1893.



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WE have just received notice that Mr. Dankmar Adler, who since the death of Mr. Root has occupied acceptably the chair of the Secretary of the American Institute of Architects, has found himself obliged, by the pressure of his private practice, to resign that office. In his place the Directors have elected, as Secretary of the Institute, Mr. Alfred Stone, of Providence, R. I., who has long been a member of that body,—one might say almost the only active member, since there can have been but few meetings or conventions at which he has not been present and taken an active part in the proceedings and discussions, while the attendance of other individuals has been sporadic, and their attempts to influence action only of intermittent character. While thus taking a leading part in the councils of the body, he has never in the slightest degree subjected himself to the imputation of seeking to "run things," and it has almost always been found that when his plain common-sense arguments had been heeded the Institute discovered that events proved it was proceeding in the most judicious manner possible. Perhaps the fact that Mr. Stone has two partners, whereas Mr. Adler has but one, may enable him to give to the Institute's affairs the time and attention they demand, without being forced to sacrifice too much of his own private interests.

THERE has been a good deal of discussion among the members of the American Institute of Architects about a proposition, which is said to have been made, to have a Secretary of the Institute appointed by the Board of Directors, who need not be a member of the profession, but shall devote himself entirely to the service of the Institute. It has even been reported that a candidate had already been selected, in the person of Mr. McLean, the managing editor of the *Inland Architect*, who has been very closely connected with the Institute affairs for some years, and probably knows more about them than any one not in the ranks of the profession. As Mr. McLean writes us that he would not think of accepting such a position, even if it were offered him, we suppose that the rumor is unfounded, and, indeed, we should be sorry to see Mr. McLean retire from the control of the charming professional journal which he has directed with so much ability and taste. As to the main question, whether it is advisable to take a Secretary for the Institute from outside the profession, while, like Lincoln, we prefer not to jump our fences until we come to them, it may not be amiss to suggest that the Constitution of the Institute would have to be amended before a Secretary who was not a practising architect could legally

exercise the duties of the office. The By-Laws permit the Secretary, with the approval of the Board of Directors, to employ such clerical help as he may require, and it would seem as if this provision ought to make it quite practicable to keep in the responsible position of Secretary an architect of the highest rank in the profession. If it should be found that men in the most active practice could not be induced to undertake even the duty of directing clerks and signing papers, there are several architects whom we could name, members of the Institute, thoroughly accomplished and experienced in professional life, who, through various circumstances, prefer the quiet satisfaction of a moderate business to the excitement of battling for employment in the crowd of "hustlers." Among these, the very best secretaries, cool and experienced, with time enough to spare for thoughtful courtesy, would be found, and, until the supply of such men is exhausted, there will be no need of going outside the profession for officers of the Institute.

IT has been suggested that a lay Secretary, whose time was entirely at the disposal of the Institute, could be set at work travelling over the country, organizing Chapters, and looking after professional interests. There is certainly something in this suggestion. It has often occurred to us that a sort of architectural bishop, who would go from Chapter to Chapter, observing the condition of the faithful, and animating their zeal by an encouraging word here, or, perhaps, an admonition there, might be a very useful personage; but we imagine that, in church affairs, a lay bishop would meet with more derision than reverence, and an amateur would hardly have better success in dealing with associations of architects; and, as it would be useless to expect any busy architect to give up his office and take to pastoral visitations, the same end must be brought about in some other way. This, we think, is quite possible. In the first place, many questions which are now decided by the Board of Directors might be submitted to the Fellows. Of course, they are decided judiciously, but it would interest the members to be allowed to say something, from time to time, on some other subject than the admission of new brethren, and to interest members is the best means of increasing the influence of the Institute. With a sufficient supply of reply postal-cards, an extensive interchange of views could be kept up between members of the Institute in various parts of the country, which, as we believe, would be of immense benefit to them all. Another thing which might easily be managed, and would afford interesting entertainment for Chapter meetings, might be a lantern-slide exchange between the various Chapters. Lantern-slide clubs are just now very popular among amateur photographers, and one or two are even international in extent. With architects, such an exchange would be not only interesting, but useful. The Philadelphia, New York, Boston, Chicago, St. Louis, and San Francisco Chapters, for example, would each arrange to make a collection of lantern-slides of the principal buildings, both new and old, in their respective neighborhoods, and each collection would circulate from Chapter to Chapter through the winter, returning to its owners in the spring, and, during the summer, there would be material enough, in new buildings, for a fresh collection, to be used in the ensuing winter. A lantern could be bought or hired for exhibiting the views in each Chapter room, and it would be difficult to find any entertainment which would attract more members. Many architects are skilful photographers, and the production of slides is so easy, and requires so little apparatus, that the supply could readily be kept up.

THE process of obtaining designs for the new City-hall in New York goes on in a manner which promises excellent results. The Architectural League, having taken the matter under consideration, sent a committee, consisting of Messrs. Bruce Price, Charles I. Berg, George L. Heins, John DuFais, and President Sturgis, to wait upon the Mayor, and suggest, at the outset, the employment of professional advisers of the highest class, to aid both in drawing up terms of competition, and in judging the competing designs. This action of the League, in view of the lamentable result of most competitions for public buildings, was certainly justified, in the interest of the public, as well as of the profession, and the delegation

appears to have been very well received. The Mayor requested his visitors to put their views in writing, to be submitted to the other members of the Municipal Building Commission, which was done, and a list of ten architects added, from whom it was proposed that not more than three should be chosen as advisers. At a subsequent meeting of the sub-committee of the Municipal Commission this communication was read, and discussed at length, and an order adopted suggesting the names of Messrs. R. M. Hunt, William R. Ware and Napoleon Le Brun as the professional advisers to the Commission, these being three of the gentlemen mentioned in the League Communication; and the members of the League delegation, who seem to have been readily accepted as the mediators between the city officials and the profession, were requested to confer with the three persons selected, and report to the Commission the terms upon which they would act as advisers. If things continue to go on in this way, we may hope that New York will succeed in obtaining a new city-hall worthy the greatness of the municipality; but, as one of the Commission is reported to have said that three weeks would be allowed for preparing the competitive designs, and six weeks more for deciding among them, having detailed drawings and specifications made, and signing the contracts, the League representatives may have some more missionary work to do before satisfactory conditions can be arranged. In Europe, where public buildings are desired and intended to be a credit to the community which possesses them, not three weeks, but a year, would usually be allowed for preparing competitive designs for a building of such importance. It should never be forgotten that the more care and study is given to the plans for a building, the more rapidly, efficiently and economically it can be carried out, and to begin building from an ill-digested and hurried plan is to enter upon a long season of changes, delay, vexation and expense. It is true that competitive drawings are, to a certain extent, sketches, and not working plans, but apart from the artistic advantage of careful study of a design, the subsequent preparation of working drawings and specifications is immensely facilitated by long and thorough consideration of the preliminary sketches. With sketches as a basis in which every important point has been thought out, the working plans can be made very quickly by the ordinary office force, while, as every architect knows, flashy, hasty competitive drawings are often perfectly useless for carrying into execution, and the building which they are supposed to represent has to be planned all over again before anything like a working drawing can be made. For instance, we have seen, more than once, competitive perspectives showing lofty stone towers, rising from what the plans represented as the middle of a hall, or other large rooms; and, as a stone tower cannot well be suspended in mid-air, or rest upon a roof, it is obvious that a radical remodelling, either of the plans or the elevations, would be requisite before the design could be carried out. To a certain extent, such designs are fraudulent, as they deceive by falsely representing that a certain plan and elevation, both of which are probably attractive, can go together, but, in the hurry of a three-weeks' competition, it is impossible to avoid some misconceptions of the sort, which may have serious consequences.

THE new building for the Manhattan Life Insurance Company, which is to be sixteen stories high, is to have its foundations built by a method familiar enough in bridge engineering, but rarely used in building, although we think there have been several other cases in which it has been employed. The soil in that part of New York is a fine sand, about fifty feet deep, overlying rock. It would be hazardous to put so heavy a structure on the sand, but to excavate the sand in order to carry piers down to the rock would be likely to undermine the neighboring buildings, especially as the sand is saturated with water. This difficulty is to be overcome by sinking caissons, or cylinders of steel-plate, to the rock, so that the sand can be excavated from the inside of the cylinders without fear of affecting the neighboring soil. In the case of the Manhattan building, however, a modification of the ordinary system is to be introduced, about the merit of which we may be permitted to entertain some doubts. In order to enable the excavation inside the caissons to be carried on under water, they are made with a tight top like a diving-bell, and air is forced into them, so as to keep the exterior sand and water from entering while the workmen dig away the sand from the

inside and under the edges. To remove it entirely, pipes are provided, through which it is forced by the atmospheric pressure. As the caissons hold a large volume of air, there might be some difficulty in sinking them to their place; so it is proposed, while the men are excavating inside, to have masons at work outside, building the stone foundation piers on the flat top of the caisson. The excavation inside the caisson is so regulated that the caisson sinks about as fast as the pier on top of it is built up, the masons thus working always above the water-line, while the caisson sinks farther and farther below it. When the caisson reaches the rock, the workmen inside level the rock, so as to give it a firm bearing, and then fill it with concrete, which, we are told, is to be "carefully packed," so that the space from the rock to the roof of the caisson may be solidly filled, and the whole is left in place, the building thus standing on cylinders of steel-plate filled with concrete, surmounted by piers of stone and brick.

WE do not suppose for a moment that the Manhattan Company's architects and engineers have left any point unprovided for, but, to the ordinary constructor, there seem to be some difficult conditions to be met. Any one who will try to float a tumbler upside down in water, and build a pier of blocks on it, will probably be convinced that an inverted cylinder full of air, and floating in water, forms a very unstable foundation. Of course, in the present case, the sand on all sides helps immensely in preventing the caissons from tilting in either direction, and it may be all that is required, but there certainly seems to be a chance of lateral movements, which would be anything but favorable to the piers. Moreover, unless the architects have some recipe for concrete which is superior to anything we are acquainted with, we do not see how they can be sure of filling the caissons so that the concrete will remain exactly at the top, without either swelling or shrinking. The "careful packing" of the material after the space between the top of the mass and the roof of the caisson gets too small for men to work appears to us an impossibility, and we can only surmise that it is intended to fill the remaining space with soft concrete, put in through a tube, dependence being placed on hydrostatic pressure to compact it. In many cases this would answer well enough, but it is hardly credible that such concrete, even if of good materials, would not either shrink or be so spongy that the weight of sixteen stories, acting upon it through the medium of a thin metal plate, would not make some impression upon it; and, particularly where three or four piers are built on a single caisson, as is the case in certain places, any movement of the top plate of the caisson would be objectionable; while the use of inferior cement, disposed to swell in setting, for the sake of filling the caisson completely, would be a dangerous experiment.

THE students of German, of whom there are many among young architects, will be interested to know that the Federal Government of Switzerland, together with the governments of several of the Cantons, adopted, on January 1 last, a new system of spelling. The new system, which is that advocated by Konrad Duden, in his dictionary, has been for several years gaining in favor in Germany, and it has for some time been fashionable among the writers of *fin de siècle* novels to write "tot" for "todt," "Tier," instead of "Thier," "Teil," in place of "Theil," and so on. Now, however, the reformed system has so commended itself to more serious writers that it seems likely soon to be adopted in all German-speaking countries. The *Schweizerische Bauzeitung* formally changed its style of spelling on the first day of the year to agree with the new official system, expressing its belief that the old style would soon look antiquated, and that it was best to join at once in the reform. To a person familiar with German the new spelling presents no difficulties, but young students are likely to be puzzled at meeting in their reading with a whole range of words beginning with T which are not to be found in the ordinary German-English dictionaries. It is not many years since a spelling-reform movement was begun here, mainly supported, we believe, by Mr. Melville Dewey, or, as he then wrote it, Melvil Due, at present librarian of Columbia College, and while the world is in a mood for such things, no language needs a reform more than English.

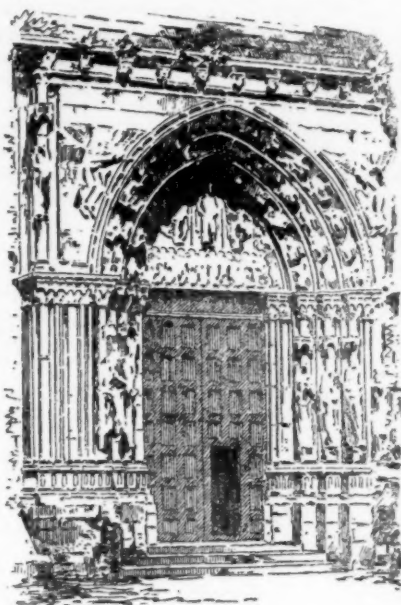
THE ILE-DE-FRANCE SCHOOL OF ARCHITECTURE.¹—III.

Fig. 13. South Portal of Notre-Dame d'Étampes.

DURING the transitional time and for more than a quarter of a century thereafter everything not immediately connected with the broken arch, with ribbing or the flying-buttress, continued to be improved and perfected in the direction of Romanesque forms. In the capitals, the curve became freer and freer; they were more deeply and delicately chiselled; storied and grotesque subjects and interlacing patterns were abandoned for conventionalized foliage, then the latter gave way to vegetable forms copied from nature; the abaci, which were merely bevelled prior to 1060 or 1080, were carved out as mouldings, complicated at first but tending gradually toward a big torus separated from the fillet by a cavetto. The pillars were simplified, on the one hand, and made more complex, on the other: in the first case they were reduced to the monocylindric column; in the other they formed bundles of colonnettes. The latter were adorned with rings, a decoration much in vogue in the Picard school, but coldly received by the Parisian proper and abandoned everywhere from the middle of the thirteenth century. In the cathedral of Laon it was almost abused [see "*Cathédrale*," Fig. 55].

The transformation was accomplished earlier and more rapidly in the doors than in the windows. From 1145 to 1150, the Gothic type of door with statues, canopy and statuette appears in an almost complete form in the north transept of

14), as well as in the sister façades of Notre-Dame of Mantres (Fig. 15), and Notre-Dame of Paris (see *American Architect* for August 2, 1890, "Religious Architecture," Fig. 2),—in these last with a beauty of ornamental sculpture which has never been surpassed in France. Through Chartres the type was reflected on Le Mans and Angers.

The windows long maintained the semicircular arch and sometimes the *formeret* circumscribed them exactly, in spite of the triumph of the broken arch in the vaulting. Their archivolts were enriched with mouldings which the Picard architects were fond of disposing in zigzags, at the risk of making them too heavy; the same peculiarity occurred in the large arches; the exaggeration to which the system was carried may be estimated at Bury.

It was in the belfry that the Romanesque window found its last refuge. At Sarcelles, in Notre-Dame d'Étampes, at Vernouillet and a hundred other places, very finished towers may be seen without a single broken arch in them, but resting on a framework of pointed arches. To French artists of the twelfth century this seemed the most natural thing in the world, for the disposition is repeated in Champagne, Burgundy, Anjou, and even in Angoumois.

More radical changes were effected in the twelfth century in the form and position of the belfries. The central belfry made its appearance; however, it was not generally adopted anywhere except in Picardy, and it was rarely erected above a very broad nave or intersecting space, for in such cases a corresponding height would have been necessitated; a disproportion of this kind would not have disturbed a Norman architect, but it seemed in poor taste to a Parisian. In Saint-Gilles at Étampes gables were ingeniously arranged at the base of the central tower to cover slanting walls designed to furnish a final smaller base. We do not know of a single stone central belfry at Paris; all of the towers of the eleventh, twelfth and thirteenth centuries still standing, and all those whose position can be determined—at Saint-Germain-des-Prés, Saint-Germain-l'Auxerrois, Saint-Pierre de Montmartre, Saint-Martin-des-Champs, the abbey of Saint-Geneviève, Saint-Julien-le-Pauvre, Saint-Germain de Charonne (also Notre-Dame d'Auteuil, before 1880)—rise, or rose, on the right or left of the entrance to the choir. This fact has had a powerful influence on French cathedrals,—not one in Ile-de-France, Picardy, Champagne, Touraine or Maine, at Limoges, Bordeaux, Bayonne, Rodez or Narbonne, has ever had a central tower; the



Fig. 14. Portal of Saint-Ayoul, Provins.



Fig. 15. Cathedral of Mantres.

Saint-Denis, and we find it without many variations in the western façades of Notre-Dame of Chartres (see *American Architect* for August 2, 1890, "Religious Architecture," Fig. 10), and of Notre-Dame of Senlis, at Notre-Dame of Étampes (Fig. 13), at Saint-Loup-de-Naud, at Saint-Ayoul of Provins (Fig.

lead en spire is the nearest approach to it. The only exception occurs at Laon, and there Norman imitation is apparent in its disposition as a lantern, a disposition that was transmitted to the charming church of Saint-Yved at Braisne. Though Martin Lalye and Jean Vast, in the middle of the sixteenth century, took the risks of rearing, at Beauvais, a lofty tower on the four pillars at the intersection of the nave and transept,

¹ From the French of Anthyme Saint-Paul, in Planat's *Encyclopédie de l'Architecture et de la Construction*. Continued from No. 892, page 64.

a catastrophe soon taught their admirers that the original intentions of the builders had been misconstrued.

The square tower had the preference over the octagonal from the twelfth to the sixteenth century. There are beautiful

twelfth-century specimens of the latter at Tracy-le-Val, Cambronne-lès-Clermont, Foulanges, Orgeval, Rueil, etc., not to speak again of the unique central tower of Poissy.

The crowning of the belfries was a subject of the liveliest interest to the architects of Ile-de-France in the twelfth century. During the preceding century, for want of something better, they had made use of low four-sided stone roofs, such as may still be seen in the department of Oise, at Morienvall, Pontpoint, Rhuil and Rethondes. We can detect no local transition between these squat pyramids and the soaring spires; the constructors of some neighboring region, which we believe was either Touraine or Anjou, must have lent a helping hand to those of the French school, for how else can we account for the two masterpieces of the style in the period prior to the

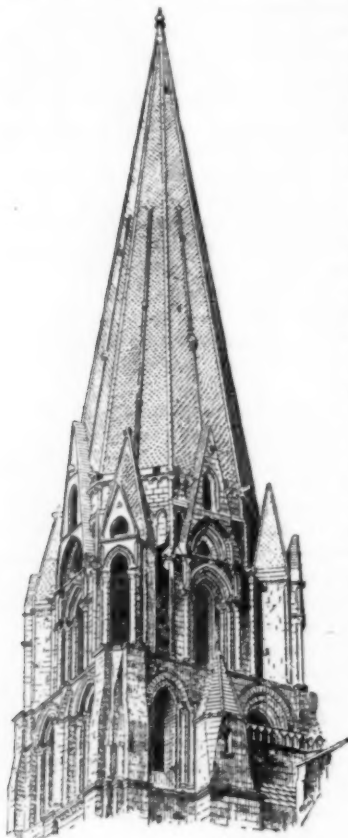


Fig. 16. Old Spire of Chartres Cathedral.

thirteenth century, — the abbey-belfry of Vendôme and the old spire of Chartres (Fig. 16), one of our national glories? We do not know whether some contribution may also have come from Normandy, or whether even this province antedated Ile-de-France in the composition of church towers. The famous examples are sufficient, and, if necessary, that of Chartres alone, to explain the prevalence of the two types from the second half of the twelfth century in the crowning of square towers. The one most widely employed was naturally the simplest, — above the upper cornice a large octagonal spire, with small pyramids at the angles following the slope of the former, and with dormers (often wanting) on the faces. Nogent-sur-Marne, Athis, Bougival (Fig. 17), Mareil-Marly, Sarcelles, Conflans-Sainte-Honorine [see "*Fleche*," Fig. 8], Vernouillet, Limay, Nesles, Saint-Leu-d'Esserent, Saint-Vaast-de-Longmont, etc., have belfries of this kind; one quite well-preserved example existed down to 1880 within the present walls of Paris, at Auteuil; another on Suger's basilica, was still the pride of the inhabitants of Saint-Denis, a quarter of a century ago [see "*Fleche*," Fig. 10]. In the second type, which is plainly richer and more effective than the first, the small pyramids are transformed into spirelets or turrets that extend



Fig. 17. Belfry of Bougival (Seine-et-Oise.)

down as far as the seat of the upper story; to make place for these, the latter is octagonal in form, the oblique sides often being concealed by the turrets and the face-walls having no opening but one long bay. The most successful of these, after the old spire of Chartres, are the charming belfry of Notre-Dame d'Étampes, for the twelfth century, and that of the cathedral of Senlis [see "*Clocher*," Fig. 6] for the thirteenth. The towers of Notre-Dame at Laon [see "*Cathédrale*," Fig. 56; and "*Clocher*," Fig. 8], which were completed about 1220, and are also of the second type, though without turrets, are on a par perhaps with the belfry of Senlis; they attracted the attention of contemporaries abroad — copies of them are encountered in the German cathedral of Bamberg and in the Sicilian church of La Martorana at Palermo. At Notre-Dame of Paris [see "*Clocher*," Fig. 7], the turrets lose in relative importance and are brought forward slightly so as not to interfere with the disposition of the bell-chamber story, which is square and retains its double bays.

[To be continued.]

CONSTRUCTION.¹ — XIX.

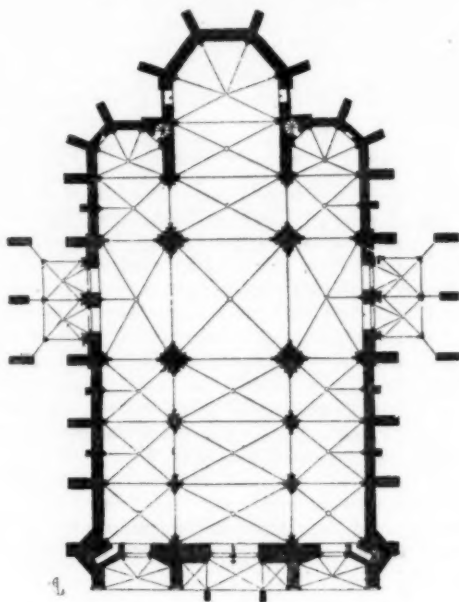


Fig. 102. St. Urbain, Troyes.

It is true, that, in the example of construction just given to our readers, there are grave defects and we do not disguise them. That outer scaffolding of stone, which forms the whole strength of the building, is subjected to the action of the atmosphere; it seems as if the builder, instead of trying to protect the vital parts of his structure, had taken pleasure in exposing them to all the chances of destruction. His system of equilibrium depends upon the absolute resistance of materials too often imperfect. He evidently wishes to astonish and he sacrifices everything to this desire.

But beside these grave defects, what profound knowledge of the laws of equilibrium! what subjection of matter to the idea! what a theory, fertile in applications! Let us never imitate these subtle constructions, but let us profit boldly by the acquisition of so much knowledge. But to profit by it, we must cultivate and exercise it.

In the article "*Chainage*," we have shown what were the processes used during the Middle Ages for anchoring the edifices. For the long beams of wood, used during the Romanesque period, the builders of the thirteenth century, seeing that these soon decayed, substituted cramp-irons uniting the stones composing the courses. This method was never, at any time, employed with such singular exaggeration as in Ile-de-France. There are edifices, like the Sainte-Chapelle-du-Palais at Paris, where all the courses, from base to summit, are fastened by irons. At Notre Dame in Paris even, it is seen that all the structures raised or repaired after the early years of the thirteenth century are, at heights not far separated, fastened by cramps set in lead. Certainly these builders had not entire confidence in their very ingenious devices and their innate good sense made them soon feel that they were carrying their boldness too far. The way in which these anchorages are arranged shows, moreover, that what they feared most was the bending or twisting of the piers and walls;

¹ From the "*Dictionnaire raisonné de l'Architecture Française*," by M. Viollet-le-Duc, Government Architect, Inspector-General of Diocesan Edifices, translated by George Martin Huss, Architect. Continued from No. 889, page 7.

and in that regard the system of stone posts adopted by the Burgundian architects had a marked superiority over the dangerous use of cramp-irons sealed up in solid masonry. It must also be said that the builders of Ile-de-France found difficulty in procuring long

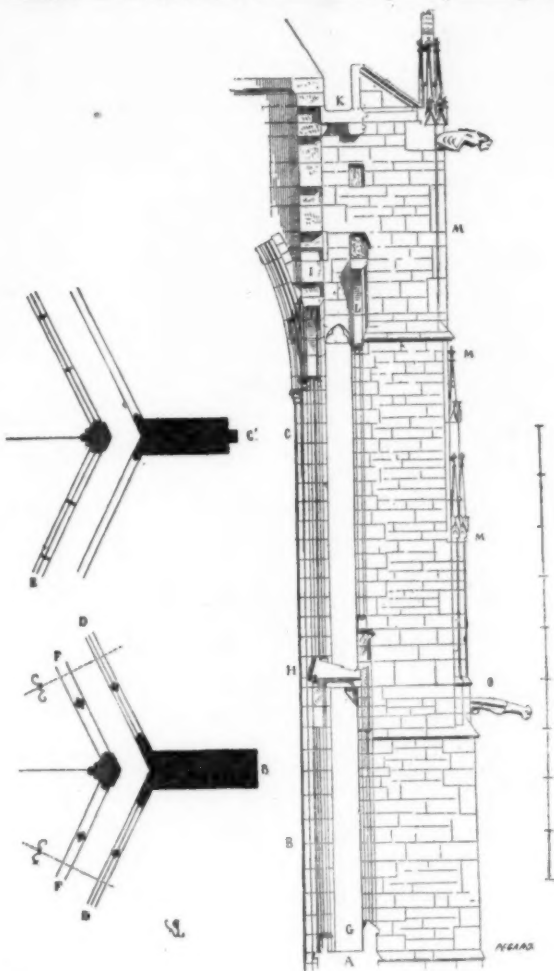


Fig. 103. Buttress of St. Urbain, Troyes.

stones, resistant enough and capable of being set with impunity against the cleavage, while in Burgundy these were common and of excellent quality.

It is time now to introduce our readers to an edifice which, in itself alone, embodies and at the same time skilfully exaggerates all the theories of the builders of the Gothic school. We refer to the church of St. Urbain of Troyes.

In 1261, Jacques Pantaléon, a native of Troyes, was chosen pope, under the name of Urbain IV, at Viterbo; he died in 1264. During his pontificate, he wished to erect at Troyes a church under the name of St. Urbain; so this monument was begun and rapidly progressed; nevertheless, it remained unfinished, as the successor of Urbain probably did not think it proper to continue the work of his predecessor. Such as it is, the church of St. Urbain of Troyes shows, through the master-builder, who was intrusted with its construction, a singular hardihood and a truly amazing knowledge of building. If the date of the foundation of the church of St. Urbain and that of the interruption of the work were not historical facts of undeniable authenticity one would be tempted to suppose that this edifice was built toward the beginning of the fourteenth century.

We ourselves, owing to proofs so incontrovertible, have long hesitated before believing that the thirteenth century had seen begun and finished what remains of this monument; being in the habit of relying first of all upon archaeological signs, we could not give to the construction of Saint Urbain a date earlier than the fourteenth century; but a profound study of the structure has shown that historical tradition was in accord with fact. They no longer built thus in the fourteenth century. Only, the architect of St. Urbain was one of those artists in whom the most advanced theoretical principles are allied to a profound experience, to a skill that is never at fault, to a sure knowledge of the quality of the materials, to infinite resources in execution and to natural originality; he was, to put it briefly, a man of genius. His name is unknown to us, like those of most of these laborious artists; if Urbain IV had sent from Italy an architect to build his church at Troyes, certainly we should have known it, but we should not have to spend much time over his work, for Southern Italy at that time was raising only structures that do not furnish types suitable for study.

The plan of the church of St. Urbain of Troyes belongs to Champagne. The choir recalls that of the little church of Rieux, that we have already given: upon the four piers of the crossing must have been a tower, probably very high, if one examines the broad section of these piers. Two other spires flanked the entrance, accompanied by a porch projecting like that of the church of St. Nicaise, at Rheims. The central tower was not commenced and the nave and façade remained unfinished. From what remains of these parts one can give an exact account of what this church was to be. The choir and the transepts are complete. Let us cast our eyes first upon the plan of the church of St. Urbain (Fig. 102) taken at the ground-floor; this general view is necessary in order to appreciate the different parts of its structure. This plan presents points of support that are solid, thick and resistant, a very simple general arrangement.

Placed between two streets, two deep and well-protected porches give entrance to the two arms of the transept. Above the ground-floor, at a height of 3.30 metres, the whole building looks like a structure of glass of extreme lightness and supported by the buttresses, which alone remain solid, as far as the gutters above. Hence it is the construction of these buttresses which must occupy us in the first place.

Figure 103 gives one of the buttresses of the apse parallel to one of the lateral surfaces. The solid basement, 3.30 metres high, ends at A. At B is drawn the horizontal section of the pier at the level B and at C the horizontal section at the level C. D is the open-work set with glass outside of the gallery G; F is the free open-work holding the ceiling H, which serves as a passage on the level of the supports of the large upper windows; E, the mullions of these glass windows. The archivolts of the windows, whose extremity is at I, serve as wall-arches to the great vaults. The gutter, K, above is supported on the inside by the filling placed upon the archivolts I and on the outside by an arch L and a whole system of open-work, whose details we will soon give.

The open-work at D and F is partly set in grooves, so that these are both independent of the piers and are real sashes of stone, enclosed between the buttresses.

Let us say one word about the materials which enter into this structure, for their quality is partly the cause of the system adopted. Even at Troyes, they could not procure freestone; for the region furnished only chalk, good, at best, only to make the filling for vaults. The architect of St. Urbain had to bring stone from Tonnerre for the facings and in order to economize these materials, transported at great cost, he used, so far as he could, a certain stone called Burgundian, found several leagues from Troyes and proving to be only a coarse limestone, firm enough, but in shallow courses and cutting badly. It is with these latter materials that he built the solid part

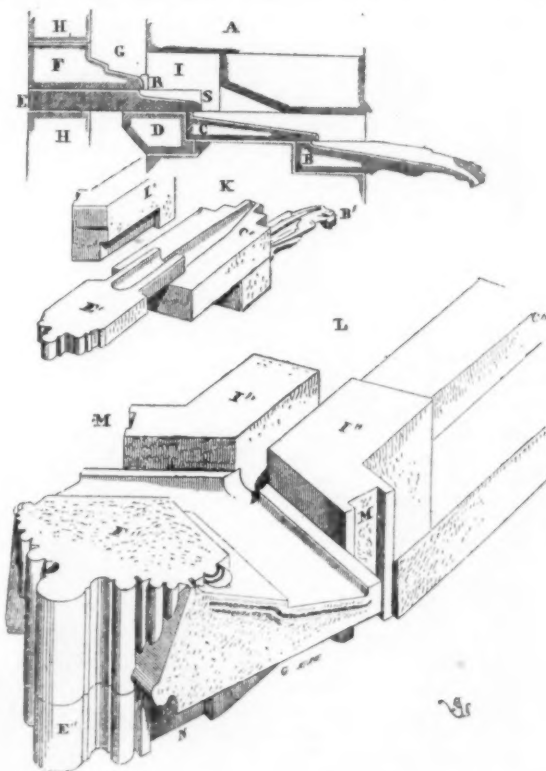


Fig. 104. Detail of Pier and Buttress, St. Urbain, Troyes.

of the piers, covering their outer surface M with great slabs of stone from Tonnerre, set against the cleavage and finely cut. So, also, with the stone of Tonnerre he built the inner piers, the open-work, the arches, the gutters and all the delicate members of the structure

now, the stone of Tonnerre here used is a species not very thick, but of great resistance, firmness and compactness and capable of being set against the cleavage without danger. In fact, this building is a structure of scappled stones, solid but clumsy, finished off with a fine and very beautiful stone, used with the strictest economy, as we would use marble to-day.

The lightness of the open-work and the mullions surpasses all that we know of in this class of work; and yet the materials used have been so well chosen and the elasticity of the structure is so complete, that very few of the pieces are broken. Moreover, as the structure is perfectly solid and well balanced, the injuries occurring to the open-work and windows have no importance, since the latter can be easily replaced, like real sashes, without affecting the principal structure.

The anatomy of this building must be examined with the greatest care. We shall try to bring out the details vividly before the reader.

First, then, let us take that part of the pier included between *H* and *O*—that is, the ceiling of the gallery and its lintel joining the inner pier to the outer one, the casings of the open-work and the drainage for the water at this point.

At *A* (Fig. 104) we see the section taken through the axis of the outer and inner piers. *B* is the gargoyle throwing off the water collected in the passage *G*—that is to say, not only the rain which falls vertically upon this slab, which is a small matter, but that which beats against the glass; *C* is the gutter of the roof, acting as bond-stone—that is, extending through the whole thickness of the pier; *D* is the console sustaining the lintel *E*, which serves as gutter-stone and joins the inner pier *H* to the outer one; *F* is the course of the roof of the gallery and supports the gutter; *I*, the two cheeks forming outer facings and holding the lintel gutter *E*, as shown at *I'* by the perspective detail *K*. In this detail the piece *E'* is the lintel-gutter, *C'* the second gutter-stone and *B'* the gargoyle. The large detail *L* shows, in place, the two pieces *I* at *I''*, the gutter *C* at *C''* and the roof piece *F* at *F''* with the lintel *E* at *E''*. All this arrangement is made with the greatest care, the stones being well cut and well set; accordingly no rupture is seen.

Let us notice that the gutter-lintel *E* (detail *A*) is left free in its course from *R* to *S* under the pieces *I*—that is to say, the bed *R S* is thick and cemented only after the settling of the structure has produced its effects, so as to avoid all chance of rupture.

We see at *M* (detail *L*) the rebates destined to receive the outer glass windows of the gallery and at *N* those destined to receive the inner open-work supporting the roof-piece and the mullions of the windows.

How can open-work so delicate as in these two windows be kept in vertical planes?

That on the interior is only 21 centimetres thick, and that on the

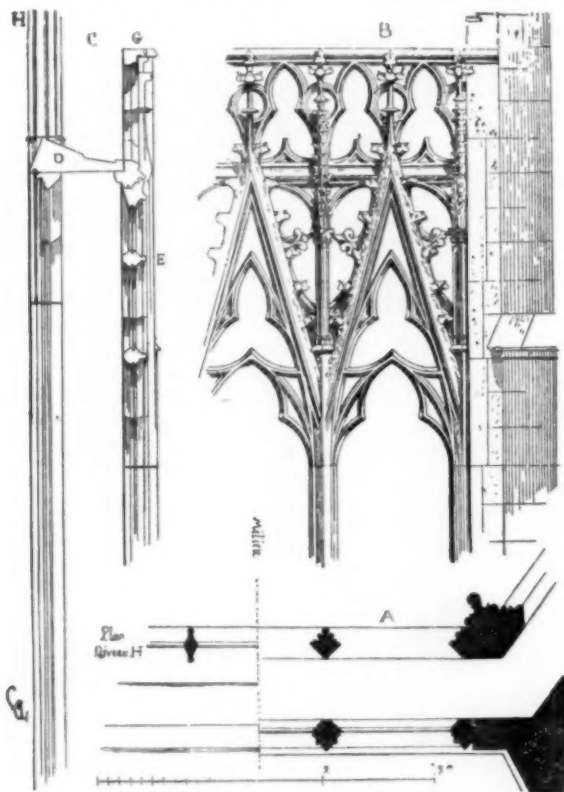


Fig. 105. Outer Open-work of Gallery, St. Urbain, Troyes.

exterior 22 centimetres including all projections. Their rigidity is obtained by the simplest means, in that the arching of each of them, included between the rebates of which we have already spoken, is in

one piece. Each section of open-work, then, is composed of but three pieces: two jambs and an upright slab pierced with openings.

We must not forget what has been said previously about the materials used in building the church of St. Urbain. The architect had

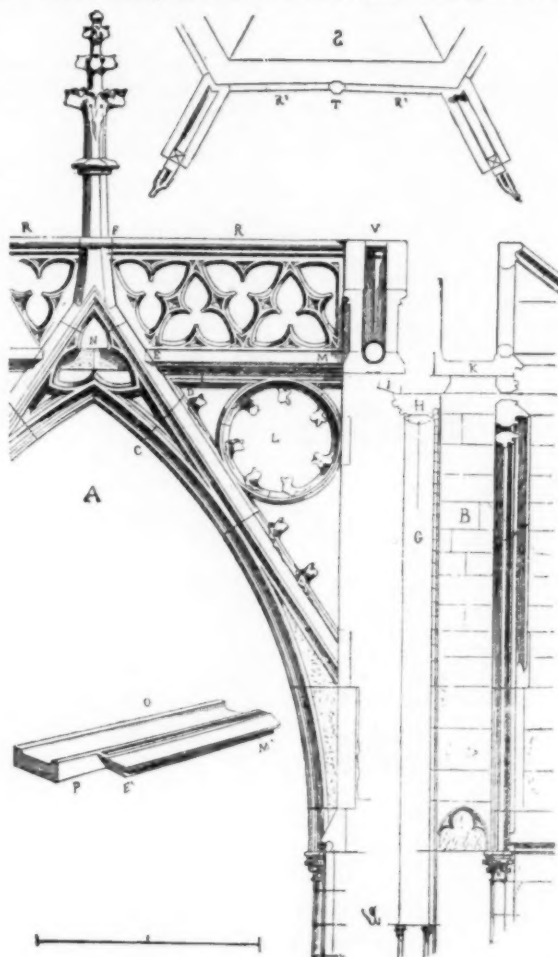


Fig. 106. Inner Open-work of Gallery, St. Urbain, Troyes.

made his structure of resistance out of common stone, a sort of blocks worked with the pick; and whatever was only accessory, like decoration, gutters, open-work, were of the stone of Tonnerre, shallow and very firm ledges, but of great length and width. These stones of Tonnerre are really only flags, whose thickness varies from 20 centimetres to 30 centimetres and are of excellent quality.

The edifice consists only of piers between which are placed upright slabs with apertures. This singular system of building is applied everywhere with that rigorous logic which characterizes architecture at the end of the thirteenth century.¹

Let us take, then, the outer open-work of the gallery in the church of St. Urbain and see how it is cut and kept vertical.

We represent it here in the plan *A* (Fig. 105), in its outer elevation *B* and in its section *C*.

The roofing-stone *D*, making the two sets of arches firm and forming a gutter and a support for the upper windows, is made of one or two pieces joined to the pieces under the inner pillars out-lined in *F''*, in the detail of Figure 104.

To give more weight and more rigidity to the great slab, which is cut out so as to form the exterior arching set with glass (Fig. 105), whose section is drawn at *E*, this slab has a railing *G* joined to it and made of the same piece, so that the gutter *D*, forming the ceiling of the gallery, rests upon a projection reserved on the interior along the outer arching, while the lower bed of this ceiling is made fast to the inner arching, also composed of a large slab set upon end, with windows cut through and held at its extremities by the rebates *N*, of our detail *L*, in Figure 104.

We ought to say that to produce a more pleasing effect, the architect has given the interior arched open-work a more delicate design and a different form from that of the exterior arching; and these two openings produce the most brilliant pattern and wonderful effects resulting from the insertion of stained glass.²

¹ How does it happen that we, who to-day have cast-iron, or can procure stones of excellent quality and in large pieces, have not thought of putting into practice the method so happily applied in the building of the church of St. Urbain? What resources might we not find in the study and the use of this system, so true, so simple and so well adapted to many of our edifices in which are demanded large windows, lightness and swiftness of erection?

² The decoration which encloses the chancel of St. Urbain was probably not admired by everybody at Troyes; for, some years ago they had the idea of concealing it by an enormous decoration of pine wood and stucco, painted white.

Let us now look at the upper part of the structure of the choir of St. Urbain, for there the architect has displayed a remarkable sagacity.

If we refer to Figure 103, we shall notice that the upper windows are set in a vertical line with the coping of the roof at *I*, that their archivolt serves both as wall-arches and as relieving-arches for carrying the timbers and that the gutter *K* rests partly upon a projection reserved above this archivolt and partly upon a piece of open-work *L*, fixed about 50 centimetres in front of the window.

Figure 106 gives at *A* the outer surface of this open-work and at *B* the section made through *C D E F*. In this section, we find at *G*, the section of the window, at *H*, its archivolt-wall-arch and at *I*, the vault.

The open-work supporting the gutter *K* consists of an arch reinforced by a gable, performing the duty of a tie.

The open circles *L* help to sustain the gutter along its extent from *E* to *M*. This gutter, in each compartment, is made only of two pieces of stone, joined at the apex of the slopes at *N*; and each of these pieces is cut as indicated in *O*, its junction with the open-work taking place from *E'* to *M'* and the part *P* being cut out and having no drip-stone, in order to let the summit of the gable go through.

The pattern of the gable and the circular openings *L* are faithfully drawn upon our figure. The finial (its shaft penetrating the balustrade) and the point of the gable are made of a single piece of stone, so as to add the necessary weight to the extremity of the pattern. But to avoid all chance of the gable being thrown down outward, the two pieces of the balustrade *R* are not placed in a straight line, but form an angle slightly obtuse, as shown in the plan *S*; *T* being the shaft of the finial at the top of the gable and *R' R'* being the two parts of the balustrade cut each from a single slab.

Hence the apex *T* of the gable cannot be thrown outward, supported as it is by the two open-work slabs *R' R'*, which rest on the tops of the piers pierced by gargoyles to drain off the water, as seen in *V*.

This is rather an arrangement of carpentry than a structure of masonry; but we must not forget that the quality of stone used at St. Urbain lends itself to such a structure and that, thanks to these artifices, the architect has been able to raise a structure of extraordinary lightness, which consists, in reality, only of a masonry of rough stone and upright slabs, pierced with openings.

The flying-buttresses which support the great vaults of this church above the chapels are built in conformity with this system of open-work and of large pieces of stone set like props [see "*Arc-Boutant*," Fig. 66].

The architect of the church of St. Urbain (his scheme being accepted) has been faithful to his principle in all the parts of his construction. He has understood that in a church so light, built with stones and slabs, it was necessary to allow this open-work great freedom in order to avoid ruptures; wherefore, he has fitted these slabs only into grooves that permit the masonry to settle, without breaking the delicate tracery which constitutes the walls.

We see by examining Figure 106 that the gutters are free, almost like pipes and that, even in case of a break, the dripping of the water could cause no injury to the masonry, since these gutters are suspended over vacant spaces without, by means of these open gables.

It was necessary to be bold to conceive a structure of this kind; it was necessary to be skilful and careful in execution, to calculate and foresee everything and to leave nothing to chance; so, this structure, despite its excessive lightness and despite neglect and unintelligent repairs, is still solid after five hundred and sixty years of existence.

The architect required from the quarries of Tonnerre only slabs 30 centimetres thick at the utmost, of great dimensions, it is true, but of comparatively light weight; he thus avoided the greatest expense at that period—that of transportation. As to the handiwork, it is considerable; but in those days this did not cost the most.

The church of St. Urbain will often appear in the course of this work, for it is certainly the utmost limit to which building in stone can attain and as an architectural composition it is a masterpiece [see "*Arc-Boutant*," "*Balustrade*," "*Croix*," "*Fenêtre*," "*Gargouille*," "*Porche*," "*Porte*," "*Vitraux*"].

(To be continued.)

PROPOSED GREAT CATHEDRAL IN MEXICO.—A City of Mexico despatch says: Bishop Manuel Arnezquita of the Tabasco diocese of Mexico, has issued an appeal to all Catholics of Mexico, the United States, and Canada for money to be used in the erection of a great cathedral on the bank of the Grigalva River, on the spot where the first mass was said on the American continent. At present there is nothing to mark the spot. The Catholics of Mexico are contributing liberally towards the project. — *New York Evening Post*.

Nothing is more ridiculous than that scaffolding of stucco, which displays its pretentious wretchedness in front of one of the most charming conceptions of the art of the thirteenth century in its decline. The barbarism that destroys is certainly more dangerous than the barbarism of the authors of the high altar of St. Urbain; but, still, what would the friends of the arts in Europe say, if they saw a façade moulded in plaster, erected in front of the western façade of the court of the Louvre, under pretext of embellishment? How much progress we have still to make in order not to merit the title of barbarian, which we give so freely to periods when certainly no one would have been permitted to hide a work executed with intelligence, care and talent, behind a useless overgrowth, coarse in material and workmanship, without form and without taste, a product of ignorance, combined with the most ridiculous vanity.



THE COLD WEATHER AND FIRES.—VOLUME OF THE YEAR'S WORK.—IMPORTANT BUILDINGS NOW IN HAND.—THE CRERAR BEQUEST.—MONUMENT TO COMMEMORATE THE CHICAGO MASSACRE.—THE SCHILLER THEATRE.—THE BOARD OF EDUCATION ESTABLISHES A BUILDING BUREAU.

CHICAGO, like most other places in the United States, has been visited by a cold wave more continuous and more severe than has been experienced for five or six years. As a result of our succession of very open winters, it had been begun to be looked upon as a settled fact that the climate of our city was becoming of a much milder nature than that which characterized the so-called good old days, and, consequently, the winter months were looked upon as a season in which much work could be accomplished in the building line. Depending on this, it was expected to bring many buildings to completion by the first of May of this year, and so the present extremely cold weather has been a decided set-back and disappointment. Some of the large buildings of skeleton construction are either partially or entirely enclosed in pine jackets. The Athletic Club's structure is entirely enveloped, while the big Marshall Field building has three or four stories encased. This, however, with the present low mercury, is only a short step towards affording anything like a suitable temperature to work in. Salamanders are resorted to in very large numbers, and there has been the usual amount of fires resulting from them. The Massachusetts State Building at the World's Fair grounds had a very narrow escape from fire from this cause. One of the large Fair hotels, which was eventually to be transformed into a "bichloride-of-gold" institution, has been reduced to ashes, though in this case the blame does not rest with the salamanders. Quite extensive alterations are being made in the home of the Calumet Club, one of the oldest and largest clubs of the city. Probably a match carelessly dropped among some shavings was the cause of the fire that reduced that fine building to a mass of ruins. A rather amusing example of the proverbial Chicago "push" was given in the action taken by its officers and Board of Directors: while the engines were still playing on the smoky pile these men met at the house of the president, appointed a committee to look up temporary quarters and report the next evening, and it was settled that a new and much finer building should take the place of the old one.

Aside from the difficulties connected with the cold which those interested in the Marshall Field building have to overcome, the public is being somewhat amused at the struggle which is transforming the bridge, which was to connect the old and new buildings, into a veritable Bridge of Sighs. Between the present retail store and the new structure an alley runs, a disadvantage which was to be overcome by throwing across it a bridge. This the adjoining property-owners refused to permit, as one bridge will considerably diminish their light, while, if one is constructed, there is no reason why a dozen similar ones should not spring into existence in mid-air. An injunction has been obtained to stop the work, but the struggle seems likely to continue for some time, as it is very important to the owners that the two buildings should be connected.

It will certainly be a great disappointment to many owners that it will be impossible, owing to the many set-backs of this winter, to have their buildings completed by the first of May. The amount of building in Chicago has, as a matter of course, been very large this year, though, owing to the fear that a new law might this year be aimed against the sky-scrapers, there was a general tendency to hurry on such buildings in the last months of 1891, which reduces the increase of money spent in 1892 over that expended the year before. The first eleven months of the year 1892 show the increase in number of operations over those in 1891 to be 328—11,504 being erected in 1892, while 11,176 were constructed in the corresponding eleven months of 1891. The frontage of the buildings of 1892 exceeds those of 1891 by 38,980 feet—308,634 being the figures representing the frontage of 1892, while 269,654 are the figures for 1891. The entire eleven months of 1892 have seen expended \$59,371,220, while the statistics of 1891 showed \$52,000,500 as the sum given to building purposes. Architecture is certainly fast founding, in our city, monuments which are not a disgrace to the profession, and many are the institutions, either public or private, whose housings the city can well be proud of. Either among those which have been erected during this last year or are in process of construction at present, the following are a few: The Chicago Public Library, which, when completed, will cost \$1,250,000; the Illinois Central passenger depot, seven stories high, with a cost of \$1,000,000; the Art Institute, cost \$800,000; the City Criminal Court building, seven stories high, with a cost of \$450,000; the Young Men's Christian Association building, thirteen stories high, cost \$800,000; the Armour Institute, \$250,000; the Chicago Historical Society building, two-and-a-half stories, cost \$150,000; the Hahnemann Medical College cost \$100,000; Walker Museum and three dormitories costing \$300,000. This does not include the large Newberry

Library, being erected on the north side, which, with its four stories, will cover a half-square, and which has been before mentioned in these letters. Aside from these buildings of a semi-public character, there are the Medinah Temple building, twelve stories high, to cost \$500,000; the Monadnock-block extension, which, when it is accomplished, will be the largest office-building in Chicago, and will cost in the neighborhood of \$1,000,000; the sixteen-story Old Colony Building cost \$600,000; the Columbus Building cost \$800,000; the Security Building cost \$500,000; the Teutonic, which calls for an expenditure of \$500,000 also; the building of the Hartford Deposit Company cost \$600,000; the twelve-story Boyce office-building cost \$250,000; the twelve-story Gillespie office-building cost \$150,000; the Dexter Building cost \$100,000; the Isabella cost \$200,000; the Ellsworth, at a cost of \$300,000, and the new Marshall Field structure, which will cost \$800,000. A number of other large edifices might swell the list of these large building enterprises, but, from their less-known character, it would be only tiresome to enumerate them.

To those of us who have known Chicago as an uninteresting provincial town full of unwarrantable self-conceit, the change that has come over her as she buds into dignified maturity is very noticeable. Her nature was, to begin with, very unlovable, and even her most ardent admirers had to admit there was little of beauty in it; but now that she has blossomed forth into strong, fresh, many-sided maturity, with its widespread interests, even her least ardent admirers have to admit her to be interesting. In whichever direction a person's tastes may lead him, he can now find material with which to satisfy them in the Chicago of to-day, and there is certainly an incentive to be found in the feeling that these interests are each one the beginning of a greater future, which future, in a measure, depends on individual exertions. We have passed the trying times when exertion only resulted in keeping alive a struggling body: now exertions show for something, and those who meet in the interests of art, music, literature, science have, or soon will have, their own especial homes. Music has the splendid hall of the Auditorium; Art will have an abiding-place between the walls of the Art Institute; literary interests will be found centred in the rooms of the new University, where such men as Van Holtz and Professor Moulton lecture to those who care to hear; the Newberry and Public libraries will shelter those of studious habits, while the antiquarian can be permitted to forget the present within the walls of the Historical Society. It has also just been decided that the Academy of Science shall have a new home, and that it shall be located within the limits of Lincoln Park.

In counting the libraries of our city, we are obliged to hold our breath concerning the bequest of over two millions of the late John Crerar, designed for the use of building and endowment. The will has been contested by relatives of the deceased, and now the decision of the Supreme Court of the State is being anxiously awaited by Chicagoans. The directors of the projected library, not having as yet been incorporated as a body, have been incapable of taking any legal action concerning the library. It is reported, however, that they have not been idle, and that one of the best-known architects of the country has been consulted about the plans for the building.

Relative to the home of the Academy of Science there has also been much public discussion, and the feeling of many not especially interested in the association is that it is a great pity to grant building space to the society in Lincoln Park. As a matter of precedence, it may be bad to allow a building to be erected within the Park, but, architecturally, the prospect is pleasing that a fine building may have such picturesque and suitable surroundings. It is devoutly to be wished that it may be a fine building, and that it will be an added feature to the beauty of the Park, rather than a blot upon it. Since the large fire of 1871, this excellent association has been three times burned out, and that it has continued to exist at all would seem to indicate a considerable amount of vitality. Not to be out-done in magnanimity by the North Side park, one of the West Side ones has offered space for a natural history museum, and report has it that plans will soon be obtained.

A recent addition to the possessions of the city is the gift by one of our public-spirited citizens of a drinking-fountain, placed in the recess between the City Hall and the County Building. That it is as good as it is makes it doubly a pity that the work is not still better. The design of the general shape of the fountain is fairly good, while the details are commonplace. The chief figure is that of Columbus, to commemorate this year of 1893. The figure, — in fact, the whole work, — which might have been a delight to the thousands who daily pass along this busy thoroughfare, is simply what might be expected to come from the hands of a very mediocre artist assisted by casters whose reputation for good work about equalled his own. If the lesson only could be learned, that what is worth doing at all is worth doing well, how fortunate many of us would consider ourselves in finding our "things of beauty" a joy forever. The building which forms the background for the fountain is about as poor as it can well be; but, had the fountain itself been fine, it would have been a double delight to have found something really artistic in the dirty, dingy, disorderly court.

Another gift is about to be given to Chicago, and one feels like saying with the children: "Heavy, heavy hangs over thy head. Which shall it be, fine or superfine?" It is a bronze group, to be located on Eighteenth Street, just east of the old cotton-wood tree, which alone for so many years has marked the spot of the Chicago

Massacre. The donor is Mr. Pullman, of world-wide railroad-car fame. The location for such a group is exceptionally fine. The sculptor is Carl Roll-Smith, a Dane. The monument will consist of a central group of six figures of heroic size, mounted on a granite pedestal, on whose four sides will be bas-reliefs depicting the incidents of the evacuation of Fort Dearborn and the subsequent massacre. The pedestal will be ten feet high, and the group about nine. The casting will be done in New York, by the Henry Bonnard Company, the plaster-cast of the figures having been already received by them. In the group is seen, in the foreground, the Pottawattomie chief, Black Partridge. He is saving from death by the tomahawk in the hands of one of his own tribe Mrs. Helm, the wife of one of the early settlers, whose name is well known in local history. According to the etiquette of Indian warfare, Black Partridge had the right to dispose of his war-prize as he felt inclined, and, having been on friendly terms with the Helm family, he preserved Mrs. Helm from a horrible death, in which act he is represented, his arm about her, warding off the blow with which another savage is threatening her. At the back of the group, Dr. Van Voorhees, the post-surgeon of the fort, is being killed by an Indian. In the foreground, a child sits crying. Twelve children were tomahawked on this day memorable in Chicago history. That Dr. Van Voorhees is being pierced with a spear points to a disregard of historical detail which is to be regretted. The worth of the work cannot be at all decided upon by the rough drawings which have been shown. The subject is certainly one of great interest, and capable of very dramatic treatment, and it is to be hoped that it may prove a rival in point of excellence to the fine group of Indians in the northern portion of the city. It is rather interesting to know that Kicking Bear, the celebrated Sioux brave who last summer was a prisoner at Fort Sheridan, served as a model for the figure of Black Partridge, while from Short Bull, another Sioux prisoner, was made the studies for the other figures. The subject of the front bas-relief is a bird's-eye view of this famous battle of Chicago. The bas-relief at the back has for its subject the evacuation of Fort Dearborn. Captain Wells, who had come to the assistance of Captain Heald, the commander of the post, leads the way with his Miami braves, while the garrison and settlers follow. On one side is shown the death of Captain Wells, and on the other Black Partridge returning a medal which was given to him by the United States Government for his friendliness to its two commanders, Heald and Wells.

The matter of insurance has been adjusted on the Athletic Club building, the burning of which last November was mentioned in these columns. It is said that there are chances of the building now being completed by the first of June. To accomplish this undertaking, great effort will have to be made, and it looks now as if it were safe to say no effort would be of any avail. The building, as it is planned, will give the most luxurious housing to the club of any of its kind in the United States. If the published descriptions are carried out, it will be a most interesting building to visit.

One of the buildings finished within the last year, of which no mention has been made in these columns, is the Schiller Theatre, which is a very successful structure both on the exterior and inside. The exterior is successful in the peculiar style of its architects, displaying their peculiarities in a marked degree, and is also an example of one more large building in our city whose façade is entirely constructed of terra-cotta, so colored and moulded that, to the unsophisticated, it appears like stone. A great deal of geometrical ornamental work of decidedly Moresque appearance gives a peculiar character to the building, which is still further accentuated by a polygonal, dome-like structure, similar to the one on the Transportation Building. An excessively wide, projecting cornice without brackets or dentils is particularly noticeable. The interior, in color and design, seems to be a connecting link between the design of the Auditorium Hall and the coloring of the Transportation Building of the World's Fair. In the theatre it is extremely successful, being a most pleasing mingling of green, gold and red, green being the body-color used. A curious feature is the shape of the proscenium-arch, which is in the form of concentric, semicircular Romanesque arches, each with a deep reveal. The finish of the lower floor is in mahogany, which harmonizes with the red in the decoration. The pale-green, being approached by this red through the gold, makes an especially charming effect. On either side of the wall of the first galleries are paintings incorporated into the scheme of decoration much as they are at the Auditorium.

The Board of Education in this city has this month decided on a plan which, if carried out with success usual in such bodies, will be fruitful of most grave results. The idea is no less than to establish a Building Bureau. Lately, work on school-buildings has been done unusually well, and at a very reasonable rate. The Board, however, did not seem to feel it was getting the most for its money, and has, consequently, created this Building Bureau. In this bureau, the superintending architect shall provide all necessary plans and specifications, which shall be the property of the Board. He shall be given a room in the City-hall, and shall keep regular office-hours. The duties of the architect are to be the supervision of construction and repairs, and the employment, under the direction of the Board, of the necessary draughtsmen and inspectors. Considerable opposition was aroused in the Board by this plan, as many of the members felt that no first-class architect could be obtained for the salary to be paid, and that before long the appointment to the office would be the result of favoritism; men unworthy of the position would be the

ones to attain to it, and, consequently, poor work would be the result — work which, when poor, would be doubly dangerous in this especial place, as the health, and perhaps lives, of so many children would be in question. The bureau plan was finally settled upon, though the matter of salary seems not yet determined.

The cold weather has made work at the World's Fair grounds difficult. Among the workmen, the Turks and Japanese suffer the most, while of all the guests, so far, the Esquimaux are the most hilarious, and dogs and sledges glide over the icy ponds to the boys' merry cry of "Kyak! kyak!" A rather arbitrary proceeding seems to be the order forbidding the Columbian Guards to wear ear-muffs or to have fires in the guard-houses. The banishing of fires in the guard-house seems to have its reason as a precautionary measure, but why ear-muffs should be taboed in below-zero weather is hard to understand. The ear-muff never pretends to be an especially artistic article of dress, but perhaps, with the proper staff treatment, it might become as picturesque as a Frisian metal coif. At any rate, there is little danger that the wearing of them would become such a settled habit that it could not be broken up during the hot months of next summer.

The pending strike on the grounds spoken of last month has been averted by the entrance into the union of the obnoxious non-union firm that was fortunate enough to receive the mammoth job. The firm still reserves the right to keep part of its establishment non-union, but the part in which will be done the World's Fair work will be entirely under the union management.

An interesting feature at the Fair will be the military display in the form of a perfect camp of regulars. Forty-five acres will be used. Here, eight hundred men, drawn from Uncle Sam's frontier posts, will drill and exercise, and show, in fact, a small corner of an army under camp discipline.

VENTILATION.



Design for Window for a Concert-hall, by M. Ruty. From *L'Art pour Tous*.

ON December 19, a paper under the title of "Sanitary Ventilation" was read before the Surveyors' Institution, and if, in the opinion of some members, it did not reach the usual standard of excellence of the contributions to this society, it was at any rate suggestive and sound so far as it went. The author, Mr. Edward Tidman, is a Fellow of the Institution, and the president, Mr. C. J. Shoppee, occupied the chair during the reading. On the ventilation of our homes and offices the health of the community largely, if not chiefly, depends; but it is a matter almost totally neglected, and even when the aid of "science" is invoked in the person of a self-styled "sanitary engineer" the arrangements are not always effective in bringing wholesome air to the lungs of the occupiers of dwelling-houses. In the discussion which followed the reading of the paper a speaker cited an instance of an elaborate system of ventilation, in which the air was made to circulate, it is true, but only up one pipe

and down another, so that the room was "ventilated" by its own vitiated atmosphere. In another case, instanced by the author, a ventilator-pipe from a drain was made to discharge beneath a bedroom window. Happily the dishonesty of the contractor neutralized the ignorance of the designer, as this "sanitary appliance" was only carried beneath the surface far enough to be out of sight, the connection with the drain not being made. The instance is not unique, and is quite sufficient to warrant Mr. Tidman in the selection of his title of "Sanitary Ventilation," to which a somewhat fastidious, not to say captious, critic took so much exception during the discussion. In the vast majority of cases ventilation of rooms is not specially provided for, but fortunately nature — in guise of the native carelessness or cupidity of the building contractors — provides a remedy for this. The unpremeditated openings at joints of doors, windows and floors supply a sufficient volume of air to make up for that abstracted by the wide chimney-mouth of our open fire-grates. Of course this is a deplorably unscientific mode of procedure. It is unhealthy and uncomfortable, but especially is it wasteful; and there is hardly anything less easy to defend than the unnecessary burning of coal, — a most deplorable waste of national wealth.

We have not, however, to do with the ethical aspect of ventilation, but with its practical side. Mr. Tidman says that "there is such a diversity of opinion and practice among the profession as to the proper and most effective system of ventilation and sanitation that clients are bewildered, and they naturally say, 'Where doctors differ, who shall decide?'" We think engineers and architects experience trouble in getting money for the necessary arrangements rather than in the designing of them. Civilization demands that we should pay for fresh water; so must we for fresh air if we would have it without draughts. A point not often considered is the ventilation of stables, and upon this the author touches. In one case, relating to cavalry horses, the death-rate was 180 to 197 per 1,000 per annum. The stables were rebuilt on designs in which provision was made for efficient drainage and ventilation, and during the following ten years the death-rate fell to 28.50 per 1,000. Mr. Tidman says that 75 per cent of town stables are in such an insanitary state as to be dangerous to man and animals, and to this cause is attributed the late attack of glanders and farcy. The quantity of fresh air per hour that is considered necessary for a mixed community of men, women, and children is 3,000 cubic feet each, whilst for men alone 3,600 cubic feet per man are required per hour. If 100 cubic feet of air-space were allowed per individual, with a mixed crowd, the air would have to be entirely changed thirty times an hour, or thirty-six times an hour for men only. In metropolitan lodging-houses thirty feet super, or six feet by five feet of surface, and 240 cubic feet are allowed per person. In police-houses fifty superficial feet and 450 cubic feet are given. Dormitories under poor-law administration must have 300 cubic feet for healthy persons, and 850 to 1,200 cubic feet for the sick. The Education Department requires ten square feet and a height of thirteen feet, or 130 cubic feet per scholar. In the case of animals, horses and cows should have 1,200 to 2,000 cubic feet per head; in army stables the allowance is 1,900 cubic feet.

We all know it is not the easy thing it would at first sight appear, to introduce fresh air without causing draught. To effect this thoroughly the air should be heated before being admitted to the room; but heated air rises, so that it may not, or a large part of it may not, come to the individual. Again, heated air is often over-dry and unpleasant. In large towns, too, the air decidedly wants freeing from floating particles before it is in good condition to breathe. In the Victoria Hospital, in Glasgow, there is a most carefully thought out system of ventilation, in which the air is forced in through hanging screens which are kept saturated by running water; the air, of course, being duly heated in cold weather. This arrangement is highly effective. There may be, and often is, a dense, sooty fog surrounding the building, but the interior atmosphere is as bright as mountain air. Of course an installation such as this is not within the compass of the average householder; but it is remarkable that it is not tried in some of our London theatres and restaurants. During the London fog season — which might be described as the "winter fogstice" — one would pay almost anything to get out of the foul air, irrespective of the merits of the entertainment provided for the money. As it is, fog is one of the greatest enemies to the theatrical manager. Possibly when we have reached a state so entirely metropolitan that all live in flats, arrangements will be made to ventilate whole blocks, windows being constructed not to open, and street doors all air-locks. In the meantime, Mr. Tidman introduces us to an arrangement which is like a Tobin's tube containing a strainer of some textile material. By placing the strainer vertically a large filtering area is obtained. Arrangements are made for removing and cleansing — a most necessary precaution, as any who have seen the cotton-wool filter used in the Houses of Parliament will easily understand.

The paper deals with sewer and drain ventilation also. The author says we are all familiar with the surface ventilators in our roads and streets, and the effluvia given off by them. That is true; and some districts are worse than others. In the parish of Chiswick, for instance, where there is a separate drainage system, and a pumping-station for discharge of effluent water into the Thames just above Chiswick Eyot, we have experienced some of the most disgusting stenches that ever turned human stomach; and we know at one time Mr. Thornycroft and his assistants were fairly driven out of their offices. Of course this is a want of ventilation; not, possibly, a want

of sufficient openings, but a want of the continuous use of these openings. The underground sewers and drains are in some sort a gigantic barometer, and at certain seasons, or states of weather, the air is retained within until it is thoroughly impregnated with the filthy emanations from the mass contained. Then comes a change of wind, a surcharge of moisture and lightening of the atmosphere, when from every man-hole and grating — past every useless trap and cracked drain-pipe — steam the pestilential gases, rich with the seed of typhoid and diphtheria. The County Councils were to have put all this right; but hitherto the test has proved beyond their strength. Perhaps, if cholera come with the summer weather to wake us from our lethargy, and a few die quickly to warn the many who are wasting slowly, then money may be spent, something effective may be done in the way of sewer ventilation and other manifestations of sanitary science, so that we shall all grow rosy, healthy, and strong, and the good St. Cholera will no longer have to walk abroad to scourge us for our shortcomings.

As to what that "something" should be, Mr. Tidman's paper does not afford much light and leading in regard to detail. "Lamp-post ventilators," he says, "are all very well in their way"; and their way, we would add, is rather a poor way. Surface ventilators he looks on as "most objectionable," and for this expression he was taken to task during the discussion. It is, we were told, an axiom of sanitary science that a sewer should be entirely uninclosed to get the most perfect conditions. No doubt, however, Mr. Tidman meant what he said, that surface ventilators are "most objectionable"; and here, we think, he cannot be gainsaid, although they are better than none at all — just as a bad-tempered domestic may be preferable to no service. Lamp-post ventilators, with gas-burners at their base, are said to be excellent extractors. But if the light becomes extinguished — as it easily may be — and the outlet turned inlet, the sewer might become charged with an explosive mixture of gas and air, and most serious results would follow. In dread of this some gas-works have refused to supply gas for the purpose.

The author gives particulars of the system of sewer ventilation carried out at Eston. Here a tall chimney-stack belonging to the Cleveland Salt-works is taken advantage of to ventilate the sewer. The chimney is a high one, the draught being equal to two inches on the water-gauge, which is a good pressure. The chimney is 220 feet high, and the average temperature at the base 475° F. The velocity of the passing air would be over 2,000 feet per minute. On the other hand, the sewer is small, viz, main sewer twelve yards lineal three feet, brick, 220 yards lineal two feet, brick, and 768 yards lineal eighteen inches, sanitary pipe. This is in straight lines. There are two tributary sewers, one 600 yards and one 986 yards long. A twelve-inch pipe was taken from the nearest man-hole to the chimney, and the surface ventilators were stopped. A number of readings at the various ventilators were taken, and from these it will be seen how little hope there is of getting much relief from a system of ventilation by factory chimneys. Readings were taken with the cover of the hole (where the experiment was being carried out) removed, and also with it on. At a distance of sixty-six yards from the chimney, with the cover off, velocity of wind in feet per minute was 1,174, and 1,394 when sealed. At the next nearest station, 128 yards, the air passed at the rate of 235 feet with the cover off, and 178 feet with it on. At 166 yards it drops to 152 feet and 136 feet respectively; at 531 yards, seven feet and eighteen feet; at 731 yards, five feet and two and one-half feet; whilst at 986 yards the readings are given at zero, from which we conclude that the effect was unfelt. Now it must be a very busy manufacturing district which has such a factory chimney as that at Eston available on the line of sewer at distances of every half-mile or so.

It is evident that in residential districts and rural places, at any rate, we cannot have this chimney-stalk ventilation; but Mr. Tidman gives us an example of what is the proper system. As every house contributes its quota to the sewers, so should it be made to do its share towards ventilation. East Grinstead is a small place in an open district, and no doubt in any case the people would be long-lived and the mortality low. But when we find that in 1889-90 it was only 8.4 per thousand, and that for the average of the last three years it was but 10.10 per thousand per annum; that from typhoid, scarlet fever, and diphtheria the deaths were nil; that the mortality of children under one year was but 5.8 per cent of those born, and that in the last report issued there was record of but one death from zymotic diseases, other than whooping-cough, during the year, — when we consider these things we are justified in expecting that there are exceptional causes tending to healthfulness. The author quotes these facts, and attributes them to the system of drainage ventilation. "It is a rule here," he says, "that no builder is allowed to insert a trap in his house-drain unless he place a four-inch vent-pipe on the sewer side of the trap, so that each house does its share of sewer ventilation. There is also a four-inch ventilating pipe placed at the highest point in the house-drain, in addition to a four-inch ventilator to each soil-pipe, carried up three feet above the highest window." "By this means alone," he continues, — and we think he does not speak without justification, although he was called to book during the discussion, — "by this means alone hundreds of lives are preserved that under certain other conditions would have been sacrificed." Perhaps some day, in the millennial future, when election petitions have made the party politician impossible, then legislators will turn their attention to matters appertaining to our practical well-being, and a comprehen-

sive, workable scheme of sanitation will become universal in the country.

In the meantime every local authority is bound by law, so Mr. Tidman tells us, "to cause the sewers belonging to them to be constructed, covered, ventilated, and kept so as not to be a nuisance or injurious to health, and to be properly cleansed and emptied." That we are glad to hear from a Fellow of the Institution of Surveyors; but it would have been even more gratifying if the many surveyors who crowded the theatre of the Institution to listen to and discuss the paper had told us how the law is to be put in motion. Who shall survey the surveyors? Is there a means of enforcing penalties, supposing they exist? If not, we would suggest one which would have the additional advantage of solving a point of scientific interest. It was stated during the discussion, — and the matter is said to be supported by high authority, — that there are fewer microbes in the sewers than in the open air above. We would propose, therefore, that in each district where the sewers are not "constructed, ventilated, and kept so as not to be a nuisance or injurious to health," a committee, including the local surveyor, the local board of health, or a selection of county councillors, should be confined for a few days in a chamber drawing its atmosphere only from the main sewer. If they emerged in their wonted health from the ordeal we should then look with more composure on unventilated sewers and defective house-drains, and one of the chief bogies of civilization would be laid. — *Engineering*.

AN ARCHITECT'S HOME.



WHEN an architect sets out to build his own house his clients and friends naturally have some curiosity to see what he will do in the combined rôle of client and architect. He is often supposed to be able to do just as he pleases, — limited only by the depth of his purse, — but after all he is subject to conditions similar to those which govern his clients. He has either to get a builder and build by contract, or become the builder himself, buying the materials and hiring the labor, — both ways have their disadvantages.

Another condition may be this: that however much the architect indulges his vagaries in planning or arrangement, he must not build a house totally unsuitable to live in by ordinary mortals who, in this transitory life, might come after him.

Much as the writer would have preferred to have built the walls, to the height of the first story, at least, of brick, he had to content himself with a frame wooden house built in the usual orthodox way. The lower story is covered with clapboards laid narrow and without corner-boards; the upper story is covered with shingles, also the roof, but it is intended ultimately to replace the roof shingles with plain red tiles.

The gables are filled with plaster-work with some ornamentation in relief, this was first modelled in clay and then cast in cement.

The writer, from his experience in this work, would recommend modelling the ornament *in situ* on the plaster while soft. All the exterior plaster-work is colored a light brownish yellow with water-color, not oil, just as such work in Europe is usually done, and has been done for hundreds of years.

The gable rafters, the timbers forming the bay-window, and in general all those bounding the plaster-work are of cypress, stained, not painted, a dark-umber color. By this method the grain of the wood shows to a certain extent, and a fitting framework for the plaster-work is formed.

The roof shingles are painted the color of red tiles; the shingles on upper story are stained a cinnamon color, the clapboarded lower story is painted a kind of Indian-red, which will be finally changed to a brown. The sashes are painted white, and the doors a bluish-green color.

The roof in plan is perfectly simple: a ridge running north and south, with a gable at each end, broken only by the lesser gable over dining-room, and one small gable over staircase. The pitch of roof is 52° and no snow will lie on it for any length of time. Another advantage is gained in the interior on the attic floor, where in height and cubic capacity the rooms are as good as those on the second floor.

The eaves and gable rafters project thirty inches from the wall-line. This heavy projection, whilst taking away the meagre look which small projections give, serves many other purposes: first, it throws the water away from the walls and protects them from the weather; it also shelters the upper part of the chamber windows, the greater number of which are casements.

The general plan of the cottage, to which considerable thought was given, had to be, primarily, an economical arrangement, suitable to the requirements of the family and the site. We did not require a great number of rooms, nor did we need these connected by wide openings, so that, as is customary, the whole of the ground-floor could be thrown into one room. The widest door opening is that

from the hall into the parlor, and this is only four feet wide — ample enough for all practical purposes.

The rooms, in form, are generally that of a parallelogram, and their proportion has been carefully considered so far as other things would allow. The parlor is twenty-three feet long by twelve and one-half feet wide, increased at the bay-window to fifteen feet, the bay being eleven feet by two feet six inches. The dining-room is fifteen feet by twelve feet. Own chamber over parlor is twenty-two feet long by twelve feet ten inches, exclusive of the bay-window.

The hall upstairs, which extends over the porch, forms a room fourteen feet ten inches by eleven feet ten inches in size, which we have made a library — a room where the family can gather round the table in the evening and be undisturbed by any one coming in.

There are no "back stairs" in this house, a considerable amount of space being thus saved.

The staircase is continued up to the attic-floor in just the same style, size, etc., as the lower part.

The staircase, library, own chamber, bath-room, guest-chamber, and the two closets to the north have casement sashes, mostly glazed with leaded glass, all hinged at the sides to open outwards, and having mosquito wire screens inside, hinged to open inwards. The five lights in bay-window of own chamber have oval medallion forms with pale-green antique glass; the central three of these have figure subjects painted after Henry Holiday, representing architecture, painting, and sculpture.

The small casements in the chamber-closets give good ventilation and light. The first story is nine feet from floor to ceiling; the second story and attic are each eight feet six inches in height.

The main part of the house is twenty-four feet wide by forty-three feet deep, and on the lot, which is sixty feet wide, the house stands near the eastern boundary. The kitchen is placed at the northeast corner, and on the eastern side there are few windows, and these of moderate size.

The parlor, facing the south and with one end to the west, has the sun all day, while the shadiness of the porch is extended by an awning which covers from the arch outwards to the corner of the dining-room.

The interior of the house is not entirely finished, that is to say, there is some decorative work to be added later on. The woodwork in the parlor is painted white. There is a dado formed by painting the plaster white for twenty-four inches in height, with small wood capping and base. Above this the walls are papered with a light cream-colored paper, — a French design, — reproduced by a New York firm of manufacturers. The cornice of the room is of wood painted white, and under this is a frieze eight inches deep formed by painting in oil a light salmon-color with garlands stencilled on in cream-white. This will be replaced by a frieze of modelled canvas, — designed and made by an old friend, Mr. Wm. Scott Morton, of Edinburgh. The ceiling has a pale tint of a celery-green color in water-color. The mantel is of wood, and the fireplace has yellow Sienna marble facings with fireback and jambs of bronze.

The hall and staircase are of oak on the ground-floor, and cypress in the library. The hall has a dado thirty-six inches high. All the woodwork is stained a moderately deep brown color, and the walls are painted in oil a Pompeian red color. The ceilings are yellowish in water-color.

The dining-room is wainscotted to a height of five feet six inches in oak, the dado capping stepping up and over the door and window-heads. The oak is stained a very pleasing brown color, about the depth of English brown oak, and finished with a dead polish. The plaster-surface of the walls above the wainscoting about thirty-six inches to the cornice is at present painted a greenish-blue color. This space will be filled-in by-and-by with coarse canvas painted in colors, from the architect's design, forming a deep rich frieze to the room. As the colors will be flatted with turpentine, the effect will resemble tapestry. Fruit and flowers conventionally treated will form the subject.

The ceiling, at present tinted Indian-yellow, will ultimately be divided into panels by moulded wood ribs with applied ornaments in centre of the panels in which the thistle, Tudor rose, three interlacing moons, and other ornaments will be represented. The fireplace in this room is of red cement, made by Lascelles & Co., of London, from a design by Mr. R. Norman Shaw, the architect.

On the second floor the woodwork of all the chambers is painted white. In own chamber the fireplace end is panelled the whole width and height of the room, forming two closets, one at each side of the chimney-breast. The fireplace has blue-and-white Dutch tiles and a "hob" grate.

BRONZE. — The Italian *bronz* has been usually traced to the low Latin *brunitus*, meaning brown; but the eminent French chemist, M. Berthelot, in the *Revue des Deux Mondes* (September 1, page 47), shows it to be derived from the place name, Brundisium, now Brindisi. An eighth-century manuscript, "Compositiones ad Tingenda," preserved in the Canons' Library at Lucca, gives a recipe for making *brundisium*, — that is to say, bronze, — and the details show that the alloy was fabricated at Brindisi for the mirrors mentioned by Pliny. *Es brundisium* became *brunitium*, *bruntium*, and, lastly, *bronz*, just as *as cyprum* became *copper*. The manuscript is given, but apparently with mutilations and misprints, in Muratori's "Antiquitates Italicae," II. 386. — *Notes and Queries*.

BURNED CLAY AS ROOFING MATERIAL.¹



The Palace from the Bassin d'Apollon, Versailles. From "La France Artistique et Monumentale."

UNDER the head of Burned Clay as a Roofing Material, the word "tile" expresses the material it is made of, how it is made, and its uses. The *Century Dictionary* defines the word "tile" as a thin slab of baked clay used for covering the roofs of buildings, etc. A thin slab of tin, iron, or metal of any kind is not tile. Tile is burned clay as a roofing material, and nothing else, and that is what I want to occupy your attention with for a few minutes.

Edward S. Morse published a series of articles in the *American Architect*, in 1892, on "The Older Form of Roofing Tiles," that are exhaustive in tracing their history. He traces their use back to China, several thousand years before Christ, and says they were made even before the sloping roof was first used. Palm-leaves, straw, and the bark of trees formed the first coverings for sloping roofs, and then comes terra-cotta tile made in the form of bark, with the larger pieces curving upward, and smaller pieces to cover the joints. Relics of these ancient tiles are found in the art galleries in Berlin, Dresden, and London. The articles are illustrated with cuts of tiles made in different countries, and it is a remarkable fact that tiles are made and used in this country to-day of the same general form that were used four thousand years ago.

In his classification, Mr. Morse shows that the normal (Asiatic) tiles were used in the Orient, Ancient Greece and Italy, China, India, Greece and Italy; the pan (Belgic), in England, Scandinavia, Belgium, Holland, Japan, Java, and various modern countries; the flat (Germanic), in Germany, Austria, Hungary, Poland, Switzerland, France and England.

In the shape and form of these tiles you will see the same shapes and forms most generally used to-day, both in Europe and America. It is shown that these old forms of tile are bedded in mud and clay; it is necessary in laying most of the tiles made at this day to bed them in cement. The most artistic tiles are found in China, Korea, and Japan, where they are highly glazed in different colors, with very elaborate finishings, making a very showy and ornamental roof.

The old form of tile was made of material the most enduring of man's fabrications, and the terra-cotta roof-tile, when properly made, is, all things considered, one of the cheapest and most durable. Acting as a non-conductor, the upper portion of the house, under a tile roof, is warm in winter and cool in summer. Slate absorbs and transmits a great deal of heat. Shingles are short-lived, and a menace in times of conflagration. With the best tile clays in the world, and an abundance of the unskilled labor usually employed in making tile, there is no reason why roofing-tiles should not come into common use in this country, as they have in all other parts of the world. These are the conclusions of Mr. Morse, after an exhaustive investigation of tile-roofing — I must say that I fully agree with him.

In the "Encyclopédie de l'Architecture et de la Construction," A. Rospide has an article on "Roofing-tile in France," which gives a good description of the latest improvements. He divides his article on "Roofing Material" into four parts: first, clay; second, stone; third, metallic; and fourth, wood; giving the preference in the order named. In speaking of the manufacture of tile, he says it is still carried on just as it was before the development of machinery. The clay must be selected with great care, reduced to a paste, run into a plaster mould, then dried and burned. This necessarily makes the tile thick, and requires a great deal of trimming and handling. The simple flat tile was long ago almost universally superseded by the lapping and interlocking tile. He says the following are requisites of every good roofing material:

1. It must exclude moisture, which rots wooden framework.
2. It must be capable of withstanding the force of the wind, and must admit of provision for all expansion and contraction consequent upon variations in temperature.
3. It must not overweight the trussing so as to increase the size of the supporting timbers.
4. It must be fireproof.
5. The original expense should be consistent with the purpose which the construction is to serve.
6. It should require but little care.

¹ Paper read before the National Brickmakers' Association at Louisville, Ky., January 26, 1893. By John R. Elder, President of Clay Shingle Co., Indianapolis, Ind.

Every one of these conditions is fully complied with by the tile made under the patents of the Clay Shingle Company.

Louis H. Gibson, architect, spent years in France and Germany investigating their manner of building, especially in constructing their houses so as to be secure from fire. He speaks in no uncertain way about burnt clay for covering houses. It is the ideal covering—the only material that is reliable, and will stand the test for centuries. He says:

"The arguments in favor of a tile roof are too old and too numerous to need anything more than mere mention. If we stop to think about it, we know that the roofing material in general use is far from satisfactory. Slate, at best, is a temporary roofing; it is readily affected by heat; so much so, indeed, that a little heat will expose all of the woodwork of an ordinary roof to the action of fire. Shingles are as inflammable as it is possible to arrange the same amount of wood. Slate and shingles, as we know, are the general roofing materials. Tile, being a clay product, affords protection to all woodwork under it in a perfectly satisfactory way. The heat does not affect the tiles in the least. Frost affects them much less than slate. The covering of a roof with tile practically means not only the protection from the elements, but, as well, protection from conflagrations, or any unusual or dangerous degree of heat. Heat, as we know, cannot affect burned-clay products. This quality, together with its ability to resist other elements of nature, renders it the ideal building material. Its qualities of this character are quite as apparent for roof-covering as for other use. For some reason, not easily understood, tile roofs have not been generally manufactured in America. While the field is open, and while there is a general demand for the material, it is not satisfied. There is a difficulty in securing a satisfactory tile roof at a moderate price.

"For the purpose of demonstrating the real value of tile roof, I choose to go back to their history in France. There are many roofs existing in this country which are not quite one thousand years old, and those of the tenth and eleventh centuries are common indeed. What better evidence of their quality can be asked?"

In the western part of Indiana, in a small country town, lives a very intelligent old gentleman. He is a carpenter, and supports himself and family by work at his trade. He had travelled very little; his business did not allow him much time for reading, but he was a great thinker. He had an inventive mind, and understood the use of tools. As there were excellent clays in his town, he tried to form a tile for roofing houses. He spent all his spare time and money for years in experimenting. The forms he made were burned in a fire-brick factory near. When he had got a good point he kept it, and changed and altered and improved until he succeeded in getting what he believed to be just the thing. He wanted a tile that would be strong, light on the roof, that would be guarded at every point against sleet, rain, and drifting snow; that would be wind, water and frost proof, and fireproof; that could be made by machinery at a small expense, and could be worked and burned without loss. After getting all these points to his satisfaction, he consulted a patent attorney and found his form and principle were new—that his tile was patentable. He secured one patent, and followed that with others, until he now has six. Like most inventors, he had no money to manufacture his tile. He had neither money nor influence to seek the capital necessary. After several years the president of the railroad running through his town became interested in his invention, and through his influence the necessary capital was obtained. A factory was started. Again time and money were spent in putting his theories into practical use. Tile was made, the factory was run successfully and profitably, and to-day some splendid buildings are covered with tile made at his little factory. He can show roofs equal to any in the world. Unfortunately, the factory burned, and has not yet been rebuilt, but four factories are now at work in different parts of the country, and before this year is out more tile will be made of his pattern, and under his patents, than in all the other tile factories in the United States.

Architects and others often wonder why more tile has not been used in the United States. This question is easily answered: In the first place, this was a timber country; clapboards and shingles were easily made out of timber, and they formed a cheap roof that answered the purpose for a time. Then came slate, and tin, and galvanized-iron, and felt, and gravel, that could always be obtained when wanted, were light and cheap. Tile, as made, was heavy, expensive, hard to get, and in consequence was only used on expensive buildings, that could contract for them in ample time. Many have tried to make tile, but the rule has been to follow the old forms of tile, and the old manner of making them, so that there was no profit in it. Both Mr. Morse and M. Rospide, quoted above, confirm this fact. The manufacture of tile has not kept pace in advancement with that of any other branch of clay industry. The idea has been to invent a machine to make tile easily and cheaply, while the fact is, there is plenty of machinery exactly suited for the purpose. The brick-presses of to-day can make tile just as easily as they can make brick, and the best of these are not expensive. I would not consider a repress expensive that will make 4,000 tiles a day, and cost but \$225. The German press that forms the tile in plaster moulds is not what progressive Americans want. The application of our improved machinery in preparing clay, and forming tile, is a long step in the direction of increasing the use of tiles, improving their quality, and cheapening their cost.

So far as I have been able to learn, there are only five tile-works in the United States. Three of these are in Baltimore and two in Ohio. Terra-cotta works have made tile on orders, but it is a branch they have not prepared for, and only make them when they feel compelled to. There are more tiles made by one factory in Ohio than by all the balance in the United States. This fact would indicate that making roofing-tile has not been profitable in this country; and this is probably true, as we find where any business is successful competition starts up all around it. In our opinion, the reason the tile business has not been more successful is because the old form of tile, and the way of making them in the old country, has been followed in this. The tile is too heavy, has to be laid in cement, and the improved machinery has not been used in making them. And, again, stocks have never been kept on hand to fill orders on short notice. When you think of the vast sums that are spent each year in buildings, and that fully one-twentieth of the cost of all these buildings is for the roofs, you can see what a business can be done if the tile can be had at a reasonable price.

In speaking of the tile-factories above, I did not include four that have been started within the last year to make tile under the patents of the Clay Shingle Company. One factory has been started at Baltimore, one at Trenton, N. J., one at Chicago, and one at Denver. Before this year is out all these factories will be making tile on a large scale, and negotiations are now pending for several other factories.

In considering the value of roofing-tile, the question of protection from fire, and insurance, enters largely into the account. In these days, when so much money is spent in fireproofing the inside of buildings with hollow-brick walls, deadening the floors with terra-cotta blocks, and steel joists and girders, it seems like folly to put materials on a roof, the most exposed part of the building, that will not resist the least heat, but rather attracts fire from adjoining buildings, and often when more than a square away. Many of you have had fires, and know what it means to be burned out; and all of you pay insurance, and know what a heavy tax that is. In Germany, where buildings are constructed under government inspection, with all possible protection against fire, and where tile roofs are universal, the rate of insurance is one-tenth of what it is in this country. A risk that will cost one dollar there will cost ten dollars here, and losses by fire there are as one to one hundred here. In the last seventeen years, in the United States, the losses by fire were \$1,818,323,306—more than the present National debt. In the year 1891 the loss was \$143,764,967, in 23,313 fires. In these fires, 44 brick and tile works were destroyed; 981 fires were caused by sparks from locomotives and flues, on which the loss was \$4,506,184; 12,394 business failures were traced directly to the loss by fires in 1891. Last year, \$40,600,000 of property was destroyed by fire that did not originate on the premises or by exposure to adjoining property. The percentage of loss in 1891 that originated on the premises was 71.8, and by exposure, 28.2. This is a fearful record of loss by fire, and, the worst of it is, every one of you have to pay part of it, whether your property was insured or not. This is only the money value of the loss, and if the loss in time and business, by men thrown out of work, were estimated, it would probably be more than doubled. Now, as it is an admitted and unquestioned fact that there is no material that affords so certain a protection from fire as burned clay, you see the value tile has for roofing. Nearly one-third the fires and one-third the loss in 1891 were from outside exposures, that might and would have been saved if the buildings had been covered with tile. Can any stronger argument be used in favor of covering houses with tile?

Another valuable quality in the clay roof-covering is that it is a non-conductor. This is evidenced by the use of porcelain insulators on electric lines. They are considered just as good for this purpose as glass. Now it is as important in building a house to keep out the heat in summer as to keep it in in winter. It is the rule that the attics of our houses, and especially if covered with slate, are as hot as ovens; and as long as a single floor and coat of plaster only separate the attic from the sleeping-room, the temperature in the latter nearly equals that of the former. Nothing so effectually overcomes this as a tile roof, which neither attracts the heat nor retains the frost. The sleeping-rooms in a house covered with tile are always comfortable—cooler in summer and warmer in winter.

The day for boring auger-holes with gimlets is passed. In all mechanical business, and particularly in clay industries, in these days, it takes capital to start a business and carry it on. The profit is made to-day on the amount of business done—on the use of the best machinery and appliances, and conveniences for handling and shipping. Little fish can't swim safely in streams where big fish live and thrive. The point I want to make is, that to be successful in any branch of the clay business, in these days, you must have money enough to get the best machinery and to meet all bills until your business gets on a paying basis. This is particularly true in the tile business. Many have the idea that the roofing-tile business is a small one—that it is like the drain-tile business, a neighborhood affair. It is not. It is a business as large as you have the money and business brains to make it. No tile-factory I know of in this country has been able to keep a stock on hand to supply immediate demands. It has been necessary to order the tile for the roof before the cellar was dug, and then often wait weeks or months, with the building exposed to the weather, before you got them.

The consequence of this uncertainty and delay has compelled architects and owners to substitute other roof-covering—they would not be devious to death waiting. Tile will stand shipping; the business is a large and growing one, but it must not be started and carried on on the gimlet principle.

You have read in your papers of the trials and tribulations of the man who tried to run a brick-yard. He had read about making brick in the papers, and therefore knew all about it. All he had to do was to buy a machine, start a yard, and the machine would make the brick. He tells of his troubles: the time lost, money lost, brick lost, temper lost, and even his religion lost, before he succeeded in becoming a good brick-maker. If this is true of brick, it is doubly true of tile. It is possible some of you have had experience in trying to make tile, and could tell interesting stories of how sanguine you were when you started in, and how disgusted you were when you started out. If you have not been there, others have. I have met them—plenty of them. I have heard of men who could tell you all about making tile—but their tile never got on the roof. I suppose I am talking to practical men, who can appreciate a practical business proposition. When I tell you that if you want to start in the tile business buy experience and knowledge from the successful man you will understand it. If the knowledge is of the right kind, it is cheap at any price. It will save you much more than you pay for it. Experimenting costs a great deal more than practical knowledge and experience. The man that has the knowledge and experience has paid for it. You see the point?

Will tiles sell? is a question that may be asked. I have been in a position to know they will. Of course, tile, as compared to other roofs, is not a cheap roof, and will not be used on the cheaper class of buildings. But tile has qualities for roofing no other material has, and if a tile looks well, has the fire and frost properties, can be laid at a small cost, is not too heavy, and can be sold at a reasonable price, every building that has valuable records and property to protect—churches, school-houses, railroad depots, and elegant private residences—will use it. The trouble is not to sell tiles, but to have them to sell, so that architects and builders know they can get them, when wanted, without delay. I know what I am saying when I tell you the only trouble about selling tile is in keeping a stock on hand to supply the demand. Tile is the coming roof in the United States.

I have shown you, from the best authority, that there is no roofing material which equals tile. Slate is the next best, and in comparing prices with an inferior article you must bear in mind the relative qualities. The *American Architect* quotes prices on building materials. In looking at the quotations on slate, in Chicago, to builders and contractors, the prices range from \$3.50 to \$14 per square. Red slate is \$12 to \$14, and unfading black and purple, \$7.10 to \$9.00. Now the tiles made under the patents of the Clay Shingle Company can be sold, at a good profit, for \$8.00 per square, and can be laid on the roof as cheap as, or cheaper than, slate; so you see the modern tile, made by machinery, having all the valuable qualities of the old tile, has the advantage in weight and price over the better class of slate. With these points in its favor, who can say that tile is not the coming roof?



THE PHILADELPHIA T-SQUARE CLUB.

THE Philadelphia T-Square Club met on Wednesday, January 18. The subject for the evening was—"A full-size detail of a Carved Panel in the Italian Renaissance style." The first mention was awarded to George B. Page, the second to Adin B. Lacey, and the third to Percy Ash. The Secretary reported that the Club Exhibit at the Columbian Exposition comprised designs by the following members: Arthur Truscott, J. J. Bissegger, James P. Jamieson, Adin B. Lacey, Percy Ash, Edward T. Boggs, Charles Z. Klauder, John J. Dull, James H. Cook, Louis C. Hickman, A. C. Munoz. The subject for the next competition, due February 17, was announced: Pen-and-ink Rendering from a Photograph of Ann Hathaway's Cottage. PERCY ASH, Secretary.



[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

OLD HOUSES, FRONT STREET, HARRISBURG, PA.

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

THE NEWTON CLUB-HOUSE, NEWTON, MASS. MESSRS. HARTWELL & RICHARDSON, ARCHITECTS, BOSTON, MASS.

COMPETITIVE DESIGN FOR THE NEWTON CLUB-HOUSE, NEWTON, MASS. MR. S. J. BROWN, ARCHITECT, BOSTON, MASS.

ANOTHER design submitted in the same competition was published in our issue for August 15, 1891.

HOUSE OF MR. ROBERT BROWN, JR., ARCHITECT, DORCHESTER, MASS.

For description, see article elsewhere in this issue.

[Additional Illustrations in the International Edition.]

FOUNTAIN AT FONTENAY-LE-COMTE, FRANCE. RESTORATION BY M. LIBAUDIERE, ARCHITECT.

[Three Copper-plate Photogravures.]

THE great fountain at Fontenay-le-Comte is curious to study because of the wide elliptical arch, which is introduced between the archivolt and the frieze of the surmounting pediment in such a fashion that the design introduces three architraves where there need be but one. Whatever of agreeability the fountain has is due to the treatment of the inner wall with its strong arcades and panelling.

THE IMPERIAL INSTITUTE, SOUTH KENSINGTON, ENG.

We published a view on a large scale, two portions, of Mr. Colcutt's design for the Imperial Institute after the competition. It will be interesting to compare it with the photographic views of the parts of the building which we publish to-day. For it will be seen that the architect has made alterations in detail, and the pains which have been taken suggest one of the causes of Mr. Colcutt's success. The sculpture, which was an element of the design, has yet to be introduced, but, in spite of its absence, the building may be pointed to as a sign that architecture still is a living art in England.

DETAIL OF THE SAME.

THE HISTORY OF JOAN OF ARC.

WHEN it was decided to have the walls of the Panthéon in Paris painted by the foremost artists in France, the intention was to illustrate the history or legends of St. Geneviève, to whom the building was dedicated at the time. Soon afterwards the painters were allowed to have more scope in the selection of the subjects. If M. Puvis de Chavannes and M. Jean Paul Laurens kept to the traditions of the patroness of Paris, who lived in the fifth century, M. Lévy selected Charlemagne, the restorer of order in the eighth century, as his subject, while M. Cabanel depicted scenes in the life of St. Louis, the representative king of the thirteenth century. The illustration we publish this week shows that M. Lenepveu has taken events of a later period, that is, the tragedy of Jeanne d'Arc, of which the final scene was gone through in 1431. Far apart as were the transactions which are represented in the Panthéon, most of them unite in revealing the power which faith in the unseen exercised at different times among the French people. Geneviève, Charlemagne, Louis and Jeanne were alike confident that they were inspired to undertake most difficult duties, and were to have more than human help to support them against their opponents.

M. Lenepveu in his paintings is careful to suggest a condition of mind in Joan which may be called ecstatic, and is exhibited in three states. The pained expression which denotes her great fear when the mysterious voices were heard ("et primâ voce habuit magnum timorem") is contrasted with the satisfaction which was felt when Charles was crowned, and with the hope that afterwards was able to overcome the terrors of the martyrdom. It must be said that of late years French artists are rather indifferent to the portrayal of emotions, and many of them would have painted a similar series of scenes without troubling themselves about the manner in which Joan's features were moved by her feelings. M. Lenepveu is so thorough in his method he could not pass lightly over any detail, and as he has spared no pains to be exact in costume and accessories, he has likewise endeavored to reveal to his countrymen not only the appearance of the peasant-girl in the periods of inspiration, struggle, triumph and martyrdom, but also the enthusiasm by which deeds were accomplished which were a puzzle to her contemporaries and are incomprehensible to people of a later time.

Political events have of late years surrounded the memory of Joan of Arc with a novel interest. As she was born in Domremy, which is in the valley of the Meuse in Lorraine, Joan has been accepted as representing the grief which has made many Alsatian women wear black, and the desire to revenge the losses of the last war which prevails among Frenchmen. Accordingly an equestrian figure of Joan has been set up in Nancy, and she is represented as if leading her countrymen towards the captured provinces. If the morals of the heroine of Orleans were no better than those of Mdle. Théroigne, who led the women of Paris to Versailles and captured the cannon of Louis XVI (she also had her martyrdom, for she was driven mad

through a fustigation by her countrywomen), Joan would still be accepted as the genius of militant patriotism. Many of the people who lay wreaths on the figures of Joan in Paris and Nancy may be as sceptical about her virtues as was the Bishop of Beauvais, or Monstrelet, or Voltaire, or the author of the first part of "King Henry VI." Are they to be blamed? In a case where so much is doubtful we must tolerate many interpretations. The more the circumstances are investigated the more difficult is it to draw a conclusion.

With the evidence relating to the astonishing events which occurred in France before him, a man is likely to judge of the character of Joan of Arc according to his own idiosyncrasy, and make the history serve any theory he may wish to set up. Thus it is that M. Marin, after an exhaustive study of the contests, concludes that Joan was possessed of military genius. Herr Mahrenholz, on the other hand, maintains that all she performed was dictated by an inferior officer. M. Lesigne concludes, after his researches, that Joan was not consumed in Rouen, but married a noble and brought up a large family in happiness. M. Siméon Luce believes she was an agent of the Franciscans, while M. Chapotin asserts that she was controlled by the rival order, the Dominicans. If the history related to an earlier time and a different country, it would be called mythic. It would be well if the darkness were more generally accepted by the French. It now suits them to utilize the fame of Joan of Arc as if she were an Alsatian in revolt. At another time she may be turned to account against the English, who are supposed to have been her executioners. Yet, if there is any truth in the records, her most bitter enemies were Frenchmen.

It would be out of place to attempt here any new theory on the subject, but a few notes may be given from the records of Joan's trial (they have been reprinted in five volumes, with notes by M. Jules Quicherat) and other sources, which will help to explain M. Lenepveu's series of paintings.

Joan was born on the festival of the Epiphany in 1412, and was the child of Jacques d'Arc and Isabelle Rommée, who were peasants. According to Michelet, her Christian name was really Jean, after the Evangelist, and because a descendant of her brother in 1612 called himself Dare some assume that was the surname. The Dukes of Lorraine, including the little village of Domremy, were generally found among the allies of the French kings when they were at war, but at other times the Dukes fought against France. In the beginning of the fifteenth century, Lorraine, although surrounded by English and Burgundian troops, was faithful to the House of Valois, that then was nearly overthrown. The battle of Agincourt was fought in 1415, that is, when Joan was three years old. Charles VI, who was driven mad by his calamities, died in 1422. His successor, the Dauphin, was not the kind of ruler that could rescue France from the English troops. The reality was terrible. Intelligence of the defeats, we suppose, reached Domremy in an exaggerated form, and could hardly fail to excite an impressionable girl like Jeanne d'Arc. Her parents' cottage was near the village church, as is seen in the painting. The sounds of the bells gave her extreme pleasure. There was also a remarkable beech-tree beside her home, which was supposed to be in some way connected with the fables, and it was referred to at her trial as a scene of superstitious acts on her part. Joan occasionally kept her father's sheep, but most of her time was spent inside the house. M. Lenepveu represents her as holding a distaff, for, when describing her youth, she declared before her judges that she was not afraid of competing in spinning and sewing with any of the women of Rouen ("nec timebat mulierem Rothomagensis de nendo et suendo").

It was in her thirteenth year that Joan appears to have had the first of her mysterious manifestations. On her right side a light arose, and a voice advised her to be good, and to frequent the church, and also announced that she was at a future time to visit France. Subsequently St. Michael appeared, as is represented in the painting, and informed Joan that St. Catherine and St. Margaret, who are shown above, were to be her guides. These visions continued for four years, and she was silent concerning them. It was testified that in no way was she made vain by them. In 1429 she was told the time for the delivery of France had arrived, that she was to visit the Dauphin at Chinon, and ask for troops to raise the siege of Orleans. When she expressed fear, it was said that if Sir Robert de Baudricourt were applied to he would give her an escort to bring her to Charles.

Accompanied by her uncle, she went to Baudricourt, who had Joan exorcised. Then she was sent to Nancy, to the Duke of Lorraine. Eventually she found her way to the Court at Chinon. The story about her recognition of Charles amidst a crowd is well known. De Quincey considers the whole affair was a mere trick of legerdemain, such as may be seen any day for a shilling, and he says he was surprised to hear Southey owning a secret bias in favor of Joan, founded on the detection of the Prince. Prejudiced as was the writer of "Henry VI," he took a more worthy view of the transaction, and it would appear from the evidence at the trial that there was no collusion at Chinon. Besides, Joan was sent to Poitiers, and there for three weeks was subjected to all the examinations which were supposed to be efficacious in detecting impostors. The reports of the inquiry at Poitiers are lost; but as Joan at her trial repeatedly referred to them, they must have been in her favor. The ecclesiastics decided that the Dauphin might lawfully employ

her services. Charles gave her a suit of armor; from the Duke of Alençon she obtained a black war-horse. For the sword she ordered a search to be made in the church of St. Catherine at Fierbois. The banner was made according to instructions given by the voices. It was of white linen, on which images of Christ and the Blessed Virgin were painted, with the crown and lilies of France. M. Lenepveu follows these details. The banner seemed to exalt her spirit; with it in her hand she rode about the camp at Chinon. In "Henry VI" Joan professes to be changed in appearance after one of her visions:

And whereas I was black and swart before,
With those clear rays which she infused on me
That beauty I am bless'd with which you see.

The lines express the tradition as it was known after a couple of centuries; but, according to the evidence, Joan was swart, short, and active,—"erat brevis quidem staturâ, rusticânâ facie et nigro capillo, et toto corpore prævalida,"—the sort of girl that was to be seen in many peasants' cottages. She was not, however, unfeminine, for, like Cordelia, her voice was soft, gentle, and low,—*vocem mulieris habet ad instar gracilem*,—and to the youths in the army she seemed to be something divine.

Joan appeared before Orleans on April 12, 1429. Lingard, who believes she was the victim of a delusion which, however, nerved and elevated her mind, says that care was taken by the French to communicate her history with due exaggeration to the English who were besieging the city. The men concluded she was either an impostor or a sorceress, and became as afraid of one as of the other. There were two tasks before the French. The first was to throw supplies into Orleans, where there was famine, an operation that was successful, apparently without loss of life, owing to the terror which Joan's name inspired. The second was to compel the English to depart. Joan's tactics, as described by herself at her trial, were very simple. "I told the soldiers," she said, "to boldly enter among the English troops, and I also entered boldly." About sixty temporary fortifications had to be conquered, and there were ten days of fighting before the siege was raised. Talbot and Suffolk invited a renewal of the contest outside the walls, but Joan would not allow the French troops to leave Orleans. The victory was completed on Sunday, and she said, "*En nom Dieu, laissez-les partir, et allons rendre grâces à Dieu*." How much the presence of Joan contributed to the triumph is seen from the letter of the Duke of Bedford, who was the English regent. "The courage of the soldiers," he wrote, "was shaken by lack of belief and the unlawful doubt of a disciple and limb of the fiend, called the Pucelle, who used false enchantments and sorcery."

The rescue of Orleans was the flood in the tide which, rightly taken, would lead to fortune. Joan of Arc, whose mission was to see the Dauphin crowned at Rheims, was eager to follow up the victory, but for a time Charles was dilatory. At length Joan's advice was followed. Jargeau, Mehun, Baugeny, and Patay were attacked and taken. On July 14, 1429, Rheims was entered.

On the next day, which was Sunday, Charles was consecrated in the cathedral. Most historians relate that, as soon as the ceremony was over, she threw herself on her knees before the king, embraced his feet, declared her mission accomplished, and with tears solicited his leave to return to her former station. But the evidence at the trial does not recall a scene of that kind. Nor is Schiller's treatment more warranted, for, according to Carlyle's abstract, "Amid the tumult and magnificence of this royal pageant she sinks into a rêverie; her small native dale of Arc, between its quiet hills, rises on her mind's eye, with its straw-roofed huts and its clear green sward, where the sun is even then shining so brightly, and the sky is so blue and all is so calm and motherly and safe. She sighs for the peace of that sequestered home; then shudders to think that she shall never see it more." M. Lenepveu is more true to the depictions when he represents Joan as standing firmly while she offers her thanksgiving for what is past, and resolute to meet the future. She is not exhausted, and appears to feel that her task is not accomplished while an English soldier remains in France. That in the course of the day she talked about death with the Archbishop was only natural with a girl whose visions did not reveal her own fate.

Enthusiasm is rarely of long duration among soldiers, and it is not surprising that the officers soon after the coronation began to treat poor Joan as one of the worst amateurs. She was not consulted about movements, but when failure occurred she bore the blame. At last at Compiègne, in May, 1430, she was deserted, and taken prisoner by John of Luxembourg, who was a Burgundian. Then came the turn of the men of peace. Whether inspired by heaven or hell, she was an exceptional subject, and it was the business of science to endeavor to discover the complicated movements which produced such remarkable effects. Theologians, metaphysicians, moral philosophers, devil's advocates, were all eager to take part in the analysis of the heroic girl's mind. The University of Paris, that claimed a sort of monopoly of the most interesting victims, lost no time in applying for the possession of Joan. But the operators were not trusted by the Burgundians and their allies, for Joan in Paris might obtain the benefit of a doubt. The English, too, were anxious that their defeat might be explained by the influence of infernal powers, and for that end it was only necessary to make Joan out a sorceress. There was no difficulty in finding an agent. When Beauvais fell into the hands of the new king whom Joan helped to

create, Pierre Cauchon, who favored the Burgundians, was deprived of his bishopric. He fled to England and became an adherent of the House of Lancaster. The archbishopric of Rouen was promised to him. It happened that the spot where Joan was captured was near the boundary of the diocese of Beauvais. Cauchon accordingly claimed jurisdiction over her; Henry VI of England also set up a claim on the prisoner. Eventually she was delivered and brought in chains to Rouen. The trial went on during four months. The Bishop of Beauvais presided, and he had the help of forty-two assessors, who represented moral theology, canon-law, and civil law. Joan was examined during five days in court and six days in prison. In a contest with dialecticians she could hardly expect to succeed, but her inconsistencies are not of account. The answers were analyzed, and twelve propositions made out of them were submitted to the University of Paris. The assessors, we suppose, were associated with that learned body. At any rate, no time was lost by the University in condemning the propositions as blasphemous and heretical. On Whit Monday, in 1431, Joan was doomed to death for apostasy and sorcery.

Savonarola lost his prophet's strength under torture and signed a confession of guilt. Is it surprising that Joan of Arc should also reveal a human weakness, and when she thought of the fire that awaited her should lose confidence in her inspiration? She signed a retraction, and her punishment was changed to imprisonment for life. For some reason, that remains unexplained, she ceased to be a prisoner of the Church, and was handed over to the English authorities. Then came a revulsion of feeling. Once more the memory of the spirit voices overcame her, and she was filled with remorse at her disloyalty to her guides. Joan spoke about her divine inspiration, and as all her words were noted, information of the change was brought to her judge. The words might easily have been interpreted as the result of delirium brought about by her sufferings, but State policy made it necessary that Joan should pass from life as a being that was less than human.

The last scene of all has been depicted by M. Lenepveu with rigorous exactness. The judges were present, but their formalities on such an occasion were observed with impatience by the soldiers, who asked if they were to be kept waiting until dinner-time. The employment of a soldier to carry faggots and the raised arms of others suggest that there was a stain on the army which could only be removed by a fire like that which was about to be lighted. No cross was allowed to be borne by Joan, but a soldier, out of pity, broke a staff in two, tied the parts together, and gave them to her. She held it, but begged for a crucifix. The scaffold was made higher than usual, in order that all might see whether the executioner was merciful and allowed the culprit to be smothered. In Joan's case there was to be no abridgement of the torture. It is satisfactory to learn that the consolation of believing in heavenly guidance came back in that supreme hour with stronger power. She could be considerate for the monk who brought her the crucifix, and implored him to descend before he suffered through his humanity. It must be admitted that not much was gained by her execution. The power of England was not made more enduring by her absence from France. But it must be admitted that throughout the proceedings there was a regularity which was not always witnessed in State trials. The judges acted according to their lights, and for many a year afterwards in Europe and America unhappy women were burnt whose guilt appeared less manifest than that of the peasant-girl of Domremy. If M. Lenepveu's paintings will teach all who look on them to be tolerant to genuine enthusiasm in every form, the Pantheon may still be taken as a place of wise counsel.

COMMUNICATIONS

[The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.]

THE LEAGUE EXHIBITION.

PHILADELPHIA, PA., January 23, 1893.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—I do not wish to appear captious or to meddle in what is none of my affair, but I cannot help saying that I was disappointed in the notice of the Architectural League Exhibition in the *American Architect*, now being held in New York. The fact is that I received a much more just impression of the Exhibition from the daily papers than from the *Architect* itself. This latter account is enough to deter any one from taking any trouble to visit the League this year, but as it only appeared in Saturday's edition and as the Exhibition closes to-morrow it can have but little effect on the number of visitors. Fortunately for me, I had been to the Fine Arts Society building a week ago and since then have returned twice, each time more thoroughly convinced that there were more objects worthy of study, from the magnificent three-quarter-scale drawings of the Madison Square Garden and the Century Club to the fanciful frieze of Walter Crane, so admirable in its scholarly restraint, than I had ever had the luck to see in any League Exhibition.

As to your correspondent's comment that the rooms are too fine for the drawings shown in them, — most people, I think, prefer looking at pictures in five convenient and well-lighted rooms to seeing the same number crowded into two rooms and a dark entry, as used to be the case.

Of course this letter is not for publication unless it might chance to be of any use to you, and I hope you won't think it ill-natured.

Yours truly, JOHN STEWARDSON.

[We are glad to get such a letter as this, and we publish it, to show other people the kind of letters that we like, and that are really serviceable to us, and, we hope, to our readers. The fact is, that, although we really found this year's exhibition rather lacking in conspicuous attractions, like the Exposition drawings last year, and the Cathedral competition designs a year or two before, we found it, as we always do, very interesting in detail, and prepared, as usual, notes on the greater part of the works shown, when it occurred to us that perhaps the long and minute accounts which we have generally given of the works exhibited were more suited to our taste than to other people's, and that it was quite possible that they might be a decided bore to our readers. This idea grew upon us so far that we concluded, in deference to it, to cut our story, for this time, at least, very short. Mr. Stewardson's letter is, to us, a very pleasant indication that one, at least, of our readers has not found our previous criticisms too long, and unless we hear from some persons of a contrary opinion, we shall, next time, again take courage to extend our observations to such length as may be required to do justice to the subject. If people knew how grateful it is to an editor to receive some indication that his lucubrations have found readers, they would not need to apologize, as Mr. Stewardson courteously does, for writing letters like his. Nothing is more discouraging for persons who write for publication than to feel as if they were beating the air. They are perfectly willing to have people disagree with them; in fact, in the present instance, Mr. Stewardson's praise of Walter Crane arouses in us belligerent sensations which are positively delightful, — but they cannot endure to think that no one reads what they write. — Eds. AMERICAN ARCHITECT.]

SIZE OF THE PARIS HOTEL DE VILLE.

CINCINNATI, OHIO, January 24, 1893.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—Will you kindly print the chief dimensions of the Paris Hôtel de Ville in the next number of the *American Architect*? I have purchased the magazine regularly for three or four years and do not remember of ever finding the information.

Very respectfully, H. L. BRIDWELL.

[The new Hôtel de Ville measures 470 feet by 263. The central feature attains a height of 164 feet, while the angle pavilions are 85 feet high. The Salle des Fêtes measures 40 feet by 164 and is 43 feet high. — Eds. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS

THE COST OF TWEED'S COURT-HOUSE.—Apropos of the probability that during the present rule of a Tammany mayor a new city-hall will be built in New York, the *Evening Post* of that city publishes these instructive statements: The new court-house was planned in 1868, and was nearly completed when the Ring got possession of the work in 1869. The original appropriation for it had been \$250,000, and about \$4,500,000 had been expended upon it when the Ring took charge. For its completion and furnishing the members of the Ring expended over \$8,000,000. They spent over \$6,000,000 directly, and then over \$2,000,000 for "repairs." The work was divided up among favored Tammany contractors, each of whom enormously increased the amount of his bill in order that the surplus might be divided among the members of the Ring. The total expenditures for different kinds of work performed in "completing and furnishing" are eloquently set forth in the following table, which we quote from Mr. Charles F. Wingate's valuable history of the Ring's doings, published in the *North American Review* in 1875:

Carpenter work and timber.....	\$1,430,619.03
Furniture.....	1,575,782.96
Carpets, shades, and curtains.....	675,534.44
Plastering work.....	531,594.22
Painting and decorating.....	319,539.85
Plumbing and gas-work.....	750,313.37
Ironwork.....	132,564.90
Safes.....	404,347.72
Awnings.....	41,746.83
Articles (probably brooms, etc.).....	41,190.95
Marble for work in progress.....	77,498.25
Pay-roll of work in progress.....	22,709.35
Superintendence of building.....	29,427.34
Thermometers.....	7,500.00
Locks.....	2,676.75
Total.....	\$6,052,045.96

Repairs on woodwork.....	\$750,071.92
Repairs on plaster work.....	1,294,684.13
Repairs on plumbing work.....	51,461.75
Repairs not defined.....	75,716.13
Total.....	\$2,171,933.93

The names of the contractors who put this enormous amount of work into the building were very familiar in the community a few years ago. Keyser was the plumber, Garvey the frescoer and decorator. Ingersoll supplied the furniture, McBride Davidson the safes, and James W. Smith the awnings. The rate of charging was well

indicated by the latter's price for awnings, which was \$150 each, though the usual price was \$12.50. It was shown by Mr. Tilden's wonderful analyses of the accounts which were obtainable when the Ring was exposed that its members had a regular share in the 65 per cent addition which was uniformly made to every bill above its original amount. Tweed's share was 24 per cent, Connolly's 20 per cent, Sweeney's 10 per cent, Watson's 5 per cent, and Woodward's 5 per cent. Watson was the auditor whose duty it was to see that all the bills were "raised" before their payment was authorized, and Woodward was the disbursing agent, who took the warrants approved by Watson to the bank, got the money, and divided it among the contractors and the members of the Ring, giving to each his due share.

CHILLINESS OF ENGLISH COUNTRY HOUSES.—Where English country houses fail is not in want of space but in lack of warmth. It is astonishing that a sojourn of nearly 800 years in a sub-arctic region has not taught the Anglo-Norman race that a six-months' winter demands some greater provision for the change of temperature than the mere lighting of fires in a few sitting-rooms. As we have said before, the warming of the hall is the key to the position. In country houses the hall is nearly always of ample dimensions, and not one but all the sitting-rooms are on the ground floor, deriving their supply of fresh air from the hall, which, as in the London house, gets its stock, in turn, from under the main door. But the greater space leaves ample room for a thorough warming of the central air-chamber. Yet, in how few country houses is the hall properly warmed by stoves! With that provision omitted, the size of the hall and staircase merely prevents the air from ever becoming properly warmed at all; and for weeks the passages and bedrooms remain at a temperature in which it would be unsafe to allow even cattle to sleep. A further capital defect in most country houses is the absence in bath-rooms of either hot water or hot air, and the impossibility of obtaining any sudden increase of temperature in case of chill or illness. There are many large and costly country mansions less well provided in this respect than a fifth-rate London house. Contrast this with the conditions for indoor life as understood by the Romans during the three centuries in which they occupied this country. Every Roman villa, however small, as a visitor to any of the numerous excavations may see for himself, was thoroughly heated with hot air, running in pipes under the floors and up the walls. Better than this, the same furnace which distributed this even warmth throughout the house also heated a small hot-air chamber, or Turkish bath, next to which was a cold plunge-bath. The writer recently saw the remains of a Roman house, built some sixteen hundred years ago, perfectly fitted with a warming apparatus, while a modern house of six times its size, in the garden of which the old villa lay, was unprovided with any other means of heat than open grates. Naturally, the warming of country houses may be over-elaborated. But that is rare, though we have known instances in which a difference of two degrees between the thermometers in any two rooms was visited with dismissal to the domestics in charge, while the first impulse of a visitor was to rush to open a window. Minor adaptations, though not so important as those to secure space and warmth, are, nevertheless, of daily consequence.—*The London Spectator.*

CO-OPERATIVE TENEMENT-BUILDING IN BOSTON.—The problem of building healthy and comfortable tenements for the poor, which is in the experimental stage in Philadelphia, seems to have been solved in Boston, where the Co-operative Building Company last week declared a dividend of six per cent. The persons associated in the enterprise are not conducting it for profit, being men and women of well-known philanthropic views, and if the earning of a dividend has any significance, it is as a reminder to those also disposed to do good along the same line that wise business management is inseparable from success. The company now has buildings upon six thoroughfares. A description of a group of houses recently built on Harrison Avenue will give an idea of the accommodations provided for wage-workers. These houses were built on the plan of a hollow square, the houses being in four blocks,—a block of eight each on Harrison Avenue and Reed Street, and four each on the two side streets,—are three stories high and forty feet deep. This makes an open court of 80 x 100 feet, an attractive feature, to be laid out as a sort of park, with paths and shrubs. The cost of the houses was \$109,016.00, including \$16,900 for the land. There are no single-room tenements in these blocks. The four corner houses contain, each, six tenements of two rooms each, the rents for which are \$2.50 per week for each front and \$2.25 for each rear tenement. The other twenty houses contain each a three-room tenement on the first floor, and a four-room tenement on second and third floors, for which the rents are respectively \$3.50, \$3.75, and \$3.50 per week. There are, therefore, in these blocks, twenty-four tenements of two rooms each, forty-eight rooms; twenty tenements of three rooms each, sixty rooms; forty tenements of four rooms each, one hundred and sixty rooms. The total is twenty-four houses of eighty-four tenements, or 268 rooms, with three families in each house, except in the corner houses, which are arranged for six families. The average weekly rental per room is \$1.01½, or \$52.78 a year, making the total gross rental of \$14,144 for the 268 rooms. While many of the tenants belong to the class of mechanics or artisans, more than a few are day-laborers. The houses afford comfortable and convenient homes for both poor and well-to-do tenants, and for both large and small families.—*N. Y. Evening Post.*

THE EXPENSES OF INSURANCE COMPANIES.—When property-owners are complaining of alleged high rates for fire insurance they not unfrequently say that the ratio of expenses to premium rates is too high, and shows extravagance on the part of the companies. These grumblers, apparently, do not understand that the expenses of a company include taxes and large sums paid for securing better fire-protection. For instance, the fire-patrols in various cities are supported entirely by the insurance companies; and the companies also maintain a large

corps of surveyors and inspectors, whose duty it is to examine property to be insured, and to improve the fire-hazards of such property. If the facts were known, it would undoubtedly be shown that from twenty-five to thirty per cent of the entire expenses of a fire-insurance company are incurred with a view to lessening the fire-losses and improving the character of the property to be insured. It is an axiom almost in the business that if the total expenses of a company overrun forty per cent of premium receipts it is pretty certain to show loss on its underwriting account. The losses of a general-agency company are now expected to exceed sixty per cent, and the expenses must therefore be kept within forty per cent, if any profit is to be shown. The tendency of recent legislation is to increase the expenses of the companies, and consequently the only possible way in which they can hope to make both ends meet is to increase their premium receipts. When the combined losses and expenses continue to exceed income the natural remedy is to increase the income, inasmuch as the companies cannot control their losses, and legislation is continually adding to their expenses. If the companies were to summarily cut off all that portion of their expenses that goes to provide better protection to property the fire-losses of the country would be greatly increased. It is a question with many underwriters whether this is not the proper thing to do. Let property-owners make such risks as they see fit, and the insurance companies charge for the risks as they find them. As they do not do this, however, they are entitled to consideration for the very large sums they expend annually in the matter of fire prevention and protection.—*Spectator.*

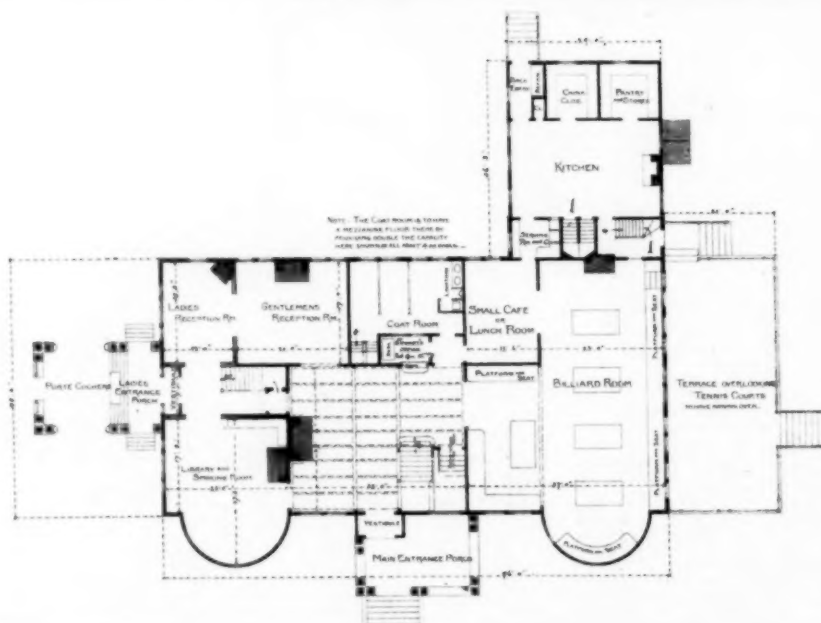
THE METAL-WORKER.—The *Metal Worker*, one of the oldest and most admirably conducted of the legitimate trade-papers, marks the opening of the new year and its thirty-ninth volume by abandoning its blanket quarto form for the more convenient large octavo.

A FAMOUS WOODEN BRIDGE.—The most famous wooden bridge was built at Schaffhausen, in 1757, by Grubenmann, an illiterate carpenter. It had wooden arches with spans of 193 and 172 feet respectively.

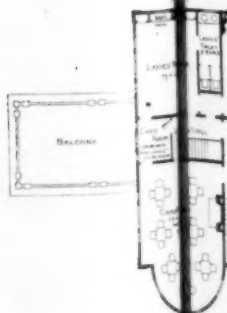
TRADE SURVEYS

A SLIGHT advance in wholesale prices on leading staples within a few days has given rise to false hopes of a general improvement in values. No change has yet taken place in business conditions. A large volume of business is transacted weekly. Gold exports continue. If the statement of high financial authority is correct,—and there is no reason to doubt it,—that the extraordinary gold exports of the last two years have been due to temporary reasons, and have been made outside of ordinary trade movements, and that these funds are now held abroad for transient purposes,—then a reaction is only a question of time, and a return flow may be expected, with a consequent fall in gold and rise in silver. In financial circles there is an abundance of money. The surplus reserve is larger at this time than it has been for several years, with one exception: The loans and deposits are about the same as a year ago, while the New York banks have twenty-five millions less gold than a year ago. Our exports last year—merchandise, gold, and silver—were \$1,011,713,999; balance in our favor, \$135,515,820. Financiers predict easier monetary conditions, and, consequently, increased activity in railway building, soon after Europe begins to square accounts with us, a matter which cannot be indefinitely delayed. There is no reason whatever for borrowing trouble over gold exports at this time, though writers in daily papers never cease dwelling upon the possibility. The banks at home are in a safe condition. Reports from various quarters tell of the gradual decrease of mortgage indebtedness. On the other hand, demands are arising for larger loans. There is a silent and unnoticed influx of industrial capital into several Western States, which is helping development. Mill and shop labor is busy almost everywhere. Wages have been lowered since autumn in a few industries to a slight extent, but the chief loss suffered by wage-workers has been in reduced working-hours. Within two or three weeks employment has increased, and in several industries preparations are being made for greater activity. There seems to be a unanimity among manufacturing interests to avoid accumulating stocks beyond reasonable proportions. Textile-goods and hosiery manufacturers have recently asserted the importance of this policy, and shown, by abundant statistics, the necessity for care in the out-turn of mills and factories. The same sensible policy obtains in other industries, where carelessness has prevailed heretofore. Within a week or two, an increase has been observed in commercial failures. By way of offset, there is an increase in the number of projected enterprises. It is well to keep in mind, however, that the manufacturing capacity of this country has reached a limit where great care is essential. A dangerous accumulation of merchandise is possible. The dangers of and from it are clearly understood. Manufacturers have been warned against it, and distributors continue to remind them of the dangers of departure from this line of action. A speculative era is earnestly hoped for by many who recall the excitements, and ups and downs of former speculative eras; but the common-sense judgment of enlightened business interests is that an even, steady progress is far better. The disposition to loan money on Western mortgages is not weakened, but there is a feeling that greater care is necessary. Quite a number of agencies have lately been established in the West, in the interest of Eastern lenders, with a view of keeping better posted, and these interests are exerting some degree of political influence in the complexion of State legislative bodies. The latest reports from Eastern commercial centres indicate increasing inquiry, a condition heretofore noted. More buying is being done. Buyers act as though higher prices were wellnigh impossible. Jobbers who keep well posted on trade-currents are pleased over the fact that store-shelves are low, and that great activity in buying must soon set in. In the heavier industries there is very little to report, but it is known that demand will assume large proportions before long. Iron, steel, and its products are wearing out. Machinery orders are large. Ship-building orders last week called for one hundred and twenty thousand tons of steel plates and shapes. The builders are making contracts for material, and the increase of electrical and cable lines is encouraging builders to enter upon still larger operations.

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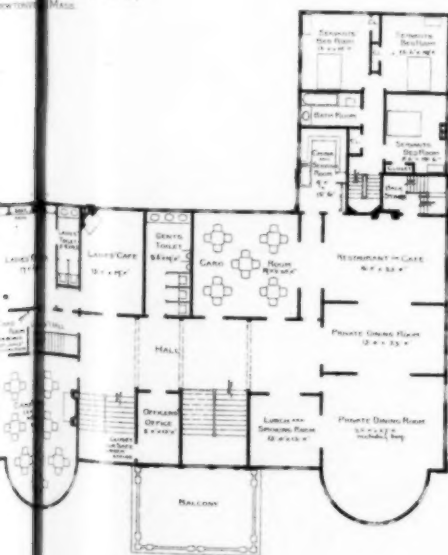


PROPOSED HOME OF NEWTON



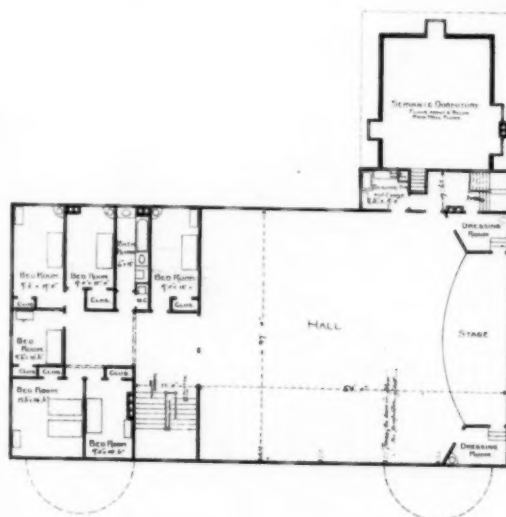


CLUB, BOSTON, MASS.



RESTAURANT AND DINING ROOMS
KITCHEN AND PANTRY
BATHS AND TOILETS
BED ROOMS
HALL
LOBBY
OFFICE
REAR PORCH
BALCONY

Samuel J. Briggs, Feb. 1891

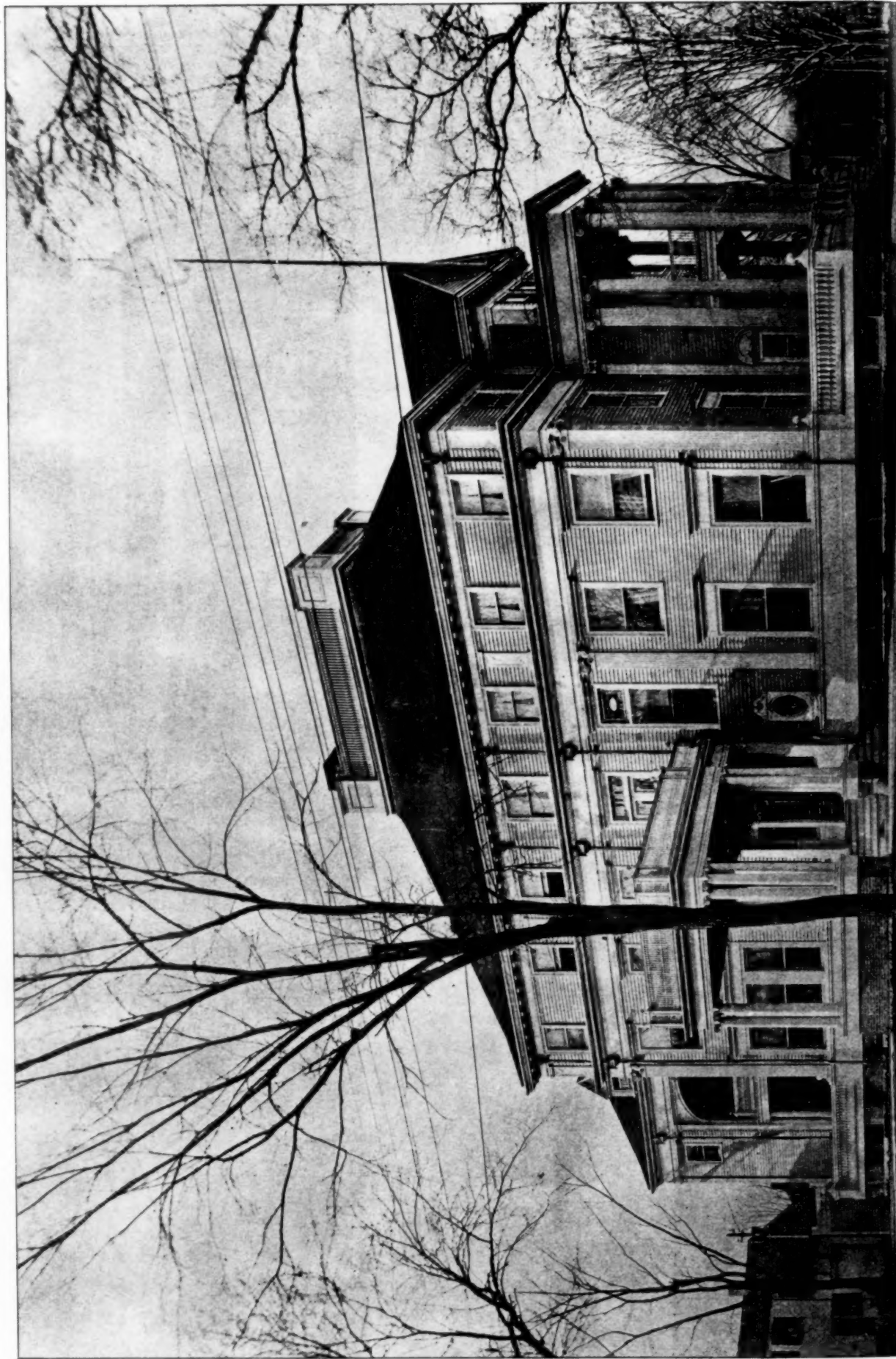


REPLIQUE PHOTOGRAPH BY C. BOSTON

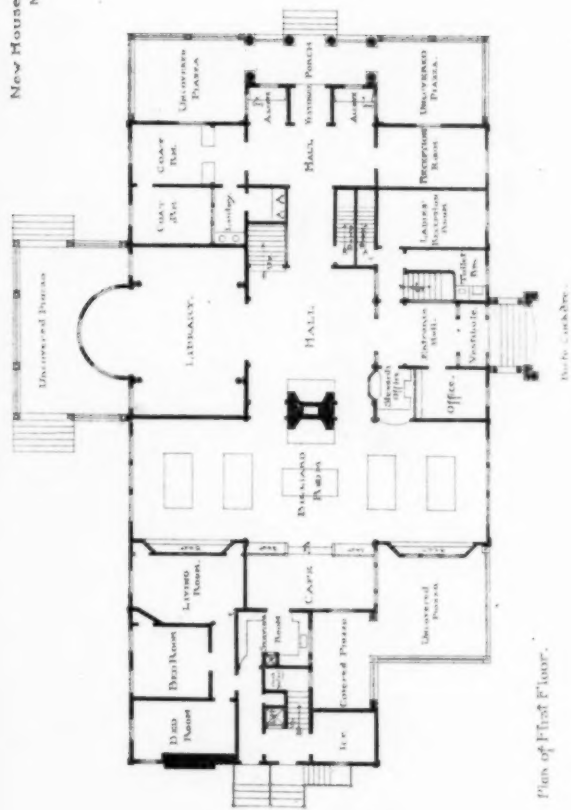
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AMERICAN ARCHITECT AND BUILDING NEWS. FEB. 4. 1893.

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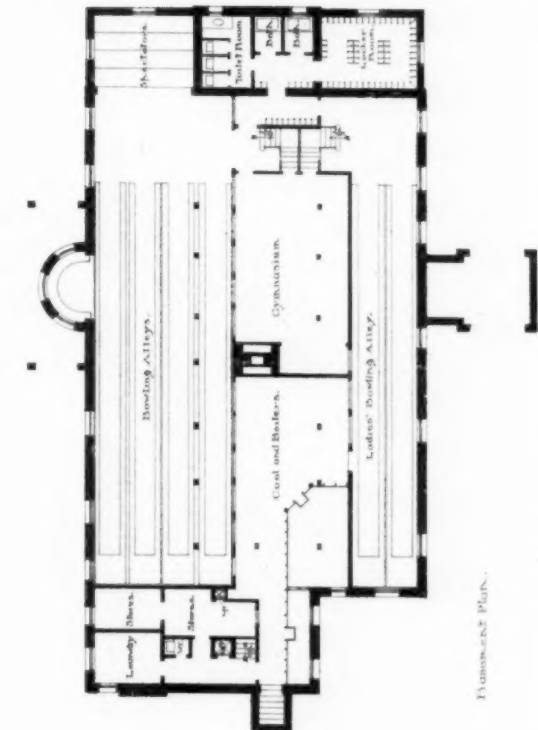
New House for the Newton Club
Newton, Mass.



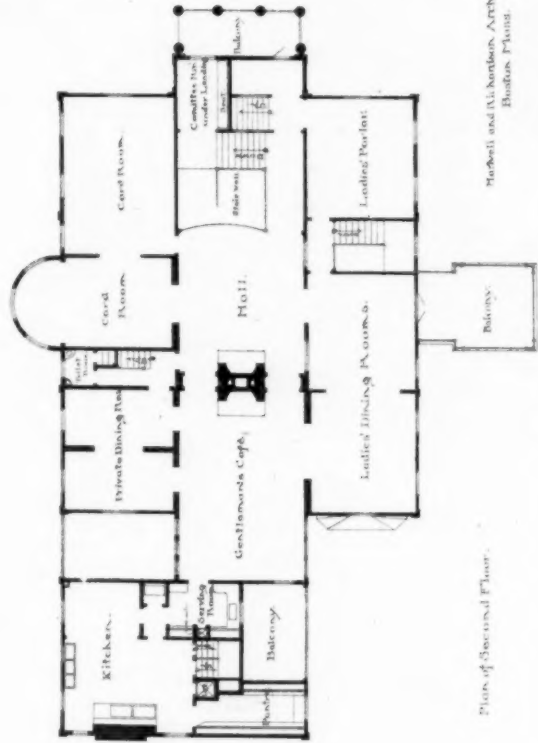
Plan of First Floor.



Plan of Third Floor.



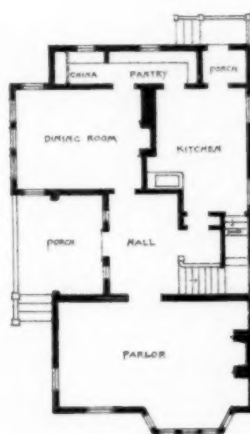
Plan of Second Floor.



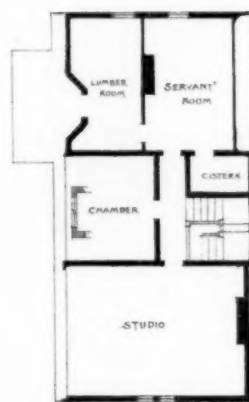
Markwell and Al. Architects
Boston, Mass.



CHAMBER FLOOR



GROUND FLOOR



ATTIC FLOOR





FROM
THE
SOUTH-
EAST.

THE AMERICAN ARCHITECT AND BUILDING NEWS

ADVERTISERS' TRADE SUPPLEMENT.

No. 128.

SATURDAY, FEBRUARY 4, 1893.

VOLUME XXIX.
No. 893.

FIRE-CLAY FLUE-LINERS.

A FIRE-CLAY liner is an article designed to overcome the liability of fire from defective flues. They are manufactured out of specially prepared fire-clay, under enormous steam pressure, and thoroughly burned in down-draught kilns, subjecting them to such an intense heat that ordinary clays would melt and lose their shape. Being thus prepared, they are frost, fire, and time proof.

They are all made in lengths of two feet, and of different dimensions, to suit the different kinds of work demanded of them. They are three-fourths of an inch thick, are perfectly smooth inside, and built in flues, have but one cross joint every two feet, and no perpendicular joints. The ends of the liners are carefully prepared, so that when built in chimneys they fit close together, and require little, if any, mortar to make a permanently tight joint.

The liners should be encased in four inches of well-laid brickwork, and should be built in as the chimney is being erected. One or more set of liners may be used in a chimney. In order to make absolutely fireproof flues, we would advise leaving one-half to one inch space between the outside of the flue-liners and the outside of the brickwork, to be filled with soft mortar or grout. This space will also prevent rooms from being overheated by a very hot flue.

As usually constructed, flues or chimneys have eight inches of brickwork; by using our fire-clay flue-liners four inches of brickwork is all that is necessary, thereby saving four inches of brickwork and gaining eight inches of space, overcoming all possibility of fire from defective flues.

Fire-clay flue-liners are not an experiment; they have been on the market for sixteen years, and their use is constantly increasing, and they should be used by all who are in search of safety.

They make the most perfect flue that can be constructed. Being perfectly smooth inside, the soot will not collect, as in ordinary chimneys; the draught is better, and they are spark-tight.

In unlined brick chimneys the action of heat and cold will cause the mortar to crumble and fall out from between the bricks, leaving crevices through which the fire is liable to work its way. This is specially noticeable in old buildings. In chimneys or flues lined with our fire-clay flue-liners there is no mortar in the brickwork from the action of the weather, and there can be no opening formed for the

fire to escape. According to insurance statistics defective flues cause one-half the fires; as a natural consequence, the insurance rates are less on buildings which have their chimneys properly lined with fire-clay liners.

In addition to flue-liners, we also manufacture, by the same process, fire-clay flue-pipe. They are made round and extra heavy. We manufacture them from six to twenty-four inches in diameter. They are made in two-foot lengths, and differ from the liners in having a socket or bowl to make joints tight, and are used without being encased in brickwork. They make a cheap, neat, and safe chimney, are easily erected, and can be used where it is not practicable to build brick chimneys.

WALDO BROS.,
88 WATER STREET, BOSTON, MASS.

LANE'S PATENT STEEL PARLOR DOOR HANGER.

THE Lane Parlor Door Hanger differs from others in several important respects. Among the chief points of superiority may be noted: first, that it is made throughout of steel instead of cast-iron, thus avoiding all danger or probability of breakage. How much annoyance and expense may be caused by an inaccessible defective hanger or track in a furnished house, those who have had such experience need not be told. The wheels run on a single track. This track is not liable to such derangement as swelling or shrinking, or springing out of shape from furnace heat or humid air, but is thoroughly durable. The track, being secured to one partition instead of two, as in the case of the common double wood tracks, is not subject to derangement from unequal settling of said partitions. The wheels of this hanger are made with a centre of the very best sole-leather, the edge of which forms the rolling surface. This leather is a solid disc extending quite to the axle, and is firmly pressed and held between steel discs by means of steel nuts on a steel axle. The use of the leather in the wheel causes it to run with the noiselessness of a bicycle, and the wear on the leather being a rolling one only, renders it practically indestructible. The extreme simplicity of this hanger and track makes its erection easy, and cost for labor very light — some carpenters say it takes but a quarter of the time required for other kinds and no cutting of doors; so that, if at a greater first cost, the expense when erected will generally be found much less than where the cheap grades of hangers are used. Next avoid-

ance of doors warping. We accomplish this by using one track only, the hanger suspended directly beneath it, and the middle of the door fastened to the hanger, so that the whole weight of the door is suspended plumb from the track, tending to keep it straight and true. The principle is well known to the horseman as applied to his whip. The axle of the hanger-wheel does not run in a solid box, but is of the anti-friction type, and most people now recognize the great superiority of anti-friction hangers over the old-style, noisy, hard-running kind with fixed bearings. Each hanger may be adjusted independently of the other by the use of a screw-driver and without derangement of any part. The stop we make of steel, and place at the rear of the door and midway; the door thus will strike square, as it should do. We make the stop on the gravity principle, and if either door should need to be run out into the passageway, a knife-blade may be inserted at the side and rear edge of the door, turning the stop one-quarter way around, when the door will be free to pass out.

Manufactured by
LANE BROTHERS,
POUGHKEEPSIE, N. Y.

FRENCH ROCK ASPHALTE.

THE various ways in which asphalté can be utilized in the construction of buildings increase constantly. For fifteen years we have been laying cellars, floors and roofs of fire-proof buildings with Seyssel Rock Asphalté Mastic, and its use in hospitals, sugar refineries, breweries and stables has been very general. The latest use for which it has been adopted is in the form of asphaltic masonry for the substructure of the printing-press foundations in the basement of the *Mail and Express* building, the engines in the same building having also been set on the same material to prevent vibration. Among some of the important buildings in which we have used the Seyssel Asphalté during the past year may be mentioned the Western Union Building Extension, College of Physicians and Surgeons, Presbyterian Hospital, Manhattan Hospital, Yale College Medical School, Eastern Dispensary, Edison Illuminating Co.'s building on 53d Street and Duane Street, all the corridors of the Equitable Building, Baltimore, Capitol Brewery, Washington, and the S. S. White Dental Co.'s laboratory at Staten Island. We are now laying floors in the 50th Street Power-house of the Broadway Cable Railroad. To enable the public to get some idea of the many uses to which asphalté may be put, the

Compagnie Générale des Asphaltes de France, the proprietors of our works (which occupy thirty-three lots at Hunter's Point opposite the 34th Street Ferry), have arranged to make an elaborate display at the World's Fair, and have had built from designs of a leading French architect a rotunda, which will prove an attractive feature in Class 12: mining produce of the French Department; a model of it can be seen at our office. Mons. Léon Mals, the consulting engineer of the company, sends an oil-painting showing the interior of the Seyssel Mines.

Photographs showing the various factories and work of paving, and sidewalks in prominent streets and thoroughfares, will attract the attention of architects, and specimens of asphalt in all its conditions from the time that it is mined up to samples of work long used, will afford an unusual opportunity for gaining knowledge of a material the use of which is comparatively in its infancy in this country. Our works at Hunter's Point we would say were especially erected for the purpose of enabling us to lay streets here precisely in the same way as by the French company in Paris. The rock is forwarded direct from the mines to our works here, where it is crushed and powdered.

NEW YORK MASTIC WORKS,
T. HUGH BOORMAN, General Manager,
35 BROADWAY, NEW YORK, N. Y.

PULLMAN SASH BALANCE.

It is a compact device for sustaining a window-sash by the tension of a carefully tested coiled spring.

It saves time and money, as by its use, boxes, pockets, and dividing strips in frame are rendered unnecessary, and it is much more quickly and easily applied than are the clumsy weights and cords. It prevents the trouble and annoyance inseparable from frayed and broken cords and noisy pulleys.

By making face-plate oval instead of with square ends, they can be fitted three times as fast with a common auger-bit, only requiring two screws in the face-plate.

It is guaranteed to balance a sash more perfectly than weights or any other device. It is perfectly noiseless.

Being constructed of the very best materials and thoroughly put together, with the friction of a counter-weight overcome, it will last a lifetime.

Its adjustability is caused automatically by a self-acting brake which adjusts the balance to the varying weights of sash. This renders it unnecessary to fit a sash tight or loose, and prevents a sash from being pushed too violently against the top of the frame.

A top balance is also made for use in places where there is not sufficient room at the side. Its use in mullion windows enables an architect to introduce light where it is the most needed, by reducing the amount of wood.

PULLMAN SASH BALANCE CO.,
ROCHESTER, N. Y.

S. C. JOHNSON, manufacturer of ornamental hardwood floors, Racine, Wis., is at present at work on a new catalogue which will be issued about February 15. This catalogue will be a beautiful and complete one, containing nothing but new and artistic designs. He wishes to put one of these in the hands of all architects, contractors, and builders, or any who are at all interested in this class of work.

Whenever in want of anything of this kind

it will be to your advantage to see Mr. S. C. JOHNSON's catalogue before purchasing.

S. C. JOHNSON,
RACINE, WIS.

BUFFALO HOT-BLAST SYSTEM OF HEATING AND VENTILATING.

It is not proposed to enter into a lengthy portrayal, or discuss the comparative effectiveness, healthfulness, economy and cost of installation of the various apparatus now being offered, as it would not come within the scope of a catalogue description. The sole purport, therefore, of the accompanying description is to help progressive patrons, who desire the best at a moderate outlay.

Numerous volumes upon the subject of heating and ventilation have been compiled within the past century, yet it can safely be asserted that few possess any amount of real value. Many of these emanate from manufacturers whose interests are directly centered in some patented stove, grate or furnace, who will argue that their particular invention is a panacea for all the ills of heating.

Whether it be for the heating and ventilation of factories, mills or hospitals, legislative halls, theatres, and all this class of structures, a careful, thorough, and honest investigation of existing buildings, outfitted with various apparatus, upon the part of the intelligent buyer, can reach but one ultimatum, viz, that a plant combining the features of steam heat and mechanical ventilation is, from the points of efficient results and economical operation, the only one worthy of installation.

These features are most happily combined in the Buffalo Hot Blast Steam Heating and Ventilating Apparatus. Its component parts comprise a fan, a motor, a steam-heater, and a system of air-distributing ducts; under certain conditions of application, the latter becomes unnecessary, or is reduced to a very small item.

Cheapness is not the argument used in favor of the Fan or Plenum System, or the lever by which it has received its rapid advancement to popular favor and introduction. It is nevertheless true, that in many instances of installation, not only into manufacturing establishments but into that type of buildings occupied for business and entertainment purposes, the first cost is less than that of any other system, even of heating alone. Generally speaking, however, the first cost may be counted upon as equalling, if not exceeding, that of direct steam radiation, hot-air furnaces, etc. The point should not be overlooked that an amount expended for the latter class of outfits covers but one item, that of heating; no other than mechanical ventilation by a fan can be relied on as being positive in its action at all times and under all conditions of the weather. Granting this, and adding to that of the heating apparatus the cost of a fan-ventilating outfit, at as low a figure as it is possible to place an efficient one, and we have the only fair basis for comparison in the matter of price.

It is only too well appreciated by many occupants of factories that the atmosphere is neither agreeable, comfortable, nor healthful. Manifold noxious gases, incident to many manufacturing interests, so combine with air already vitiated by the respiration of operatives as to make it foul in the extreme. To the legislative and socialistic movement, concerning the protection and comfort of employes, which has so interested the public at large, may be ascribed considerable credit for the

bettering of such situations by the introduction of ventilating-fans. Where proprietors are compelled by factory-inspectors to install these ventilating arrangements, then they are often more ready to adopt, especially if erecting a new building, an apparatus which will not only heat the space, but ventilate it at the same time.

Buffalo Hot Blast Apparatus, in summer, may be used solely for ventilating and cooling purposes; while in winter, a supply of fresh air being generally admitted to the fan, the ventilation is equally well accomplished at the same time the heating is being performed.

Of all structures, the factory, undoubtedly, is the most difficult type to warm uniformly by direct heating systems, such as steam-coils, stoves, and the like, due to cold air being constantly admitted by opening doors, loosely-fitted windows, etc. With the Buffalo Hot-Blast Apparatus, the air is forced by a fan continually to every portion of the buildings, by means of judiciously arranged distributing-pipes, and thus a very even temperature is secured at each point. The space to be heated may be a one-story manufacturing establishment, several of this type, or one or more buildings with a number of stories, yet there is no difficulty in securing like results in each instance under an intelligent arrangement of the heating-plant. This fact, coupled with the usual small difference in cost between hot-blast heating and direct steam for mills, has figured prominently in its wide introduction therein.

In the example of business and public structures, the feasibility of heating the space evenly throughout by direct methods is more easily attained. In view of this, to actuate the selection of the Hot-Blast System, it must embody other points of merit equally cogent; these are clearly apparent in numerous instances. The possibility of a fresh, even, and ample supply of air under perfect regulation as to humidity and temperature at all times, regardless of natural conditions, is an argument which always commands consideration. This is attained in the Buffalo Steam Hot-Blast Apparatus, for it embodies the most happy combination of hot-air heating and ventilation extant.

Frequently buildings may be seen where a number of thousands of dollars have been expended for handsome exterior architectural effects, that should have had the amount so equalized that a modern heating and ventilating system could have been placed. Beautiful and imposing structures we never fail to admire, but the arrangement for securing a reliable heating and ventilating outfit should be planned in every detail with as much interest and intelligence as the construction of any other portion shows. This being done, we will then find a model apparatus, well-proportioned flues, boiler, engine, and heating-outfit apartments conveniently arranged, and, in short, a complete and efficient plant.

In Billings's "Principle of Ventilation and Heating," the author states, "in this climate it is impossible to have, at the same time, good ventilation, sufficient heating, and cheapness. The fact that good ventilation is expensive is not so well recognized as it should be," etc. Ventilation is expensive when arrangements for it have to be provided in existing buildings, previously planned in utter ignorance of such requirements, when we have to diminish the supply of fresh air to the smallest permissible amount in order to be allowed to introduce it at all. Plans for ventilation should always be perfected and

approved of by one familiar with mechanical ventilation, before the construction of the building is commenced, when the cost for providing for an entirely satisfactory plant, by having the flues of proper dimensions built in the walls, is very slight. The cost, then, of the Buffalo Hot-Blast Apparatus will seldom exceed or equal the outlay for many of the unreliable hot-air furnaces, or other devices, claiming to obtain ample ventilation by combining hot and cold air. It does not matter how carefully or thoroughly such a plant may be designed, no certain amount of air can positively be relied on as being supplied to every room, irrespective of outside conditions. Only by forcing fresh heated air under pressure to the several apartments can uniform results be obtained.

Upon mechanical means, solely, is the operation of the Buffalo Hot-Blast Apparatus dependent. Its action, therefore, obviously, is positive, not dependent upon atmospheric conditions, direction and force of the wind, but it always supplies the full required amount of pure air comfortably warmed.

BUFFALO FORGE CO.,
BUFFALO, N. Y.

ADULTERATED STAINS.

WE desire to announce that we have established a branch in Chicago, in the Owings Building, corner Dearborn and Adams streets. This action has been rendered necessary by the discovery that our stains were being adulterated by our former agents there.

We are carrying a full line of stains in stock there, and also samples, reproductions of water-colors, etc. Any one buying from our Chicago office has our personal guaranty of permanency of the stains, and that there is no kerosene, petroleum distillate or other adulterant contained in them, also that they will absolutely prevent the decay of the wood.

SAMUEL CABOT,
70 KILBY STREET, BOSTON, MASS.
OWINGS BUILDING, CHICAGO, ILL.

BUILDING INTELLIGENCE.

Reported for the American Architect & Building News.

ALTERATIONS.

Easton, Pa. — Alterations and repairs to Police Headquarters; builder, R. Keim.

HOUSES.

Chicago, Ill. — Clarence Howe, two-sty dwell., Washington Ave. and Ninety-fourth St.; cost, \$3,000.
William Frank, four cottages, 5030-5034 Throop St.; cost, \$4,000.
Church of the Holy Cross, two-sty dwell., 6537 Maryland Ave.; cost, \$8,000.

Minneapolis, Minn. — I. Fancett, two-sty frame dwell., 1916 Columbus Ave.; cost, \$4,000.
C. Peterson, two-sty brick veneer dwell., 3304 Portland Ave.; cost, \$10,000.

New York, N. Y. — Ninety-fourth St., n s, 42^d 30th w Madison Ave., 6 four-sty brick dwells., peak, tin and slate roofs; cost, \$132,000; owners, Smyth & Robinson, 405 East Sixty-first St.; architects, Cleveland & Putzell, 13 Astor Pl.

Boston Ave., e s, 125th s Perot St., three-sty stone and frame dwell., peaked slate roof; cost, \$3,025; owner, Kate C. Hunphill, 448 Amsterdam Ave.; architect, Thomas Greenlees, Williamsburg, N. Y.

Ninety-third St., s s, 43rd 11th w Madison Ave., 2 four-sty brick dwells., tin roofs; cost, \$50,000; owner, Walter Reid, 1666 Second Ave.; architect, Walter Reid, 1472 Third Ave.

One Hundred and Seventy-seventh St., n s, 85th e Fleetwood Ave., three-sty brick and frame dwell., peak, shingle roof; cost, \$3,500; owner, John H. Cawood, 1820 Morris Ave.; architect, R. E. Rogers, 110 East One Hundred and Twenty-fifth St.

Van Corleian Pl., 80th e Jacobus Pl., three-sty stone and frame dwell., peak, shingle roof; cost, \$4,500; owner, L. J. Brandt, 608 East Eighty-fourth St.; architect, John Brandt, 608 East Eighty-fourth St.

East One Hundred and Fiftieth St., No. 608, five-sty brick dwell., metal roof; cost, \$10,000; owner, Edward Higgins, 608 East One Hundred and Fiftieth St.; architects, John B. Snook & Son, 12 Chambers St.

Bathgate Ave., e s, 200th s One Hundred and Eighty-third St., 2 three-sty stone and frame dwells., tin roofs; cost, \$7,000; owner, Abby Runk, Southern Boulevard and Webster Ave.; architect, M. J. Garvin, 530 Third Ave.

Pearl St., n e cor. Old Slip, five-sty brick dwell., tin roof; cost, \$28,000; owner, William Englemen, 114 Pearl St.; architect, Ernest W. Greis, 36 Union Square.

Philadelphia, Pa. — Selig St., n e s, s e Jefferson St., 2 two-sty brick and frame dwells., owners, Wright & Dager, 607 Jefferson St., Roxborough.
Ridge Ave., s s, n Fountain St., 2 two-sty brick dwells.; builder, C. J. Wallace, 408 Lyceum Ave.

Bristol Pike, n w cor. Ferry Lane, two-sty brick dwell.; owner, Charles Zelter, Collegeville.
German St., Nos. 422-424, 2 four-sty brick dwells.; builder, George Heisler, 2236 Dickinson St.

Pittsburgh, Pa. — Luella Place, dwell. for Thomas C. Pitcairn.

St. Louis, Mo. — Two-sty brick dwell.; cost, \$5,000; owner and contractor, Jas. Marre.

Two-sty brick dwell.; cost, \$4,000; owner, Mrs. A. Owens; contractors, Abrahams & Mair.

Two two-sty brick dwells.; cost, \$6,000; owners, Sheehan & Loler R. E. Co.; contractor, J. Costello.

Two-sty brick dwell.; cost, \$3,000; owners, Sheehan & Loler R. E. Co.; contractor, J. Costello.

Two-and-one-half-sty brick dwell.; cost, \$3,500; owners, Sheehan & Loler R. E. Co.; contractor, J. Costello.

Four two-and-one-half-sty brick dwells.; cost, \$20,000; owner and contractor, J. Flannery.

Two-sty brick dwell.; cost, \$3,500; owner and contractor, J. Lynch.

Two-and-one-half-sty brick dwell.; cost, \$2,500; owner, C. Herkenhoff; contractor, Wm. Kerkenhoff.

Two-sty brick dwell.; cost, \$6,000; owner, F. L. McGrath; contractor, J. Flavin.

Two-sty brick dwell.; cost, \$4,500; owner, P. Fucholski; contractors, Wieden & Son.

Two-sty brick dwell.; cost, \$3,000; owner, L. J. Wieler; contractor, F. W. Folk.

Two two-sty brick dwells.; cost, \$7,000; owner, W. C. Eihler; contractor, C. H. Sudholter.

Two-sty brick dwell.; cost, \$3,600; owner, Mary J. Clark; contractor, E. M. Greggerson.

Three-sty brick dwell.; cost, \$12,000; owner, Mrs. F. Carroll; contractor, A. W. Heimburger.

Worcester, Mass. — Lund St., three-sty frame dwell.; owner and contractor, F. W. Groat.

Eastern Ave., one-sty frame dwell.; owner, A. Borgeson; contractor, A. E. Erickson.

Alvardo Ave., two-sty frame dwell.; owners and contractors, Ward & Blanding.

OFFICE-BUILDINGS.

New York, N. Y. — East Fourteenth St., No. 18, six-

sty brick office-building, tin roof; cost, \$45,000; owner, Henry C. Bolton, University Club; architects, Brunner & Tryon, 36 Union Square.
Fine St., Nos. 34 and 34¹/₂, five-sty brick office-building, asphalt roof; cost, \$50,000; owner, Hanover Fire Ins. Co., 40 Nassau St.; architect, O. B. Jennings.

West Fifty-second St., Nos. 643, 645, 647, two-sty brick office-building, tin roof; cost, \$6,000; owners, Canda & Kane, 14 West Seventy-second St.; architects, Neville & Bagge, 250 West One Hundred and Twenty-fifth St.

PUBLIC BUILDINGS.

Leominster, Mass. — Plans are being made for a town hall for this place; architects, Hartwell & Richardson, Boston.

SCHOOL-HOUSES.

Arlington, Mass. — Brick and brownstone high-school building, eight rooms; contract to be let; architects, Hartwell & Richardson, Boston.

Ware, Mass. — Brick and stone high-school building, hip roof, 82' x 104'; five class rooms, and assembly hall; contract to be let; architects, Loring & Phipps, Boston.

STABLES.

Boston, Mass. — Western Ave., rear, bet. Everett and Riverdale Sts., Ward 25, one-sty frame stable, pitch roof, 30' x 40'; owner, Allen Clark; builder, Mr. McGuinness.

Prospect Ave., rear Baker St., Ward 23, frame stable, 20' x 24'; owner, Solomon Levy.

Philadelphia, Pa. — Sansom St., No. 2011, plans have been prepared for brick and stone stable; architect, Will H. Decker, Hale Building, Juniper and Chestnut Sts.

Master and Thirty-second Sts., plans have been prepared for two-sty brick stable; for Bergner & Engel; architect, Otto C. Wolf, n e cor. Broad and Arch Sts.

Sydenham St., w s, n Master St., two-sty brick stable; builder, John Halback, s e cor. Twenty-sixth and Thompson Sts.

STORES.

Boston, Mass. — Essex and Columbia Sts., five-sty brick and terra-cotta store, flat roof; owner, The Taylor Estate; architects, Hartwell & Richardson.

Brooklyn, N. Y. — Driggs Ave., s e cor. Leonard St., four-sty frame store and dwell., tin roof; cost, \$6,500; owners, D. Michel and H. Newmann, 171 Graham Ave.; architect, Henry Vollweiler, 483 Hart St.

Bleeker St., n s, 230th w Knickerbocker Ave., 2 three-sty frame stores and dwells., tin roofs; cost, \$4,500 each; owner and builder, Wm. Berlinger, 1255 Greene Ave.; architect, H. Vollweiler, 483 Hart St.

De Kalb Ave., n s, 100th e Hamburg Ave., three-sty frame store and dwell., tin roof; cost, \$4,500; owner, architect and builder, Francis Terek, 1116 Myrtle Ave.

Driggs Ave., s s, 25th e Leonard St., 3 four-sty frame stores and dwells., tin roofs; cost, \$5,500; owners, D. Michel and H. Newmann, 171 Graham Ave.; architect, H. Vollweiler, 483 Hart St.

Willoughby Ave., n s, 250th e Evergreen Ave., three-sty frame store and dwell., tin roof; cost, \$4,500; owner, John Wehrle, Church St. and Fort Hamilton Ave.; architects, D. Acker & Son, 752 Broadway.

Second Ave., e s, 60th s Fifty-third St., three-sty frame store and dwell., tin roof; cost, \$3,000; owner, architect and builder, M. Brophy, 337 Thirty-ninth St.

Second Ave., e s, 80th s Fifty-third St., three-sty frame store and dwell., tin roof; cost, \$3,000; owner, F. Anderson, 138 Thirty-ninth St.; architect and builder, M. Brophy, 337 Thirty-ninth St.

Chicago, Ill. — Mrs. H. Halla, 3 two-sty stores and flats, 7100 Greenwood Ave.; cost, \$5,200.

G. Brien, 2 three-sty stores and flats, 6406-6408 Stony Island Ave.; cost, \$20,000.

Charles F. Lange, four-sty store and flats, 972 North Halsted St.; cost, \$10,000.

F. Hettinger, two-sty store and flats, 147 Illinois St.; cost, \$5,000.

Mich. Rotkowski, 4 three-sty stores and flats, 573 South Robey St.; cost, \$7,000.

F. R. Otis, five-sty store and flats, 1068 Custom House Pl.; cost, \$15,000.

LOCALITY OF AUTHORSHIP OF DESIGNS PUBLISHED IN THE AMERICAN ARCHITECT.

The assertion that the *American Architect* is a paper whose characteristics are *national* and not merely local is supported by the following table, which exhibits the manner in which several journals have treated domestic architecture. In this comparison the *IMPERIAL* edition of the *American Architect* is considered, since the additional plates of the *INTERNATIONAL* edition are, in the main, illustrations of foreign work.

PAPER.	Number of subjects contributed.	Number of contributing architects.	Towns in which contributors were established.	States in which contributors were established.	Architects practising in the State of publication furnished.				
					Subjects.	Per cent of total number of subjects.	Different architects contributing.	Per cent of total number contributing architects.	Towns.
No. I. . . .	214	100	28	16	161	.752	75	.688	7
No. II. . . .	137	78	21	15	46	.335	24	.307	2
No. III. . . .	118	56	16	11	70	.593	22	.392	1
Am. Architect.	267	152	47	24	73	.273	30	.256	3

From this table it appears that Massachusetts architects—.256 per cent of the total number of contributors—provided only .273 per cent of the total number of designs published, percentages which, in view of the fact that Massachusetts is one of the most populous States in the Union, prove that they have not been accorded an unreasonable amount of our limited space.