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**S**UBSCRIBERS to the International Edition who now and then discover that some of the plates of that particular edition have not been received by them, although declared by the text to be properly a part of that issue, will spare themselves a little annoyance and wasted impatience if they will recall that Atlantic storms are things we cannot control, that, although stormy weather may delay the arrival of our invoices, it is very rare that an ocean steamer is actually lost, and that, consequently, they will receive, eventually, the delayed prints. The text-forms have to go to press on the assumption that the expected invoice will be delivered with routine regularity, though the connection—often a very close one—sometimes fails altogether, as it did last week and possibly may this week also.

**T**HE Council of the Royal Institute of British Architects has nominated, as the recipient for the present year, of the Royal Gold Medal annually presented to some architect of the highest distinction, Mr. Richard M. Hunt of New York. Mr. Hunt is the first American ever selected for this honor, and there can be but one opinion in the profession throughout the United States,—that a better choice could not have been made. In this country, Mr. Hunt has for many years been unanimously regarded as standing at the very head of the profession of architecture. A quarter of a century ago Mr. Hunt's ideas and sayings were the talk of the offices, much as Mr. Richardson's became a decade later, and, although Mr. Hunt, during the most brilliant part of Richardson's too brief career, was rather out of the course of active practice, his splendid achievements since that time have shown how great and solid was the talent which had already won for him, in the country where he had received his early training, and had first shown his capacity, the highest honor which even France can bestow upon an artist. It is pleasant to find the great English professional body, which, in such matters, never acts without ample knowledge and long deliberation, selecting for its great honor one who has so long held the highest place in our regard; and American architects will feel the selection as, in a way, a compliment to all of them.

**W**E had a letter not long ago asking whether an architect had a right to accept proposals on behalf of his client, and, if he did so, whether his client could repudiate his action; and in such case what would be the position of the architect. As in all such cases, the answer to this question depends upon the contract between the architect and his client. It

often happens that the latter requests the architect to act for him in such matters, or gives him specific authority to accept bids at his discretion for particular portions of the work. An authorization of this kind may be either written or verbal, and in either case, if it is distinctly expressed, it will entitle the architect to bind his client by acts done in accordance with the authority thus delegated. Unless such authority is expressly given, however, the architect cannot bind his employer by acts of the kind in question. In the ordinary contract of employment between the architect and his client no such authority is implied, and an architect who assumes such authority does so at great risk. If his client chooses to ratify the architect's action, he adopts it as his own, and he is then bound; but he is under no obligation to ratify it, and if he chooses not to do so the architect may find himself liable in damages to persons who have suffered loss through his unwarranted assumption of a right to which he was not entitled. It is true that such unauthorized acts are usually done by architects with the best possible intentions. They receive what seems to them a very favorable bid for a piece of work, and, fearing that their client may lose the advantage of it if the answer is delayed until he can be consulted, they accept it immediately, and, naturally, they think it rather hard if their client subsequently repudiates their good offices, and leaves them with an indignant contractor to console. For all that, their position is wrong. Even though their error may have been committed through excess of zeal, it is none the less an error, and, although clients are generally amiable enough to endure a little annoyance, or even loss, rather than disown the action of an architect whose only fault has been that he has been too anxious to serve them, such amiability is purely voluntary on their part. As in most questions concerning the relations between architects and their clients, the architect can form a pretty good idea of what his duties and rights are by putting himself, in imagination, in the place of his client. Whatever may be his estimate of the superiority of the architect's judgment to that of his client, he must acknowledge that, if he were the client, he would not like to be informed that he had been committed, without his knowledge or consent, to a contract. It is quite possible that the contractor to whom the architect had bound him might be personally objectionable; or there might have been, unknown to the architect, a lower bidder, or an offer from some one whom the client desired to favor; or the latter might, on ascertaining the amount of the bids, wish to drop the matter altogether, or modify his plans; and to find his discretion in regard to all these matters taken away from him by the hasty action of a man whom he had never authorized to act for him would be annoying, to say the least. It may be observed that old and experienced architects do not often fall into such errors. It is commonly the young and enthusiastic members of the profession who undertake to manage their clients' business for them, and it will be well for them to bear in mind that an architect's authority to act for his client is, where not expressly defined by agreement between them, or by the agreement between the client and contractor, held by the courts to be extremely limited. He may reject bad work and materials, and express his opinion as to whether a contract, or a portion of it, has been performed, and, in emergencies of construction, it is generally held that, as the scientific adviser, he may order the necessary steps taken, at his client's expense, to save the latter's property, but beyond this his implied powers do not go, and if he or his client wish that more authority should be vested in him a special arrangement must be made.

**T**HE *Engineering Record* makes some very just and rather novel comments on the ridiculous "invitation to architects," recently issued by the committee having in charge the erection of a new city-hall for the town of Davenport, Iowa. As many of our readers have probably already seen and laughed over this precious document, we need only say that it provides that "the architects will be left to show as large and convenient a building as they can furnish and needed at a cost not to exceed seventy thousand dollars." The language of this sentence leaves something to be desired, but its meaning will be clear enough, particularly in the light of the succeeding one, which says that "the architect whose plans are accepted will be required to guarantee by certified

check to the amount of four thousand dollars that when advertised for bids there will be an offer from competent contractors within sixty days thereafter." Quarter-scale drawings are required, together with specifications, "complete enough for the committee to understand and consider the scheme for the proposed building without additional verbal explanation"; and, as an incitement to extraordinary effort on the part of architects, a prize of two hundred dollars is offered for the best set of plans and specifications, one hundred and fifty dollars for the second, and one hundred dollars for the third; no promise whatever being made that the author of the best design will be employed to carry it out, or will receive anything more than his two hundred dollars.

THE *Engineering Record* truly says that, "If anything could be more grotesquely repellent to solicited professional services of architects and engineers, we venture to say that it has not yet appeared in print," and it expresses astonishment that corporation officials should "so far abuse public trust in them as to effectually drive away the very professional men they are put in office to solicit, and thus completely defeat the purposes of their appointment." This comment is well put, and deserves the attention of all persons interested in municipal works. We are inclined to think that the Davenport committee acted innocently enough. Judging from the internal evidence of their programme, not one of them ever had anything to do with an architect, or had more than the vaguest notions in regard to the profession. The invitation, from beginning to end, is really addressed to builders, not to architects. There will be plenty of builders who will be glad of the chance to offer competing sketches of what they can undertake to do for the committee's seventy thousand dollars, and, of course, they stand ready to make a contract in conformity with their scheme. The four thousand dollars caution-money, in the case of competing builders, is a sufficiently reasonable security against deception, and the committee is, practically, not inviting designs in the way that architects understand them, but is calling for tenders, accompanied with samples, for city-halls, just as it would invite by advertisement bids for pork to feed the inmates of the almshouse, with, probably, the honest intention of giving the job to the man who will give the best article for the money, the idea of the intervention of an architect, as the man of science who will show the builder how to make the structure strong, convenient and beautiful, in ways which neither the committee nor the builder would ever think of without such help, never entering their heads. Of course, city-halls can be built in either way. Most of the civilized world concluded long ago that the service of the highly-trained professional man is essential for securing a proper degree of beauty and utility in a public building, but there are portions, particularly in this country, to which carpenters' city-halls seem good enough, and, so long as they are contented, we do not know that the outside world need feel called upon to interfere. Meanwhile it may be remarked that to write an invitation to builders, and call it one to architects, does not change the character of the persons to whom it is really addressed, and who will reply to it, but may, and often does, mislead people not immediately concerned, who, not being familiar with such matters, do not see that architects are about as likely to respond to such an invitation as the professors in a medical school would be to answer an advertisement for "surgeons" to officiate in an abattoir.

IT is a matter of considerable interest that the professorship of decorative composition in the *École des Beaux-Arts*, left vacant by the death of the celebrated decorative painter, Galland, has been conferred upon an architect, M. Henri Mayeux. The principal competitor of M. Mayeux for the appointment was a painter of considerable distinction, M. Luc-Olivier Merson, but the architect was preferred. M. Mayeux, although a thorough architect, has, ever since his student-days, been noted for his skill in composition and detail. In the early volumes of "*Croquis*," his brilliant designs were always among the principal attractions, and, although he has since become distinguished as a skilful and accomplished architect, his fame as a designer and composer of ornament has not grown dim. In this country, a man of such tastes would have been very likely to drop out of the ranks of the profession to devote himself wholly to painting or sculpture, but in France an architect not only may be, but is expected to be, an artist, and it does not seem strange there, as it would here, to find one exercising the functions of a professor of decoration in

connection with an extensive architectural practice. Perhaps, however, it is even now less strange here than it would be in England, and it is a hopeful sign that it is so. In England, an architect who has any tastes outside his strictly professional work is usually an archæologist. Fortunately for us, we have nothing to archæologize about, and the necessity that our architects are under of recurring for inspiration to the allied arts and to nature, instead of the buildings of their predecessors, has been a good thing for American architecture, and will be of still greater value as it becomes more generally accepted.

THE wretched collapse of the Panama Canal scheme seems to have called renewed attention to the Nicaragua Canal, and the promoters of the latter enterprise have lost no time in taking advantage of the renewed public interest to call attention to the merits of their own plan. As we have often before described this plan we need not refer to it again. The point now particularly urged upon the public and on Congress is that of guaranty and control by the United States Government. As presented by the Canal Company, the risk assumed by the United States in lending its credit to the undertaking does not seem very serious, and the advantages of control by our Government are obvious. The concession from the States of Nicaragua and Costa Rica must, by its terms, be held by a private corporation, so that the Canal and the bordering territory could not become the absolute property of the United States, but the concession permits any foreign Government to own a majority of the stock in the Canal corporation, so that our Government can have practically complete control of the canal without entering into political complications with small, but friendly, States, and such control it is very desirable for the United States to possess. To say nothing of the danger that some European Government, such, for example, as that of Germany, which is very much alive to commercial advantages, might quietly buy a controlling interest in the corporation, and use it to our great and permanent detriment, it is evident that what is sure to be the great highway between our Atlantic and Pacific coasts ought to be under our own direction. If England has found it necessary, not only to buy a controlling interest in the Suez Canal corporation, but to seize and hold Egypt to make sure that its route to India is not interfered with, it is even more necessary for us to see that the naval and commercial connection between the two halves of our own country is secured against all possibility of interruption.

M. PH. DELAHAYE, in his regular article in the *Revue Industrielle*, of January 21, takes up the matter of the Nicaragua Canal, and the scheme for reviving the Panama Canal Company. We do not know whether he is related to the Deputy Delahaye who has taken such an active and creditable part in the legislative investigation of the Company's proceedings, but he seems to understand the subject thoroughly, and his article, though not long, is well worth reading. As to the amount of work actually accomplished with the monstrous sums sent to the Isthmus, and spent, his opinion appears to agree pretty closely with that of the American engineers, to which we referred in a recent article; but he does not enter into detail on this part of the subject, merely giving the exact figures, as disclosed by the investigation, of the amounts of stock and bonds issued, and money paid in. From these figures, however, he concludes that the attempt to float the enterprise again would be hopeless. No banking-house, he says, would undertake to offer to the public an investment so notorious, and it would be madness for the Government to guarantee it, as certain speculators are trying to induce it to do, on the ground that the passage of the law authorizing the lottery loan rendered the Government responsible for the proper application of the money. Before the Panama corpse can be galvanized into life, as M. Delahaye says, the people who had the spending of the Panama Company's money must say where and how they wasted the millions of French savings, and, as they are never likely to do this, he sees nothing in the way of carrying out the Nicaragua scheme. He sees no objection to having the canal under the direction, and virtual ownership, of the United States Government, and, with economy and honesty, assisted by the Government credit, he thinks the enterprise could certainly be carried out.



ARCHITECTURE OF THE LOW COUNTRIES.<sup>1</sup>—I.

Fig. 1. View of the Cathedral of Tournai.

ACCORDING to Julius Caesar, the Celts were the earliest inhabitants of the territory of the Low Countries. Their architectural achievements were confined to the erection of enormous unhewn stones, such as the Pierre Brunehaut, still standing in the vicinity of Tournai; their dwellings were nothing but wretched huts made out of the most common and the least-durable materials.

The Germans, who drove out the Celts a century and a half before the Christian era, have left no traces of their passage except a few *tumuli*.

After the conquest of the Belgian territory, which was undertaken by Julius Caesar in the year 58 B. C., Roman civilization and arts were gradually introduced. Roman supremacy lasted nearly four centuries, or until about the middle of the fifth century. It was not until the reign of Augustus that this part of the Gauls was furrowed with roads and that posting-houses were established there for the accommodation of travellers.

The oldest cities of Belgium, Tongres and Tournai grew up at this time, on favorable sites at the intersection of military roads. The introduction of architecture, considered as an art, dates from this period; but it is hardly probable that in this remote section of the Gauls it attained a very high degree of perfection. Roman art was, moreover, in decadence and the Romanesque period was about to open. This first type of mediæval architecture dates, in fact, from the seventh century; it underwent a gradual transformation and development until the thirteenth.

## ROMANESQUE PERIOD.

The Romanesque style, properly so called, was the only style in force in France, in the regions along the Rhine and in the territory of the Low Countries, during the period extending from the downfall of Roman supremacy there to the reign of Charlemagne. During this time the basilican disposition predominated, and constructions were generally very soberly decorated; it is clear that, though, on the one hand, the Romanesque artists of the Meuse district drew their inspiration from the Germanic traditions of the Rhine, those in other parts of this territory adopted the architectural principles of Northern France.

Of the edifices of the Germanic type, unquestionably the most important is the beautiful basilica of St. Servatius at Maestricht. The aisles and crypt date from the eleventh century; the rest of this remarkable monument belongs to the twelfth. Two towers, very simple in character, accompany the apse in which the choir terminates. The spacious narthex in front is the latest and richest portion of the church; its two quadrangular towers originally soared to a much greater height. One of the transepts is still adorned by a magnificent porch in a transitional style. The Romanesque cloister was replaced by a fine Pointed one in the fifteenth century. To the same Rhenish type we must also refer the Church of Notre-Dame at Maestricht, formerly a collegiate church.

At Nymegen, we likewise find Romanesque fragments of this type; the Minster of Roermond exhibits the same details; several examples still exist in the Province of Limburg, as the

church of Alden-Eycken and the small church of Sluze. The Romanesque style appears, at Liège, in a notable part of the interesting Church of Sainte-Croix, in the churches of Saint-Barthélemy, Saint-Jean and Saint-Jacques. The little Church of Saint-Nicolas-en-Glain, in the vicinity of Liège, consecrated July 22, 1151, belongs to the same style, as well as several small basilicas in the Condroz, that picturesque portion of the Province of Liège.

There are Romanesque remains at Dinant and at Hastière; but it is to be remarked that, aside from the beautiful collegiate church of Maestricht, only fragments of structures have been preserved—here an apse, there a tower, or a façade, incorporated into edifices reconstructed at a later period, either in the Pointed or a much more recent style. To cite further, among the important churches, is the old collegiate church of St. Vincent, at Soignies, erected about 965. The transepts and choir terminate in straight walls. There are two imposing towers, one at the intersection of the transepts and nave, the other in front.

When the terrors inspired by the approach of the year 1000 had subsided, Hainault witnessed the erection of the most imposing edifice preserved in the Netherlands, namely, the Cathedral of Tournai, a vast basilica disposed in the form of a Latin cross (Fig. 1). The arms formed by the transepts, as well as the choir before its reconstruction in the Pointed style, terminated in apses. Nothing could be grander than the appearance of this vast structure, divided into three aisles, which make an angle with the transepts by two bays, and which are formed by two superimposed rows of forty pillars joined by semicircular arches. The magnificent apses constitute the most remarkable part of the edifice. Nowhere on the Continent is there, in our opinion, another sight as imposing. The lofty nave was originally covered with a flat ceiling; it was not vaulted until the eighteenth century. Above the cross rises the principal tower, square in form, with four more slender quadrangular towers at the angles of the transept.

We may add that the beautiful cloisters of Tongres and Nivelles belong also to the Romanesque era, but with these the list of the principal religious edifices in this style must be considered as completed.

As to civil constructions, it will be remembered that the institution of communes, which goes back to the eleventh century in the Netherlands, and to which the cities are indebted for their most beautiful civil monuments in the Pointed style, had not acquired sufficient preponderance before the middle of the thirteenth century to exercise any considerable influence on civil architecture. Therefore, hardly any important edifice of the kind is found that antedates the twelfth century. Houses of this period still exist at Tournai; the Halle aux Blés at Ghent has the architectural dispositions of these old dwellings. Let us note in passing that its gable is broken in steps, as in the houses of the sixteenth and seventeenth centuries, which shows how incorrect is the term "*Spanish gable*," which is generally applied to this form.

## THE TRANSITIONAL PERIOD.

The architecture of the transitional period has left few traces in the Netherlands, except in houses of worship, and even in these the simultaneous use of the semicircular and pointed arch is but seldom the only constructional method adopted for the *ensemble*. In the cathedral of Brussels (Sainte-Michel-et-Gudule) and in the Chapelle of the same city, as also in the collegiate church of St. Martin, at Ypres, the choirs offer fine examples of the transitional style. More complete specimens are found in the churches of Saint-Quentin, Saint-Piat and Saint-Brice at Tournai; in the Chapelle du Saint-Sang at Bruges, in the church of Notre-Dame-de-Pamele at Oude-naarde and in the church of Lisseweghe. In Saint-Sauveur at Bruges, Saint-Jacques at Ghent and Saint-Pierre at Ypres, it is mainly in the towers that traces of it are to be seen, but the splendors of the style are especially displayed in the decoration of the beautiful portal of the collegiate church of St. Servatius, at Maestricht.

The Pointed period, the major part of whose monuments, religious as well as civil, belong to the tertiary style, was extremely prolific in edifices of all sorts in the Low Countries. Yet, however remarkable the civil constructions may have been, it was particularly on religious edifices that the architects of the time lavished all the wealth of their brilliant art. The transformations characterizing the three divisions of the Ogival period correspond, as in France, almost exactly to

<sup>1</sup> From the French of J. van Ysendyck, in Planat's *Encyclopédie de l'Architecture et de la Construction*.

the thirteenth, fourteenth and fifteenth centuries; and in the Low Countries it even extends to the middle of the sixteenth century.

In consequence of the augmentation of the *personnel* of the chapters, the increased power and importance of the abbeys and the additional pomp introduced into religious ceremonies,

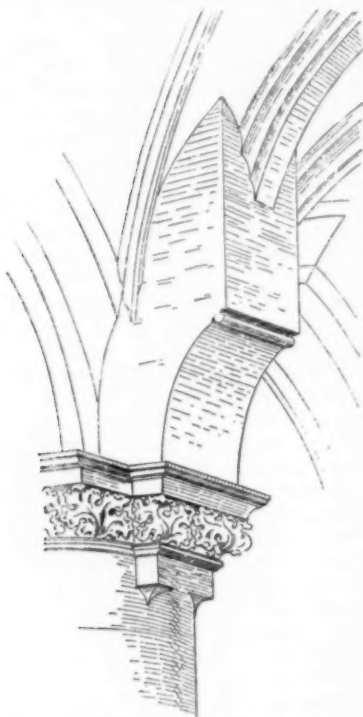


Fig. 2. Corbelling in the Church of St. Waltrudis, at Herenthals.

the churches took on more importance; their plans were enlarged, and in most cases the choirs were at first surrounded by collaterals, which were themselves usually accompanied by chapels; in the fourteenth century the side-aisles even were bordered with chapels; in the fifteenth and sixteenth this disposition became general. Notwithstanding the spaciousness of the cathedrals and abbey-churches, their façades are not adorned with triple porches with deep coverings, like those of the cathedrals of Paris, Amiens and Chartres; the beautiful rose-windows of these last monuments exist in the others only in the southern transepts of the collegiate church of St. Martin, at Ypres, and of the church of Notre-Dame-au-Sablon at Brussels. The use of

the flying-buttresses becomes equally rare at the end of the fifteenth century. They are replaced by the buttress alone, even to support the loftiest naves covered with vaults of wide span, as in the cathedral of Saint-Bavon and the church of Saint-Michel at Ghent, in the church of Saint-Jacques at Liège, as well as in the great chapels of the cathedral of Brussels. Iron tie-rods are generally introduced at the springing of the vaults.

We may properly insert here (Fig. 2) an illustration of an original disposition peculiar to the construction of the buttresses in the church of St. Waltrudis at Herenthals. Instead of placing the upper buttresses on the *doubleaux* separating the seven vaulting compartments in each of the side-aisles, the architect of this interesting edifice carried them back, by means of corbelling, to the capitals of the columns between the two naves. The disposition of the cloister partially enclosed in the angle formed by the transept and the northern side-aisle in the collegiate church of St. Martin, at Ypres, also furnished occasion for the contrivance of especial flying-buttresses. Those supporting the vaults of the lofty nave are themselves supported by flying-buttresses neutralizing the thrust of the vaults above the north side-aisle, and in this way the buttress of the latter is far enough away from it to give all the space requisite for the face of the cloister attached to the northern nave.

Aside from the church of Saint-Lambert at Liège, which had originally three towers, religious edifices of the thirteenth century generally possessed but one tower. The spires crowning them were of wood. Of the fourteenth century, hardly any can be cited except the two adorning the primary church of Huy and the beautiful constructions forming the façade of the cathedral of Brussels (Fig. 3). On the other hand, in the fifteenth and sixteenth centuries, a large number were erected; the most remarkable of these belonged to the churches dedicated to St. Martin [*? Notre Dame*], at Hal, Ypres and Courtrai, to Notre-Dame-du-Lac at Tirlemont, Saint-Bavon at Ghent and Sainte-Walburga at Oudenaarde; the tower of the church of Sainte-Gertrude at Louvain and its openwork stone spire; the tower of St. Catherine's at Dieghem, with its original termination, and lastly the splendid towers of Notre-Dame at Antwerp, only one of which is wholly completed (see "Religious Architecture," Fig. 28, *American Architect* for August

16, 1890). In Holland were constructed the towers of the great churches of Utrecht and Breda and those of the beautiful cathedral of Saint-Jean at Bois-le-Duc. To this period belong also those colossal trunks of towers constructed on the fronts of the churches of St. Waltrudis at Mons, Saint-Sulpice at Diest, St. Rombold at Mechlin, Saint-Jacques at Antwerp, Saint-Michel at Ghent, the cathedrals of Zierikzee and Leeuwarden and St. Peter's at Louvain, — towers which, by their elevation, their beauty and the boldness of their spires, would have been, like the tower of the cathedral of Antwerp, among those marvels of Pointed art whose conception and originality are confined exclusively to mediæval artists.

Among the numerous religious monuments erected in the thirteenth century, we must assign to the first rank the Church of Saint-Paul, at Liège, the primary church of Notre-Dame at Tongres, the naves and transepts of the collegiate church of St. Martin, at Ypres, the choir of the cathedral of Tournai (Fig. 1), the church of St. Leonhard, at Léau, and the primary church of Dinant. It was during the fourteenth century that the following were constructed: the cathedral of Saint-Jean, at Bois-le-Duc, the primary church of Huy, that of Aerschot, the beautiful church of St. Martin [*? Notre Dame*], at Hal and the naves and choir of the church of Sainte-Croix, at Liège. To the fifteenth and sixteenth centuries belong the church of Verwick, the primary church of Saint-Sulpice, at Diest, Sainte-Walburga, at Oudenaarde, the cathedral at Antwerp (see "Religious Architecture," Figs. 27, 28, *American Architect*, for August 16, 1890), the church of St. Gommarius, at Lierre, St. Rombold, at Mechlin, St. Peter's, at Louvain, Saint-Michel and Saint-Bavon, at Ghent, St. Waltrudis, at Mons, Saint-Jacques and St. Martin, at Liège, the church of Hoogstraeten, and Notre-Dame-au-Sablon, at Brussels. Freestone in small blocks, obtained from numerous quarries opened in Belgium during the Middle Ages, was employed in the construction of all these edifices. In Holland and along the entire littoral, where there was no stone and where the means of communication were very inadequate, brick was used from the thirteenth century; this was the material employed in the churches of Utrecht, Dordrecht, Haarlem and Breda. In Belgium the



Fig. 3. Façade of the Cathedral of Brussels.

cathedral of Saint-Sauveur, at Bruges, was erected, and also the church of Notre-Dame in the same city, with its important tower and slender spire. Throughout this region brick was the common building-material. It was carved and ornamented with mouldings, and even the mullions and the clerestories of the





forces, and we must therefore establish some limiting conditions that will enable us to solve the problem.

We note in the frame; that  $h i$  and  $j k$  can be drawn in direction at once; next that  $h k = c e$ , that  $g h = e f$  and

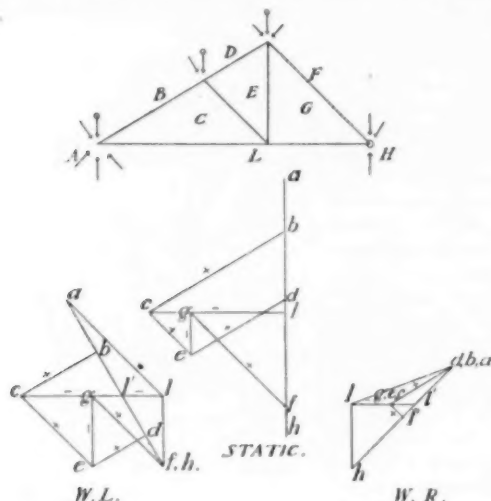


Fig. 31. Truss VI.

the direction  $f g$ , noting that  $g$  must fall midway between the lines  $h i$  and  $j k$ . Then we draw  $h i$  and  $j k$  extending them indefinitely; draw  $f g$  until  $g$  comes to a point midway between these two lines. Draw  $g h \parallel$  to  $G H$ , this gives  $h$ .  $h k \parallel H K$ , fixing  $k$ ; then proceed.

Joint  $D I$ :— $d i, i h, h g, g f, f e, e d$ .

Joint  $I J$ :— $i j, j k, k h, h i$ .

Joint  $F M$ :— $f g, g l, l m, m f$ .

Joint  $G L$ :— $h k, k l, l g, g h$ .

Joint  $J N$ :— $j n, n o, o l, l k, k j$ .

Balance, the same.

**Wind-Left Diagram**:—Load-line, drawn parallel to a line normal to rafter; resultant passes through centre of rafter, cutting tie in two parts proportional to those in which the load-line is divided. Through the division-point draw a horizontal line, and then from the  $z$  extremity of the line draw a vertical line  $z m$  to represent the  $z$  reaction, and  $ma$  to represent the  $a$  reaction.

Joint  $A B$ :— $ab, bc, cm, ma$ .

Joint  $B D$ :— $bd, de, ec, cb$ .

Joint  $C M$ :— $ce, ef, fm, mc$ .

In regard to other joints, the note in the Static-Load Diagram applies. Draw the lines  $i h, j k$ , indefinitely; extend  $c e$  until it cuts them, giving us  $h$  and  $k$ ; locate  $g$  as before.

Joint  $D I$ :— $d i, i h, h g, g f, f e, e d$ .

Joint  $F M$ :— $f g, g l, l m, m f$ .

Joint  $I J$ :— $i j, j k, k h, h i$ .

Joint  $G L$ :— $h k, k l, l g, g h$ .

Joint  $J N$ :— $j n, n o, o l$  (coincident since  $N O, L M, L K$ , form a triangle and no strain can come on the interior bracing)  $l k, k j$ . This completes the diagram.

**Wind-Right Diagram**:—Load-line, drawn parallel to a line normal to the rafter, divided into two parts, at  $m^1$ , proportional to the parts into which the resultant of the wind-pressure divides the tie. Obtain the reaction of abutments  $z m$  and  $ma$ .

Joint  $Z$ :— $yz, zm, mx, xy$ .

Joint  $U Y$ :— $uy, yx, xw, wu$ .

Joint  $X M$ :— $wx, xm, mt, tw$ .

Construct on  $nr$  a figure similar to the one just constructed on  $uy$ .

Joint  $R U$ :— $ru, ur, wt, ts, sp, pr$ .

Joint  $K R$ :— $kr, rp, po, on$ .

Joint  $J N$ :— $j n, n o, ol, lk$  (coincident points),  $k j$ .  $lm$  gives tension in balance of tie and  $k j$  compression in rafter, other pieces not strained.

§ 185. **Truss VI**: (Fig. 31.) **Static-Load Diagram**:—Load-line, determine reaction of abutments as explained in § 174.

Joint  $A$ :— $ab, bc, cl, la$ .

Joint  $B D$ :— $bd, de, ec, cb$ .

Joint  $D F$ :— $df, fg, ge, ed$ .

Joint  $F H$ :— $fh, hl, lg, gf$ .

**Wind-Left Diagram**:—Load-line, normal to rafter, result-

ant passes through centre of rafter and fixes  $l' - al, lh$  are thus fixed as the reactions.

Joint  $A$ :— $ab, bc, cl, la$ .

Joint  $B D$ :— $bd, de, ec, cb$ .

Joint  $D F$ :— $df, fg, ge, ed$ .

Joint  $F H$ :— $fh$  (coincident),  $hl, lg, gf$ .

**Wind-Right Diagram**:—Load-line as above.

Joint  $H$ :— $fh, hl, lg, gf$ .

Joint  $D F$ :— $df, fg, ge$  (coincident),  $ed$  completes the diagram.

§ 186. **Truss VII**: (Fig. 32.) **Static-Load Diagram**:—Load-line,  $ab, be, ei, in, ns, sw, wj, j z$  ( $= \frac{1}{2}$  of total weight on truss),  $zx, xr, rm, mh, hd, da$  ( $= \frac{1}{2}$  of total weight).

Joint  $A$ :— $ab, bc, cd$ .

Joint  $D H$ :— $hd, de, eg, gh$ .

Joint  $B E$ :— $be, ef, fg, ge, cb$ .

Joint  $H M$ :— $mh, hg, gf, fl, lm$ .

Joint  $E I$ :— $ei, ik, kl, lf, fe$ .

Joint  $I N$ :— $in, no, ok, ki$ .

Balance symmetrical.

**Wind-Left Diagram**:—Load-line normal to rafter, plot loads at each joint,  $ab, be, ei, in$ . Divide at  $r'$  into two parts, proportional to the two parts into which the tie is divided by the resultant wind-pressure, then draw  $nr, ra$ .

Joint  $A$ :— $ab, bc, cd$ .

Joint  $B E$ :— $be, ef, fg, ge$  (coincident since the frame  $B G H$ , is triangular without  $C G$ ),  $cb$ .

Joint  $H M$ :— $gf, fl, lm, mh$  (coincident),  $hg$ .

Joint  $E I$ :— $ei, ik, kl, lf, fe$ .

Joint  $I N$ :— $in, no, ok, ki$ .

Joint  $M R$ :— $ko, op$  (coincident);  $pr, rm$  (coincident),  $ml, lk$ . Bracing in balance of frame not strained.

**Wind-Right Diagram**:—Load-line similar to Wind Left; reactions,  $jr, xi$ .

Joint  $J$ :— $wj, j z, z y, y w$ .

Joint  $S W$ :— $sw, wy, yv$ , (coincident);  $vt, ts$ .

Joint  $R X$ :— $tr, vx$ , (same as  $yz$ );  $xr$  (coincident),  $rp, pt$ .

Joint  $N S$ :— $ns, st, tp, po, on$ .

Joint  $I N$ :— $in, no, ok, ki$ .

Joint  $M R$ :— $ko, op, pr, rm$  (coincident);  $ml, lk$  (coincident).

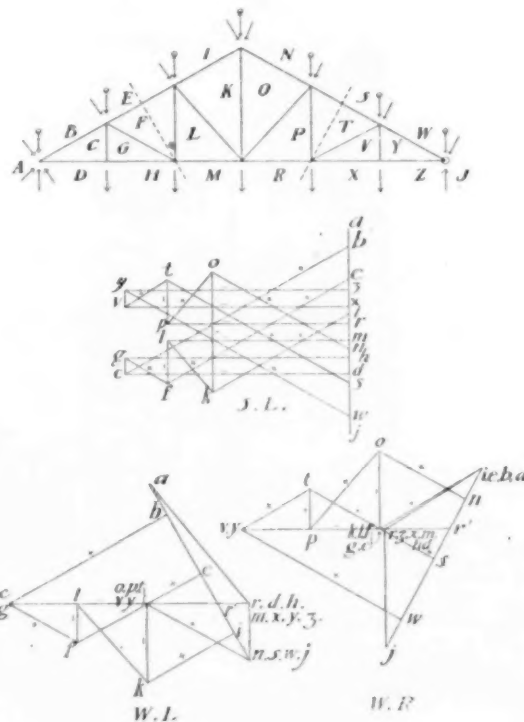


Fig. 32. Truss VII.

There are no strains in the bracing as the figure is triangular.

§ 187. **Truss VIII**: (Fig. 33.) **Static-Load Diagram**:—Load-line,  $ab, bd, dg, gj, jk$  (reaction, determined as explained in § 170 and as shown by dotted lines);  $k l, l m, ma$  (reaction obtained as above).



Joint A: — *ab, bc, cm, ma.*  
Joint M L: — *lm, mc, cf, fl.*  
Joint B D: — *bd, de, ef, fe, cb.*

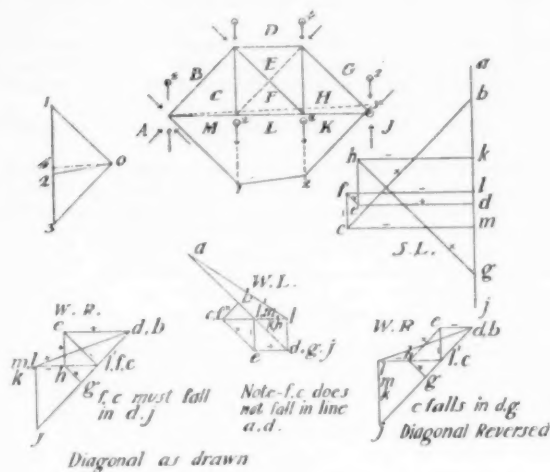


Fig. 33. Truss VIII.

Joint D G: — *dg, gh, he, ed.*  
Joint L K: — *kl, lf, fe, eh, hk.*

Wind-Left Diagram: — Acts only on B C, resultant passes through C M. Load-line, *ab, bd, dl*, vertical, to a line through *l'* which is the dividing part of the load-line; *la*.

Joint A — *ab, bc, cl, la.*

No strain in C F, as there is now no load at L M. We therefore go next to joint B D.

Joint B D: — *bd, de, ef, fe* (coincident), *cb.*

Joint D G: — *ed, dg* (coincident), *gh, he.*

Joint L K: — *eh, hk, kl* (coincident), *lf, fe.*

Wind-Right Diagram: — (Diagonal as drawn full).

Load-line, same as W L.

Joint J: — *gj, jk, kh, hg.*

Joint D G: — *dg, gh, he, ed.*

Joint B D: — *de, ef, fe* (coincident), (C F has no strain); *cb, bd* (coincident).

Joint K L: — *hk, kl* (coincident), *lf, fe, eh.*

Wind-Right Diagram: — (Diagonal as dotted).

Load-line as before. No strain in F H.

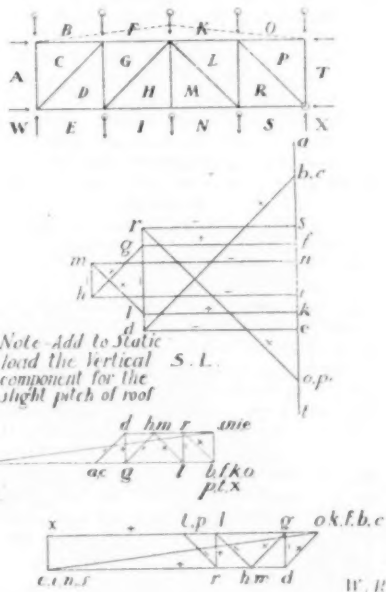


Fig. 34. Truss IX.

Joint J: — *gj, jk, kh* (or *fl*), *hg.*  
Joint D G: — *dg, gh, hf* (coincident), *fe, ed.*  
Joint B D: — *de, ec, cb, bd* (coincident).

Joint M L: — *ef, fl, lm* (coincident), *mc, ce.*

§ 188. Truss IX: (Fig. 34.) Static-Load Diagram: — Load-line. Note that, when used, a pitch roof is usually placed over the top chord and the vertical component of the wind thrust on this must be added as a part of the Static-Load. Note also that *ab* is carried now direct to the abutments and does not affect the top chord and  $\therefore$  there is no strain in B C and direct compression in A C.

Load-line, *ab, bf, fu, ko, ot, ts* (reaction), *sn, ni, ie, ea.*

Joint W: — *ab* (ac), *ed, de, ea.*

Joint B F: — *bf, fg, gd, de, cb* (coincident).

Joint E I: — *ie, ed, dg, gh, hi.*

Joint N I: — *ni, ih, hm, mn.*

Joint F K: — *fk, kl, lm, mh, hg, gf.*

Balance the same.

Wind-Left Diagram: — Note: add to load at A B the load due to the projection of the roof. Now B C becomes loaded. Load-line = *wa, ab*; reaction at X, obtained thus; wind resultant passes through middle of A C, then *wb* multiplied by its lever arm divided by the lever arm of X = reaction at X. This = *be* in the figure; then, *e w* = reaction at W.

Joint W: — *wa, ac* (coincident), *ed, de, ew.*

Joint A B: — *ab, bc, ea* (coincident).

Joint B F: — *cb, bf* (coincident), *fg, gd, de.*

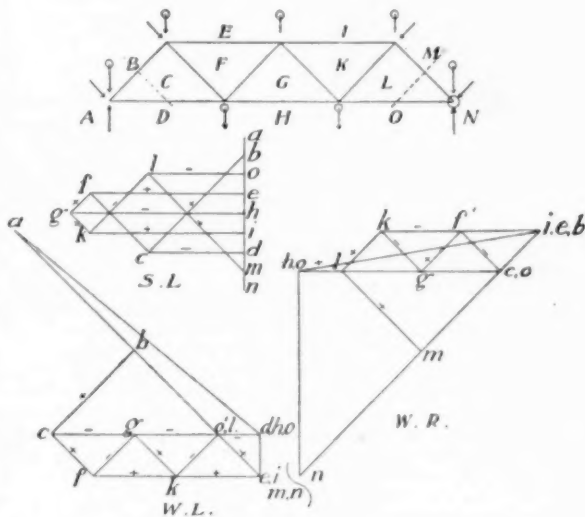


Fig. 35. Truss X.

Joint E I: — *dg, gh, hi, ie* (coincident), *ed.*

(No strains in H M).

Joint F K: — *gf, fk* (coincident); *kl, lm, mh* (coincident); *hg* (*hi = m n*).

Joint N S: — *nm, ml, lr, rs, sn* (coincident).

Joint K O: — *lk, ko* (coincident), *op* (coincident), *pr, rl.*

Wind-Right Diagram: — Similar to Wind-Left Diagram in all respects.

§ 189. Truss X: (Fig. 35.) Static-Load Diagram: — Load-line, *ab, be, ei, im, mn, no* (reaction); *oh, hd, da* (reaction).

Joint A: — *ab, bc, cd, da.*

Joint B E: — *be, ef, fe, cb.*

Joint D H: — *hd, de, ef, fg, gh.*

Joint E I: — *ei, ik, kg, gf, fe.*

Joint H O: — *oh, hg, gk, kl, lo.*

Joint I M: — *im, ml, lk, ki.*

Wind-Left Diagram: — Load-line, *ab, be, eo, oa* (*eo* found by prolonging wind resultant and dividing load-line into parts proportional to the division of the tie and drawing horizontal line through points of division).

Joint A: — *ab, bc, cd, da.*

Joint B E: — *be, ef, fe, cb.*

Joint D H: — *de, ef, fg, gh, hd* (coincident).

Joint E I: — *fe, ei* (coincident), *ik, kg, gf.*

Joint H O: — *hg, gk, kl, lo, ok* (coincident).

Joint I M: — *ki, im* (coincident), *ml, lk.*

Joint M O: — *mn* (coincident), *no, ol, lm.*

Wind-Right Diagram: — Load-line, *im, mn, no, oi*, reaction found as before.

Joint *N*:—*mn, no, ol, lm*.  
 Joint *I M*:—*im, ml, lk, ki*.  
 Joint *O H*:—*kl, lo, oh* (coincident), *hg, gk*.  
 Joint *E I*:—*ik, kg, gf, fe, ei* (coincident).  
 Joint *H D*:—*gh, hd* (coincident), *dc, cf, fg*.  
 Joint *B E*:—*ef, fe, cb, be* (coincident).  
 Joint *B D*:—*cd, db, bc*.

To be continued.]

## CHINESE CURIOS.<sup>1</sup>—II.

### JOSSES.



A Capital from the Tuileries by Philibert Delorme.  
From *L'Art*.

Amoy and Canton are places which supply travellers and curio-dealers with hideous idols, called "josses." They are manufactured, wholesale and retail, "moderns" and "antiques," orthodox or to order, as may be desired. I am sorry to be obliged to state that much of the joss business is a fraud, pious and otherwise. The regulation joss is either a very fat and placid gentleman with a large genius for lolling, or a dignified, virtuous female with a superfluous number of arms and hands. But these styles did not suit merchants who desired to astonish their folks at home. So, to please their customers, the Mongolian joss-maker, with

a keen eye for the main chance, turns out an assorted lot of clay hobgoblins warranted to freeze the blood of a small boy or produce hysterics in a nervous and dyspeptic girl. In this category come the man with the tiger face and ferocious fangs, the so-called "God of Hunger," who is only an every-day, half-starved opium-smoker, and the "Snake God," who probably is a phase of delirium tremens. None of these belong to Chinese art; they are simply "fakes," made for the markets of Christendom.

Joss-making is very simple. The manufacturer's chief stock in trade consists of wooden or metal moulds. In these the wet clay is put into shape and allowed to dry. It is then touched up, dipped in molten glaze, and allowed to cool. The average workman can turn out a hundred a day. The clay is kaolin, running from red and gray to snow-white, and costs about a cent per pound. The glaze is melted in a small charcoal-furnace, similar to the old-fashioned soldering-furnaces of retired plumbers. The wages of a good artist vary from twenty to forty cents per day. The cost of a fair-sized image is about three cents. He sells it for five cents to a native, and for as high as \$5.00 to the credulous European or American tourist. The moulding, touching and retouching are the same in all the shops. The glazing varies indefinitely. It may be opaque of any color, transparent but tinted with any shade desired, or clear and colorless. The best work is made by painting the clay with heavy white paint and dipping in the glaze last described. In another kind of good work the clay is colored in caustic colors, kept in the heat until these have set, and then glazed as usual. The Chinese are very skilful in this field of labor, and with fine brushes will turn out josses that at first sight might be mistaken for *cloisonné*.

Antiques are popular with the dealers, as they can be planted and dug up to order from any desired age or dynasty and bring a handsome profit. The simplest is the black joss. It is made by painting a clay cast with a preparation of tar, bitumen, shellac, or Ningpo varnish, wrapping in several thicknesses of paper, and firing it in a kiln. According to the preparation and treatment, you can obtain a black-brown, red-black, blue-black, or a dark-gray product. The color sets through, so that a fracture discloses a very clean and uniform surface. There is little or no vitrification in this treatment, which makes the cast resemble a carving all the more. "Touching" removes any irregularities or defects, and also adds the signs of decay which usually accompany the flight of years.

Another and very different group of josses are those carved from wood and covered with gold and gay colors. Many of these are very ancient and are much more in demand than the pottery ware. They are carved with evident skill and retain their lightheartedness for years. The prices vary according to size, workmanship and amount of gold or other decorations covering them. The smallest made are but an inch high and bring a few cents. The largest are ten to twelve feet high and cost \$150 to \$500 and upwards. In the larger sizes (say those of more than a foot high) the carving is admirable and the coloring life-like and very artistic. There are four of these

large-sized josses in the famous temples of Lam-po-do, at the entrance of Amoy harbor, and they produce as imposing an effect as any collection of statues in the galleries of Europe.

Josses carved from stone are rare and dear. Great mandarins pay fabulous prices for small ones made from jade; those made of the pale-green and light-blue shades are much more valuable than the white, yellow or brown. Liu, the former governor of Formosa, owns a joss about eight inches high, which is said to be fifteen centuries old and to be worth \$10,000. Small ones of one to two inches high seldom cost less than \$200 to \$250.

The difficulty of cutting the refractory stone is great and is the chief reason for its high price.

In Fuchau they make many josses out of steatite and selenite of various colors. These are rather neat and are very cheap. The softness of the stone allows the dealer to give a newly-carved image the appearance of great antiquity by rubbing it with a little fine sand. An hour's work removes all shape-lines and produces that effect which marks all ancient statues from the Sphinx downward.

### SOAPSTONE FIGURES.

In almost every modern drawing-room there is an ungainly statue or carving in soapstone, which the owner vaguely says came from Japan, China, or somewhere in the far East. Where they really do come from is Fuchau, which, next to Amoy, is the greatest and most important city in the province of Fo-Kien. A few are carved in Amoy, Wenchow, Chan-Chan Foo and Canton, out of the soapstone rock which occurs in inexhaustible deposits in the vicinity of Fuchau. But neither in quality, much less in quantity, will the output of all these three places combined compare with that of the latter city.

The soapstone, or steatite, to use a more accurate word, is quarried almost like ordinary building-stone. It is singularly free from flaws or blemishes and often comes out in pure blocks of a cubic yard. The purest quality comes in smaller pieces. Fineness from a Chinese standpoint is a matter of translucency, color, and distribution of shading. No other steatite can compare with this in variety and brilliancy of color. In a collection imported from Amoy by Simon Muhr, Esq., of Philadelphia, there are objects in black, brown, maroon, carmine, indigo, ultramarine, French-gray, orange-purple, yellow, bistre, sienna and opal. Usually a carving is made of one color, but some are even in polychrome.

The Fuchau carvings are famous in China and are found in every city and town. The simplest are basso and alto reliefs upon irregular plaques, ordinary plates and clumsy vases. The figure is a joss (the conventional deity), a patron saint, a hero, demigod or dragon.

Sometimes the artist is a portrait-cutter and, instead of an imaginary creature, turns out a very fair representation of a human being. The carvings of this class are very cheap, ranging from fifteen cents upward. The relief-portraits command prices from \$1.00 to \$5.00.

A second class of work is formed by articles of domestic utility—paper-weights, inkstands, joss-stick-holders, pin-boxes, jewel-cases, pedestals and the like. They are cut in simple geometrical forms, are highly polished, and decorated with floral designs and serpentine work. They are not dear, costing from five cents to \$1.00.

A third class consists of statues and animal figures. The dragon, the "Dog of Happiness," the "Heavenly Poodle," "Buddha," "Sira," the "Goddess of Mercy," fishes, buffaloes and lions are the favorite designs of both maker and buyer. In size the carvings range from a mere toy half an inch high to handsome pieces of two feet square. There is a wide range of prices, a rough dragonet bringing a few coppers, while a large and well-executed "Goddess of Mercy" is quickly sold at \$40 to \$50.

A fourth class is essentially Chinese. They call it a "dramatic picture." It is a brave attempt to do in one piece of stone what Cellini did in a dozen panels of metal-work. The stone, taken as a whole, is carved into a conventional mountain with impassable roads, viaducts and caverns. At every point which pleases the artist's fancy is carved a human figure. They are out of perspective and out of proportion in every respect. Two warriors, for example, are fighting on a bridge whose timbers are like matches. Two lovers are trembling in a cavern, while the girl's irate father, as large as a baby, confronts them at the entrance. A horse whose head is larger than his trunk is about to be devoured by a dragon the size of a mouse. So the incongruities run on. In spite of the ludicrous unnaturalness, the workmanship excites admiration. The infinite patience with detail, the enormous labor expended upon the work, and the charming chromatic effect from the well-chosen colors of the steatite are worthy of a high and noble art. These dramatic pictures are not over-costly. They range from \$1.00 to \$25 apiece. The native artist is a poorly-paid fellow. He is satisfied with thirty-five cents per day, while his apprentices are delighted with even much less. They belong to a powerful guild which has a history of ten centuries, and are as proud of their art as an R. A. is of his productions with the brush.

### CASH.

Collections of "cash" are of considerable interest. They are small coins of bronze, brass, copper or silver, ranging in intrinsic value from one-twentieth of a cent to twenty-five cents. The oldest of these coins on record appeared about 2300 B. C. Over 150,000 different kinds of cash are preserved in collections. Some are wonderful examples of coinage, but most of them are clumsy and coarse.

<sup>1</sup> Continued from No. 897, page 138.



In this field the East is a paradise for the numismatist. He can work all his life, spend very little money, and leave to posterity thousands of coins. All he need do is to confine his work to the collection of cash, the small coins in brass and bronze whose value ranges from one-tenth to one-fourteenth of a cent. Their workmanship varies, but is usually very good. Their shape to-day is like that of European coins, with the exception that through the centre is a square hole through which the coins are strung together like beads. In the past, however, other forms were employed, including the square, triangle, heart, ellipse, shield, key, sword and spear. The number of kinds is simply immense. They are referred to in Chinese literature as far back as 250 B. C. The earliest that I have heard of dates from the Ts'in dynasty, which ruled from 255 to 207 B. C. From that time until to-day these useful little coins have been issued by every monarch, no matter whether he was emperor of the entire country or king of one of the petty principalities into which from time to time the Chinese Empire was broken. There have been over 1,200 occupants of the various thrones, royal and imperial. In addition to these regular issues, if such they may be called, there have been special issues from time to time, and also special local issues. A wealthy mandarin in Canton is said to have the finest collection extant, containing 25,000 specimens of different kinds.

The cost increases as you go backward in time. The cash of this century can be secured at their nominal face value. Those of the eighteenth and seventeenth centuries bring from one to ten cents each. Those of the Han dynasties, from A. D. 206 to A. D. 100, bring \$100 each when in fine state of preservation.

These true antiques are found in ancient tombs and ruins. Several hundred were discovered in Amoy this year in digging a grave, when the laborers broke into an old tomb several feet below the surface of the soil. The coins lay in a pretty earthenware jar, and were incrustated with a thin layer of malachite that here and there had been changed by moisture into azurite. The coins were sold by the lucky coolies in the next twenty-four hours and are said to have brought one dollar apiece, an immense sum to men working for twelve cents a day.

To succeed in collecting cash a person must be a fine Chinese scholar. The labor thereby involved is so severe as to preclude most collectors from indulging in the pleasure to any great extent.

#### TEA-ROOT CARVINGS.

For more than a hundred generations there has been a guild of artists in the province of Fo-Kien whose life-work is the carving and modifying of the gnarled and interlaced roots of the tea-tree into things of beauty—that is, beauty from a Celestial point of view. The herb whose leaves gladden Western palates in the form of Oolong, Hyson and Souehong is a hardy plant and takes a firm hold on mother earth. Its roots seem to have no regular law of growth. Sometimes they develop very much as a beard sprouts from the chin; at others they separate and move along in parallel lines as if they were a lignose centipede. In general, it may be said that they make a large, clumsy mass, from which shoot out anywhere from three to thirty rootlets. Their surface is never smooth, but always irregularly corrugated. The value of a root depends upon its size, its outline, its freedom from decay, and its suggestiveness of some everyday object. It is rare that a main root or root-mass is more than six inches in diameter. Such belong to trees ranging in age from thirty years to a century. Infrequently they attain to twelve and fifteen inches, and are then said by Chinese experts to be four and five hundred years old.

The roots are dug from the soil and allowed to thoroughly dry in the open air under a shed or else in a moderately warm room. The loose earth is carefully removed, as is the loose bark and all pieces decayed, cracked or worm-eaten. The artist then determines what it is to be. The favorite types are dragons, buffalos, cows, carnivores, bears, mandarins, priests, howling dervishes, dancers or mythical heroes. If the root cannot be worked into one of these shapes, it is converted into a pedestal or platform for a figure-piece. The primary operation consists in sawing it into rough shape. This is done with a fine cross-cut saw and the clean edges removed by rubbing them on tiles or bricks. Sometimes a root is bent by softening it with steam or boiling water, and then twisting it in any desired direction. Now comes the hardest task of all. The most valuable piece is that which shows no art and seems perfectly natural. The carver goes over the block, removing here a fibre and there a set of roots, here thinning out one on the under side and forcing it down, and there burning another and expanding it at the burned point. I have one in my drawing-room which is a capital figure of a dragon, rearing, and opening his jaws as if to spring upon his prey. Careful examination shows that nothing has been added to the mass, but that hundreds of fibres, knots and corrugations have been skilfully removed.

In nearly every instance a human figure made in the same manner or carved from wood of the same color, or else made partly from tea-roots and partly from carved wood, is added to the first piece. The designs are endless in this field. Learned men lecturing, birds, mandarins standing on dragons, boys riding cows and other ridiculous quadrupeds, dancing beggars and men fighting each other are the commonest groups, but of the more uncommon there are thousands. One famous artist in Fuchau claims to have produced, with the aid of his apprentices, over fifty thousand different

designs, and, judging from his stock on hand, his claim seems reasonable enough.

The tea-root carvings are seldom very costly, running from fifty cents to \$100. Nine-tenths bring less than \$2.00 each. A handsome set of a dozen can be purchased for \$20, which will decorate a drawing-room or hall better than bric-a-brac many times more expensive. The figures are strong, durable, and in no danger of fracture by servants. Outside of their æsthetic value, they are of interest in showing the wonderful ingenuity and economy of the Chinese.

#### "FIGURETTES."

An odd art-industry in Amoy is the making of tiny images, which are variously known as "figurettes," or "little devils." They are statuettes ranging from half-an-inch to three inches in length, and are moulded from a paste whose composition is a trade secret. It would be better to use the plural than the singular, for each community of modellers uses a paste different from that of the others. Among the ingredients employed are hard wax, insect-wax, glue, vegetable gum, linseed gum, papier-maché, burned umber, sepia, kaolin, ultramarine, yellow ochre, chrome-yellow, vermilion, white-of-egg and pulverized egg-shells—rather a wide field to choose from. The backbone of the figure is a stick of hard, dry wood, left rough to give a better purchase to the paste. Upon this are moulded the head, toes and one leg. The other leg and the arms are stiffened by wires or thin pieces of wood. The coarse work is done by boys, girls, women or apprentices, who are remarkably quick and skilful. They use their fingers in outlining and a variety of little wooden tools in producing textures, hair, beards and weapons. The figures are then handed over to the artists, who are always men. They finish the features, give an expression to the face, and remedy any defect or mistake of their subordinates. The figures are then carefully dried. According to the composition of the paste, this is done in a warm room, a cool current of air, a kiln, or the open sunlight. The best kinds are dried in a warm room and require from three to eight weeks before they are thoroughly done.

The figurettes are divided into two classes—toys and art-objects. The former are built upon long sticks, like jumping-jacks. The wired arms are jointed loosely to the body, so that when the stick is whirled they gyrate in a very amusing manner. The workmanship is coarse and the cost a mere trifle, ranging from one to two cents per figure or from ten to twenty cents per dozen. The other kinds are built upon short sticks, which are fastened into small wooden platforms so as to stand upright. Their workmanship varies, some being rude and clumsy and others very fine. Their variety is infinite. One set of one hundred represents all the characters in a great classic drama. Another set of the same number embodies the various types in the armies of an heroic Chinese king and a savage monarch whom he has conquered. A third consists of two hundred figures of the various vocations of daily life. Other sets are those of distinguished generals, famous kings, heroic queens, poets, law-givers, engineers and admirals. The leading artist in this quaint industry claims to carry five thousand separate faces in his memory and to be able to reproduce any one in paste at the word.

The figurettes are made in colors or monochrome. When colors are employed, the greatest care is bestowed upon the correct tinting of details. The crown is gilt, the bracelets silvered, and the coats, undercoats and trousers colored according to the style and age to which they belong. The historic accuracy in many cases is admirable. On the other hand, the modelling of colored figures is usually mediocre or worse. The features are poorly outlined and the fingers, weapons and ornaments indicated rather than moulded.

In monochrome the reverse is the case. The paste is dark-red, brown or brown-black, and every detail is wrought out with the greatest care. On a figure an inch in height the eyelids, ear-ring-holes and finger-nails are often so well executed as to bear scrutiny with a strong magnifying-glass. As might be supposed, the cost of this class is higher than that of the other, and runs from three to six cents per figure or from thirty to sixty cents per dozen. How the artist manages to live upon the rates is a profound mystery.

The Chinese have a happy knack of displaying all kinds of figurettes by placing them in miniature theatres, temples or pleasure-grounds. A glass box 8 by 10 by 5 inches containing diminutive trees, rocks and twenty-five figures can be purchased for \$1.00.

Next to a trip through China, nothing can give a better notion of the endless variety and brilliancy of costume than a set of two hundred figurettes, or "little devils."

#### CARVED FRUIT-STONES.

Nothing is wasted in China. The stones of various fruits and the shells of nuts are cleaned, dried and carved into ornaments of the most graceful kind. Among the stones used are the olive, plum, peach, lai-chu and cherry, and of the shells the walnut and cocoonut. The stones are selected with care; each must exceed a certain standard of size, proportion, hardness and weight. They are dried slowly and at such a heat as not to crack or sprout, and are then ready for the carver. The designer marks a rough outline of the future group or picture and hands it over to his boys or apprentices. These work with great rapidity and soon block out the design, cutting through the hard ligneous tissue, and then extract the kernel. A second treatment now takes place to dry the interior of the stone, as well as to prevent the fine lining of the interior from undergoing decomposition. This completed, the designer sketches a second

outline, and also indicates by his pencil or brush where the surface is to be lowered, pelted, made into leaf-work or arabesque, or be cut altogether away. The work is performed by the subordinates as at first. The designer then does the finishing touches, after which the assistants clean, polish, and oil or wax the perfected carving.

The stones are sold in this shape to quite a large extent, but more largely in other forms. Among these may be mentioned buttons, watch-charms, sleeve-links, ear-rings and brooches, and, when strung together, bracelets, anklets, necklaces, watch-chains, rosaries and official ornaments.

The price of a stone varies greatly with the workmanship and the fame of the carver. Some may be bought as low as ten cents apiece, others command as high as \$2.00 and \$3.00 each. The average price is thirty cents a stone, with a handsome discount for purchases in quantity. The carvings display great variety and beauty. One class represents bunches of flowers and leaves, in which pistils, stamens and tendrils are accurately executed. Similar to these are fruits and flowers and leaves. A second class is composed of carvings of birds, reptiles and higher animals. The dragon, griffin, stork, snake, horse, lion, tiger, camel, elephant and bull are the favorite figures. I do not recall ever having seen a cat, dog, wolf, sheep, goat, or other animal beyond those specified. A friendly mandarin, to whom I stated this, said that a canon in Chinese carving was to reproduce only those animals which had been deified, and that the ten mentioned were about the only ones which had enjoyed divine honors. A third class, and by far the most interesting, comprises groups of human figures representing scenes in history, poetry, mythology and the drama. The workmanship is often so fine as to be microscopic in its delicacy. In fact, the finishing touches are made by the artist while using a magnifying-glass of at least fifty diameters. On stones not over an inch in length along their major axis it is not uncommon to find eight, nine and ten characters in different attitudes and costumes. Unlike most phases of Chinese art, there is much regard paid to perspective and foreshortening. Some of these pieces might have been made by Hindoo or Italian artists, so free are they from local or racial conventionalism. Nevertheless, in the main, conventionalism is all-prevailing. Dignity always wears a beard, and low comedy, with villainy, is disguised with queer markings and quaint attitudes. The horse has a head twice too large, and the dragon carries a tail which in real life would have insured his prompt destruction. Gods wear queues and goddesses stroll about on compressed feet. But was there ever a school of art of any sort free from conventionalism? Even were there one, it would probably be as unsatisfactory as the most artificial systems of our own civilization, or of this strange and mighty one upon the borders of the China Sea.

EDWARD BEDLOE,  
U. S. Consul, Amoy.

#### THE PROBLEM OF HEATING HOUSES.



Wooden Carvings from the Church of St. Gerson, Cologne. From Havard's "Dictionnaire de l'Aménagement et de la Décoration."

I DO not intend to go into the technical problems and arrangements, only into the caloric problem of heating houses. It may be said that the following is an attempt to give a practical theory of what amount of fuel might be needed to keep a house comfortably warm, and as a basis for computing how much is really used and how much is wasted.

We take, as an example, a room of 10,000 cubic feet, because from such a supposition we can transfer the same calculation to a house of any given number of cubic feet. It is now the practical experience that such a room requires from three-fourths to one ton of coal per month. How much ought it to require?

There are many practical factors to be taken into account.

1. The loss of heat through cracks, untightness of windows, floors and ceilings.
2. The loss of heat from opening of doors by people coming in and going out.
3. The loss of heat through conduction, walls, windows, etc.

4. The amount of heat absorbed in warming-up the walls, ceilings, floors, windows, furniture and persons, or rather their clothing, who come in from the cold air.

5. Warming-up the air in the room.

To give the calculation a practical aspect we will suppose an outside temperature of 10° F., the room to be kept at 70° F. For the purposes of calculation I will drop for the moment that abominable slang called English weights and measures, considering that the United States is not England, and will go to the metric system, — to return, when we reach the practical conclusions, again to that perversity called the English system.

The size of the room we suppose to be 10,000 cubic feet = 283 cubic metres.

Supposing that room to be 50 feet (15.2 metres) long, 20' (6.08 metres) wide, and 10' (3.04 metres) high, the floor area of this room is 92.4 square metres, the ceiling, 92.4 square metres, the walls, 129.4 square metres.

Supposing the windows to be one-fourth the area of the walls; we have 32.4 square metres window-space; three doors, each 2 square metres = 6 square metres.

We will not consider for the present the first heating-up of the room, but suppose that the room has reached 70°, while the temperature outside is 10° F.

1. Considering the cracks in the average building, we will not be far off in supposing that, in total, they add up for our supposed room very nearly to one square foot, or 0.035 square metres.

With a difference of temperature of 10° outside and 70° inside, the average speed of the air rushing through such an opening will be about four miles an hour, or 5.85 feet per second, or 1.78 metres; hence the cracks in this wall supply every second 5.85 cubic feet or 0.11 cubic metres of air of 10° F. (−13° C.) to be heated to 70° F (21° C.), or a difference of 60° F. (34° C.).

As the specific heat of air by volume is 0.24, every second 0.0264 metric kilogrammes calories have to be supplied to warm the in-rushing air through the cracks 1° C. or 0.9 metric kilogrammes calories from 10° F. to 70° F.

As one pound of excellent coal (0.46 kilogrammes) gives 3,200 metric calories when fully utilized, the amount of caloric needed by the in-rushing air represents in one hour almost exactly one pound of coal.

2. Every time a door is opened and kept open for five seconds the same rules may be supposed to hold good in regard to the in-rushing air. This represents for every opening of the door 10 cubic metres of cold air, because the upper half of the door will be filled with warm air going out; every opening represents 85 calories, or, supposing 60 openings of the door per hour, 5,100 calories = 1.6 pounds of coal; hence what we may call the factor of air exchange is made up of the following losses of heat per hour in pounds of coal:

|                     |                              |
|---------------------|------------------------------|
| Cracks, pores, etc. | 1.0 pounds of coal per hour. |
| Opening doors       | 1.6 " " " "                  |

2.6 pounds of coal per hour.

3. Loss through conduction and radiation. From experiments of Wiedman, the transmission of heat through walls is represented by

$$\text{the formula } L = \frac{D \times Q}{O (T^1 - T^0)}$$

in which formula  $L$  represents a constant figure,  $D$  the thickness in square metres,  $F$  the quantity of metric calories per hour,  $O$  the area, and  $T^1 - T^0$  the difference in temperature of the two sides of the heated surface in centigrades.

$L$  for various substances has the following value: Glass, 0.815; wood, 0.17; brick and stone, 0.06; granite, 2.4.

These figures apply to the case of our room, and have somewhat to be modified according to the construction of the room. It would not be difficult to carry them out in detail for every window-frame, wall, door, etc., but we will average the thickness of the walls exposed to the outer air as 12" stone. The inner walls dividing our supposed room from other rooms, being equally heated on both sides, may be eliminated in our case, because they neither give nor receive heat. We find that the area of the outer walls is 63 square metres; the windows occupy one-half that space, hence we get 31½ square metres of a thickness of 12". Introducing these data into our formula, we get a transmission of 2,100, or equivalent to a consumption of coal of 0.69 pounds per hour.

The windows, occupying about 15 square metres against the open air, give a loss of heat, using the above formula, of 7,000 calories per hour = 2.2 pounds of coal per hour; window-sashes, frames, etc., 800 calories = 0.35 pounds of coal.

The ceiling is a special source of loss of heat. Through this factor, supposing it to be of lathes and plaster, with an average factor of  $L = 1.1$  and a thickness of 2", we obtain a loss of 10,500 calories, or 3.2 pounds of coal per hour.

Hence the total amount of loss by conduction gives the following amounts:

|                       |                               |
|-----------------------|-------------------------------|
| Walls                 | 0.69 pounds of coal per hour. |
| Windows               | 2.20 " " " "                  |
| Sashes, frames, doors | 0.35 " " " "                  |
| Ceiling               | 3.20 " " " "                  |

6.44 pounds of coal per hour.

The floor does not offer a source of loss of heat. It may, on the



contrary, contribute heat to the room from a room below; hence it may be properly omitted.

A source of loss of heat is also from the entrance of people into the room. Supposing their outer clothing to be the same temperature as the outer air, and this clothing to weigh ten pounds per person, every time such clothing is warmed in the room there are abstracted 85 calories, or, for sixty persons an hour, 5,100 calories = 1.5 pounds of coal.

As this computation may form a basis for comparison, I have expressed all the figures immediately in their equivalent of coal. This gives a total hourly need of coal of:

|                                |              |
|--------------------------------|--------------|
| For cold-air exchange.....     | 2.6 pounds.  |
| For conduction of heat.....    | 6.4 "        |
| Persons entering the room..... | 1.5 "        |
|                                | 10.5 pounds. |

Our knowledge of the problem would admit of an exact calculation of all the details, even to the extent of the loss by radiation from door-knobs, window-catches, condensation of frost, etc., if necessary.

With a similar calculation, the consumption of a house having a given number of cubic feet can be calculated, including only the rooms and space to be heated. The quality of heating-apparatus may be judged by a comparison of the actual consumption of coal compared with the theoretical one from the above formula.

We have to consider also a very large number of factors, which, as a rule, all tend to increase the consumption of coal:

1. The ventilation craze of people. They do not consider that through the unintended openings and cracks a thousand cubic feet of fresh air enter the house every day, but persist in having the windows open.

2. A flimsy structure of the house, allowing the wind to blow through clapboards and partitions.

3. Exposure, and probably fifty more special points might be accumulated; but with the liberal allowances made in the case of our room, it may be said that if in any house there is more coal used than ought to be, from a deduction of the cubical contents and the various other data, that something is wrong, and ought to receive attention.

The conclusions would be for every 1° F. difference between outdoor and indoor air 80 pounds of coal are needed for a space of 10,000 cubic feet, with free exposure; indoor to be kept at 70° F.

Supposing a house to be 50 x 30 deep and 30 feet high = 45,000 cubic feet, heated all through to 70°, the monthly average 32°, the house would reasonably require  $4.5 \times 38 \times 80 = 13,480$  pounds of coal for this month, or 6.7 tons.

If the average of the winter months (October to April) be 45°, the consumption would be  $4.5 \times 25 \times 80 \times 6 = 54,000$  pounds, or 27 tons.

But economical handling (nights) or satisfaction with less heat (65°), shutting off rooms and halls, will reduce the amount materially in practice, and probably 20 tons would amply suffice.

C. M.

#### CREMATING GARBAGE.



THE New York Times says that in a recent address before the Woman's Health Protective Association of New York on the subject of the disposal of waste or refuse matter in cities, Col. W. F. Morse, a well-known sanitary engineer, said:

"If the City of New York can burn at the foot of East Sixteenth Street, as it has for three years past, the infected bedding, clothing, furniture, and hospital waste from patients ill or dead with infectious disease, such as diphtheria, smallpox, typhus and cholera, with no chance for the escape of the germs of the disease or any fumes of nuisance or smoke, then it is entirely possible to destroy, at any convenient location on the water-front, the garbage which is brought out from the houses.

"It is only a question of necessity, desirability and of final expediency. If Chicago, with its million and a quarter of inhabitants, can spend \$75,000 for the cremation of its garbage, and if Philadelphia, with its million of people, can by its ordinances declare that its garbage shall be cremated, why should New York insist that its garbage must be used for the purpose of making ground on an island in the Sound twenty miles from the city?"

"The question is one which should not be considered from any standpoint other than the sanitary protection of the public. The matter of cost for the construction of furnaces and of operation is no more than is paid for the actual building of scows and the employment of tugs and men to tow the waste twenty miles. An estimate made two years ago pointed out the fact to the Health Department that, whereas it cost eighteen cents per cubic yard to tow this material outside of Sandy Hook and dump it into the ocean, it could be burned within the confines of the city for less than twelve cents per cubic yard.

"Unlike most other cities of the country, New York early adopted the method of towing out to sea and dumping on the edge of the harbor the great bulk of matter which was worthless. After many years' experience of this method, the annoyance and trouble resulting from it, together with the unsanitary and objectionable way in which it was done, and which could not seem to be avoided, became so great that the authorities, under pressure of public opinion, devised a plan by which, instead of dumping it into the ocean, all the waste of New York should be carried to an island in the Sound and there deposited to manufacture ground, which was to be afterward used by the city.

"Now this is a clear case of jumping from the frying-pan into the fire. Instead of any gain by the change being had, there is positive loss. The same length of haul of garbage takes place through the city's streets to the scows, and then the stuff is towed-up between the two cities of New York and Brooklyn, over an even greater water thoroughfare—the East River, where crowded ferry-boats and Sound steamboats are constantly moving—than down the bay to Sandy Hook. And the result of this operation of making land with putrescible, decaying substances of every kind, according to the record and statements of the best sanitarians, is that ground so manufactured or built-up of matters which in themselves undergo fermentation and decay is of such character as to produce disease.

"There are numberless instances where it can be positively proved that persons dwelling on such ground are subject to zymotic diseases, from which their neighbors living on original ground are free. A statement has been made by a distinguished sanitary expert of this city that whenever an outbreak of diseases, such as diphtheria, typhus, scarlet fever, etc., appears in New York, they follow the course of old streams or creeks which have been filled-in and built upon. Now, if this be true (and there is every reason to think it is true) in the city of New York, where the drainage facilities are the very best, how much more must it be true of ground which is wholly made out of putrescible matter?

"A proposed remedy for the garbage nuisance is the destruction in each individual house of its own waste. This is practicable in many cases, but probably not more than five per cent of the population of this city feel it their duty to contribute to the welfare of the whole by burning such material as would give offence when cast into the garbage heaps. It is not always best to burn in the kitchen stove the general refuse of the family, and if it were, it would still be difficult to persuade a servant that it is healthier to cremate the garbage in the family range rather than cast it into the nearest ash-barrel. The application of this method in the crowded tenements in the lower part of the city is absolutely impossible.

"The experiment has been tried to a large extent in Brooklyn, with the result of destroying stoves and ranges, and in many cases creating a nuisance by the emission of fumes from the chimney. The best reform in this direction which can be really undertaken in New York is to arouse the attention of the people to the prevailing conditions of garbage collection, removal and disposal, and to the absolute necessity for a more cleanly and sanitary method. According to the testimony of the best experts, this putrescible household offal is a most offensive mixture of animal and vegetable matter in a state of decomposition, which, when mixed with other refuse, serves to contaminate the entire heap, producing offensive odors and supplying pabulum for the germs of disease.

"It is this great mass of dangerous matter which must be properly collected and cared for. Under the light of modern sanitation, it should be insisted upon that this portion of public refuse should be collected by itself; that it should be destroyed by the most rapid and thorough process that is possible to put into operation; that it should be done each day, and that there should be no opportunity for putrefaction. Nor should there be any chance for its disposal at a place where it may become a future menace to the health of the public."

Colonel Morse, in closing his address to the Health Association, said:

"We know from experience the effect produced on the minds of people by the five cases of cholera reported in this city last September. It was most alarming, in view of the prevailing sanitary conditions, and readily productive of an epidemic of the dread disease. We do not know whether there will be a similar visitation in the coming spring. But there is every reason to believe, from the history of cholera abroad, and the fact that the communication between Europe and America is so rapid and close, that it will be almost a miracle if we can keep out the germs which are now kept in restraint by the cold weather.

"Taking into account the statements from the best-accepted authorities on the subject, there is every reason to expect that the cholera may again make its appearance, and this time with a much better chance of becoming epidemic throughout the country. It

would seem to be the duty of every one who has the welfare of the city at heart to lend the weight of his influence to the adoption of every method which has been proved to be of value as a means of public-health protection. Certainly the question of the disposal of garbage is one which ought to arouse the attention and interest of every person in the city to the importance of improving the present dangerous way of treating offensive and worthless matters."

The remedy or substitute proposed by Colonel Morse for the present method of garbage-disposal in New York is cremation, or the destruction by fire of the entire refuse of the city, with the exception, of course, of ashes. These latter can still be dumped as now and at comparatively small expense, if not mixed with vegetable or animal matter. Colonel Morse advocates the immediate building of a number of small furnaces or crematories, larger than, but similar, to the one in successful and constant operation at the foot of East Sixteenth Street, to be located in different parts of the city, chiefly along the water-fronts on both sides of the city. Others can be erected in vacant lots,—temporarily, perhaps,—in the upper part of the city.

To these crematories would be hauled, in tightly-closed carts, every hour, by night as well as by day, the refuse product of stables, markets, shambles, factories, shops and the household, there to be utterly destroyed off the face of the earth, including all the noxious gases and odors, leaving nothing but the ashes, fully purified. These ashes, by the way, it is believed, could be made the source of some revenue to the city as fertilizers, to be sold to the market-gardeners of Long Island and New Jersey.

As usual in matters of this kind, Massachusetts has taken the lead among the Northern and Eastern States. The city of Lowell, last fall, immediately after the cholera scare, contracted for the erection of one of the large-size crematories, which was duly built, and put in practical operation about the first of January. A staff correspondent of the *New York Times* made a visit to Lowell on Saturday, and saw the machine in full blast. Like most valuable inventions, it is one of simplicity.

Described briefly, it is an empty chamber with two fire-boxes and a tall chimney. The chamber is for the reception of garbage. One fire, at one end, is for its destruction, and the second fire, at the other end, is for the burning of the smoke, cinders, gases and fumes as they pass out and over in the attempt to go up the chimney-flue.

At the time of the visit the furnace was in full operation, but nothing could be seen issuing from the top of the high chimney save a thin film of white smoke or steam, while not the least odor of any kind was apparent from any side of it.

Considerable opposition was made at first to the location of the crematory at Lowell, it being within a mile-and-a-half of the centre of the city, and in the midst of a number of dwelling-houses; but, as day after day went by with no unpleasant odors or damaging effects to the health of the neighborhood, all opposition was withdrawn.

The crematory is inclosed in a house made of corrugated-iron, 45 feet long by 25 feet wide. It stands about twenty feet from the line of the street, in what appeared to have been a sand-bank. A platform from the street leads directly to the top of the furnace, through the doors of the house when opened, for the reception of teams.

The teams drive upon the platform, back up to the house-doors, and dump their loads upon a chute made of steel plates which slope toward a number of holes in the top of the furnace. One of the holes is large enough to admit the body of a horse, and whatever the nature of the material thrown down, it quickly falls or is raked into the holes, and descends into the maelstrom of flames passing beneath. The holes are ordinarily covered with fire-clay plates, withdrawn and replaced by the aid of iron handles. When the apertures are uncovered there is a strong downward draught, and no odor is apparent upon the premises save that from the material as it is dumped. A hose and brush, however, quickly clean off the platform, and the roaring fire takes care of all the waste, both liquid and solid.

The furnace, or cremator itself, is a rectangular brick structure, 35 feet long, 10 feet wide and 12 feet high, with a stack 30 feet of brick and 60 feet of iron. At each end of the furnace, on a line with the garbage-grates, which are set inside, half-way from the top to the bottom, are the fire-boxes, and at the stack-end are flues into the chimney, closed by heavy fire-clay slabs. The interior walls are lined with heavy fire-clay blocks accurately fitted together, backed on the outside by a heavy brick wall, braced and bonded together with stays, rods and angle-irons.

The furnace being charged, the fires are lighted first at the front and afterward at the rear end. The flames from the first fire pass over and through the mass of garbage piled upon the grates, driving the smoke and gases into and across the second fire, where they are consumed. The flames from the second fire are, by the action of a strong draught, brought back underneath the garbage-grates, intensely heating the mass from below. When liquids are to be destroyed, a part of this heat and flame is directed under the hearth, or pan, and all the contents are quickly evaporated and burned. All the odors, gases and products of combustion are passed through one or the other of the fires, there being no escape except across the fire-boxes.

The ashes as they fall through the garbage-grating are raked out of a range of doors on one side of the furnace below the platform, and from time to time, as required, the garbage is stirred up and distributed over the grates by iron bars thrust through an upper range

of stoke-doors. The cost of this crematory was in the neighborhood of \$10,000, and the cost of its operation, involving the services of two laborers and the burning of a ton-and-a-half of coal a day, is an additional expense; but the city swill-houses are abolished, along with the system of selling the garbage to farmers with which to feed swine and, perhaps, milch-cows, as has been done, and the city authorities and chief property-owners are satisfied with the change and the extra charges, in view of the results.

Boston is busy experimenting with various kinds of crematories, oil and coal burners, and will probably, according to the report of the health authorities, adopt the cremating system before the warm weather sets in.

In the Southern cities garbage-crematories have become quite numerous, and are still increasing, owing to the greater danger of epidemic diseases in warm climates. The work of a crematory in Savannah, Ga., during eleven months of 1892 gives an interesting idea as to what the garbage of a city of 65,000 inhabitants consists of and of its quantity. During the time mentioned there were burned 15,473 loads of garbage, or 41,271 cubic yards, 611 loads of night-soil, equalling 3,675 cubic yards; 49 cows, 45 horses, 43 goats, 623 dogs, 1,100 cats, 73 barrels of fish, 71 barrels of onions, 38 barrels of apples, 19,607 pounds of meat, 6,742 head of poultry, 8 loads of oranges, 28 loads of bananas, 13 loads of cocoa-nuts, 1 load of apples, 1 load of peaches, 18 loads of peanuts, 18 loads of potatoes, 1 load of tongues, 1,370 dozen eggs, 6 snakes, 1 monkey, 1 rabbit, 1 sheep, and 242 pieces of infected goods. This made a mass of 46,000 cubic yards destroyed, at an average expense of fifteen cents per cubic yard.

Colonel Morse said that to obtain the best results there ought to be one crematory to every 100,000 inhabitants, located as near as possible to such population; but he said that ten or twelve crematories of the larger size would do the work for New York without trouble. They would cost from \$10,000 to \$12,000 each, making the total equipment of the city amount to something like \$125,000—a *bagatelle* by comparison with the results. According to the best reports and estimates, the cost of operation of the cremating system would be about one-third less than the present system of scow-towing and dumping, not to mention the public health and comfort.

There is, it is declared, an offset, more or less important, in the ashes of the burning-system. The process of destruction yields about five per cent of ashes, and between five and eight per cent of the ashes is potash. When screened and separated from broken glass, tin cans, etc., the residue is worth about the same as Canada wood-ashes, or about \$24 per ton. In some places the value of the ashes nearly defrays the cost of the fuel. It is believed that crude petroleum, instead of coal, may be used with economical results.

But, as Colonel Morse says, the question is one that ought not to be considered from any other standpoint than the sanitary protection of the public. He declares that it would be for the best interest of the city of New York, in view of the coming cholera menace, to expend the necessary amount of money for the cremation system, if only for one season, regarding it as a temporary expedient if it so pleased. But whatever is done should be done quickly.

The estimated time for the construction of a crematory, ready for operation, is about six weeks, so that, to be ready for warm weather, construction should not be delayed much longer. A beginning, at least, should be made before the middle of March is past.

In beginning the new order of things at the first of the present year the Board of Health of the city of Lowell issued an order, which, in view of the fact that garbage collection and disposal in New York for the past month and more has been anything but regular, might well be copied by the health authorities of this city, regardless of the question of cremation. The following is the order of the Lowell Health Board:

"On and after January 1, 1893, all the swill and garbage made by the householders in the city-limits will be burned, under the direction of the Board of Health.

"At present, collections can only be made twice each week, and it is important that it should be kept so as to reduce its possible annoyance during the period of its retention on the premises.

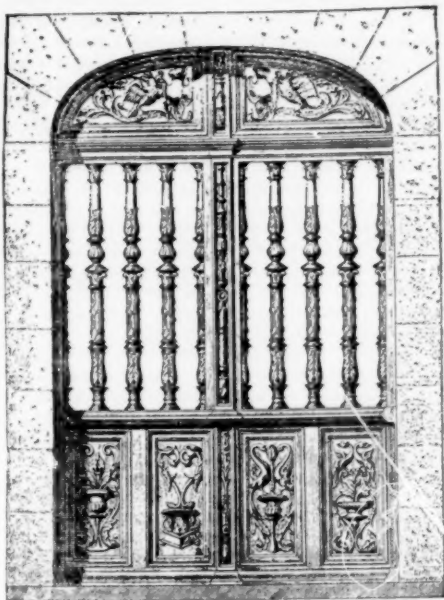
"In order to keep this refuse cleanly, the Board would suggest the making of a box or barrel large enough to keep three days' refuse, and provide it with a cover, that rain-water may be kept out and the odor confined.

"Put in your receptacle for swill all kitchen refuse, apple and potato parings, corn-husks, cabbage-leaves, shoes, rubbers, tin cans, old bedding, soiled linen or cotton, and put nothing but ashes or earth into your ash-barrels."

**THE PENN STATUE FOR THE PHILADELPHIA CITY-HALL.**—The dimensions of the colossal Penn statue have been amusing the spectators and critics of the City-hall court-yard ever since the snow melted, and the tablet was posted on the now greenish-stained pedestal, down which the bronze ooze has dripped. According to this veracious inventory of the proportions of the thirty-seven-foot 60,000-pound Penn, the modern Gulliver's nose is thirteen inches long, each eye is twelve inches long and four wide, and his mouth stretches fourteen inches from corner to corner. His hair is four feet long, his cuffs three feet and the buttons on his coat six inches in diameter. His finger-nails are three inches long, his feet twenty-two inches wide and five feet four inches long, and his ankle five feet in circumference.—*Philadelphia Record*.



## THE NEW GRAFTON GALLERY, LONDON.



XVI Century Door. From Havard's "Dictionnaire de l'Ameublement et de la Decoration."

London is becoming Parisian in the sumptuousness of its picture-galleries, and if the Grafton only had some palms in the corners of the rooms and banks of large-leaved plants in the centre of its settees we might imagine ourselves in the French capital. The rooms are excellently lighted and exquisitely decorated. All the woodwork is white and the walls are hung with dark-red velvet. A flight of steps leads from the handsome entrance down to the octagon-room, the music-room and two long galleries, the latter of which are, unfortunately, too narrow to see the pictures effectively. The architects are Messrs. Wimperis & Arber, who may be heartily congratulated upon the beauty of their work. As to the show, it is somewhat a mixture of the old Grosvenor, the New Gallery and the Paris Salons; many of the old names are to be found, and also a sprinkling of new ones. A few very weak and feeble productions are displayed, apparently for no other reason than that they are signed by names of "family,"—that was a fashion held in honor by the promoters of the old Grosvenor; but the majority of the works of the modern New-Impressionist schools seem to suggest that the gallery and the catalogue might have appropriated the celebrated mot of Danton: "*De l'audace, et encore de l'audace et toujours de l'audace.*" Some of the foreigners seem to have raked out the veriest—rubbish, I was going to say, but we will designate it as their "slightest impressions"; still it is a pity that powerful painters of great talent should have sent over here what they would not have shown even in the Champ de Mars, apparently *pour se moquer des Anglais*. We all know how foolish the British public is, and how crazy when it gets a craze; we have not forgotten Jumbo and the lady who fed the poor dear with penny buns. Still one would think that even the Britisher would dispute the cleverness of some of these coarse daubs, without any truth of color, with utterly false drawing and no attempt at proper values. Serious work like Raffaelli's is always welcome, even though we may object to its black coloring and hard outlines; but to call Dannat's pictures art, in any sense but that of throwing dust into our eyes (which, if successful, is really a great art), is surely a monstrous piece of audacity; and the same may be said of J. Morris Henderson's marvellous falsities—a kaleidoscopic jumble of cubes of color forming a species of mosaic.

It is a great treat to see one of Emile Claus's wonderful effects of sunlight here in grimy London. His "*Soleil d'arrière Saison*" is an exquisite example of summer landscape; and note the truth of the blue river against the green, green meadows, and the white cow with tender bluish shadows. "An October Morning" is equally charming, and recalls the artist's work of the 1889 Centenary Exhibition. An Antwerp artist, Franz von Leemputten, is scarcely less original in the treatment of his "Return of a Pilgrimage in Campine." Here is a village crowd, with the priests, the golden-trained image of the Virgin, and banners, waiting the return of the pilgrims arriving in a procession of covered market-carts. There is an aspect of reality in all their backs and the color is bright and crisp. M. Dannat evidently aims at Velasquez in his "Spanish Study" (study!) but falls far short of Goya. Melchers's "Faith" is rather startling to the uninitiated, but his "Wedding" must please even the most hardened Philistine. A young couple stand in church at the foot of the pulpit, from which the black-gowned pastor is haranguing them. The girl's eyes are turned to the ground, the young man gazes upwards, while the family look on from behind. The treatment of the girl's dress and blue-white veil is very masterly, and the expressions of

the faces have been well studied by this talented and truthful Scandinavian.

To Londoners Covent Garden is an old friend, but it remained for a Fleming to discover its beauties. Mr. Hoeterick's "Sands and Paddling" are also very noteworthy. But what in the world does Mr. Alexander Roche mean by making all parts of his "Idyl" of the same tone,—humanity, vegetables and clothes,—a dull leaden yellow? Pleasanter it is to look upon Mr. Orchardson's fine portrait of a somewhat unpicturesque personage—the most masterly performance in the galleries, taking it all round, in color and powerful drawing—and upon M. Fantin's charming flowers. That the fine "Storm Effect" was painted by the Alfred Stevens of old, the painter of *dames du monde*, is hard to believe; as hard as to credit Mr. Stott (of Oldham—do not forget that—of Oldham)—as to credit M. Stott with having painted "Isleult." Mr. Stott's faults are not usually weakness, feebleness and sentimentality, but in this picture all these qualities prevail, and the lady seems clad in the properties of the old Newman-street artist academies. Better far are Mr. Stott's landscapes—his sunny pastures and gentle cattle.

M. F. Knapff is in landscape what M. Boutet de Monvel is in figures. They are strangely flat and low in color, but in effect of light and mist they are singularly beautiful. Very clever also is M. Raffaelli's "Citoyens"; but every one knows this painter, his merits and his faults; the individuality of his work being his great characteristic, and blackness his chief fault. He uses paint as others do a chalk pencil, and seems to rub in color as a means of tinting "Black and White." Quite opposed to Raffaelli is Besnard, who has sent his old portrait of the lady flitting across an open window between a play of moon and lamp light. It is vastly clever in color and action; the various lights and reflected lights upon the satin, from the cold pale gray of the moon to the shimmer of the golden lamplight from within the room, are managed in a most masterly fashion; and yet, as a picture, it gives no pleasure; and one wonders at the architecture of the doorway and terrace—it does not seem to explain itself.

Mr. Arthur Melville becomes more and more wonderful and his admission to the Old Water-color Society more and more mysterious. How such a staid society can tolerate him passes one's understanding; he is so utterly wanting in all traditions of respectability and conventionality. His "Sapphire Sea" is marvellous. Taken from a height, we look down upon red roofs, white houses, and a sea which stands upon a heap. People—Indians or Japs?—walk about without legs, but bearing umbrellas, exactly as they appear from the top of the Eiffel Tower. But its very unconventionality is refreshing in the extreme, and, excepting the opacity and heaviness of the water,—the dryness of it,—the picture is marvellously true. His "Portrait" likewise is startling in its naked truth; but it is rather the truth of the representations upon a stained-glass window than that of actual life. A girl is sitting with one hand upon the keys of a piano, and the other resting upon a stool; neither has the least pretence to being modelled—there are no knuckles, nor veins, nor nails, only a flat, tinted mass of a certain form. Still the turn of the head and the bold painting of the hideous gown are very clever, if too decidedly *à la Japonaise*.

M. Tattgrain's strange "Entry of Louis XI into Paris, August 14, 1461," is here; and two lovely flower-studies by Fantin-Latour. M. Carrière exhibits what seems to be a study for his large picture of "Maternity" at the Champ de Mars exhibition of last year; and Mr. Albert Moore an elegant little Greekery, "The Toilet." The Saxon painter, F. von Uhde, gives us one of the modern religious pictures, "Lord abide with us"—serious, studied and full of feeling, but unnecessarily ugly and dirty. Our Lord is the mere model who cuts his hair and poses for such pictures, and the laborers who invite him into the house are commonplace and uninteresting. It is by no means a happy example of the school or of the painter. M. Aublet has some good things, and M. Blanche two or three of his peculiar flat portraits; as for Mr. F. Brangwyn and Mrs. Furse, they seem to have red upon the brain.

It is a pity that great artist Roll should be so ill-represented, although there are fine points in his "Portrait of M. Tirard." Kuehl has a delightful interior, Degas his "Absinthe" (was it worth spending time over?) and Mr. C. Pearce a charming mother and child, obviously the Holy Mother and her Divine Infant. "I have that within which passeth show." For beauty of expression and soberness of color this picture could not be surpassed; the beauty of sadness and gentleness, and the pathos of poverty be it understood—not mere prettiness: it has none of that; rather, as regards the child, ugliness, in its little white cap and black hood; but it is the sort of ugliness of some of Henner's types. Some admirable water-colors by Mr. T. Simpson ought not to be passed by without a word.

The exhibition will probably cause the enemy to blaspheme somewhat, and the British Philistine will shout in dismay; but time will settle all things and show who is on our side. Conventionality has had its day, and if Impressionism has done no other good, it has forced people to think. What seemed outrageous twenty years ago is now accepted calmly—Claus, for instance, even Raffaelli; perhaps we may arrive at putting Dannat and Degas among the masters (when they are a little older), and all the rest of the ballet-girl school *sans cérémonie*. At any rate, such an exhibition as this makes the older amongst us smile, when we think of the scoffing we received some years ago, when Manet's "Fifre" and "Spaniard" were on view somewhere in London, where, I forget, but I well remember

the effect those fine works had upon the mass of the London work. And now go to the Grafton and look at the advanced school! where would poor Manet be, where is even Mr. Whistler, by the side of the younger set of the advanced school? Such is art, and of such are the wisecracks who make up the public.

S. BEALE.

## BOOKS PAPERS

A WEEK or two ago we published a short account of the manner in which a certain corner-stone in Mexico had been subjected to rape, and its contents, unusually valuable, abstracted. It might prove a curious inquiry to seek to discover how and why arose the custom of concealing in the corner-stone of a building contemporary records, current coins and occasionally, seemingly, articles of such value as to encourage a peculiar form of house-breaking. Usually the master of ceremonies is content to inclose with the programme of the dedication ceremonies a few coppers and a copy of a daily newspaper. If the chief or only object of this ceremonial is to preserve for the information of future archaeologists a record of contemporary morals and customs, it seems to us that for the daily newspaper, with its record of crime and political squabbles, there might wisely be substituted a good hand-book of the city or town where the building is to stand; and, so far as New York City is concerned, a copy of "*King's New York City*"<sup>1</sup> would be of immense value to those Muscovite delvers who, a few centuries hence, may be working up into new foundations the building-material which now, in another guise, forms one of the city's glories.

This hand-book is a really remarkable and useful publication, encyclopædic in character and volume, full and precise in its statistical information, and, because of its 850 illustrations of important buildings, a book architects will find of real value and use to them, in spite of the fact that, though the buildings have been judiciously selected and carefully illustrated, all mention of their authorship is omitted, save in rare instances. This defect the editors have promised us should be removed in the second edition, which is now in preparation.

THE books are so unquestionably good and useful in themselves that American students of building-construction have long found one of their most useful aids to comprehending the principles and practice of good building to be the three volumes — recently increased to four — of "*Notes on Building Construction*." In spite of many cases of inapplicability of English methods to American practice, these books have become deservedly popular in this country, and their sale here must have been highly satisfactory to their publishers. Their popularity has been so great that it is rather a wonder that some American publisher has not thought it worth while to pirate them; but we think a pirated edition would be a failure, because purchasers would justly feel that a work of this kind reproduced, however fairly or unfairly, in this country, ought to be edited and revised so as to accord with American practice, and the cost of such revision would wipe out all possibility of a profit. Fortunately, architects, in a certain measure, share the privilege which is enjoyed in its perfection by musicians, who, one and all, can read understandingly all musical compositions, no matter what may have chanced to be the language spoken by the composer. To a very large extent foreign architectural works are comprehensible to all nations, because drawings and diagrams constitute a written language that can be interpreted by the educated eye without having to call to aid the halting tongue and the ill-understanding ear. Because of this, our architectural libraries are full of books prepared in all the civilized lands of the world, and they serve their purpose as fully as if all had been prepared here.

The four volumes we speak of are, however, rather costly, and because they are so largely not adapted to American practice they are passed over by those who can afford to spend money only upon books which are wholly fitted to their daily needs. For such purchasers there has just appeared — although it was not for this class that the book was actually prepared — a little book<sup>2</sup> of two hundred odd small octavo pages, which forms one of "*Longmans' Advanced Science Manuals*," and is itself styled "*Advanced Building Construction*." This little work is prepared for the use of those who are fitting themselves to pass the examination for the Advanced Course of Building Construction at South Kensington, and is in reality an abridgement of Parts I and II of "*Notes on Building Construction*," and forms too useful a book to be overlooked by the American student who cannot afford to purchase the work in its larger and extended form.

THE friends of the late French architect Adrien Joigny have secured for their departed friend and confrère not only posthumous honor, but have rendered a service to the literature of architecture

<sup>1</sup>"*King's Hand-book of New York City*": An Outline History and Description of the American Metropolis, with over Eight Hundred Illustrations from Photographs made expressly for this work. Planned, edited and published by Moses King, Boston, Mass. 1892. Price, \$1.00.

<sup>2</sup>"*Advanced Building Construction*": A Manual for Students, by the author of "*Notes on Building Construction*." London: Longmans, Green & Co. 1892.

which demands acknowledgment. M. Joigny was one of the many accomplished and learned architects who have lent their aid to M. Planat in producing, in a marvellously short space of time, that truly remarkable and monumental work, the "*Encyclopédie de l'Architecture et de la Construction*," with whose character and scope our readers are already familiar. As was to be expected of the many writers employed on this great work, some have done their work well, some have done it indifferently: some have been content to recast the statements of earlier investigators into new form and changed wordings, but without adding any new quality of statement or lately discovered fact, as is the manner of hack writers; some, on the other hand, have put conscience into their work, have conducted original researches, or at least have personally verified the conclusions of earlier writers. In many cases the men who have done such work as this have not done it exactly at the request of M. Planat, but, having undertaken the investigation of their own motion and followed it up from personal interest in the subject, have afterwards been induced by M. Planat to incorporate the results of their researches in his "*Encyclopédie*." One curious effect has resulted from this: it was desirable, and in fact necessary, that the alphabetical arrangement should be adhered to, and consequently the work of the same writer, which in reality dealt with an entire group of subjects which were really closely related and which if brought together in book-form would mutually aid and explain one another, are found to be distributed by the alphabetical exigencies through different fascicles and volumes, which makes it certain that the pages which treat of them will never be read consecutively, or the subjects encountered in their chronological order. To this second class of writers belonged M. Joigny, and the topic to which he had devoted years of careful study and painstaking research was that of the Classical Orders of Architecture. But few who encounter in their alphabetical order his treatises on the Astragal, Base, Capital, Column, Cornice, Egyptian Architecture, Frieze, Greek Architecture and so on would realize that they were part and parcel of one scheme of treatment. This they are, however, and fortunately M. Joigny had friends who knew it, and as a testimony to the worth and learning of the deceased architect they have gathered together these disjointed fragments and represented them in book-form, together with the cuts which illustrated and explained them in the "*Encyclopédie*," and they are now obtainable under the name of "*Histoire des Ordres dans l'Architecture*."<sup>3</sup>

## SOCIETIES

### THE SKETCH CLUB OF NEW YORK.

MR. GEO. B. POST gave a very interesting talk before the club at its monthly meeting, held in the club-room, Saturday, March 4. Mr. Post commenced with reminiscences of his early professional life, then related his experience in connection with the World's Fair buildings in Chicago and closed with a few words of advice on points of design. At this meeting the Ackerman Prize, a set of instruments, was awarded H. H. Braun, for a pen-and-ink rendering and design of a carved panel. Emil Ginsburger received second mention. Mr. Henry P. Kirby made the criticism and awarded the prize in this competition. For the Miller Prize competition for an exterior perspective of a country-house from plans given, Mr. S. F. Miller read a criticism written by Mr. Geo. Martin Huss and supplemented it with remarks of his own. The first prize, of \$35, was awarded to J. Henry Cook, second prize, of \$15, to E. J. Brown. The meeting made favorable resolutions in regard to the anticipated amalgamation with the Architectural League of New York under conditions of retaining certain privileges of self-government.

EDGAR A. JOSSELYN,  
Recording Secretary.

### THE T-SQUARE CLUB OF PHILADELPHIA.

THE regular monthly meeting of the T-square Club was held on Wednesday evening, February 15, at the club-room, 29 N. 13th Street. The programme for the evening was pen-and-ink rendering from a photograph. The photograph selected was one of Ann Hathaway's Cottage. James H. Cook's drawing received first place, Chas. G. Bachman's second, and D. K. Boyd's third. The programme for the next competition was then announced, — a design for an entrance to a large office-building in the Italian Renaissance style.

PERCY ASH.

### THE ARCHITECTURAL LEAGUE OF NEW YORK.

THE annual meeting and election of the Architectural League of New York was held in the club-rooms, 215 West 57th Street, on Monday evening, March 6th. In the absence of President Sturgis, Vice-president Coffin presided. There was a very large attendance, and much interest was taken in the competition for the prize of one hundred dollars, offered by Messrs. Dominick & Haff, for the best

<sup>3</sup>"*Histoire des Ordres dans l'Architecture*." Par Adrien Joigny. Extrait de *L'Encyclopédie de l'Architecture et de la Construction*. Paris: Dujardin et Cie, Éditeurs, 1892.



design for a silver loving-cup. The prize was awarded to Mr. E. Calma, of Montreal, Canada, a non-resident member.

The election resulted as follows:

President, George B. Post, of New York; Vice-President, Charles R. Lamb, of New York; Executive Committee, Class of '95, Edward Hamilton Bell, of New York; Class of '96, Chas. I. Berg, of New York; Class of '96, Edwin H. Blashfield, of New York; Class of '96, Warren R. Briggs, of Bridgeport, Conn.

WARREN R. BRIGGS,  
Treasurer and Acting Secretary.



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

HOUSE OF GEORGE S. WILLETS, ESQ., CORNER ERIE AND PINE STREETS, CHICAGO, ILL. MR. W. R. EMERSON, ARCHITECT, BOSTON, MASS.

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

HOUSE OF EUGENE FELLNER, ESQ., BROOKLINE, MASS. MESSRS. CRAM & WENTWORTH, ARCHITECTS, BOSTON, MASS.

HOUSE FOR MESSRS. WENDELL & SMITH, OVERBROOK, PA. MR. HORACE TRUMBAUER, ARCHITECT, PHILADELPHIA, PA.

THE OLD COLONY BUILDING, CORNER DEARBORN AND VAN BUREN STREETS, CHICAGO, ILL. MESSRS. HOLABIRD & ROCHE, ARCHITECTS, CHICAGO, ILL.

HOUSE OF E. A. DE WOLF, ESQ., ST. LOUIS, MO. MESSRS. EAMES & YOUNG, ARCHITECTS, ST. LOUIS, MO.

#### [Additional Illustrations in the International Edition.]

HOUSE OF E. J. MARTYN, ESQ., ASTOR ST., CHICAGO, ILL. MESSRS. W. L. B. JENNEY & MUNDIE, ARCHITECTS, CHICAGO, ILL.

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

VILLA AT CHAMPROSAY, FRANCE. M. TROPEY BAILLY, ARCHITECT.

[Photogravure.]

LATERAL FACADE OF THE SAME.

[Photogravure.]

ANGLO-CALIFORNIAN BANK, AUSTIN FRIARS, LONDON, ENG. MR. F. ROBERTS, ARCHITECT.

FOREIGN architects who visit the city express surprise to see so many excellent buildings in out-of-the-way places. But as London is not planned like their cities, there is no avoiding the drawback which prevents such a building as Mr. Roberts's from being more generally known.

HAMPSTEAD SYNAGOGUE. MR. DELISSA JOSEPH, F. R. I. B. A., ARCHITECT.

This synagogue is situated in Dennington Park Road, West Hampstead, on the site of Laurieston Lodge, and was erected to meet the needs of the many Jewish families residing in that growing district. The building would have been placed in West End Lane but for the need of obtaining an eastward aspect for the ark.

The façade is carried out in red brick and red stone, the small amount of detail being Romanesque in character. The leading feature of the external design is the main tower, which is an uncommon feature in synagogue designs and which is a conspicuous object for a considerable distance. This tower contains, on the ground-floor, the main hall; on either side, in the subsidiary buildings, are the vestibules, which lead to the gallery-staircases, inclosed in small wings constituting the end features of the principal elevation.

The main building is octagonal on plan, and in that respect differs from any other synagogue in London. At the corners of the inner octagon are columns carrying the galleries, which occupy the space between the inner and outer octagons, the columns leading up to a dome of great height. The rake of the gallery is exceptionally steep, in order to give a uniformly good line of sight.

The Continental system of grouping the ark, the reader's platform and the pulpit at one end of the building is here adopted for the first time in London. Behind the ark, obscured by wrought-iron grilles, is the choir. The inside of the building is finished throughout in pure white.

The seating capacity, when all the benches are in position, is 700 sittings. Each seat has a rising flap, with box underneath for prayer-books, and has a hinged book-flap in front. There are seven entrances to the building on the ground-floor, the principal entrances being through two pairs of double swing-doors in lobbies, to prevent draughts. The lighting is effected by a sunburner of 171 lights, and by standards and brackets. The heating is a combined hot-air and hot-water system. An ample system of ventilation is provided.

CHATEAU DE MARTINSBOURG, MAYENCE.



THE FAIR'S LOSS OF ITS JAPANESE CEDAR. — The Japanese dwarf cedar is dead. This famous tree, 300 years old, was sent to the Columbian Fair by the Emperor of Japan, but it was taken from its soil and wrapped in brown paper. When it reached Jackson Park, the Department of Horticulture discovered that it would take heroic measures to restore it to strength and bloom, even if life were not extinct. Hot pipes were laid around and about it, but yesterday the time limit was reached and the famous old tree was declared to be dead wood. This cedar, about three feet in height, and 300 years old, was considered to be probably the best specimen in existence of the celebrated dwarf trees of Japan. For three centuries its growth had been checked and held down by the process known to the clever Japs, until in appearance it was a burlesque, or miniature imitation of a noble and massive cedar-tree. There is much mourning among the Japanese in Jackson Park over the demise of the wonderful tree, but it will be retained in the Horticultural Building and given a place of prominence in the Japanese exhibit. The tree now stands in a large flower-pot and is covered with its foliage, which, however, is plainly dead and almost ready to fall off. The gnarled and rugged trunk and branches seem to tell a sad tale of suppressed vigor and growth, and, now that the ancient tree is dead, it looks more than ever like a dwarf, stunted and blighted, but at the same time a marvellous specimen of what time and patience and close attention to the end desired may accomplish. — *Chicago Inter Ocean*.

PRESENT STATE OF THE LABOR-MARKET IN ENGLAND. — The state of the skilled-labor market in England is indicated by the returns of the different trade-unions for December. Twenty-five of these organizations, with a membership of 336,361, have reported to the Board of Trade for that month, but only twenty-three of them report regularly and furnish figures useful for purposes of comparison. According to these, the proportion of unemployed rose from 8.27 in November to 10.2 in December. Deducting the number of men on strike, the number of unemployed was about 8½ per cent; and this is supposed to indicate pretty accurately the condition of the skilled trades all through the country. This is the worst showing since 1886, when the percentage of unemployed among skilled laborers was 10 per cent. The trades now feeling the pinch most are those connected with the shipbuilding and engineering industries, in which employment is very slack indeed. The clothing trades are also in a bad way. The building trades are in a worse condition than for a long time back, the percentage of those out of work being double what it was a year ago. The printing trade seems to have experienced a slight revival, but, with this slight exception, the effect of the reports is unsatisfactory. — *N. Y. Evening Post*.

THE GATE-POST BALL. — That interesting author, Mr. Baring Gould, in his "Strange Survivals," tells us that the balls so commonly seen on the apices of gables and gate-posts of the seventeenth century may be survivals of the old custom of decorating mansions with the heads of felons who had been executed by order of lords of manors, who exercised capital jurisdiction within their domains. Is it not rather the outcome of the semi-Classic taste of the period? — the ball or globe being a very common ornament, not only in English and foreign Renaissance buildings, but also in furniture. In short, architects have gained much from intelligent criticism; they have learned that the separation of art from work was fatal to development; that the gentleman-artist element was destined to reduce the profession to that of the *costumier*; that the intelligent public hesitated to pay for the services of a professional man if he could only produce a very inconvenient building in the dress of a thirteenth or sixteenth century style, and they have learned also that the interests of the profession are bound up with the conviction that architecture is not a defunct art which gave up the ghost in the sixteenth century, but is capable of development, and can be made coextensive with the requirements of the day. — *Building News*.

RESULTS OF THE ZONE TARIFF ON HUNGARIAN RAILWAYS. — The following are some of the astonishing figures of the third year's result of the zone tariff in Hungary. In order to appreciate fully the enormous increase of the passenger traffic, the following annual returns previous to the introduction of the zone tariff ought to be considered. There were carried in 1884, 6,900,000; in 1885, 7,000,000; in 1886, 7,000,000; in 1887, 8,200,000, and in 1888, 6,100,000, showing an actual falling off in the number of passengers, while the receipts during these five years varied between 9,500,000 and 10,500,000 florins. From August 1, 1889, to July 31, 1890, the number of passengers carried was 16,200,000. In 1890-91 it increased to 19,000,000, and in 1891-2 it reached the enormous figure of 28,300,000, — showing an increase, as compared with 1888-9, of 464 per cent, and in point of receipts (which from 9,705,000 florins in 1888-9 had increased to 18,320,000 florins) an augmentation of a round 100 per cent! Well may it be a matter of

surprise that the statesmen and representatives of other Continental nations have as yet made no efforts to follow Hungary's example. — *American Register*.

**THE EIFFEL TOWER AND THE CHURCH OF THE SACRED HEART.** — It is now rather late in the day to raise an agitation against the Eiffel Tower and the Church of the Sacred Heart on military grounds; but this is what certain Paris papers are now doing. They say they are reflecting the opinion of military authorities; if so, these authorities must have been strangely apathetic not to have discovered long ago what is now put forward as a new danger. It would seem that both the tower, associated with a name that is not in very good odor at the present time, and the prodigious mass of masonry which has been raised on the height of Montmartre, and to which pilgrims now flock from all parts of France, would, in the event of another investment of Paris, serve to direct the enemy's fire upon the besieged city. This is the argument that is used against the two structures on military grounds, and by virtue of which the Government should, it is said, order their demolition without any compunction either of an artistic or a religious kind. As regards the latter sort of compunction, it may be observed that there is but small chance of its being felt in such a quarter. The demolition of the church at Montmartre, however, would involve any government in very serious difficulties, which need not be explained, the history of the building being very generally known. But the military mind, which is fertile in resource, has perceived that these monuments might be employed in the defence of Paris in such a manner as to compensate—perhaps more than compensate—for the mischief they might bring upon the city. It is said that if a gun of large calibre were raised to the top platform of the Eiffel Tower it could drop shells upon any enemy who could bring batteries to bear on Paris. It is admitted, however, that the position of the gunners would be anything but enviable; for if the tower were put to such a use an enemy would certainly keep up an incessant fire upon it until the iron lace-work could no longer hold together. The adaptation of the Church of the Sacred Heart to the needs of war, horrible as the idea seems to all the Catholics of France in whom there is a remnant of the old piety, nevertheless comes more within the range of possible expedients in time of great public danger. It is declared that the great strength and solidity, as well as the height, of the structure, render its conversion into a fort with casemated walls a matter of no great difficulty. Thus it would not only be a target for shells, but a fortress from which others could be thrown a considerable distance beyond the walls on the northern side of Paris. But either these schemes and hypotheses are not to be taken seriously or the very scientific system of defence carried out since the Franco-German War, and according to which the investment of Paris by another invading army would be rendered impossible by the outer circle of new forts, must be considered less scientific than it has been represented. — *Paris Correspondence St. James Gazette*.

**A MARVELLOUS MOSAIC.** — The splendid mosaics now produced at Venice continue (writes Sir D. Colnaghi in his latest consular report) to take the first place in the artistic markets of the world. Among the important works recently executed is a large mosaic panel representing Columbus being received by Queen Isabella and King Ferdinand of Spain after his return from America. This panel, measuring about 200 square feet, shows Columbus, when kneeling before the sovereigns, presenting to them the natives of the newly-discovered land and some products of the soil. The persons represented are about thirty-eight in number, many of them of the natural size, formed in three principal groups. In the most important group is Columbus, having at his side the young Crown Prince and the sovereigns, surrounded by the dignitaries of the court, ladies and noblemen, and pages holding the standards. In the middle group, but more to the left, are the native Indians, and near the entrance of the hall other Spanish nobles and the companions of Columbus. The gorgeous and various attires of all the figures, their warlike implements, the splendid stuffs of all sorts and tints, the rich decoration of the hall, the pageantry of the court, the strange tones and costumes of the natives in full contrast with the others, and the various attitudes of all these personages form a whole in perfect harmony with the details of the scene, owing to the excellent distribution of the figures and the perfect fusion of tints. The work is so delicately executed that no one can believe that the panel is not painted until, on touching it, he discovers that it is entirely composed of small enamel cubes, put together without any aid of color or cement, and worked according to the mode of the old Venetian mosaic school. This panel will form the pendant of another representing Columbus landing in America. These mosaic-works are executed for Mr. H. Furber of Chicago, who is now building a palace near the premises of the Exhibition, which it is said will be called Columbus Palace, and will be the largest in America. — *Westminster Gazette*.

**ST. MARY'S, OXFORD.** — Those who revisit Oxford during the coming summer will be startled to discover that the beautiful spire of the University Church of St. Mary's has been sheathed in a most intricate scaffolding, which buttresses it on all sides from top to bottom. It has been discovered that the pinnacles were not safely constructed, and that their precarious lodgement had long been a real danger, although fortunately only one or two small fragments have actually fallen. Those who crowded the triforium of Westminster Abbey upon the recent occasion of the late poet laureate's public funeral have reason to know that, in spite of iron braces plentifully used, the ancient stonework there is not considered safe, for the authorities not only used wooden screens to prevent any undue strain upon the tapering columns, but also detailed workmen to warn the public from time to time against leaning with any weight against these treacherous bits of half-disintegrated stone. It had not been supposed, however, that the spire of St. Mary's was in any such case, since the architect still lives to whose restoration in the thirties much of the great beauty of the steeple is due.

Nevertheless, it now appears that, unexceptionable as that restoration was from an artistic point of view, it was not structurally sound. The effects of a disintegration, due to the peculiar atmosphere of the Thames valley, are only just beginning to be understood in their full bearing upon the conservation of ancient monuments. A thorough investigation is in progress by competent engineers acting on behalf of the University, and meanwhile £800 have been expended upon the scaffolding. A rough estimate of the cost of restoration places it at £9,000, and there is doubt still whether more may not be involved, since two cracks traversing the whole length of the structure to its very foundations have already been discovered. — *N. Y. Evening Post*.

**A YUCATAN EXHIBIT AT THE FAIR.** — One of the most interesting displays that will be seen at the Fair will be that made within the "Ruined Palace of Mitla" by the Department of Ethnology. Prof. Edward H. Thompson, who has been consul at Merida for eight years, has prepared papier-mâché moulds of the ancient sculptures found in the deserted cities of Yucatan, and thirty cases of these moulds have already arrived at the Park. They will be installed as soon as the building is completed. The ruins of Uxmal will be reproduced on an extensive scale, and among them will be a perfect fac-simile of the temple and figure of the god "Kukulkan," or the great feathered serpent. The body of the serpent is wrought in the stonework all around the building, and this will be represented entire. The original materials were principally marble and coarser varieties of limestone, and the work shows that the ancient Yucatecos possessed great skill in mechanical workmanship, though their industrial arts were but poorly developed. One of the finest reproductions by Professor Thompson will be that of an arched gate of the ancient palace of Labra, which was literally chopped out of the jungle. — *Chicago Inter Ocean*.

## TRADE SURVEYS

THERE is just enough uncertainty in the financial world to make railroad and general manufacturing interests and promoters of enterprises involving large outlays feel that it is hardly the time to forge ahead. In a comparative sense, everything is satisfactory; conditions are better than a year ago, at least on the surface. Prices have been hammered to their lowest possible level. Production has been restricted because margins are not sufficient. New enterprises are not pushed quite as fast as their promoters would like to have them pushed, because of unsettled conditions. There is a great deal of anxiety in the commercial and manufacturing world. One fear is that a stringency may crop out yet; another is that an advance may take place in values—two antagonistic results. Another is that there may be a general withholding of enterprise and a refusal to place orders for spring and summer; in fact, daily contact with business men, from banking down to shop circles, uncovers the curious fact that to-day there are more uncertainties, apprehensions and anxieties regarding the future of trade and business than there has been for six months. One reason is, the time has come for season orders and contracts and the shaping-up of the year's business. Instead of a rush of business since March 1, correspondence and indications all show an extremely conservative feeling. The conservative utterances of the official head of the new administration are received with approval by manufacturing and financial interests, and they will have no small influence upon business. There is a heavy drain of money to the West in progress, which will probably continue for some weeks to come. Gold exports continue. The great powers of Europe hold over \$1,300,000,000 in gold for war purposes, and by their holding of this volume of money constitute themselves an enemy to progress and commercial activity. Our home financial situation—on the surface at least—appears safe and sound, but, as before stated, there are large classes of people who need money, and would borrow if they could on partially-improved real-estate. The numerous money-lending agencies doing business all over the West are now advising their principals that it is, in their opinion, safe to expand loans. If their advice is taken, the Western agricultural interests will be still further assisted. The needs, or, rather, the volume, of money for which high rates of interest could be had in eight or nine of the agricultural States has been variously estimated by the managers of some of these agencies at from seventy-five to one hundred million dollars—good investments. The Western banks are now calling in their Eastern deposits, and the volume is now forty million dollars less than a year ago, according to an official statement made on Monday at New York. The point of the whole matter is that there is a growing suspicion in the minds of the average business men that their plans, if pushed, might be spoiled by stringency in the money-market. Jobbers say that, while the total volume of business is larger than last year, orders are, as a rule, very small. The fact remains that business was never done on such slender margins, and no one can suggest a remedy. Yet there are abundant evidences on all sides of industrial growth. In ten years, the capital in the Southern cotton-manufacturing industry increased from twenty-two million dollars to sixty-one millions, and value of products from twenty-one millions to forty-seven millions. The saw-mill industry has increased in like proportion; the pig-iron industry increased fifty per cent, mining in still greater proportion, and the multitude of smaller industries has expanded beyond the knowledge of figures. The stimulus is as great as ever. In the Northern States, the progress made in three or four years has been in different lines, and most of the expansion has been paid for in cash—a very important fact to note. The main features in the industrial world this week are cautious dealings in iron, coal, lumber and general merchandise. The commercial agencies show a good, healthy trade condition, and collections are easy. Borrowers seem to be making a desperate struggle to lower mortgage indebtedness, rather than increase it. Shop and factory work are abundant, but it is evident that the full volume of orders is not being placed. Why this is the case cannot be explained, unless it be due to a conservative spirit generally. Despite the low prices, very few combinations are being attempted. Experience has shown them to be less beneficial in arresting competition than was anticipated. More confidence, instead of more capital, is needed. If, for any reason, business men should conclude to resort to their old habit of placing orders for forward delivery as far forward as has been their custom in former years, there will be a commotion in trade circles such as has not been seen for three or four years.



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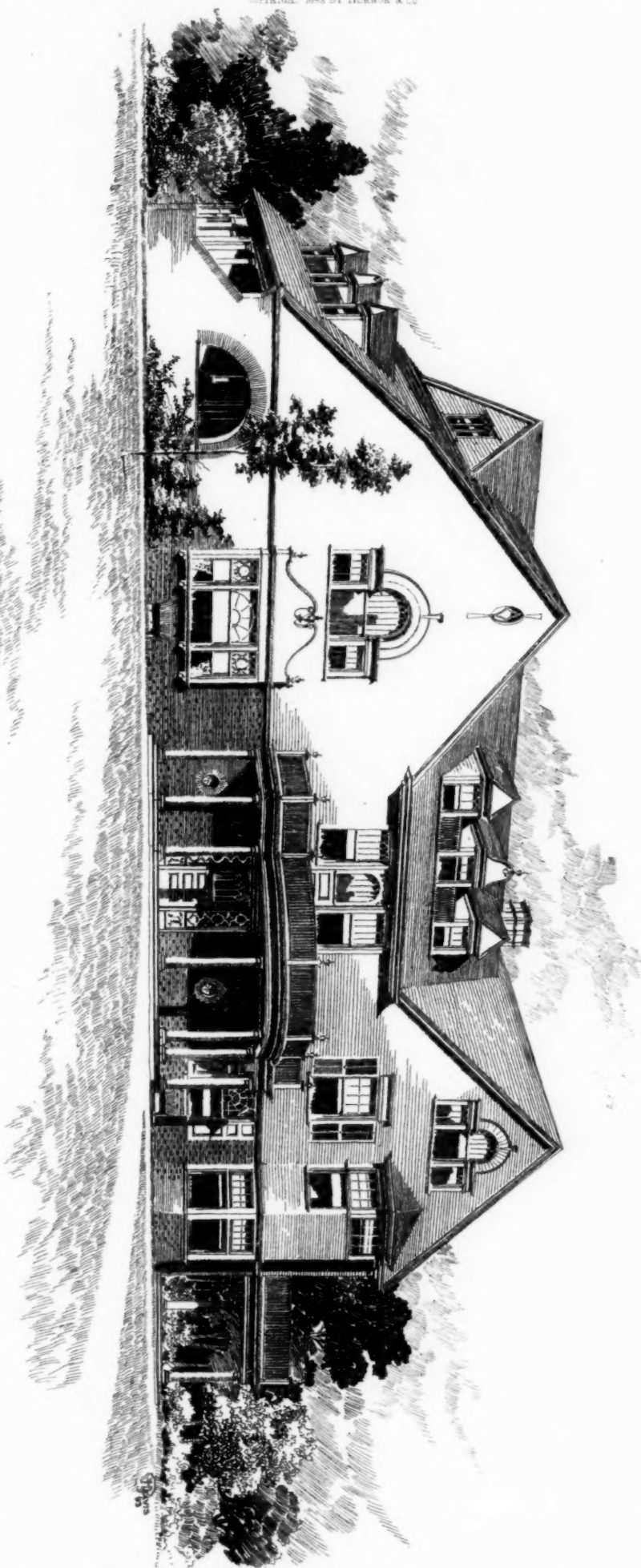
**T**HE HOUSE OF EVGENE FELLNER ESQ  
on Aspinwall Hill Brookline Massachusetts  
Messrs Cram and Wentworth *whose Office*  
is at Number 53 State Street being the Architects



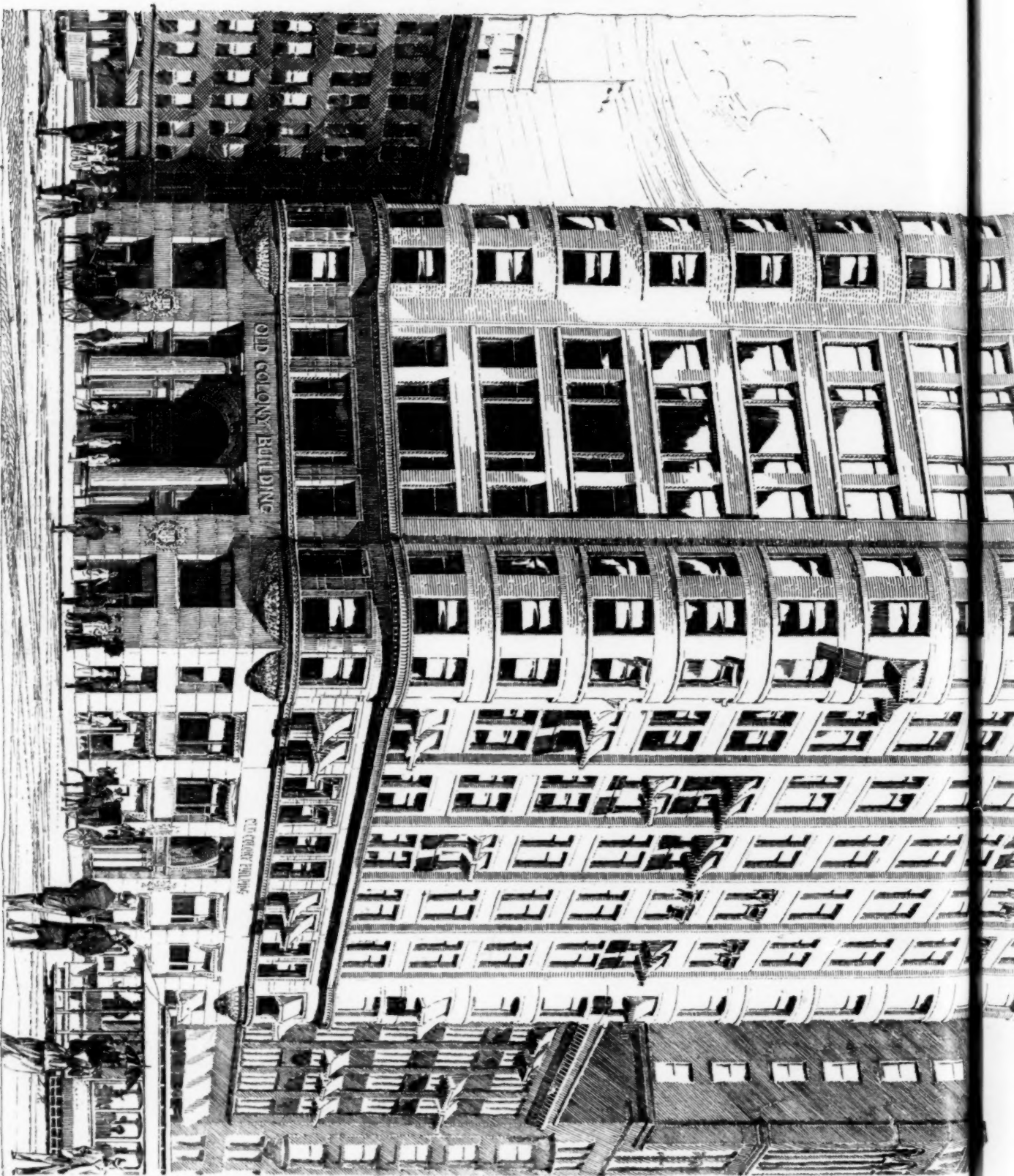




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