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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XXXIV.

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NOVEMBER 21, 1891.



SUMMARY:—

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WHAT are, or rather what are to be, the rights of the contributors to exhibitions of architectural drawings as opposed to the asserted rights of the manufacturers of the exhibition catalogue? We ask because the point has just been raised in the most unexpected and, we feel, most unjustifiable way, and though the narration of facts implies the existence of personalities (which we have done our utmost to avoid) the matter is of enough general interest to speak of in its impersonal aspect. On visiting the recent exhibition of architectural drawings in this city, we purchased a catalogue and, without glancing at the illustrations, made a tour of the room and checked off on the printed list those drawings which struck our fancy. This done we, at the first opportunity addressed notes to their authors expressing a desire to publish the drawings at the close of the exhibition. To these notes we received in every case prompt and courteous assent, the artists taking the trouble to write to the committee directing that the drawings in question should be delivered at this office. The result of this was a letter from the proprietors of the catalogue, who declared that we had “stolen a march” on them, and that we must see the expediency “of not publishing any of our cuts until at least four months after the exhibition.” We were then warned to abstain from “cutting the ground from under our feet as you [we] did last year.” To this we replied that the matter at issue concerned not only ourselves and the proprietors of the catalogue, but it affected primarily the proprietary rights of the authors of the drawings. The reply to this, a mere reiteration of the original demand, is of interest only as it contained the admission that it was not possible to “argue the matter”—a rather significant confession of weakness. It is quite needless to say that our course needs in not the slightest particular any defence, and it is only necessary to turn to any of the illustrated technical and popular papers in every country during or after an art exhibition to discover proof that it is not usual for catalogue-makers to interfere with the right and freedom of action of the authors of the works exhibited.

WHERE is one point, however, where a defence may be needed. We are accused of “cutting the ground from under” the feet of last year's catalogue owners. On examination, we find that of the fifty drawings published in that catalogue, only fourteen have at *any time* been published, of which only two were published within “four months” of the exhibition, and for doing this we are told we are mere pirates and highwaymen. The great damage done to this business enterprise by so slight action on our part is either evidence to the great importance of this journal as a medium of intercommunication, or to the feeble vitality of the infant industry architects are expected to protect, willy-nilly. And if publication in this journal is so destructive of vested interests, how comes it that this catalogue contained five subjects illustrated in these pages before the exhibition opened? Was not this enough to ensure a still-birth? Is it necessary to point out that if one catalogue-maker may assert a proprietary right, all others of the class may do the same, not only against the newspapers and journals, but against one another? If each asserts a four months' proprietorship, and an artist elects to send a fine drawing to half-a-dozen exhibitions, it would take little figuring to find out when he could maintain a right to his own. Assuming that exhibiting a design in public, or publishing it in a professional journal, is but so much advertising, are architects prepared to abandon in favor of catalogue-makers—for four months or any multiple of the period—the broader benefits to be secured through publication? Exhibitions and professional journals are both of great value to the profession, and we sincerely hope there is to be no clashing of interest between them. We ask an expression of opinion upon this matter of proprietorship, which has, without warning, been sprung on unsuspecting contributors, as we desire to know whether architects are quite ready to assign their proprietary rights under such duress as this. The technical journals can accommodate themselves to any condition of things when once that condition is fixed and understood.

THE question of the ownership of plans, under French law, is brought up, and very clearly answered, in *La Semaine des Constructeurs* for October 3. A correspondent asks the “Committee on Jurisprudence” of that journal, which is composed of persons thoroughly acquainted with the subject, whether an architect is bound to deliver the plans of a building to the proprietor of the building, after the work is completed. The reply, which is certainly definite enough, is as follows: “The architect is obliged to deliver, to the proprietor who has employed him, the plans of the constructions which have been carried out under his direction, as soon as the work is completed, on the condition, however, that the architect's fees have been fully paid.” This view of the law is supported by several decisions in France. In one case, reported in *Dalloz, Jurisprudence Générale*, 1871, Part 2, page 83, the Court of Paris decided that the architect had a right to retain the plans until he had been entirely paid; a decision which implies the contrary—that when he has been entirely paid, he must give them up. The Appellate Court of Bordeaux rendered a decision to the same effect in 1848, saying that, “in the absence of any agreement establishing, for the benefit of the architect, a fixed price for the execution of the building, and a second price for making the plans, custom and equity decide that the owner of the thing constructed, when he has paid the constructor, is also the owner of the plans which have served for the construction.” We think we have met with better legal reasoning than this, in accordance with which the proprietor of the building is apparently entitled to appropriate all the workmen's tools, and contractor's machinery and plant, which have “served for its construction,” but French courts, like others, follow their own ideas of logic in preference to those of outsiders, and there can be no doubt of the rule which they hold for the present on the subject. In England, the precedents are to the same effect; and in this country, although inferior courts, in one or two instances, have recognized the architect as the proper and rightful custodian of the plans, the chances are that the ancient English precedents would prevail over the more enlightened view taken by all our architects and by their most intelligent clients.

IN saying this, we wish to defend ourselves in advance against the accusations of hostility to professional interests, disloyalty to the Institute schedule, ignorance of professional usage, and so on, which are occasionally brought against us when we give a similar reply to the questions of correspondents on this or allied matters. We ought not to have to point out that we do not make the law affecting architects; a good many things about it are, in our opinion, grossly unjust, and ought to be changed, as they might be, by the intervention of the Institute, with the weight of its authority, and, if necessary, with money and legal assistance for prosecuting appeals, in controversies which involve points of importance to the profession; but, until the efforts of the members of the profession are combined to bring about such a change, decisions will probably continue to be given in accordance with the law as it is, and not as it should be, and the law as it is must continue to be the basis of the advice we give to our professional friends who ask for it. To show the importance of the distinction, we may recall the famous case of *Phelps vs. Tolman*, where the architect, supposing that the usual professional claim, that "drawings, as instruments of service, are the property of the architect," was good law, laid hands on the plans for certain buildings, in consequence of some dispute with the proprietor, and seclused them. The proprietor, Phelps, thereupon brought a criminal charge against him, of having stolen his property, *i. e.*, the plans of his buildings, and found a judge to issue a warrant, upon which the architect was arrested, and clapped into jail. We know, and every architect knows, and most reasonable clients know also, that it was very much for the interest of Mr. Phelps, as well as of Mr. Tolman, that the latter should keep possession of the drawings, which he alone could properly preserve, index and interpret in case of subsequent need; and there is no doubt that both Phelps and Tolman, like all other people who know anything of the ordinary relations of architects and clients, intended and expected from the first that Tolman should own the plans; yet the law as it is enabled Phelps to perpetrate a gross outrage upon his professional confidant and adviser, and, until it is changed, unwary architects need to have the dangers which it presents frequently pointed out.

ARCHITECTS, like other people, do well to be a little careful in dealing with strangers. A few days ago, two well-dressed gentlemen, who lived at a fine hotel in New York, went to a firm of architects, and told them that they had leased a piece of land on Broadway, and intended to build a theatre on it, at a cost of two hundred and fifty thousand dollars, and wished the architects to prepare plans for the theatre. We all know, to our sorrow, that architects are a credulous race, and the drawings were made, and delivered to the elegant gentlemen, who took them to some stone dealers, and asked for estimates for the stone. While the stone estimates were being prepared, another visit was made to a contractor, named White, who was requested to make an estimate for the construction of the building, and invited to take a share in the enterprise, as a member of the Arcade Amusement Company, which was to be incorporated for the purpose of building and managing the theatre. Mr. White promised to think the matter over, and a week later the gentlemen presented themselves again, and explained that they had met with a heavy loss through the failure of the Maverick Bank, in Boston, and had some large bills to pay, and would be glad of an advance of three hundred dollars. Mr. White suspected that something was wrong, but made an appointment for the pair to call again. They seemed to have made sure that he would give them the money, for it appeared afterward that they went almost immediately to a fashionable tailor, and ordered about two hundred dollars' worth of clothes. Instead, however, of treating them with the generosity they anticipated, Mr. White engaged two detectives to be present at the appointed meeting, and both the amateurs of stylish clothes were arrested on a charge of attempted swindling. One of them has already been arrested for smuggling opium and Chinamen from Canada into the United States, and it is to be hoped that both will be made harmless for a time by judicial process.

THE tower of the Madison Square Garden, in New York, which forms a very beautiful part of the composition, is to be made also a profitable one. The top of the tower is three hundred and forty-one feet above the ground, so that a

very extensive view is obtained from the upper chamber over New York, Brooklyn and Jersey City, with the harbor as far as Sandy Hook, the Hudson River and the Palisades, and the western part of Long Island. A large elevator, accommodating twenty-five passengers at once, makes regular trips to the top, while people who like exercise can reach the same point by climbing a staircase of six hundred steps. The tower is surmounted by a hollow copper figure of Diana, twenty feet high, with the crescent moon on its head. The crescent is of glass prisms, with two hundred incandescent lights behind it, and the figure itself, which turns with the wind, is illuminated by concealed lamps and reflectors. The whole affair is as curious as it is beautiful, and will be likely to prove an inextinguishable attraction to sight-seers.

THE old rule about chimneys was that they ought to have the flue tapered to the top, on the theory that, as the hot gases in them ascended, they cooled, and, in cooling, contracted; and that it was important to reduce the size of the flue in proportion to the reduction in volume of the gases, as otherwise cold air from the top would descend to fill the vacancy left by the contraction of the gases, and the draught would be checked. Reasonable as this theory seemed, practice has shown that cylindrical boiler or furnace flues are at least as good as the tapered ones, and within a few years practical engineers and architects of experience in such matters have inclined to make them slightly larger at the top than at the bottom, the increase in diameter being, perhaps, half an inch to ten or twelve feet. Recently, a Swiss engineer has made experiments to see whether the facts bear out the old rule, or support the more modern practice. To make the test, he built a chimney over a furnace grate, the stack having two flues. One flue tapered upward and the other downward, and the flues opened side by side over the grate, with openings of the same size. On lighting a fire on the grate, with unlimited access of air under it, the smoke was seen to issue nearly equally from the top of the two flues, but with an unmistakable preponderance in favor of the flue which enlarged toward the top. On partially shutting off the access of air to the fire, the difference became much more marked: the current in the flue tapering upward diminished, and finally stopped altogether, the smoke finding its way entirely through the flue with the wider top. Trials were then made to see whether the current in the flue with the upward diminution could be restored by partly shutting off the other. A damper was arranged at the top of the wide-mouthed flue, and gradually closed; but even after nine-tenths of the orifice of this flue had been shut off, no current was started in the other, and it was only after the wide-mouthed flue had been closed entirely that the smoke began again to pass through the tapering one. We believe that the old theory is now made to conform to the facts by explaining that the friction of the smoke against the sides is much less in a chimney tapering downward than in one tapering upward; but, however that may be, there seems to be no doubt that the downward taper is more favorable, under ordinary circumstances, than either a uniform section, or one diminishing toward the top. What the most favorable rate of increase is does not seem to be yet determined. The foreign experimenter, whose report in the *Schweizerische Bauzeitung* has been extensively copied, thinks that an increase of diameter at the top of about one inch to one hundred and twenty-five inches in height of flue is not too much; and he considers that ventilation-flues may, with advantage, be increased in capacity at a still more rapid rate.

THERE is one portion of the *American Architect* which we have at times felt may not receive the consideration its intrinsic excellence really deserves. Because of a misgiving as to the degree of interest that the majority of our readers feel in the fluctuations of the various markets we have thought it best to print our "Trade Survey" in small type, although by so doing we knew we sacrificed some part of the effectiveness which was really due to such well-considered effort. If any of our readers are not in the habit of reading the last column of each issue, he makes a mistake, as he thereby misses the instruction which is often to be found in these compact little essays in political economy, to say nothing of the advice and warning these surveys contain, which may be of the greatest value now and then to individuals.

ITALIAN ARCHITECTURE.¹—II.

THE MIDDLE AGES.—(Continued.)



Fig. 1. San Zenone, Verona.

WE come then to the ninth century, the period at which, as I have said, Lombard art asserted itself decisively. This date, let it be remarked, is posterior to Longobard rule. It is, in fact, to the ninth century that we refer the church of San Ambrogio at Milan, the edifice which presents the truest type of the Lombard church, with groined vaulting, differing from the Byzantine in the projection of the ribs and in the polystyle pilasters—the characteristic Lombard features. San Ambrogio was built by the archbishops of Milan, Angilberto II (824–860) and Ansperto (869–881), who had a powerful influence on the art of their time. Some writers, however,

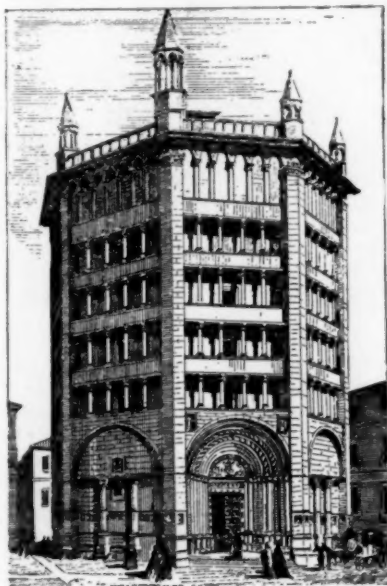


Fig. 2. Baptistry at Parma.

would now place the date of this basilica, which offers the earliest organic *ensemble* of the Lombard style, much later than I have done. This view is worthy of consideration, and, though I follow the most commonly received opinion here, it is not without reservation. Whatever may be the fact, it is true that the highest Lombard development took place in the twelfth century, with the cathedrals of Modena, Piacenza, Parma and Cremona.

Even in the north of Italy this style exhibits much variety. In the cathedral of Modena, for example, there are evident

Tuscan traces. This edifice was begun by Lanfranc, in 1099. In 1196, Pope Paschalis II, in the presence of the Countess Matilda, consecrated its altar to Saint Geminian; in 1159, Frederick I celebrated Easter there. There was then an Æmilian architecture of Lombard character, as also a Piedmontese, a Tuscan, a Venetian, and even a style peculiar to Como, all possessing the same general Lombard character. San Ambrogio of Milan has been cited; mention should also

be made of San Eustorgio, one of the most important Milanese basilicas of the ninth century, San Celso (end of the tenth century), San Sempliciano (thirteenth century), and San Babila; at Pavia, of San Michele, the oldest part of which may be of the ninth century, but belonging as a whole to the twelfth,



Fig. 3. San Miniato, Florence.

San Pietro in Ciel d'Oro (consecrated in 1136), Santa Maria del Popolo (twelfth century), San Teodoro (middle of the twelfth century?), and, just out of the city, San Lanfranco (end of the twelfth century) and San Lazaro (middle of the twelfth century); at Como, the magnificent church of San Abondio (eleventh century),—it seems to have been very well along in 1063,—San Carpofo, attributed by a few authors to the time of Liutprand (eighth century), but a trifle earlier than San Abondio, and San Fedele, belonging to a much more advanced period than San Abondio. In this list we must not forget the very singular church of Santa Maria del Tiglio, at Gravedona on Lake Como (end of the thirteenth century?).

The productions of Lombard art in Piedmont are also remarkable though there is a leaning here toward the French Romanesque. The following are noteworthy examples: the Cathedral of Montiglio (eleventh century?) San Secondo, near Montiglio (eleventh century?) and Santa Maria of Vezzolano, near Chivasso, where there is an evident Tuscan tendency; but especially important is Sant' Andrea of Vercelli, one of the most charming of Italian mediæval churches. It was founded by Cardinal Guala Bicchieri, in 1219, after his return from England. According to the chronicles, Cardinal Guala († 1227) had an English architect in his employ named John Dominic Brighinth or Brighintz. However, in the church of

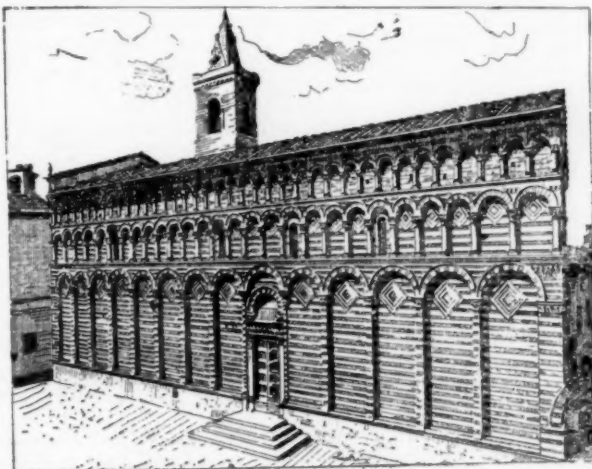


Fig. 5. San Giovanni Fuoricivitas, Pistoia.

Sant' Andrea, a double architectonic imprint is clearly recognizable. It is, in fact, the connecting link between the Lombard and the Gothic. The Cathedral of Trent exhibits the same peculiarities. In it the transition between the Germanic

¹From the French of Alfredo Melani, in Planat's *Encyclopédie de l'Architecture et de la Construction*. Continued from No. 829, page 97.

architecture of the close of the eleventh century and the Lombard, which had then reached its zenith, is very apparent,—as has been pointed out, among others, by Kugler [*Geschichte der Baukunst*, vol. II, p. 85–87]. According to certain German critics, this Germanic influence is also traceable in the church of San Zenone at Verona, completed in 1138, a basilica of considerable importance (Figure 1).

Lombard architecture flourished also at Padua. We call attention to the basilica at San Antonio, begun after 1231 and completed in the following century; the Lombard disposition is discernable in the mural masses, amid imitations of Saint Mark's at Venice and combined with tendencies towards the Gothic.

Taking the most direct route from Milan to Southern Italy, we encounter at Piacenza the magnificent Lombard cathedral begun in 1123 and finished in 1233; next comes the Cathedral of Parma, founded between 1055 and 1058 and completed in 1106, ruined and gradually rebuilt; and the original and interesting Baptistery (Figure 2). Not far from Parma is Modena, the study of whose cathedral will prepare one for a

façade, both in the mass and in the decorative system, could not be more Classic (Figure 3). Florence, however, was more conservative than the neighboring cities. Lombard influence was powerless here, although, as has already been said, it was very marked at Pisa, Lucca, Pistoja, Prato and Arezzo.

The Tuscan churches of this period are enriched with numerous small blind galleries, a feature which is far less prominent in the Lombard style of Lombardy; beneath are arches with vertical development, and there is everywhere a constant repetition of the column or light pilaster, as shown by the accompanying illustrations. Other characteristic features are found in the use, on the exterior, of alternating courses of white marble and green serpentine; and, in the entire exclusion from the ornamentation of intertwining ribbons, which occur elsewhere along with a great profusion of leaves and foliage.

The Cathedral of Pisa (Figure 4), with the leaning Tower and the Baptistery, furnishes a good example of these constructions. It was founded in 1063, during the pontificate of Alexander II; the Tower dates from 1123, and the Baptistery



Fig. 4. Cathedral and Leaning Tower, Pisa.

clear understanding of the art of the Lombard period in Tuscany.

Pisa, Lucca, Pistoja, Prato and Arezzo are the Tuscan cities in which this architecture appeared in its greatest perfection. It is perhaps unnecessary to remind the reader that in Tuscany—the land of Classic art—it would have been obviously impossible for the architecture of the Lombard period to develop as in the North. The Tuscan art of this time is therefore more Roman than Lombard proper. Again, Classic influence is everywhere manifest here, and with increasing force as Rome is approached. The conservative element, with a leaning toward the Classic forms of antiquity, has always predominated in Tuscany.

At the period of which we are writing, Tuscan life was calm and peaceful. Although offering the most direct route to Rome from the North, the country was but little devastated by war and remained, as it were, apart; it was the section of the peninsula that suffered least from invasions. This condition of things naturally found expression in an extremely conservative architecture. The basilica of San Miniato, at Florence, for example, which was rebuilt about the year 1000, has the organism of a basilica of the early days of Christianity. The

from 1163. There are many other very important churches in the same style, most of which I must pass over. San Frediano, at Lucca, is remarkable on account of its age—it was founded in the seventh century—and possesses characteristic gold mosaics. All of the upper part of the façade is adorned with work of this kind which was executed early in the twelfth century. The church was rebuilt in its present form by Prior Rotone, in 1112, and consecrated in 1147. At Lucca, I cite: the Cathedral (San Martino) and San Michele—the last with a façade rich in sculptures and mosaics. The cathedral apparently dates back to the sixth century, but it was restored about the middle of the eleventh and consecrated in 1070. The façade was completed later by a *Comacino*, Guidetto of Como, who also did a great deal on the façade of San Michele, a twelfth-century edifice. A very remarkable pulpit by the same artist in the church of San Bartolommeo at Pistoja is signed 1250. At Pistoja, I call attention also to what remains of the exterior of Sant' Andrea, said to be the work of Gruamonte, of Pisa, or Ravenna (?), and the north side of San Giovanni Fuoricivitas (1180?) likewise attributed to Gruamonte, architect and sculptor (Figure 5). At Arezzo, the magnificent church of Santa Maria della Pieve (thirteenth century) may

be cited; it is falsely attributed to Marchionne, of Arezzo, whose name is engraved on a bas-relief of one of the doors. At Prato, the twelfth-century cathedral (Figure 6) is worthy of our study.

Before entering Rome, a few words should be said on the subject of mediæval art in the island of Sardinia. It is a

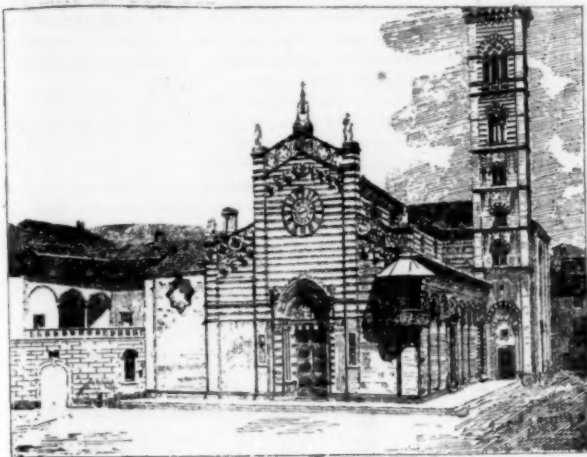


Fig. 6. Cathedral of Prato.

remarkable fact that it has much in common with Tuscan art. Italian writers make the mistake of ignoring entirely the Sardinian art of the Middle Ages. Of the monuments termed *nurhags*, the remains of the most ancient civilization of the island, little or nothing is known as to their authors or the purpose which they served.

Sardinia was ruled, in the Middle Ages, by the Pisans and the Genoese, and constituted the apple of discord between the two republics.

I remember having been deeply impressed with the peculiarly Tuscan character of the details of the right door of the Cathedral of Cagliari (Figure 7). Tuscan traces are likewise visible in the Cathedral of San Simplicio at Terranova (twelfth

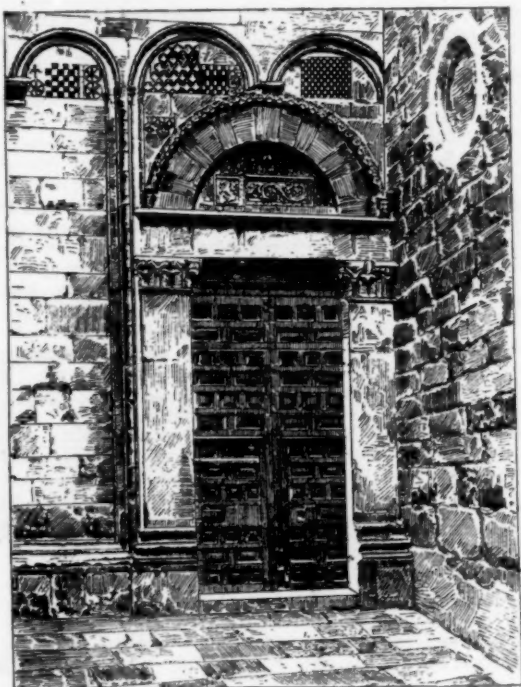


Fig. 7. Doorway of the Cathedral of Cagliari.

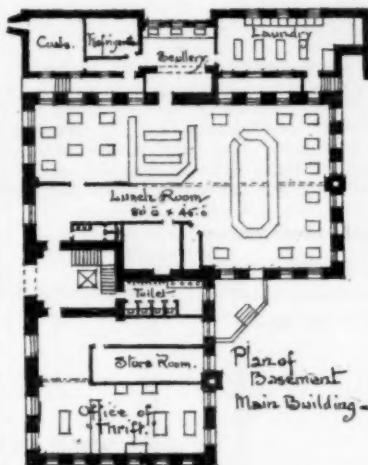
century), in San Michele of Salvennero, near Ploaghe (twelfth century), and in the abbey-church of Saccargia, near Condrongianos, which was completed in 1116.

The Tuscan architecture of this period has also some points of contact with Apulian art. But the direct influence of Lombard architecture in Apulia is likewise remarkable. For example, San Niccolo at Bari (eleventh century) recalls San

Ambrogio of Milan; the Cathedral of Bitonto somewhat resembles in certain portions San Giovanni Fuoricivitas, at Pistoja. However, Apulia, which was ruled for more than two centuries by the Greeks, the Normans and the Saracens, succeeded in harmoniously fusing the national influences with the foreign in its architecture, and the constructive and decorative elements were thus combined with science and with an exquisite and original taste.

[To be continued.]

THE PRATT INSTITUTE, BROOKLYN.¹



It is generally recognized that manual training is an important and necessary adjunct to the education of schools, and that mind, eye and hand must be trained together to secure symmetrical development.

The Pratt Institute was established with the object of promoting manual and industrial education, and developing habits of industry and thrift.

The Institute is based upon an appreciation of the dignity, as well as the value, of intelligent handicraft and skilled labor. It endeavors to give opportunities for complete

education; to establish a system of instruction whereby habits of thrift may be inculcated; to develop those qualities which produce a spirit of self-reliance, and to teach that personal character is of greater consequence than material productions. Its classes, workshops, library, reading-room and museum are designed with the best accommodation for these purposes.

The buildings are situated on Ryerson Street, and extend through to Grand Avenue, the principal entrance being on the former street. The main block is 100 feet by 86 feet, and six stories in height.

The Mechanic Arts Building, together with the extension to the main building, is 144 feet by 95 feet, the former being four and the latter five stories high. The Trade-school Building is one story high, and 103 feet by 95 feet. The construction is of brick, with dressing of stone and terra-cotta; the heating is by steam and the lighting by electricity.

The Institute is under the control of the Board of Trustees. The work is divided into departments, the heads of the various departments constituting the faculty, each member of which is directly responsible for the work of his department. In most of the departments, morning, afternoon and evening classes are held, and in all these the work is similar in nature, though in the evening classes the courses are of necessity abridged. Both sexes are admitted to the classes, and receive equal privileges.

The Technical High-school affords for both sexes opportunity for a three years' course in education such as is given in an ordinary high-school, and combines with this systematic courses in drawing and various forms of manual work. A school in which manual work is a feature has advantage over others in that it gives students better opportunities for discovering any aptitude they may have for a particular avocation, and it provides not only for the development of literary taste, but also of mechanical and artistic ability.

The plan of the school-building comprises portions of the third and fourth floors of the Mechanic Arts block. On the third floor are four class-rooms, 34 feet by 19 feet; one class-room, 25 feet by 14 feet; teachers' rooms, 24 feet by 14 feet; cloak-rooms, 27 feet by 15 feet; electrical laboratory, 29 feet by 23 feet; lecture-room, 38 feet by 18 feet; mechanical drawing-room, 36 feet by 30 feet; phonography-room, 24 feet by 12 feet. On the fourth floor are: chemical laboratory, 60 feet by 19 feet; physical laboratory, 60 feet by 19 feet; physical lecture-room, 34 feet by 20 feet; apparatus-room, 24 feet by 12 feet; office-room, 14 feet by 9 feet. The manual work for boys is under the Department of Mechanic Arts, and is arranged in graded systematic courses as follows:

FIRST YEAR.

FALL TERM.	Bench work.	Use of tools.
	Joinery and construction.	
WINTER TERM.	Wood turning.	Chucking.
	Straight and moulded.	Inside turning.
SPRING TERM.	Centre turning.	Spinning bowls and cups.
	Pattern making.	Draft-halving.
	Principles of mouldings.	Core-boxes and building-up.

¹ Being part of the series "American Construction through English Eyes" by a late holder of the Godwin Bursary, Mr. A. A. Cox.

SECOND YEAR.		
FALL TERM.	{ Moulding. Two-part Moulding. Ornamental pieces in bronze.	Core making. Swept-up work.
WINTER TERM.	{ Forging. Management of fire.	Drawing. Upsetting. Forming.
SPRING TERM.	{ Forging. Welding. Making steel tools.	Tin-smithing. Soldering. Sheet-tin work and brazing.
THIRD YEAR.		
FALL TERM.	{ Bench work. Chipping. Use of taps and dies.	Filing. Fitting.
WINTER TERM.	{ Machine-tool work. Theory of cutting-tools. Screw-cutting.	Turning. Boring.
SPRING TERM.	{ General tool-work.	Construction.

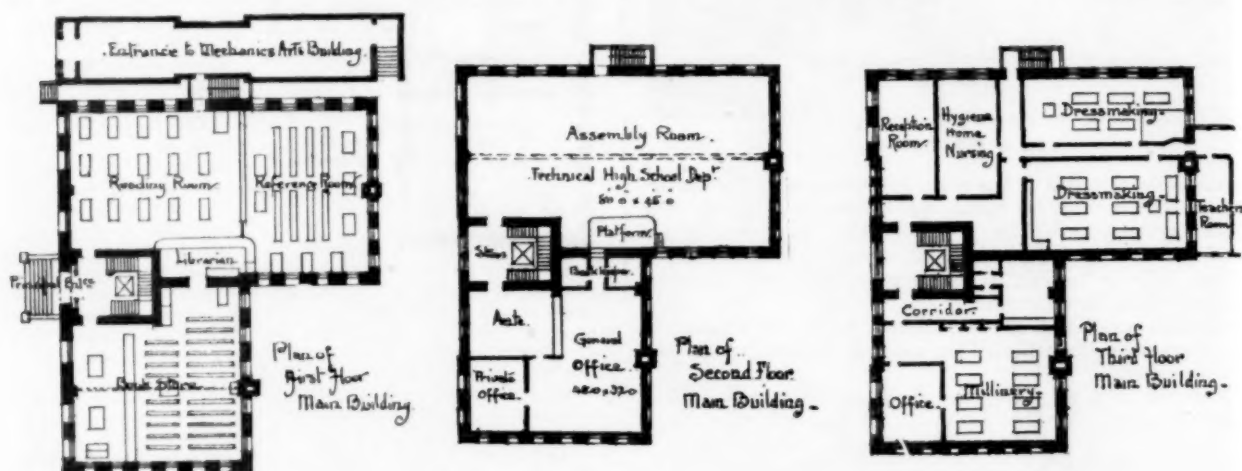
The shops and laboratories of this department occupy the entire first floor of the Mechanic Arts block: two rooms in the basement, two on second and two on third floor. The method of instruction adopted is: the teacher first executes the lesson, before the whole

after which more difficult pieces, such as pipe elbows, grooved pulleys and straight-faced pulleys, are expected.

The foundry is fitted with twenty moulding-benches for iron work and twenty for brass work, each being supplied with its set of moulding-tools and flask. A twenty-inch cupola, two brass-furnaces, a gas-furnace for white-metal and a core-oven complete the equipment. In this shop the patterns prepared in the previous year are first used, and by their use, the operations of two-part moulding are taught. When students become more advanced some ornamental pieces are moulded and cast in bronze and the process of making mould-boards from the object is explained. Casting in plaster from clay models is also taken at this stage.

The forge-shop is fitted with twenty-four power and one hand forge. The blast is supplied by a centrifugal blower and the smoke and fumes are carried off by an exhaust fan. Each forge is furnished with anvil, tongs, hammers and other tools. The care and management of the fire are first explained and afterwards working in steel is practised and sets of chisels and lathe-tools are made and tempered. To gain an idea of the exact treatment of the piece before dealing with the hot iron, many of the examples are first executed in lead by each pupil.

A portion of the machine-shop is devoted to tin-working and is furnished with furnaces, anvils, shears and soldering-irons for the



class, the proper method and the principles involved are carefully explained, and the applications of the exercise in practical work are pointed out. Each pupil then takes up the work, and the instructor gives individually what further advice or correction is necessary.

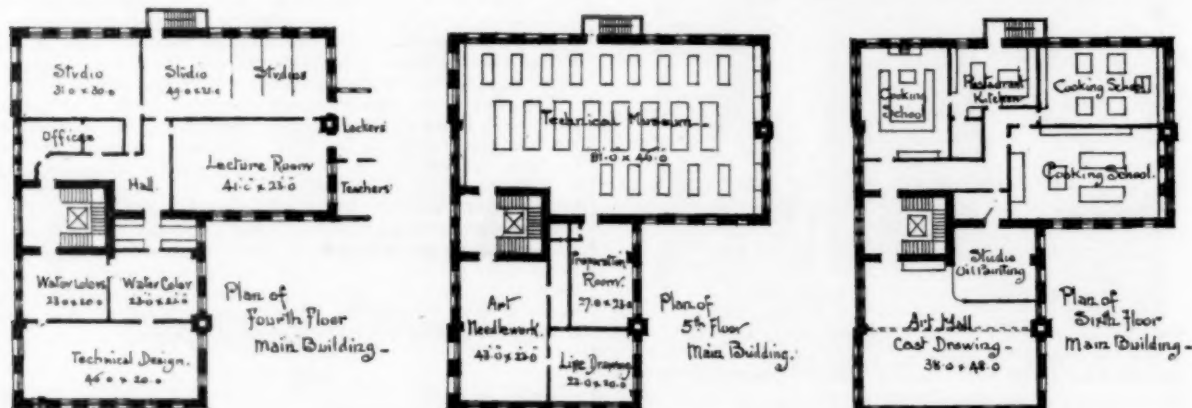
The wood-working bench-room is provided with forty-eight single benches, each supplied with a complete outfit of hand-tools, vise, tool-cupboard and drawers. The pupil is first taught the use of the saws, planes and chisels, and the proper methods of laying-out work, and, lastly, a few constructive pieces are executed; e. g., a small panelled door, sash-window, dovetailed box, etc.

The lathe-room is supplied with forty-eight nine-inch speed-lathes; each lathe has its complement of turning-tools and drawers for the work. The room also contains a band-saw, two jig-saws and the mill-tools for preparing stock, a double circular-saw, feed planer-

use of twenty-four pupils. The course comprises the preparation of different metals for hard and soft soldering, practice in soft soldering, brazing and the laying-out of simple pans, pipes, cups, elbow-joints, etc.

In the machine-shop, benches are provided for twenty pupils, each with vise and a supply of files, chisels, and other tools. The power-tools consist of eleven fourteen-inch engine-lathes, six speed-lathes, two twenty-four-inch and one sixteen inch planer, two upright drills, one universal milling-machine, one grinding-machine, one hand-lathe, one grindstone, and one wet emery-wheel. The bench-work consists of chipping, surface-filing, straight, parallel and round fitting, the making of calipers and try-squares and the use of taps and dies.

After this course the principles in electrical construction are taken and models of galvanometers, rheostats, voltmeters, ammeters,



and-jointer. It also contains twenty-four sets of bench-tools for pattern-making. The work in turning embraces straight-shoulder and moulded centre-turning in soft and hard woods.

The elements of metal spinning are next taken, and type forms of bowls, cups, vases, etc., are worked out in thin sheet-metal.

In pattern-making the operations of moulding is explained to make clear the function of draft, halving, cores, etc., and then patterns are prepared for some of the pieces to be used later in the machine-shop,

dynamos and motors are made. Instruction is also given in the theory of mechanism and the elements of machine design and resistance of materials and work in the testing laboratory.

The aim of the Trade School is to give a thorough grounding in the principles of a mechanical trade and sufficient practice in its different operations to produce a fair amount of skill of hand. Practice is given in the use of saws, planes and laying-out tools, followed by a course in joint-work, then some models of framing are made and

afterwards partitions are set and bridged, and floors laid. Doors and window-frames are made and placed in the partitions which are sheathed, clapboarded, shingle-covered and corniced, and lastly, interior trimming is taken up, in the form of stairways, wainscots, etc.

In bricklaying the pupils are first taught to handle the trowel and to spread mortar; exercise is then given in building nine, fourteen and eighteen inch walls, with square and blocked ends, and with a returned corner; then arches in walls of the same thickness are built and later flues, fireplaces, setting sills and corbelling. Each pupil works on a different section of wall and no attempt is made to do rapid work; but tests are given towards the end of the course, by pupils being placed side by side on a long wall and a greater speed attempted. Instruction is also given upon the strength of walls, theory of arches, properties and proportions of mortar and cements.

Instruction is given in plastering, in scratch-coating, laying-off, browning and hard-finishing, and in running and mitering small cornice mouldings. The surfaces for plastering are formed of shed partitions, lathed in the usual manner and arranged to present the conditions of an ordinary room.

The plumbers' shop is equipped for about fifty pupils, each one having a gas-furnace for melting solder and a drawer holding a set of tools. The work includes the use of tools — preparing wiping-cloths, tinning soldering-irons, brass, iron, lead and tin, making solder, soldering seams, making cup-joints, overcast-joints, straight-wiped-joints, flange-joints and branch-joints; working sheet-lead into bends, traps, service-boxes and safes, lining tanks, caulking iron pipe-joints, and bending with sand and kinking-irons. Instruction is also given in the proper arrangement of drain, soil and waste pipes, trapping and ventilating the same, supply-pipes, boilers, tanks, fixtures, pumps, and errors in plumbing are explained.

The instruction in stone-cutting includes straight surface cutting, finishing in various ways, chamfering, moulding, panels, and circular work. The course in stone-carving covers the principles of ornamental design and modelling, and previous to admission to this class pupils have to pass the free-hand drawing-class in the Art Department.

The equipment in painters' work consists of partitions containing doors, windows and wainscoting, and the course includes the preparation of surfaces, mixing paints, plain painting on wood, brick and metal surfaces, and later, hardwood polishing, flattening, polish white, gilding, lining, graining and paper-hanging. Instruction is given on the harmony of colors, mixing of colors, properties of oils and dryers and the various materials used in painting.

Instruction is also given in geometry so far as it deals with the properties of lines, angles and plane figures as involved in plane geometry; and in chemistry so far as it concerns the laws of chemical combination and the properties of the elements and compounds of inorganic chemistry, special force being given to the application of chemistry in manufacturing processes.

In electrical construction a knowledge of the principles of dynamic electricity and magnetism is afforded. The lectures take up the analysis of the magnetic field and lines of force, magnetic circuits, properties of electric currents, electric magnets, induced electro-motive force, electrical units and work of currents with the application of these principles to the construction of primary and secondary batteries, telephones, telegraphs, dynamos, motors, transformers, measuring-instruments, arc and incandescent lighting-systems, etc. The laboratory work deals with the verification of the laws of magnets and of induction, distribution of lines of force, winding armatures and in testing.

In applied mechanics, strength of materials and their behavior under various strains, resistance to tensions, compression, shearing and the theory of beams, cantilevers, etc., and the general application of these principles to building construction are taught.

In metallurgy, the properties of metals, ores, fuels, blast-furnace, puddling Bes-mer, open-hearth and the crucible process.

The object of the Art Department is to give thorough instruction in free-hand drawing and coloring, architectural and mechanical drawing, technical and decorative design, clay-modelling, wood-carving and art needlework. The classes occupy the entire fourth floor, half of the sixth, two rooms on the fifth and one room on the third floor of the main building, comprising in all fifteen studios and rooms especially fitted for the requirements of the various classes. Seven rooms are occupied by classes in architectural and mechanical drawing, wood-carving, water-color, design and art needlework; four studios with north light are appropriated to elementary classes for light-and-shade drawing and for clay-modelling; and the large art hall on the upper floor, lighted from the roof, is arranged for advanced work from the antique and from life.

The school is intended for those who wish to pursue, thoroughly and systematically, any branch or division of art-work and the courses of study are arranged to meet the requirements of three classes of pupils, namely, those who give to the work five days each week, those who give only two or three half-days, and those who give but their evenings.

A regular art-course is arranged for pupils who wish thorough training in light-and-shade drawing, coloring, and perspective, with work from the antique and from life.

During the first year, the study is directed principally to the choice of picturesque subjects, to perspective, broad effects of light and shade, and to the working of simple mediums. In the more advanced stages, sketching is considered in its relation to illustration and composition.

The course of study in architectural drawing affords students that training in drawing and design and the principles of building construction which shall prepare them for the work in an architect's office, or for an advanced course in architecture. The student is taught thorough and practical draughtsmanship and he is furnished with all the elementary principles of science and art from which advance may be made to a comprehensive knowledge of architecture.

There are also a mechanical-drawing course which includes the principles of machine design and construction; a course in applied design which provides instruction in decorative design and methods of practical application; a course in wood carving which meets the needs of those who desire a knowledge of technical methods of wood-carving and cabinet work, and a course in clay-modelling. In this course special arrangements are made for the study of working in clay. The wide extent to which clay-modelling can be directly used in the fine and the applied arts has justified a particular effort in this department. The work is conducted in four divisions.

1. The first is intended to supplement free-hand drawing from the antique and from life and to provide training for those wishing to make a specialty of advanced work in clay.

2. The second is for pupils of the normal class, who are instructed in the modelling of type forms, fruit, etc., and otherwise prepared to teach elementary clay work in the public schools.

3. The third is planned to meet the requirements of pupils in the architectural and the wood-carving classes and also those of the Technical High-school.

4. The fourth division is for pupils of the evening classes and the course is designed to give artistic training which shall be especially adapted to meet the needs of artisans and designers in silver, brass, iron, stone, wood and the numerous other branches of manufactured work to which modelled ornament is applicable.

It is the purpose of the Department of Domestic Science to afford girls and women opportunities for such training as will best supplement the education usually gained in their school life, and better prepare them to make home-keeping the high art that it should be. To this end, courses of instruction in cooking, household economy, laundry-work, hygiene and home-nursing, plain-sewing, millinery and dress-making have been established to encourage pupils to observe, and thereby give self-reliance.

The situation of the rooms devoted to this department are on the third and sixth floors. They are large, sunny, well lighted and ventilated, and fully supplied with apparatus essential for good work.

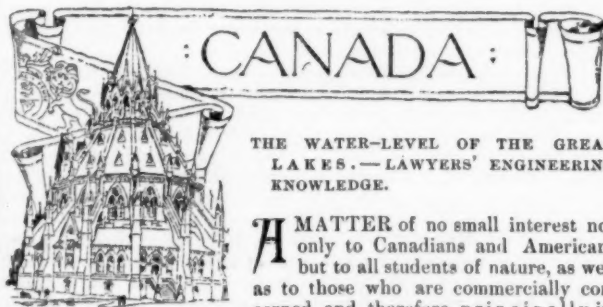
The remaining floors of the main building are occupied by a technical museum, library, thrift-office and lunch-room and the Department of Commerce.

The museum is placed on the fifth floor, and measures 81 feet by 46 feet, and receives light from windows on all sides. It gives accommodation for eight large horizontal cases and fourteen smaller vertical cases, with wall-cases under the windows on the end walls.

The library is on the first floor, and its dimensions are: reading-room, 48 feet by 45 feet; reference-room, 45 feet by 32 feet; lending-library, 47 feet by 45 feet.

The thrift-office and lunch-room are to be located in the basement, the details of which will be seen on referring to the plan.

The Department of Commerce occupies rooms in a portion of the third floor, in which stenography, typewriting and general commercial business is taught, and, in order to secure the best results, no student under the age of seventeen is received, nor any who cannot pass an examination in composition and spelling.



THE WATER-LEVEL OF THE GREAT LAKES.—LAWYERS' ENGINEERING KNOWLEDGE.

A MATTER of no small interest not only to Canadians and Americans but to all students of nature, as well as to those who are commercially concerned and therefore principally interested, is the change continually in progress of the level of the water in the great lakes of which the southern shores belong to the United States while the northern belong to Canada. Owing to the rapids in the River St. Lawrence, canals have been constructed for the passage of vessels up and down past these obstructions, and it is said that the water in these canals is lower than it has been for the last eighteen years. A large number of vessels have been delayed owing to the difficulty of getting through the canals during such low water, and, although the immediate causes of this are no doubt to be found in the absence of rain during August and September, and the prevalence of east winds driving back the waters of the lakes, yet it is a fact that there is not so much water in the lakes, out of which the St. Lawrence forms the passage to the ocean, as there used to be. A report recently made by General O. M. Poe, United States Engineering Department,

shows that the level of Lake Huron has gone down steadily since June, 1886, and that from that time to June, 1891, it has gone down nearly three feet. The level of Lake Michigan is now about twenty-five inches below its average level between the years 1860 and 1875, while the Chicago River is about one foot lower than it was five years ago. But it has been ascertained by means of careful investigation and observation that since 1838, when the waters of Lake Michigan and Huron reached a higher level than they are known to have reached before — namely, rising twenty-six inches above the average level — that there are periods of either five, seven or eight years during which the levels get lower and lower each year and rise again correspondingly. Various theories have been advanced to account for these changes, but after all, they seem to be due to nothing more than variations in the rainfall which decreases and increases apparently in corresponding cycles, though the reason for these variations in the rainfall may be further to seek.

The legal fraternity in Canada have had an unusually busy season in connection with contracts or disputes arising out of the results of contracts.

A few of our more prominent legal lights would probably find little difficulty in passing an examination as civil engineers if they desired to do so, for the amount of technical knowledge they have lately had to learn in connection with cases before the courts or before arbitrators, has not been small, and the lawyers on both sides have shown that they have not only given a great deal of attention to engineering, but have very well mastered the subjects, at any rate so far as the actions were concerned. The Dominion Government built a section of railway in British Columbia, which was to be taken over by the Canadian Pacific Railway, and has since been so taken over, but the Company were not satisfied with the condition of the road; declared it did not come up to the agreement and claimed no less than ten million dollars for alleged defect in the road, with such an amount at stake both parties to the arbitration set to work to secure the highest legal talent the country could produce, and shipped about a dozen great lawyers to the scene of the dispute, a distance of four or five days' journey from their homes, while they rattled their "quartars" in their breeches' pockets and cried "Damn the expense." Well it was worth doing so far as the Government was concerned, for the legal lights brought down the claim to just over half one million (\$579,000) which under the terms of the agreement of the reference to the arbitrators must be applied towards remedying the defects in the construction, pointed out by the arbitrators and under Government inspection.



PROFESSIONAL SQUABBLING. — NEW COMPETITIONS. — A CORRECTION.

SYDNEY, N. S. W.

UNMINDFUL of the fate which we are told befalls the house divided against itself, the conflict still rages between the New South Wales Institute of Architects and those who have seceded from it. In Melbourne, too, somewhat strained relations exist

between the Royal Victorian Institute of Architects and the Architectural Association. In both instances the contest is being carried on with a bitterness as intense as that which seems to distinguish the civil warfare of a South American Republic.

A conference of architects selected from both parties, was recently held in Sydney to try and bring about a reconciliation; but the attempt was rendered abortive by the extraordinary policy of the representatives of those outside the Institute, from whom the proposals for peace first emanated. These gentlemen had drawn up a basis on which they proposed a reunion should be effected. These conditions, which it is understood, were drawn up by Mr. John Sulman, F. R. I. B. A., were as follows:

(1) "That Mr. Horbury Hunt do now resign the Presidency forthwith, and also his *ex officio* position as member of the Council.
(2) "That the present Council and other officers resign, and be elected by the votes of all members subsequent to one month of admission.

(3) "That those gentleman who have been members of the Institute for the previous five years be readmitted without ballot, and those within the last five years shall be considered as fit and proper persons to be members, and shall be elected without being balloted for again. I also think we should be allowed to enter without payment of entrance-fee. Should any member have been in arrears with his subscriptions at the time of his resignation, such arrears to be paid on his re-admission.

(4) "That the resignation of several of us having been caused by attacks upon them by Mr. Hunt; that an expression of regret be published in the *Builders' and Contractors' News*, to the following effect:

"Having sincerely at heart the welfare of the architectural profession, I hereby express my regret that any word or act of mine should be considered to reflect on the professional or personal honor of my

fellow architects.' You will observe that this is couched in such a manner that any gentleman would sign it. It is merely an expression of regret for any words he may have used, that may have been considered to have borne a certain meaning."

Whatever may be thought of the third stipulation, the first, second and fourth are of such a nature that not even the framers in their most sanguine mood, could ever have hoped that they would be accepted. In No. 1, there seems to lurk a desire to gratify a purely personal animosity; but Nos. 2 and 4 are simply preposterous. As it was justly pointed out at a meeting of the Institute held to consider these proposals, it would be a gross impertinence, if it were not positively ludicrous, for any regularly constituted body to submit to the dictation of those who wished to avail themselves of the advantages of membership. Neither could it be expected that the Institute would abandon its well meaning, if impetuous, president, in order to avenge those who, to use Mr. Sulman's expression, may have felt themselves slighted "by any words he may have used, that may have been considered to have borne a certain meaning." This last clause, by the way, if somewhat vague is certainly exceedingly comprehensive. It is perhaps needless to say that the reconciliation is not yet accomplished.

The architectural profession in the Australian colonies is, of all others, the one that is most in need of cohesion, but distrust and dissimulation continue to characterize all our professional relations with one another; and the lack of intelligent, dispassionate criticism leaves us struggling very much where we were ten years ago. "The accursed greed for gold" is as keen now as in the Roman's day; and no consideration for anything so puerile as professional etiquette prevents one architect from insinuating himself between another and his employer; each is ready and eager to rise — in a pecuniary sense, even if his path to eminence is over the ruins of a brother's reputation. We lack unity of purpose in everything but this; and, in consequence, the public generally treats us with rather less respect than it does its tradesmen.

There is very little being done in the building trades in or about Sydney just now, but the majority of our architects are busy on competition drawings for a Government Hospital for the Insane which it is proposed to erect near Goulburn, N. S. W. This hospital is to provide accommodation for about 700 patients, and there are five premiums offered varying from £300 to £50. It is understood, however, that the winner of the first premium will be asked to carry out the work. As pencil sketches with a wash of neutral tint, only are asked for, the bait is a rather attractive one. Another Government competition for designs for a bridge across Darling Harbor are also advertised for with premiums of £700, £300 and £200. No limitation is made with regard to cost and the competitor is allowed, it would seem, to select any material he may think fit, as no mention is made of either iron, wood or stone in the conditions.

The *Australian Builder's and Contractor's News*, does me the honor to quote the greater part of a letter of mine appearing in a number of the *American Architect* just to hand, and incidentally draws attention to a stupid mistake made, in stating the distance between Sydney and Melbourne as 300 miles. The actual distance of course, by rail, is nearer 600 — to speak correctly, 576 miles.



EXHIBITION OF THE CHAMBRE SYNDICALE DES INDUSTRIES DIVERSES. — AN INGENIOUS MONTE-ESCALIER. — THE EXHIBITION OF THE CHAMBRE CONSULTATIVE DES ASSOCIATIONS OUVRIERES DE PRODUCTION.

FROM the month of July to the month of November we have had at the Palais de l'Industrie an exhibition of the industrial arts which, in itself, does not always present much of particular interest. Oftentimes it is the same monotonous affair, the same gathering together of the same articles, the same pieces of furniture, the same tapestries, and so on. Nevertheless, now and then we find that these exhibitions have something of enough novelty to deserve mention, such as the apparatus I spoke of last year, the "siren" designed by the engineer Chaboche, which contained in one cupboard a bath, and its heating apparatus and the other accessories.¹ This year I will speak of a "monte escalier" of original design, which I believe is hardly a practical invention. But if the exhibition is always the same, or nearly so, the administration which presides over it changes every year. In 1890 it was the Société Nationale des Sciences et des Arts Industriels; next year it will be the Union Centrale des Arts Decoratifs, which leads us to expect a more artistic exhibition. This year the exhibition was organized by M. Léon Ducret, President of the Chambre Syndicale des Industries diverses.

¹ See *American Architect*, November 29, 1890.

Apart from the commercial interest which these annual exhibitions present, the end which they always have in view is professional education. Thus, in the programme prepared by M. Léon Ducret, figures, apart from the ordinary attractions, an interesting innovation, namely, competitions in handiwork. In 1885 there was opened an exhibition of the results of instruction in industrial technique, with a working-section attached. Renewed in 1886 and in 1889, these exhibitions did not succeed. The workmen, thrown on their own resources and ill equipped with tools, made use of raw materials of low cost, and defective character, and the work they turned out showed it. It is not going to be so in the competitions in handiwork which take place during the present exhibition. In the three competitions that have been organized — one in cabinet-making, one in paper-working and one in the management of mechanical heaters — all the competitors are placed under identical conditions. Each of the twenty workmen called on to take part in the contest in these three industries receives the same raw material, and works upon it during the same length of time. The cabinet-maker is bound to make in two days an office-desk; the paper-workers will bind a ledger in two afternoons; the workers in heating-apparatus will, during one morning, take charge of the heating-plant of the exhibition, and by their manipulation establish their ability. Together with the committee of organization of the exhibition, a special jury will select the winners, who, besides diplomas, will receive an indemnity of ten francs a day and savings-banks books, the total value of which will reach the sum of six hundred francs. This novelty is interesting, for it excites a profitable rivalry not only with the workers, but with the public.

Before touching the subject which is of more present interest to the whole world — I mean the *associations ouvrières* — I will first say a few words of the "*monte-escaliers*" invented by M. Amiot, an engineer. Elevators, whose use spreads more and more, are not always easily installed. They demand a certain width in the staircase cage, or a special provision which by so much diminishes the



area, which can be made use of by the lessees. The piston demands the digging of a deep well, and this may be interfered with by the nature of the soil. How, then, to displace the elevator, and by what means to avoid the fatigue of walking up several flights of stairs? M. Amiot thinks he has answered this question. His apparatus consists, in its essential parts, of a kind of carriage, in shape like a stall, slipping along two rails, one placed above the other, and attached to the balustrade of the staircase. This car moved by a windlass, by means of a chain passing over pulleys, follows the inclination of the stairs a few centimetres above the level of the steps. In case the chain should break — a rather unlikely accident — the apparatus stops of its

own accord, and one has only to step down the height of a single step to find one's self upon the stairs themselves, in the same situation as a person ascending or descending the staircase afoot. These "*monte-escaliers*" only occupy thirty centimetres of the width of the stairway; consequently, they offer no inconvenience to the ordinary use of the stairs. They are easily adapted to existing staircases, and their installation costs twelve to fifteen hundred francs for the first story, and four or five hundred francs for each succeeding story. The apparatus not being greased from the outside, no stains need be feared neither for the staircase nor for the clothing. Finally, the motive power used may be anything you please — electric, hydraulic, compressed-air, etc. Its operation is simple.

These "*monte-escaliers*," which I have mentioned because of their novelty, are really very ingenious, and are certainly original. In spite of that, I do not believe that they will have a great success, and, in my opinion, there are certain inconveniences which one can take notice of on seeing them work. In the first place, there is thrown on the hand-rail and its supports a considerable weight, which needs to be provided for in constructing the staircase. Moreover, they impart to it a vibration which must eventually over-fatigue the ordinary staircase and injure its solidity. Perhaps, however, this apparatus can be of use when provision is made for it in a new construction, or the necessary precautions can be provided.

At the door of the Palais de l'Industrie, on the east side, rises an elegant pavilion, which attracts much attention, the entrance to which is free. It is a pavilion built by the *Chambre Consultative des Associations Ouvrières de Production*, established November 26, 1884. This *Chambre* has for its aim to take care of the general interests of allied societies by making available their industrial and

commercial relations; by seeking out work and obtaining the contracts; by taking account of the nature of the interested professions by centralizing all of the information that may be useful, and strengthening them with the public powers. Only societies entirely composed of workmen can be admitted to the *Chambre Consultative*.

At the first suggestion, which was made in 1882, of the formation of this *Chambre Consultative* (which is one of the phases of coöperative effort), the associations of workmen perceived what force could be found in such confederation. Isolated, they could make but little headway; banded together, they offered a serious point of support to one another; they became a force; they represented a social movement. What will be the results of this movement from the social point-of-view? This is a very delicate question, and much discussed. It is of interest to every nation, and will require long years before it is finally solved.

I have only to mention this movement without adding the least comment, and to point out the influences in France which have connection with these labor questions that are agitating the whole world. Up to the present time success has crowned the efforts of the *Chambre Consultative*. In 1888, it attained at the *Exposition des Travaux* a gold medal. The pavilion erected in common by the associations of building mechanics was much remarked. In the following years the *Chambre* pursued its labors with pertinacity, and sought means of establishing the credit of the associations. It took steps to obtain important work from the State, from the Department and from the City of Paris, and on the 4th of June, 1888, there was promulgated a decree which opened to these workmen's associations the State work. Finally, at the Exhibition of 1889, the *Chambre Consultative* was decreed a gold medal in the section of Social Economy. At the present time, the society is composed of thirty-seven branch associations, whose exhibition occupies the pavilion which I have mentioned as being near the entrance of the Palais de l'Industrie. Twenty-nine of the societies here exhibit their products. The pavilion itself is a veritable exhibition of works of art and building. The design was conceived, and the execution of it has been watched over, by M. L. Favron, director of the Society of Carpenters of La Villette. If it is true that no architect had a hand in the projecting and building of this pavilion, we can only offer our heartiest congratulations to the commission who had it in charge. The pavilion has a very individual air — striking, without being eccentric. It measures twenty metres in length by nine metres in width, and is twenty-six metres high. The plan is a rectangle, whose four angles have been cut off to give place for windows. The elevation offers three hipped roofs of parabolic section, the main roof being surmounted with a campanile. At each of the four angles is a small turret supported on the curved hip-rafters. The two principal façades are ornamented with pilasters supporting a balcony, and above these other pilasters support the fronton. The pavilion is entirely built of pitch-pine. The double staircase which conducts to the first story is elegant, and its hand-rail is of a delightful Renaissance design. The ceiling of the large hall on the ground-floor is remarkable, being due to the Society of Sculptor-Modellers, and evinces great ability in execution. Even the joiners themselves are deceived by it, so ably is the material and manner of working wood imitated. I do not mean to say that I approve these deceptions in the elements of construction, but here in this case, in a work which is shortly to be destroyed, it is allowable to be more indulgent, and the occasion offered a most tempting opportunity to the modellers to show their ability.

I will add that the State voted 60,000 francs, and the City of Paris furnished 50,000, towards the erection of this pavilion.



THE HIGH-BUILDING QUESTION. — THE TORRENCE TERMINAL. — A SUBWAY FOR THE PARK SYSTEMS. — THE MASONIC TEMPLE. — A POCKET FIRE-ESCAPE. — THE STATE BUILDINGS FOR THE WORLD'S FAIR. — OTHER BUILDINGS AND TOWERS. — THE RESTAURANTS. — CURRENT EXHIBITIONS.

THE discussion over the desirability of erecting high buildings is still continuing, in fact seems to be reaching the high-water mark of interest, and it is to be expected the matter will soon be decided. Doctors, builders, real-estate men and architects are all taking an active part in bringing the question to a settlement. Some of our leading physicians have taken a very decided stand against these high structures on sanitary ground, one of them going so far as to assert that "if these high buildings are erected upon both sides of any considerable number of streets it would be found that in not less than five years the occupants of such buildings would be furnishing a great deal more than their proper ratio of consumptives." He further adds: "There can be no great difference of opinion among medical men who have made a study of sanitary conditions regarding the deleterious effect of high buildings, which are disproportionate to the width of the streets, upon the community. They certainly

darken the streets to a greater extent than low buildings and impede the free circulation of air. Results of the work performed by health officers among the tenement-houses of older cities prove that the shutting-out of sunshine and free air greatly aided the growth of disease. Now, if sixteen-storied buildings, solidly lined up on each side of the street, are built in Chicago's business centre our business population would practically be in the same bad condition of the crowded occupants of the unhealthy tenements.

"The more the streets are shadowed, the more the direct sunlight is excluded, the greater is the danger of promoting the growth of microbe life, of low forms of vegetable growth, many of which are known to be deleterious to health and the cause of disease."

One ex-Commissioner of Health adds his word thus against the erection of high buildings: "In any neighborhood, to exclude light from offices occupied six or eight hours a day will affect the health of occupants. But in Chicago there are very special reasons why sunlight is necessary. We are occupying 'made land' and beyond that the land upon which we build is filled more or less with vegetable matter and the proper disposition of this vegetable matter, that is, to dispose of it in such a way as not to affect the health of those occupying the land, requires the free admission of sunlight and fresh air, for they are the great disinfectants which nature has provided to make habitation possible on our site."

One point brought forward by those not in favor of the giant skyscrapers is the unnecessary and inconvenient crowding of the streets in their vicinity by the multitude of their occupants. This is but a small point, but one worthy at least passing notice by those who are literally seeking to build up our city, and who as well as every one else experience the overcrowding of our business centres with the attending inconvenience and danger.

An ordinance relative to this subject has been introduced for the consideration of the city fathers, and has been referred to the committee on buildings. It prohibits the erection of any building more than ten stories high, except upon the recommendation of a board of examiners, two of whom shall be appointed by the Western Society of Engineers, and the third by the Chicago Institute of Architects. This board in considering applications for a permit for a high building shall consider the plans submitted with reference to the durability of materials, safety of construction, sufficiency of foundation, resistance to wind-pressure and incombustibility of material. This ordinance has not been acted upon, in the meantime those most interested in the subject, being the ones most active in investigating the pros and cons of the case.

The Executive Committee of the Illinois Chapter of the American Institute of Architects, had presented to it for its consideration, at a meeting of October 29, a letter from the Chicago Real Estate Board, relative to the height of buildings. It was decided to send by mail to each member of the Chapter the letter from the Real Estate Board, as well as the following resolution:

"After the passing of the necessary constitutional laws and ordinances, any building erected in this State (except grain or coal elevators or sugar-refineries) shall not exceed a height of one hundred and twenty-five feet from sidewalk grade to highest point of outside wall or flat roof; a pitched roof, however, may be permitted to extend above this line at an angle of not more than 60 degrees. The above proposed ordinance is not to include such strictly ornamental features as towers, domes, spires, cupolas or turrets, which may extend higher, provided they are fireproof; nor apartment-houses or family-hotels which, in no case, shall exceed one hundred feet."

The secretary further continues: "The Committee earnestly desire you to reply by return mail for or against [this resolution], or if not, to propose any amendment or suggestion, which from your professional experience you consider advisable to lay before them in order that a suitable reply may be forwarded to the Real Estate Board in time for their approaching meeting."

As a result of the ballot, a letter from the Illinois Chapter read at the monthly meeting of the Real Estate Board showed the feeling of the architects. The conclusion of the letter is as follows: "The result of the ballot has clearly shown an overwhelming and almost unanimous feeling among the members of the Chapter that some immediate action should be taken to restrict the height of buildings in the city. We therefore sympathize and cordially agree with the Chicago Real Estate Board in the movement it has begun, and, further, it may rely on our cooperation in the matter of assisting to pass an ordinance in the City Council for the above purpose. The Executive Committee also is prepared to meet the Board at any time it may appoint in order to present verbally and more fully the views of its association on this important matter."

The Builders' and Traders' Exchange addressed itself to the Real Estate Board to the effect that at an early date it expected to pass resolutions against the erection of high buildings, but that before condemning them it desired all information that the Board might have on the subject.

It is reported that the stand taken by this Exchange would have considerable weight in the City Council. After much discussion a resolution was finally passed by the Real Estate Board to the effect that the Public Service Committee use its best endeavors to secure the passage of an ordinance restricting office-buildings to a height of one hundred and eight feet, mercantile buildings to ten stories and apartment-houses to one hundred feet. This resolution, to be used as a recommendation to the Council, as it now stands, practically amounts to nothing, as very few of the high buildings exceed this

height, and the manner in which the opinion of the architects is treated makes it rather a farce to have ever asked for it. Thus we are now awaiting the final action of the City Council.

Another matter recently before the Council is embodied in the ordinance known as the Torrence Terminal. This ordinance was finally passed and seems to mean the first step towards the elevation of the tracks of the railroads, after their entrance within the city limits. When one considers that there are over thirty lines of railroad with all their passenger and freight traffic entering the city and some of them traversing miles of streets at grade, resulting annually in an enormous number of accidents and loss of life, the great importance of some vital change in the present system is apparent. The idea is to have a terminal railway company which shall make connection with the tracks of all roads as they arrive at the city limits. This company may build a system of elevated road-bed from the limits to the centre of the city as it may be able to obtain the right-of-way, and the expectation is that many of the railroads, especially those leasing terminal facilities from other roads, will eventually be glad to avail themselves of the elevated system, since the time gained in getting in to the heart of the city will be very materially reduced by not being obliged to run at the rate of speed demanded by the city ordinance. Should the city succeed in forcing all railroads to raise their road-beds many of the large lines would probably gladly avail themselves of this Torrence system as a matter of economy. The ordinance is extremely strict, giving the city almost entire control and supervision of the construction which is to have fourteen feet clear over all street-crossings. Also such minor points as the architecture of stations must be submitted for approval. The ordinance having been signed by the mayor the complete organization of the company is soon to be expected, and shortly following, the promoters claim, work will be commenced.

A scheme is at present on foot to unite the park systems of the north and south sides, in a manner that the river and crowded portions of the city should be avoided. The idea is to have a long tunnel nearer the mouth of the river than any of the present bridges, the northern and southern entrances thereto being a number of blocks from the shores of our beautiful stream. This plan is known as Mrs. May's Subway. It has been under discussion for some time, and is now finally being seriously agitated, with the possibility of being put into execution. The vessel-men endorse the project with only the proviso that where the tunnel passes under the river there shall be at least twenty-two feet of water above it.

A committee of north and south side property-owners have been appointed, and they are developing the plans previous to laying them before the Council. The city will not, it is expected, delay any of the expense of the enterprise, the money for it, it is thought, will be obtained by special assessment, rather than by general tax. The cost will be somewhere in the neighborhood of one million five hundred thousand dollars. It is considered possible to get under-way all the special assessment and condemnation proceedings and be able to begin work by the first of next March. Of course, no definite plan for the subway is settled, but at present the report is that the roadway of the tunnel will be forty feet in width, that the head-room of the section under the river should be fourteen feet, and that the foot-path should be ten feet wide and located on the west side of the driveway, and reached by stairways or elevators located immediately north and south of the river. That such a scheme as this is practicable has already been demonstrated by our two smaller tunnels. These, however, are given over to the use almost exclusively of the cable-cars, and are not in themselves attractive, whereas this one will be a continuation of the boulevards, from which cars and vehicles of traffic will, as a matter-of-course, be excluded, and will be as spacious and well-lighted as it is possible for an underground driveway to be made. Whatever of glory there may be about the plan will belong to the North Side woman whose name the enterprise bears.

The copestone of the great Masonic Temple here in our city has been laid. Just a year has elapsed in the construction of the twenty stories which compose the building. The ceremony without doubt was interesting to the brotherhood of white-plumed knights, but to the world at large a much more interesting performance was one which took place a day later in the same structure, when a successful experiment was tried by the inventor of a pocket fire-escape. The stairs in the building are not yet completed, and it was a tremendous operation: the climb to the top story enabled the spectators to fully realize the height from which the test was to be made. The machine which played the principal part in the experiment is a simple device. It consists of a metallic tape one-quarter of an inch wide and a thirty-second of an inch thick running on a steel reel which is fastened to a web belt that passes around the waist. The reel is provided with a brake whereby the person using it can control the speed of his descent. There is also an automatic brake to keep a required tension on the tape and thus prevent a sudden drop. The end of the tape is provided with a thumb-screw which can be fastened to the window-sill or any object in the room. The machine in appearance is like a fisherman's reel and is about twice the size of a spool of thread. The experiment was entirely successful but, to say the least, decidedly ghastly at the commencement, when after having placed the thumb-screw and adjusted the webbing belt, the inventor stepped off apparently into space from the twentieth story. He at first descended slowly, then faster and faster till it seemed as if he must have lost control over the little machine, the slender tape

of which could scarcely be seen, and at any time looked no larger than an ordinary cord. At the tenth story the man stopped suddenly, gave the crowd beneath time to compose itself and then made another run to the seventh story, from which he descended running and stopping by turns till he reached the scaffolding where he took three men onto the line with him and dropped to the ground with them. If the invention is what it appears to be it is a very ingenious one, and one which will be of great use to mankind.

Things are, of course, progressing in World's Fair matters. Plans now being made are chiefly for the State and foreign buildings. Illinois and Wyoming have submitted plans which were approved. Other States have designs prepared which have been accepted by their own State boards, though they have not yet been presented to the Construction Department. This is the case with Massachusetts, Wisconsin, West Virginia, Indiana and Michigan. The West Virginia structure, somewhat unique, will be a building in the Colonial style, a type of the houses common in Virginia and West Virginia. It is simple in its outlines, but is not a copy of any of the old Virginian mansions, but is intended to embody some of the best features of these houses. It is to be a frame structure, finished with considerable detail on the exterior. There will be extensive wood-work in the interior, which will serve as an exhibit for the best native woods of the State. On the west and east ends will be covered piazzas of hospitable dimensions. The structure will be used for social purposes rather than for exhibit-rooms for the State. There will be club-rooms, smoking-rooms, reading-rooms, lounging-rooms, and other similar apartments.

Florida intends to reproduce Fort Marion for her building, and if the plans are carried out a structure of unusual character will be secured. According to description, "Fort Marion" is supposed to be the oldest structure in the United States. It was built by the Spaniards at St. Augustine in 1620. It is of stone and covers a space of about one hundred and fifty feet square. The walls are twenty feet high and nine feet thick at the base. It is a rectangular structure, the interior court being about seventy-five feet square. Within the fort are some twenty-four rooms. The reproduced structure on the Fair Grounds will be frame covered on the outside with the phosphate rock of Florida, to give an imitation of stone. The walks on the parapet and within the inner court will be covered with the celebrated pebble phosphate of Florida. This use of the material will constitute the State's phosphate exhibit. The old fort is encompassed about with a deep moat. This moat will be reproduced and will constitute a sunken garden in which will be shown all of the tropical plants of Florida.

The plan of the Casino, previously mentioned in these letters, has been abandoned. The pier, one thousand feet long, running into the lake has already been built, and will, of course, continue to stand, but the Committee on Grounds and Buildings have decided not to construct the Casino, on the above-mentioned pier, which would have brought it opposite the Administration Building. Instead of that the plans are changed so as to form a peristyle on the shore, sixty feet wide and five hundred feet long, running north and south and connecting two new buildings, the Music-Hall, and a café. The Music-Hall will be at the north of the peristyle, and will be given over to the use of fine soloists and other representatives from the first ranks in the musical world. The café will be at the south end and will take the place of the abandoned Casino. The thirteen columns representing the thirteen original States, as planned by the sculptor St. Gaudens, are also to be given up and their place taken by forty-eight columns in the peristyle, representing all the States in the Union. It seems as if this change might be regretted, for, if one could judge from the model and drawings it was one of the most attractive features of the grounds, while the present design would seem to be extremely commonplace, and whereas one might stop to admire thirteen columns, forty-eight would be too much of an undertaking and would simply be voted a bore.

Permission has been granted to erect five observation-towers on the grounds. They will be two hundred and fifty feet high, and will have elevators running to the different buildings. At the base the space enclosed will be over one hundred feet square, and the plan is to use this for a restaurant. The company has decided to erect one at the head of Sixty-third Street, which will be completed early next year. A passage for temporary use will connect this with the region beyond the Fair grounds, so those desiring to watch operations before the opening of the Fair will be able to do so.

The Columbian Tower Company, it is said, has also nearly completed arrangements to build a tripod-tower near Fifty-seventh Street and Stoney Island Avenue. It will cost, so report goes, six hundred and fifty thousand dollars. The first landing will be five hundred feet from the ground, with double pavilions, one twenty feet above the other, each suitable for a café. Six electric elevators will run from the ground to the first landing. The second landing will be nine hundred feet above the ground, the third, twelve hundred feet and the fourth, fourteen hundred feet. The top landing will have two sky-parlors, one ten feet above the other. Three electric elevators will run between the first and top landings. The floor-spaces of the sky-parlors will be about eight hundred square feet each. The wigwam at the base, three hundred and more feet on each side, is to be fitted up with cafés and booths after the different styles and customs of foreign countries. But when all this much has been said, we may add that we have become a little sceptical on the tower subject, as well as on the subject of Oriental streets, scenes, bazaars, etc.

The prize of fifty dollars for the design for the seal for the Lady Managers was awarded to a Chicago woman, Mr. St. Gaudens acting as judge. There is on the seal a ship, to commemorate the voyage of Columbus, the eagle from the United States coat-of-arms for loyalty, ivy for friendship, laurel for success, and a star for each member of the Board of Lady Managers. Under the ship is room for a motto, if desired. The ship holds the central position, underneath this the eagle spreads his wings, holding in his beak a laurel-wreath, while a branch of ivy fills in the space under each wing. The stars enframe the whole, and the official title of the Board surrounds all.

One interesting feature of the Fair will be its restaurants and the plans for them have just been completed. The feeding of the vast crowd that will assemble on the grounds is no small part in the whole colossal undertaking. There will be one hundred and fifteen dining-rooms, twenty-seven restaurants, seventeen complete hotel kitchens, and one thousand cooks and scullions. It has been estimated that if the dining-rooms were thrown into one great hall it would cover five acres and six thousand five hundred people can sit down at the same time. The restaurants will, of course, be placed in the different buildings so, wherever one happens to be at meal-times, a place will not be far off for refreshing the inner man. There will be sixteen restaurants on the main floor of the Manufactures Building, located under the galleries and just within the loggias, on the east and west sides of the building. Entrance to the restaurants will be made from the inside as well as from without, and in pleasant weather lunch will be served in the corridors. These dining-rooms are each one hundred by twenty-two feet. They are supplied by eight kitchens on the main floor with store-room and dining-room for servants in the basement. In the galleries are to be twenty-six private dining-rooms, connected with the kitchens and restaurants by dumb-waiters.

In the Mines Building there will be one restaurant, forty by one hundred and sixty-two feet, and five dining-rooms, forty by twenty. The restaurants in the Electricity Building will, so far as situation is concerned, be the most attractive on the grounds. They will occupy the big bays at the north end of the building, and will overlook the lagoon and the island.

Machinery Hall will have four restaurants, with a seating-capacity for nearly five hundred guests, and private dining-rooms seating over three hundred.

The Horticultural Building will have two restaurants, one at each end of the pavilion. These rooms are one hundred feet square, and will seat one thousand people.

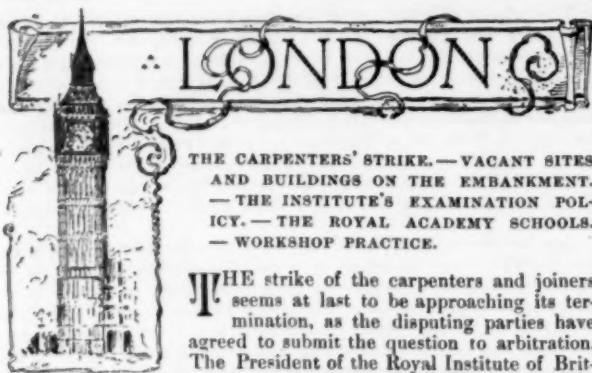
At the restaurant in the Fishery Building, which will seat two hundred people, nothing but fish and oysters can be obtained. Equally in keeping with the Transportation Building will be a typical American railway lunch-counter, where two hundred hungry mortals can be satisfied at once. The cow will do her utmost to feed the hungry in the Dairy Building, the lunch there being restricted chiefly to her products.

To offset this glimpse of a carnal future, Chicago is at present enjoying two fine art-exhibitions. The Chicago Society of Artists have just held their annual fall exhibition in the Club's new quarters in the Athenæum Building. The floor on which the little gallery is seems to be quite given over to the use of palette and mahlstick, and, with the doors open into the different studios, presents a pleasant picture of Bohemia. The galleries of the Artists' Club are very pleasant, with dun-colored walls, which generally are becoming to the pictures, though occasionally they hurt a gray or misty one. The exhibition this year is composed of many sketches, and they all, at the close, are auctioned off. What an end! Get rid of them at any cost, and sketches at that; it seems like selling one's birthright for a mess of pottage. With such a scheme, one is surprised to find the work so good, and that earnest effort has been crowned to such an extent with success. The Club has never done such good work as is shown this year at the exhibition, and the new names on the catalogue would indicate that there is a different influence working in the right direction among the group of artists.

The Art Institute is at present holding its annual exhibition of American oil paintings. As the annual fall exhibition at the Exposition was this year discontinued, Chicago was expecting more than usual from this exhibition. Some of our best men are represented, but some of their good work even can scarcely make one forget the absurd affectation of some of the canvases. In several corners the impressionist fever rages in its most malignant form, while one or two pre-Raphaelite monstrosities make one turn with delight to such pictures as Benson's "Twilight" or Simmons's head of his mother.

Benson's "Twilight," already the recipient of the Clark prize in New York, carried off one of the two prizes here, while upon Gari Melcher's "Pilots" the other was bestowed.

PARIAN MARBLE.—English sculptors are disgusted over the failure of the Glasgow enterprise which was to reopen the quarries in the Island of Paros, which are known to have furnished the ancient Greeks with some of their best marbles. The specimens which were brought back by the engineer sent out from Glasgow to investigate the quarries were of a fine rosy color and a beautiful grain. Mr. Stirling Lee and Mr. Onslow Ford were emphatic in giving the marble preference over that of Carrara. But British capitalists have locked up millions in Carrara and the Paros quarries will have to remain undeveloped until other and less burdened men take them in hand. The marble would be cheaper than Carrara.—*N. Y. Tribune.*



THE CARPENTERS' STRIKE.—VACANT SITES AND BUILDINGS ON THE EMBANKMENT.—THE INSTITUTE'S EXAMINATION POLICY.—THE ROYAL ACADEMY SCHOOLS.—WORKSHOP PRACTICE.

THE strike of the carpenters and joiners seems at last to be approaching its termination, as the disputing parties have agreed to submit the question to arbitration. The President of the Royal Institute of British Architects has been selected as the arbitrator and he is now engaged in hearing the case. The general expectation is that a compromise will be arrived at, and that the award will fix 9½d. an hour as the standard rate of wages. Meanwhile the men have returned to work, and at last after a delay of nearly six months, after an expenditure of £50,000 in strike-pay and after a serious loss to capital on account of the stoppage of important buildings, matters are to be permitted to resume their normal aspect. The whole summer has been wasted, the men are entering upon the winter in an impoverished condition, and most London buildings have suffered severely from the weather and show signs of lasting injury. And what is the good of it all? It seems strange that men should voluntarily choose to inflict such an injury upon themselves and their work when the whole thing might have been settled as easily six months ago as it is now.

The tenders for the new Municipal Lodging-house that the London County Council are proposing to erect near Drury Lane have been received and from various reasons have proved to be considerably higher than the Council originally contemplated. In the conditions of competition which were issued when the idea was first mooted it was stated that a lodging-house for 370 men could be erected to pay a reasonable rate of percentage, at £10,000, but the tenders received show an increase upon this figure of nearly 40 per cent. It is evident that this increase in the cost of the building must involve a corresponding increase in the charge per night for the beds, and this is a pity, for the Council practically pledged themselves to show that first-class accommodations could be provided at the same rate which is charged for inferior accommodations at private institutions. As matters have turned out, the Council can hardly be congratulated upon proving its case, although this building being (as I have previously explained to you) the first of its kind, it should be regarded rather in the light of an experiment, and probably in future ventures a considerable saving will be effected, as experience will show what can safely be omitted.

An amusing incident took place the other day in the City. At the eastern end of the Thames Embankment, behind Blackfriars Bridge and the Temple, lies a large piece of open ground that came into the hands of the City when the large gas-works which existed there were cleared away. The City of London School and Zion College occupy a portion of this land, but the corporation have never been able to find a purchaser who was willing to pay a sufficiently high price for the piece under consideration. To the great horror of the inhabitants of the ward, it became rumored that the Salvation Army had made the City an offer for the land to erect thereon a Central Temple, or Barracks, or whatever they call it.

The character of the Salvation Army building is too well known, and a public meeting was immediately held under the presidency of an ex-Lord-Mayor, Sir Polydore de Keyser, where indignation ran high, and the meeting decided by an overwhelming majority to petition the corporation not to allow the Salvation Army to disfigure "the finest vacant site in the metropolis." What will be the effect of this action remains to be seen, but we cannot help feeling sympathy with the inhabitants in their desire to protect their ward from the innate vulgarity of the Salvation Army.

Other building operations are, however, taking place upon this section of the Embankment. The London School Board are erecting a large new Board-room, at a cost of £60,000, from the designs of Mr. Edis; and, still higher up, a building is being erected which is but too characteristic of the stupidity of some of our government departments. The building alluded to is an addition to Somerset House, and is characterized in an able letter by Mr. I. Mullett Ellis as a monstrosity for some branch government department, in the commonest brick, without the least appearance of ornament or design, and utterly devoid of architecture of any kind. "To my mind," goes on the writer, "the river front of Somerset House, in its beautiful stone and stately style, presents one of the most dignified aspects of any building in London. That there should be additions to this historic edifice in ugly, common brick (above the skyline)—additions that bear no relation whatever to the style or proportions of its parent building—is an emphatic disgrace that we must not and cannot permit."

I took an opportunity of looking at the building referred to, and I heartily endorse all Mr. Ellis says. Between Waterloo and Charing Cross, the Embankment has been permanently disfigured by several

large buildings put up by inartistic and incompetent architects; but on the other side of Waterloo Bridge, the buildings, individually and as a whole, are of a high order of merit. For their beauty to be destroyed by this brick pile is bad enough, but, when the offender is the government itself, the offence deserves the most severe treatment at the hands of the public.

If an historian wished an account of the progress of architectural thought in England, he would probably provide himself with copies of the Presidential Addresses delivered annually by the Presidents of the Royal Institute of British Architects and the Architectural Association. The one is usually an epitome of the chief developments of opinion and the great events of the year, regarded from the point of a conservative society of the elder men; the other, perhaps of a less extensive range, looks at the questions through the rose-colored glasses of youth.

The Presidents this year are Mr. McVicar Anderson and Mr. Frank T. Bagallay, and I will deal as briefly as I can with the two addresses, and see what can be learned from them. Mr. McVicar Anderson, speaking from the Institute chair, began his address with a justification of the Institute's policy of examination. It is notorious that this policy has been challenged over and over again, and that some of the most able architects of England—Mr. Norman Shaw and Mr. C. F. Bodley, to wit—are dead against anything in the nature of an examination. But, as Mr. Anderson justly points out, architects are being examined every day. Is not the Academy itself hedged round by a very stiff entrance-examination, at which the dissentient architects are themselves examiners? Are not the architects of nearly all our great public buildings selected by competition, which is only examination in another form? These are certainly difficult nuts for the dissentients to crack. And then, further, it is not as if the Institute shut the door of the profession against all comers who had not previously proved their mettle in the examination-room. All the Institute wishes to do is to lay down the law that every person wishing to enter its ranks must have followed certain courses of study, and must, at all events, have proved that he possesses a certain minimum knowledge of the laws of composition and design, and that he is able to construct his buildings upon scientific principles. Surely this is better than simply fixing a money value, on the payment of which any charlatan could practically pose before the public as a member of an honorable body of architects. To me, and to most men, I think, the position of the Institute is an impregnable one, and perfectly logical and justifiable. Indeed, could there be a better justification than the fact that the number of candidates who offer themselves for election is now almost double what it was before the institution of the examination, notwithstanding the fact that a large percentage (at the last examination over sixty per cent) get sent back to their studies for a year, or even longer.

When, however, Mr. Anderson goes farther and argues that because the examination for Associateship has been so successful, the Institute should go farther and impose a compulsory examination for the Fellowship, I think he is going too far. It is all very well to examine schoolboys and students—even young architects of twenty-four or twenty-five do not mind submitting themselves to the ordeal of examination—but when it is seriously proposed to bar the entrance to the Fellowship by an examination, it becomes a question whether the policy is not carried too far. It should be remembered that an architect must have been seven years in actual practice before he is eligible for election to the Fellowship, and as most architects do not start practice here till they are at least twenty-five, the prejudicial character of such a proposition becomes evident. It would be another thing altogether if a by-law were enacted requiring that Fellows should be only recruited from the ranks of Associates. This, there would be little harm in, but beyond this a good many people here think the Institute ought not to go.

Examinations naturally led on to education and some cheery words of encouragement were given to the Association to persevere in its new venture. The other educational institutions were briefly referred to, but there seems some fear that the policy of concentration which the Association has adopted will weaken considerably the rival colleges—for that is really what they are. Indeed, in conjunction with the unfortunate policy pursued by its governing body, it is having a serious effect upon the Royal Academy itself. The Royal Academy Architectural School is—not to mince matters—undoubtedly mismanaged. As you know, the architect representatives are in an enormous minority in the governing body of the Academy, and the painters, who seem to imagine they can rule everything, have enacted among other things, that no student over twenty-three years of age shall enter the Academy schools. This enactment may be all very well for painters and sculptors, but it deliberately cuts out nearly half the architects. This, and other similar absurd and ill-considered regulations are having the effect of ruining what should be our National School of Architecture: the folly of the policy is the more evident, when it is in direct opposition to the views of the architectural masters and of the architectural R. A.'s and A. R. A.'s. They will find it out some day when they get no students.

The limited competition for the completion of South Kensington Museum drew from Mr. Anderson some severe remarks on the immorality of competitions in general. He could not, however, do other than offer warm congratulations to Mr. Aston Webb upon his success and upon the thoughtful character of his design. The

design was, however, novel, and this led Mr. Anderson, who is a Tory of the old school, to regret the craze for novelty in the architecture of the day. Beauty, proportion, grace and strength were all thrown overboard in favor of something novel — something that has not been done before by somebody else — and Mr. Anderson expressed the hope that before long a reaction would set in in favor of the pure Classic proportions of his early days.

The carpenter's strike was, of course, referred to, and Mr. Anderson spoke with some feeling upon the gratification he felt at the prospect of an early settlement. Before he accepted the post of arbitrator, he made it a condition that, before he heard a word of the case, the men should at once return to work. His award has not yet been declared, but there is little doubt that it will be a very just one. Another matter which excited the indignation of the meeting was the addition to King's College, but, as I have dealt with this matter, as well as the strike, further on, I need only say that the meeting expressed its feelings in a resolution, which was ordered to be sent to Her Majesty's Office of Works and to King's College, who, it appears, is really responsible for the eyesore.

These are the main points of Mr. McVicar Anderson's careful address, which was received with loud applause and expressions of satisfaction.

Mr. Baggallay's address to the Association naturally dealt to a great extent with the new educational developments. These he summed up very well into four central ideas, which were:

1. The substitution of a series of classes, arranged on a comprehensive system, for the old classes, all independent of one another, with a view of conducting students through a regular course.
2. The substitution of a single responsible teacher or lecturer in most cases for a group of voluntary instructors, with a view to making the instruction more consistent, consecutive and effective.
3. The filling-up of gaps, and making the course complete.
4. The provision of a place in which students can make their drawings and designs under the superintendence of competent instructors, with the advantage of their advice while at work, instead of only having their criticism when it was completed.

An important suggestion of Mr. Baggallay's was that a "little workshop practice" should be added to the curriculum. This is, perhaps, the first public indication of a development which a good many architects in England hope to see take place. The school of Sedding, which is growing every day, holds that an architect should not receive a purely class-room education, but that he should be encouraged to work in the shops and see the different materials dealt with. There is no doubt that such a system of education approximates more closely to the plan followed by the architects of the Middle Ages, and that the Classical professor of to-day is generally of an inartistic temperament. The influence of the revival of letters upon art is generally accepted to have been deleterious, and there is, indeed, much to be said in favor of those who wish to convert the modern architect from an eminently respectable professional man into an emotional artist, who is not ashamed to own his connection with the craftsman and worker in wood and metal. This view, though regarded as rank heresy in official quarters, has many adherents, and seems to me to be the direction in which the pioneers of our profession — or of our art, shall I say? — are steadily tending.

AN EXHIBITION OF WALTER CRANE'S WORK.



exhibition of Mr. Walter Crane's work at the Boston Museum of Fine Arts is full of interest and charm. It occupies the three print-rooms, and consists of many hundreds of drawings, both in black-and-white and in color, for books, numerous cartoons for decoration, with specimens of his wall-paper designs, and oil-paintings and water-colors.

In the first section, we may renew acquaintance with the wonder-stories of our early years, with Bluebeard and Ali Baba, Valentine and Orson, Puss in Boots and other princes, heroes and monsters of fairyland, now so glorified by the artist's cunning hand that they seem once more to resume their former sway over us. Mr. Crane's presentments of these old favorites are worthy of our childish ideals, and what more can be said in their praise? Many designs for the illustration of "older," we will not say more important, books are shown. Here are the drawings which accompanied the artist's own poem, "The Sirens Three"; those made for "Pan-pipes"; the dainty fancies which make the links of the flower-chain of "Flora's Feast"; the exquisite pencil-drawings executed for "The First of May"; and over one hundred of the original sketches in black and red drawn for "Echoes of Hellas," a delight for whose appreciates the spirit of Greek art, here displayed in title and half-title, border and vignette, and all the other parts of a beautiful book. Here, too, are profusely spread the inimitable headings, tail-pieces, initials and other illustrations to Grimm's "Household Stories"; the pen-drawings of the frieze illustrating Longfellow's "Skeleton in Armor," made for the late Miss Catherine Wolfe's house of "Vinland," at Newport; and the original designs for Mr. Crane's latest book, one not yet "out," "Queen Summer," wherein again his rich yet delicate fancy plays around the flowers.

An interesting and admirably-drawn design is "The Triumph of Labor," a procession of happy workers, executed to commemorate

the Labor Day of this year, which reminds us that Mr. Crane is a Socialist. If we could only keep him here, and send back to the Old World in unfair exchange a few thousand of some other Socialists who would make life hideous, while he tries to beautify it.

We wish there could have been shown at this exhibition in some form the designs for the large panels Mr. Crane has painted for the walls of the Red Cross Hall, in Southwark. These record some "heroic deeds of the poor," rescues from burning buildings, from the sea, from the mine, from mad animals, and other brave acts. The twelve small sketches for these panels were shown at the Arts and Crafts Exhibition in London last year.

Sir Arthur Helps once wrote: "My man who is to succeed must not only be industrious, but, to use an expression of a learned friend of mine, he must have 'an almost ignominious love of details'"; and in Mr. Crane we have a noteworthy example of the joining of these two qualities. With him, nothing is neglected, and almost everything that is added is a gain. And all the details are in keeping with the general scheme. A fellow-worker of Mr. Crane's, William Morris, designed the type and initials of his own latest book, and we find from this exhibition that the former does not disdain to design "printer's headings," which, perhaps, it will do no harm to say, are ornamental designs to be engraved for headpieces for books or magazines.

In one of the notes printed in the pretty little catalogue of the exhibition, Mr. Crane says that it was not possible to arrange any specimens of his designs for stained-glass or furniture. Architects will regret this, but pleasure and profit may be gathered from an inspection of the examples shown of wall-paper both printed and stamped, of cartoons for mosaic, of the reliefs in gold and color, modelled in gesso, and other decorative work. Among these are some cartoons showing portions of the frieze in the famous "Arab Hall" in Sir Frederick Leighton's house, and others designed for another mansion, that of Mr. Stewart Hodgson, for which Sir Frederick painted his "Daphnephoria." Most architects must be familiar with Mr. Crane's admirable wall-paper designs and so we will not linger over these but turn to the pictures in oil, which make up that part of the exhibition newest to Americans, save those who may have seen some of them when exhibited within the past few years at the now defunct Grosvenor Gallery.

"Amor Omnia Vincit," an allegory of all conquering love, shows in mellowing colors a stately city heretofore under the sway of woman only, whose fair queen relinquishes her keys to a gallant youth on a noble horse, who approaches her followed by other brave cavaliers. It is just such a theme as we find depicted in the paintings on the marriage chests of the Renaissance in Italy (of which there is a good example in the museum), and in its treatment and wealth of beautiful detail, strongly resembles them. Near by hangs another work wherein a bold young Oedipus, flushed with confident success, answers the Sphinx whose paling face and tortured eyes foreshadow her defeat. The most ambitious work is "The Bridge of Life," a composition typifying the career of man from birth to death, and containing some lovely pure color and many fine passages, but which would have gained by simplification. Other canvases represent "La Belle Dame sans Merci" drawing the pale knight after her by the magic of her "wild, sad eyes"; "Pandora" weeping over the fateful box while the cypresses bend in the wind against pale streaks of troubled sunset sky (here the artist's exquisitely-studied rendering of the accessories reminds one of Iachimo's report of the furnishing of the chamber of Imogen); and a pair of rich-hued panels, one bearing the northern fairness of "Laura" and its companion the darker charms of "Fiametta." A picture handled in a key of light and luminous tones shows how

"—sweet Europa's mantle blew unclasp'd,
From off her shoulder backward borne:
From one hand droop'd a crocus, one hand grasp'd
The mild bull's golden horn."

There are several other subjects in oil, a few in water-color, including a beautiful decorative "Masque of the Senses," and two or three small landscapes which makes us wish to see more of Mr. Crane's work in this direction, and some sketches and studies for completed and future pictures.

As a whole, the exhibition is a most delightful one and leaves an abiding impression of the artist's remarkable fertility and seemingly inexhaustible variety of resource. It shows the work of a strong man, a master of his craft, and one whose labors will have a wide influence for good on the art-work of our time.

RUSTED FOUNDATIONS.—A very simple method of laying the foundations on a swampy location, which did not furnish a firm subsoil, was employed by an American engineer for supporting a low wooden building to be used for storage of machinery. Casks were set in holes in the ground along the line of posts and were filled to the depth of about one foot with iron turnings. The posts were set in the casks, which were then filled with iron turnings compactly rammed in place. A solution of salt and water was then slowly poured over these turnings, which compactly solidified into a hard mass. The heat of the oxidation of the iron was so great that the posts smoked and were charred; the latter fact probably being the reason why they have not as yet exhibited any signs of decay; and in this respect the use of iron turnings furnishes an advantage over the use of concrete for cask foundations.—*Engineering.*

ARTIFICIAL RAIN-MAKING.¹

Lavabo, by A. Rossellino, in the Sacristy of San Lorenzo, Florence. From Muntz's *Histoire de l'Art pendant la Renaissance*.

WHENEVER a large mass of air is cooled below the temperature of its dew point, the moisture it can no longer hold as invisible vapor, becomes visible. If the reduction of temperature be but slight, the vapor appears as fog, mist or cloud; if the reduction be considerable, as rain or snow.

There has been no little attention given lately to the question as to whether or not rain can be caused to fall at pleasure on any given section of the earth—rain-machines, or artificial rain-producers, consisting essentially of devices whereby explosions of nitro-glycerine, or other similar substances, are obtained at fairly considerable elevations in mid-air, have been tried in different forms. As to the success of these attempts at the artificial production of rain, the testimony appears to be uncertain or contradictory.

The idea of rain-making by mid-air explosions is probably based on the rains that are generally believed to attend or follow great battles, Fourth of July celebrations of the Chinese character, and volcanic eruptions. Passing by the evidences produced by either the warlike or the peaceful burning of gunpowder, which at best are but vague, it may be remarked that volcanic eruptions may produce very heavy rainfalls, not only because the force of the eruption and the intense heat cause upward currents in the air, but also because of the vast quantities of vapor of water that escape from most volcanoes during their eruptions.

There is a fascination in witnessing man's struggle with the forces of nature; a struggle, be it understood, not made to oppose such forces, but rather to direct them. The former effort would be foolish, the latter must meet with success, if properly directed.

Do the scientific facts, as far as known to meteorology, give any encouragement for the continuance of the efforts of the would-be rain-makers? Let us inquire:

It is now generally agreed that the lowering of temperature necessary for the production of rain may be obtained in the following ways:

- (1) By the intermingling of masses of warm and cold air.
- (2) By the carrying of warm, moist air into a cold place.

In any case the cause of the rain is, briefly, the cooling of the air until it is unable to retain all the moisture it formerly held as invisible vapor, and deposits the excess in a visible form as rain.

The quantity of the rainfall will, therefore, depend both on the amount of moisture present in the air, and on the extent of reduction of temperature produced.

The first method, viz: The lowering of temperature by the intermingling of masses of warm and cold air, can never produce any very considerable rainfall, since, though the warm air is cooled by its mixture with cold air, and the tendency is, therefore, to cause the mixed air to become relatively moist, yet, at the same time the cold air is made warmer, and therefore, relatively drier. Drizzling rains might be produced in this manner, but scarcely ever heavy rainfalls, unless both the cold and the warm air contain large quantities of moisture.

There remains, therefore, but the second way of lowering the temperature of the air, viz: by the carrying of the warm air into a colder place. This can be accomplished in three different ways:

- (1) By a change of latitude, or by a warm, moist air blowing into a colder latitude. In general, the equatorial currents blowing toward the poles are the chief rain-producers.
- (2) By a change in altitude, effected by an ascending current, due to a heated area. Here the lowering of the temperature is due not only to the cold of elevation, but also to that produced by the expansion of the air under lower pressure.

(3) By a change in altitude, due to a mountain range opposing the progress of a wind, and thereby necessitating its gradually creeping up the sides of the mountain.

In any of these ways heavy rains may be produced and, in point of fact, they are probably the only ways in which heavy rains are generally produced.

Applying the preceding principles to the case of the modern rain-machine, let us inquire as to the probabilities of its successful operation. The simultaneous, or the successive explosion of large quantities of any high explosive, in the upper regions of the atmosphere, must produce, in general, a rapid and more or less thorough mixing or stirring of the surrounding air.

The sudden expansion of the air both by the heat liberated by the explosion and by the gases evolved during the explosion, is attended by a rush outward, followed by a rush of air inwards, towards the explosion centre. The direction of this latter rush is generally radially inward. In addition to these inward motions, the heat generated may tend to produce a slight upward motion; the general effect must be, however, to produce a mixing or churning rather than an upward motion.

The immediate effect of the explosion is to produce a miniature area of low barometer, caused by the radial rush of air towards the explosion centre, and by whatever ascending current that may result from the liberation of heat.

It would be reasonable to suppose that if the explosion produces any direct effect on atmospheric conditions, the area of low barometer should follow immediately, or nearly so, after the explosion. Have such changes in the barometric pressure been noticed to follow such mid-air explosion?

So far as the mixing motion is concerned, its action to produce a fall of rain must be slight. The ascending motion might cause a rainfall, but as this motion is slight in extent, its action under ordinary conditions, must at best be but insignificant.

In either case, any decrease in temperature, and consequent increase in relative humidity, must necessarily be slightly decreased by the dry and heated gases evolved during the explosion of such substances as nitro-glycerine, dynamite or gunpowder.

It might be supposed from the above considerations that balloons containing an explosive mixture of hydrogen and oxygen would be preferable to those carrying nitro-glycerine, dynamite or gunpowder, since in the former case the vapor of water results from the explosion, and in the latter dry gases. It must be remembered, however, that the explosion of mixed oxygen and hydrogen produces, for the greater part, a collapse, or radial rush inwards towards the explosion centre, while the explosion of gunpowder or nitro-glycerine produces, for the greater part, a radial rush from such centre.

A circumstance that appears to have been lost sight of in all the recent attempts at rain-making, is that such attempts have been apparently made regardless of the hygrometric conditions of the air. As rain is but the excess of moisture, which the warm, moist air when sufficiently cooled is unable to retain, the amount of the fall will depend, as already stated, on the quantity of moisture in the air as well as on the extent of the chilling action following the explosion or other cause. To attempt to produce rain by explosions in mid-air, irrespective of the quantity of moisture in the air, is to attempt to cause water to fall from the air when practically none is present. This is not only illogical but absurd.

It may be thought by some that the concussions caused by mid-air explosions might result in such a general movement of the surrounding air, as to cause rain to fall over an extended area. The flash of the explosion is followed by a sudden movement of the air causing the noise of the explosion. The phenomena of lightning and thunder are somewhat similar to those of artificial mid-air explosions. First we have the lightning flash, and subsequently the thunder which is a violent concussion of air. Does this concussion bring down a heavier rainfall? Popularly it is believed to do so, but the general opinion of the scientific world is that the lightning flash is the effect of a rapid condensation of the aqueous vapor, i. e., of a heavier rainfall, and not the cause of such a fall. That is to say the high potency of the lightning flash is due to the enormous decrease in the surfaces of the already charged rain-drops over that of the surfaces of the thousands of the separate drops that coalesce to form the single drops.

Nevertheless, the liberation of heat energy and the rapid admixture of air following the disruptive discharge may slightly increase the rainfall, or may act as a determining cause of rain over an extended area.

There is this difference between the lightning flash and the flash of an explosion, viz: The former occurs over a comparatively great length of path, i. e., a space of small breadth and depth but great length.

The latter occurs in a comparatively limited space, the three dimensions of which are nearly equal.

Though lightning is not a cause of rain, there can be no doubt that if rain can be artificially produced during a period in which there is much free electricity in the air, the storm will be attended by lightning and thunder. If then, there be any increase of rain due to the presence of lightning, artificial rain-making will be more liable to succeed when the potential of the air, as regards the earth or neighboring clouds, is comparatively high.

The enormous expenditure of energy required to produce a rain-storm over an extended area is a circumstance that would appear to

¹ A paper by Prof. Edwin J. Houston, read before the Electrical Section of the Franklin Institute, September 8, 1891, and published in the *Journal of the Society*.

give but little encouragement to man's many efforts in this direction. The amount of energy liberated by the greatest explosion man has yet effected in mid-air, is but insignificant when compared to the energy liberated by nature during even a comparatively limited fall of rain.

There is, however, an important consideration, bearing on the question of the probable success of rain-making by mid-air explosions that gives to such attempts a far greater probability of success than would appear to be warranted from the facts already enumerated. Presupposing the existence of a sufficient mass of moist air, at preferably a comparatively high difference of potential as compared with the neighboring air or the earth, a mid-air explosion might act as the determining cause of rainfall over a wide area, the balance of the energy requisite therefore, being supplied by the moist air. In a mass of very moist air there exists a store of energy which, if liberated, would suffice to cause movements of the air of vast extent. When the vapor of the air is condensed, the potential energy becomes kinetic, and, being liberated by the heat, causes ascending currents which produce a further condensation of moisture, and further liberation of energy previously locked up in the vapor.

There sometimes exist conditions in the air, in which it is, so to speak, in a state of very unstable equilibrium, and a slight determining cause may result in the liberation of the stored-up energy with a resulting heavy rainfall. In such cases it would appear that there are no reasons why an explosion in mid-air should not be followed by rain. At the same time it is not unreasonable to suppose that the natural causes, which brought about such conditions, would, in many cases, continue to act and thus cause rain without artificial aid.

There are, however, meteorological conditions that probably frequently exist in certain latitudes in which heavy rains might be artificially produced by mid-air disturbances, when, without such disturbances, no rainfall would occur. Should, for example, a layer of warm, moist air exist between the earth's surface and a higher layer of cold, moist air, separated by a comparatively thin layer of air, and should such conditions exist as to maintain the two layers separate, then the breaking or piercing of the intermediate separating layer might permit such an up-rush of the warmer air through the opening, that the liberation of its stored-up energy through the condensation of its moisture, would result in a general up-rush of the warm moist air and the consequent production of an extended area of low barometer. In other words, the artificial rupture of the separating layer would result in the formation of a true storm centre and a heavy rainfall of considerable dimensions. In such cases it would appear:

(1) That mid-air explosions will be more effective than explosions on the earth's surface.

(2) That directed mid-air explosions, i. e., explosions in which the general effect of the liberated energy is to produce an upward rush of air, would be more effective than undirected, hap-hazard explosions.

If in such cases, considerable difference of potential exist between the layers of air, or between that of the air generally and the earth, the lightning flashes would unquestionably be effective in piercing the separating layer especially if, as would probably be the case, the general direction of the discharge be between the layers of cold and warm air.

Since, as we have seen, it is the ascending current that causes the heaviest rainfall, it would appear that mid-air explosions of such a character as to produce in general an upward rush of air would be probably more successful than undirected, hap-hazard explosions in mid-air. Such movements might advantageously be effected by the liberation of rockets with enlarged conical heads, or of any form of fire-work that would move generally upward.

Since success in artificial rain-making is probably dependent on the meteorological conditions, both of the lower and upper layers of the atmosphere, efforts should be made to enlarge our present very limited knowledge of such conditions.

Captive balloons, containing registering electrometers, tele-thermometers, tele-hygrometers, tele-anemometers, etc., might be connected by wires with recording apparatus placed on the earth's surface. The cost of maintaining such aerial stations of observation would be but insignificant when compared with the benefit that would accrue not only toward the solution of the problem as to the probably success in rain-making, but also in the aid given to the general operations of the United States Weather Bureau in particular, and to meteorology in general.

During the general prevalence of moist, warm air, when but a slight cooling is necessary to cause a general downpour, effective rain-making might be obtained by the sudden breaking or opening of cylinders of liquefied gases, where expansion would cause an intense chilling of the surrounding air; such cylinders could be readily opened by means of earth-controlled electro-magnets.

The following general conclusions may, in view of the present state of meteorological science, be properly drawn concerning the artificial production of rain.

(1) That rain can never be made to fall at will by mid-air explosions on any part of the earth's surface, irrespective of the climatic conditions there existing.

(2) That during certain meteorological conditions, mid-air explosions may result in rainfall over extended areas.

(3) That the liberation of energy necessary for such rainfalls is due not to the mid-air explosions, but to the energy stored up in the moist air from which the rain is derived.

(4) That the meteorological conditions which must exist for the successful action of mid-air explosions would probably, in most, though not in all cases, themselves result in a natural production of rain.

(5) That a comparatively high difference of electric potential between different parts of the air, or between the air and the earth, is possibly favorable when taken in connection with other meteorological conditions for artificial rain-making.

(6) That an undirected mid-air explosion is not as likely to produce rain, as an explosion in which the main tendency of the energy liberated is to cause a general up-rush of the air.



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

HOUSE OF MR. JAMES BARRETT, BOWDOIN AVE., DORCHESTER, MASS. MR. A. H. VINALL, ARCHITECT, BOSTON, MASS.
[Gelatine Print issued with the Imperial and International Editions only.]

"THE TRIUMPH OF LABOR," ETC., BY MR. WALTER CRANE.
[Issued with the International and Imperial Editions only.]

CEILING AND WALL PAPERS BY MR. WALTER CRANE.
[Issued with the International and Imperial Editions only.]

FOUR PANELS, ETC., BY MR. WALTER CRANE.

[Issued with the International and Imperial Editions only.]

THE original drawing of "The Triumph of Labor," which Mr. Crane calls "the largest and most important single design of mine in wood-cut yet published," is about three feet long. It appeared to commemorate the Labor Day of May, 1891, and has been engraved on wood, full size, by Mr. Henry Schen, of London. "The Sphinx" is from a Cartoon for a portion of the mosaic frieze in the "Arab Hall," of the house of Sir Frederick Leighton. "Morn—Eve—Summer—Winter" are four of the eight panels painted for the decoration of the saloon of the new Orient Line steamship "Ophir." These panels, alternating with landscapes and marines, executed by Mr. C. Napier Hemy, are placed upon the sides of two light-shafts, which are octagonal in shape. The other plates include some but not all of the following designs "The Peacock Garden," wall-paper and frieze of same; "The Golden Age," cartoon for field of wall-paper. Sketch for a ceiling in gesso; two illustrations to Grimm's "Household Stories"; illustrations to "Cinderella"; design for reverse of book-cover "Echoes of Hellas," by Prof. G. C. Warr; pen-sketch design for water-color drawing of "Masque of the Senses." There is also a reproduction of the seal, designed for the London County Council. Upon execution, an English inscription was substituted for the Latin one, and some other minor changes made. The diameter of the seal is three inches.

DESIGN FOR A SCHOOLHOUSE AT BARRE, VT. MESSRS. LORING & PHIPPS, ARCHITECTS, BOSTON, MASS.

STATE NORMAL SCHOOL, BRIDGEWATER, MASS. MESSRS. HARTWELL & RICHARDSON, ARCHITECTS, BOSTON, MASS.

BAY HALL, STATE NORMAL SCHOOL, FRAMINGHAM, MASS. MESSRS. HARTWELL & RICHARDSON, ARCHITECTS, BOSTON, MASS.

DESIGN FOR A COUNTRY HOUSE. MR. PERCY ASH, ARCHITECT, WASHINGTON, D. C.

ENTRANCE HALLS, NO. 303 WEST 76TH STREET AND NO. 304 WEST 77TH STREET, NEW YORK, N. Y. MESSRS. LAMB & RICH, ARCHITECTS, NEW YORK, N. Y.

[Additional Illustrations in the International Edition.]

CHATEAU D'ECOUEN, (SEINE ET OISE,) FRANCE. THE CHAPEL.
[Photogravure.]

CHATEAU D'ECOUEN: THE CHAPEL CEILING.
[Photogravure.]

CHATEAU D'ECOUEN: THE CHAPEL GALLERY.
[Photogravure.]

CHATEAU D'ECOUEN: A CHIMNEYPIECE.
[Photogravure.]

ALLIANCE ASSURANCE COMPANY'S BRANCH OFFICES, LEICESTER, ENG. MESSRS. GODDARD, PAGET & GODDARD, ARCHITECTS, LEICESTER, ENG.

This building is now in course of erection, and stands in one of the best positions in the town, opposite the Municipal Offices. The ground-floor is faced with Portland stone, and the upper

stories with Bracknell sand-brick rubbers. The large office of the company, with the board, secretary's, waiting and strong rooms, occupy the ground-floor, and the upper floors are arranged in suites of offices. The drawing that is here reproduced was exhibited this year in the Royal Academy.

THE ENTRANCE, SOMERSET HOUSE, LONDON, ENG. DRAWN BY F. MILLER.



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

COMPUTING LATTICE MEMBERS.

November 4, 1891.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—Will Mr. Berg, through the *American Architect*, kindly answer a question suggested by the correspondence in the last issue regarding latticed columns? How can the sizes of the lattice members on the sides of the channels, their proper distance apart, etc., be ascertained for any given column supporting a known weight? A reply will greatly oblige

Yours respectfully,
T-SQUARE.

November 12, 1891.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—A reply to "T-Square's" question, I think, would be beyond the limits of the correspondence of a paper such as yours.

The question of calculating accurately the strains on rivets, lattice members, etc., of latticed columns has been elaborately treated by some specialists, but the practical results of such investigations have been very small. By calculating the contraction and expansion due to the strain, and obtaining the deflection from a straight line at different points of the column, due to the bending of the column under the longitudinal strain, one might ascertain the strain which at right angles to the longitudinal axis of the column would produce the same deflection. From this could be figured the tension or compression respectively, as the case might be, on the latticed members, and, of course, the various shearing and other strains on the rivets. It will be seen, however, from the simple statement of the elements entering into such a question, that the calculation would be theoretical and difficult, and of little practical value.

The best advice to give "T-Square" is to look up the results of the various tests on latticed columns, (which have been conducted with great elaborateness by the United States Government at the Watertown Arsenal), published annually in the Reports of the Chief of Ordnance to the Secretary of War. Similar tests have been made at other places, and at the various iron mills; the shop practice adopted by the latter and by prominent engineering firms is probably more nearly correct than would be any formula that could be devised.

Yours very truly,
LOUIS DE COPPET BERG.

A CUSTOMS QUESTION.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

NEW YORK, NOV. 17, 1891.

Dear Sirs,—Kindly let me know through the columns of your valuable paper, if there is duty on imported pressed wood ornaments for interior finish, and if so, how high. Any information will be highly appreciated by

Yours very truly,
MARTIN BORGSTEDT.

[He is a bold man who assumes to predict what the customs officials will decide in any given case, nevertheless we will hazard the guess that the ornaments in question would have to pay thirty-five per cent *ad valorem* as a "manufacture of wood—not specially provided for" in the Act of June 10, 1890.—EDS. AMERICAN ARCHITECT.]



THE GALLIERA GALLERY.—It is expected that the handsome building, constructed at the expense of the late Duchesse de Galliera, on a piece of ground presented by her to the city of Paris, will be ready for opening in January next. The history of the institution is a curious one. In 1878, the Duchesse de Galliera, by deed of gift, made over to the city authorities a suitable plot of ground for the erection of a museum. The Municipal Council, instead of at once commencing operations, postponed the matter for an indefinite period. This want of appreciation of the lady's generosity caused her to abandon her original intention to bequeath to the museum the greater portion of her magnificent gallery of art. She left her collection, worth over \$10,000,000, to the city of Genoa. Accordingly the inauguration of the museum early next year gives rise to some speculation, for it is a ques-

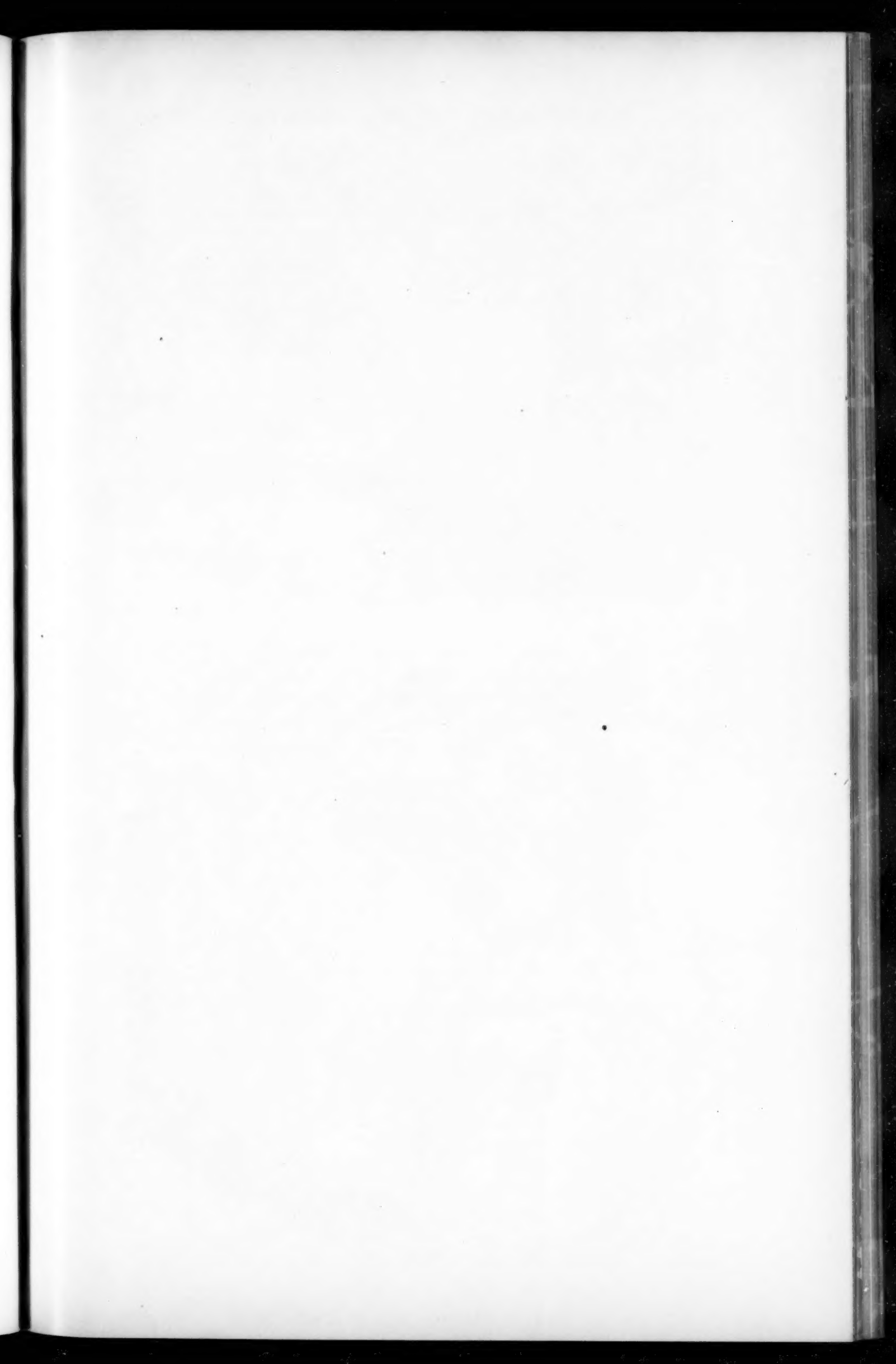
tion whether the structure, beautiful in itself, will be but an empty shell, or whether the rich Parisian amateurs will stock it from their private galleries.—*Exchange*.

BIG PANES OF GLASS.—The largest plate of glass in this city and in the State is in the Eleventh Street window of Robert J. Thompson, at the southwest corner of Eleventh and Chestnut Streets. The size of the plate is 200 by 100 inches, and it was manufactured at Kokomo, Ind. The firm which had the contract for furnishing the glass, first placed its order with a Pittsburgh company, which was unfortunate enough to break two plates of that size in preparing them for transportation. There are several others which nearly equal this one in size. There is one 194 by 100 inches, another 140 by 144, and one which was recently replaced, an infuriated bull having gone through it 198 by 98 inches. The largest plate of glass in the country is in stock at Kokomo, and is 200 by 140 inches.—*Philadelphia Record*.

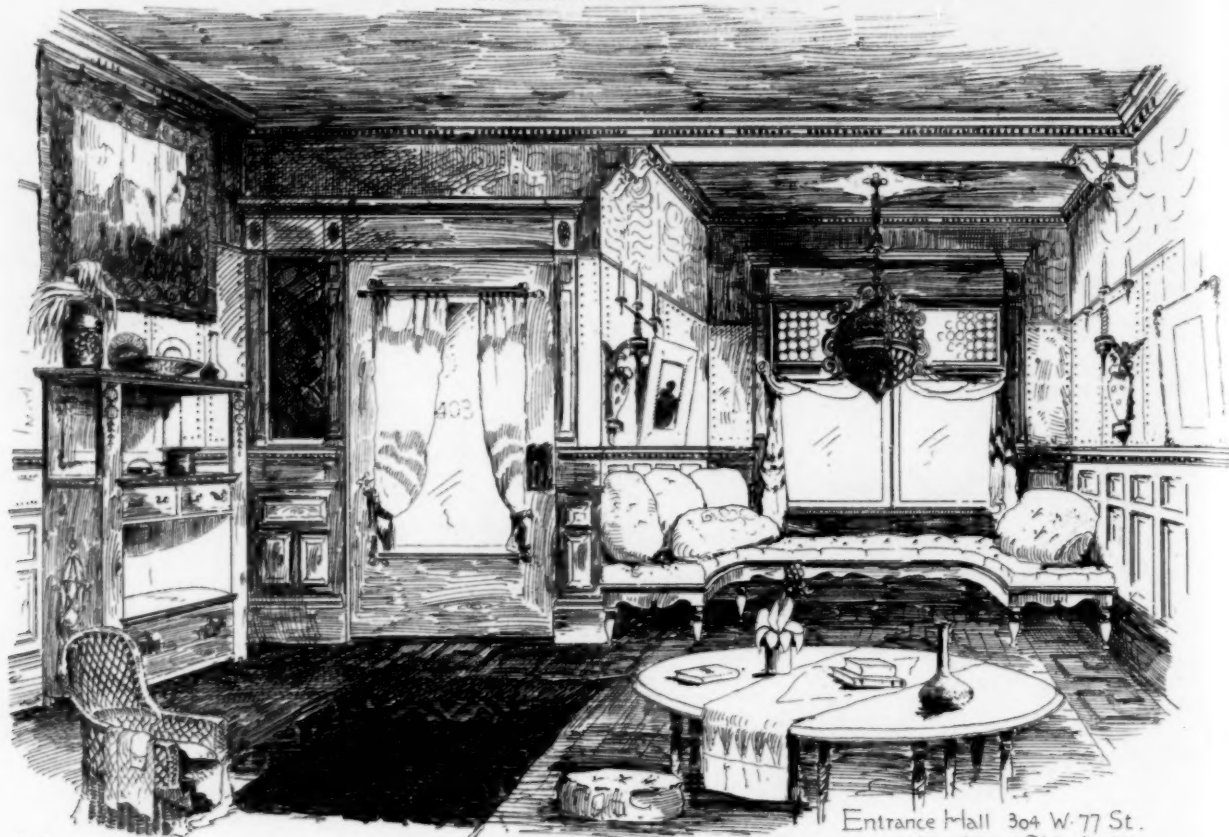
PAINTING ZINC.—For paint to stick to zinc use the following wash: Chloride of copper, 1 part; nitrate of copper, 1 part; sal ammoniac, 1 part; water, 64 parts. This coat is left for 24 hours before applying the paint.—*Specialties*.



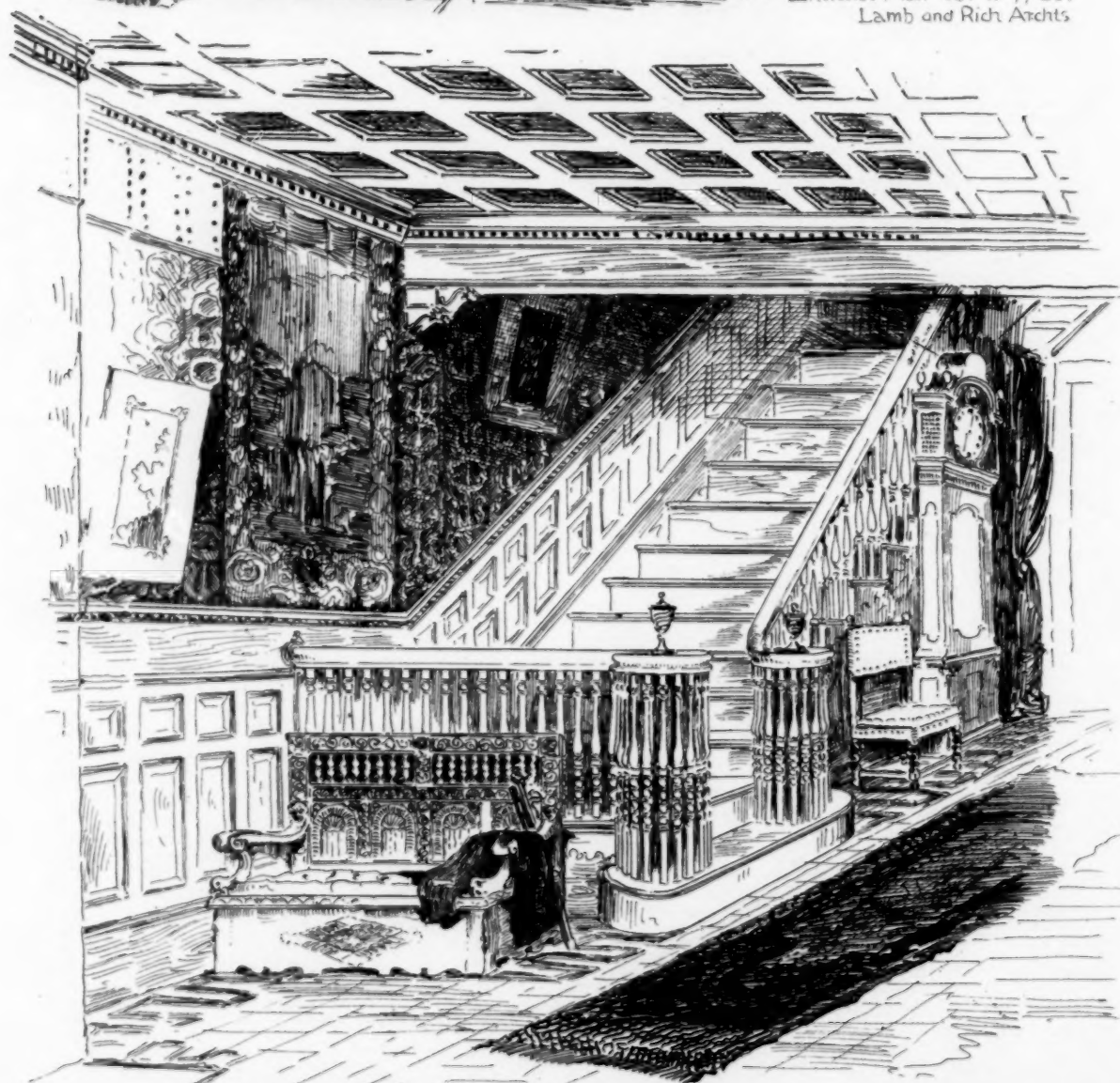
TRADE conditions can be stated in very few words. The business world at large is surprised that, after an immense crop and a comparatively good year all through, orders for future consumption should be so restricted. If it were necessary to go into explanations, they could be given. The most important one is that the country is waiting on the agricultural communities to buy, and they, instead of buying, are paying off mortgage debts. When this indebtedness is reduced to the limit they intend, purchases will begin and general trade will improve. Opinions expressed by competent authorities throughout the West pretty generally agree in this, that there will be an unusual enlargement in the cultivation of land next year, not only in the wheat and corn fields, but in the cotton area and fruit regions of the Far West. There is quite an outpouring of immigration to the Pacific coast, where favorable opportunities seem to be multiplying. A great deal of capital is finding profitable employment in mountain regions in very diversified ways. The general condition of trade is good. Iron and steel makers are counting upon heavy railway building next year. Crude-iron production has reached the highest known limit, 190,000 tons per week. Steel-rail production has fallen to the lowest ebb known for ten years. The steel-billet output is heavy and continuous, the cause is the extraordinary demand for products made of steel. The coal trade is exceptionally active, and, so far, New England and the Middle States east of the Alleghenies have consumed this year five million tons more than up to this time last year. It is just stated by reliable lumber authorities of Chicago that the lumber interests entered upon the winter with a smaller supply of white pine than last year, or for many years. This statement is important in view of the probable heavy demand next year for lumber. The hemlock interests of Pennsylvania have just attempted once more an organization that will control production, and the final meeting for such purpose is fixed for January 10th. The yellow-pine interests, however, are not as compactly organized, and any attempt on the part of the Northern lumber interests to take advantage of a scarcity of actual or artificial lumber, or its products, will result in an increased activity in Southern mills, and the expansion of lumber manufacturing interests throughout the South. Building interests need not fear any actual scarcity. All kinds of building material are at a very low ebb, and stocks will be steadily increased throughout the winter months, so that builders, at the opening of spring, will find an abundant supply, and probably at very reasonable prices. The smaller industries are complaining of dulness in a good many directions, but in the West, carriage and wagon makers, plough and implement makers, harness-makers and a multitude of little industries connected with iron and wood work, are all, according to very recent accounts, gathering up a great deal of raw material in their respective channels, as against the possibility of an advance in prices. This apprehension of an advance seems to be very widespread. While there are no solid grounds for it, both manufacturers and consumers are keeping in mind the possibility of such a result. Another matter deserving of more than passing attention is the growth of trade organizations. In their inception, the objective point was to advance prices; that object has been lost sight of in a measure, and the objective point now seems to be to harmonize interests with reference to regularity of production, and to prevent prices falling below a safe limit. Trade organizations will undoubtedly grow rapidly upon this basis. There is also a growth of membership and a growth of interest in boards of trade and chambers of commerce in a large number of cities and towns throughout the interior. The commercial spirit is taking organized shape, and much good will undoubtedly grow from this concentration. The spirit is widespread, and even small towns, with ten to fifty thousand inhabitants, now have active and enterprising boards of trade looking after the common interests of their respective communities. This tendency also will grow rapidly, and in time will exert a healthful influence upon local politics, which have heretofore been given over too much into incompetent hands. A good many conventions of one kind or another are to be held throughout the West and some portions of the South during the coming winter, all looking towards a unification of interests and united action to accomplish common benefits. Railroad returns from 150 roads this year, as compared to last, show an increase in earnings of \$25,000,000. Earnings will steadily increase during the rest of the year. Within a week, over one thousand miles of railroad building have been projected, about one-half of it in States east of the Mississippi River. The money markets are generally spoken of as easy, but practical business men take this statement with many grains of allowance. For reasons hard to clearly indicate, the movement of money, while rapid, considering the restricted volume, is slow when the requirements of the mercantile community are taken into account. Business men feel a constant stringency, and are taught to believe that all the changes suggested would make matters worse rather than better, and hence they are doing nothing to better themselves. The silver-producing interests have quietly reorganized in the West, and are determined to push the agitation for free coinage. Eastern banking interests are already compactly organized, and will determinedly meet all movements from that quarter.



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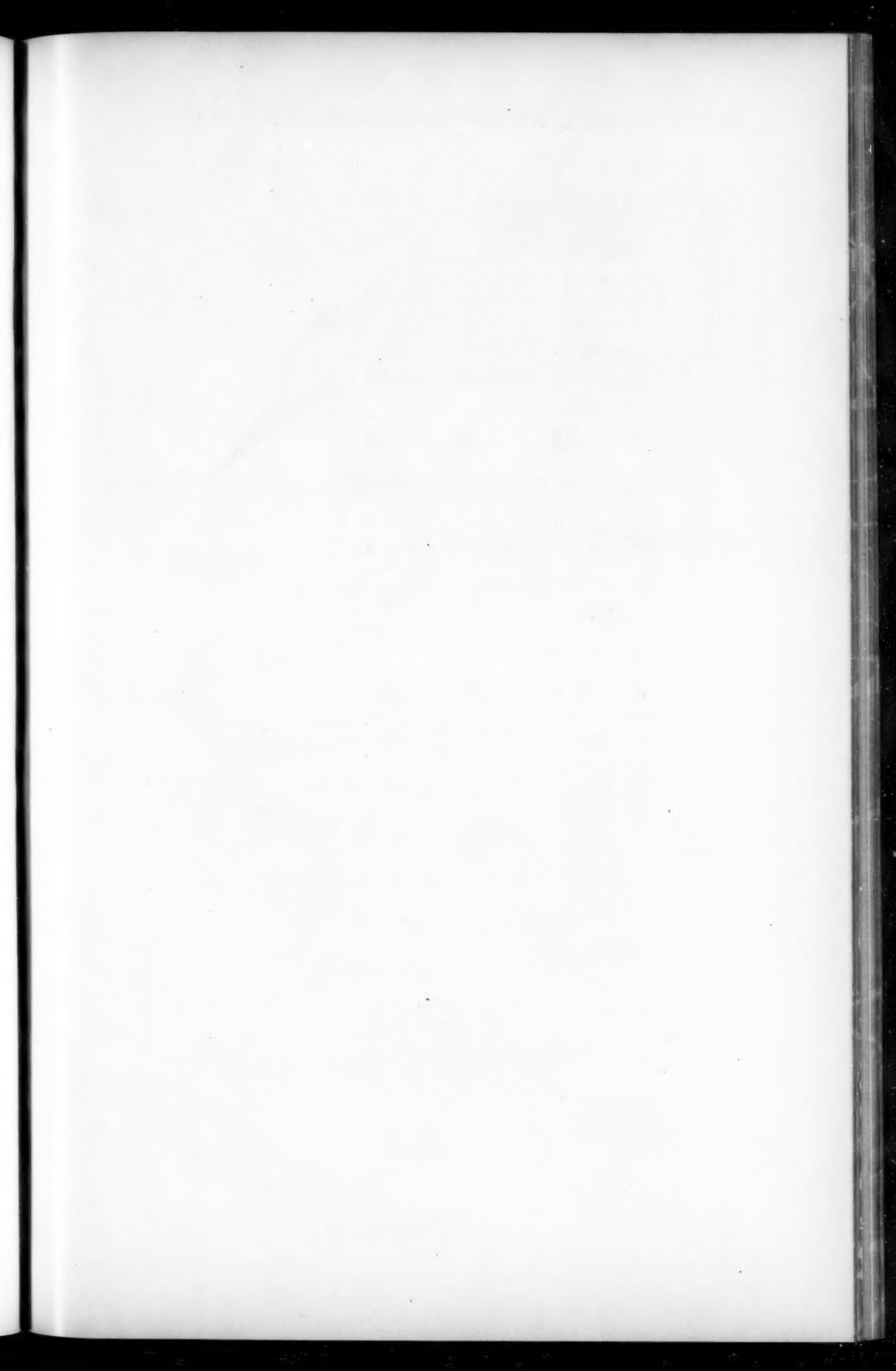


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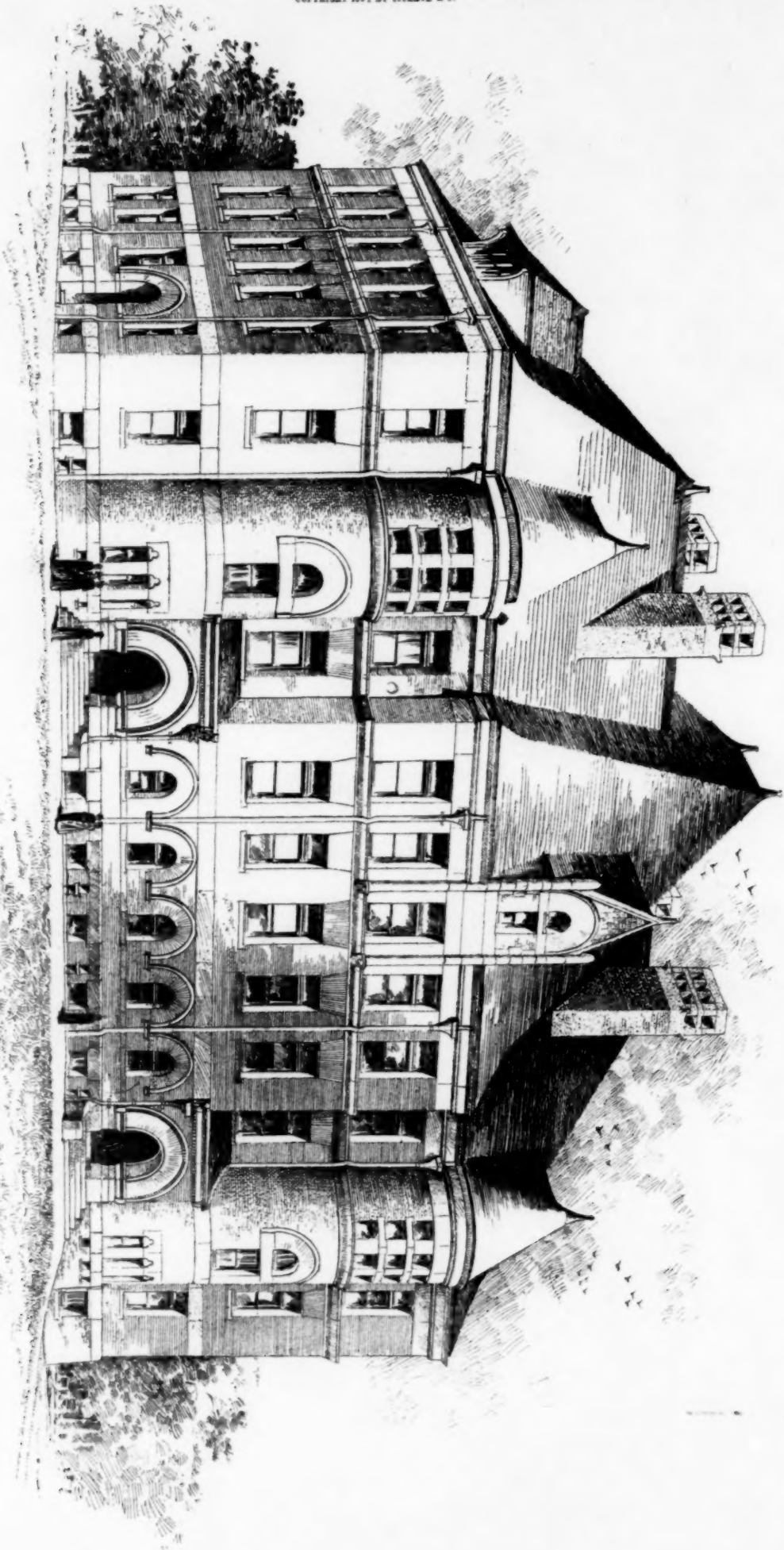
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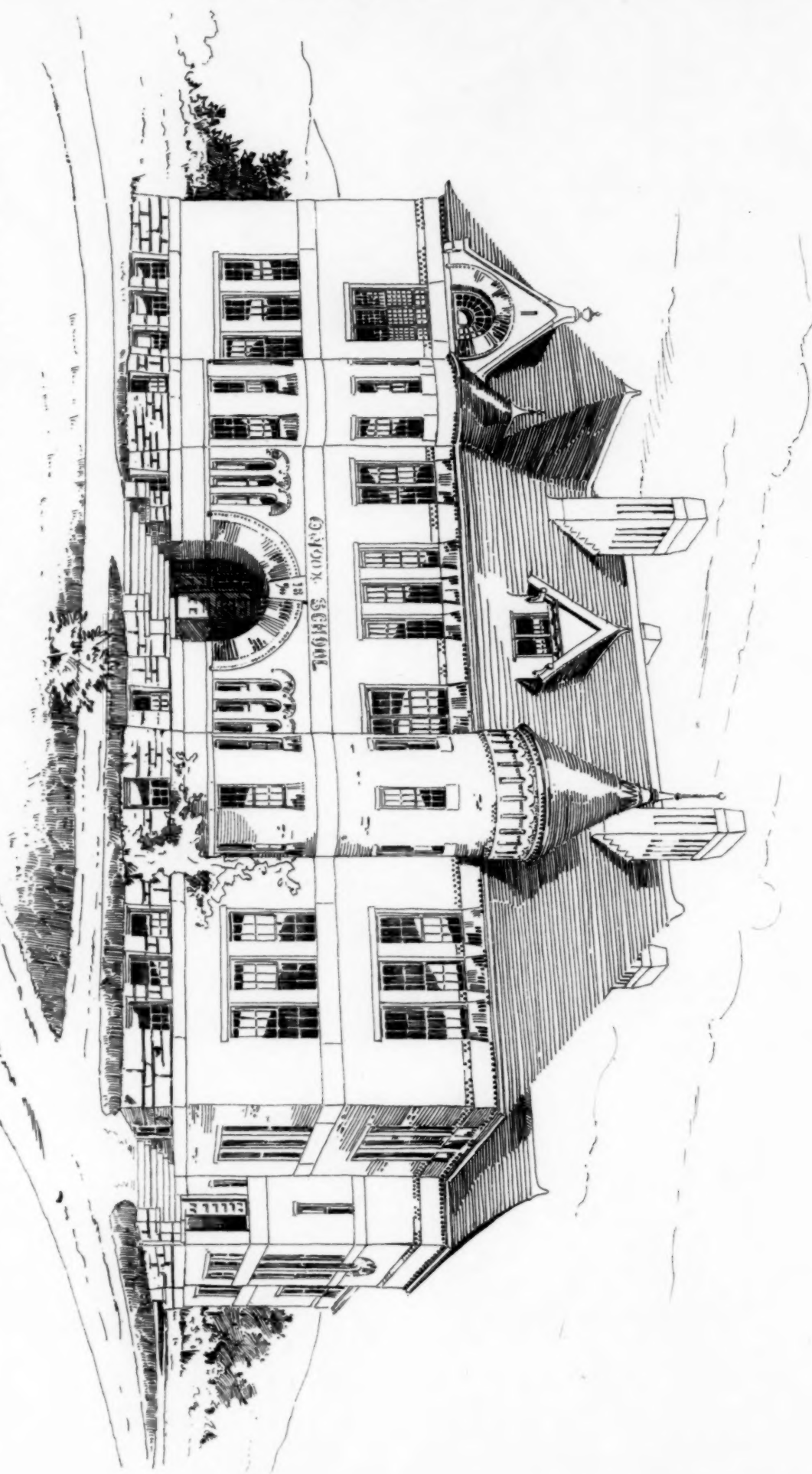




DESIGN FOR SCHOOL BUILDING • BARRE VERMONT.

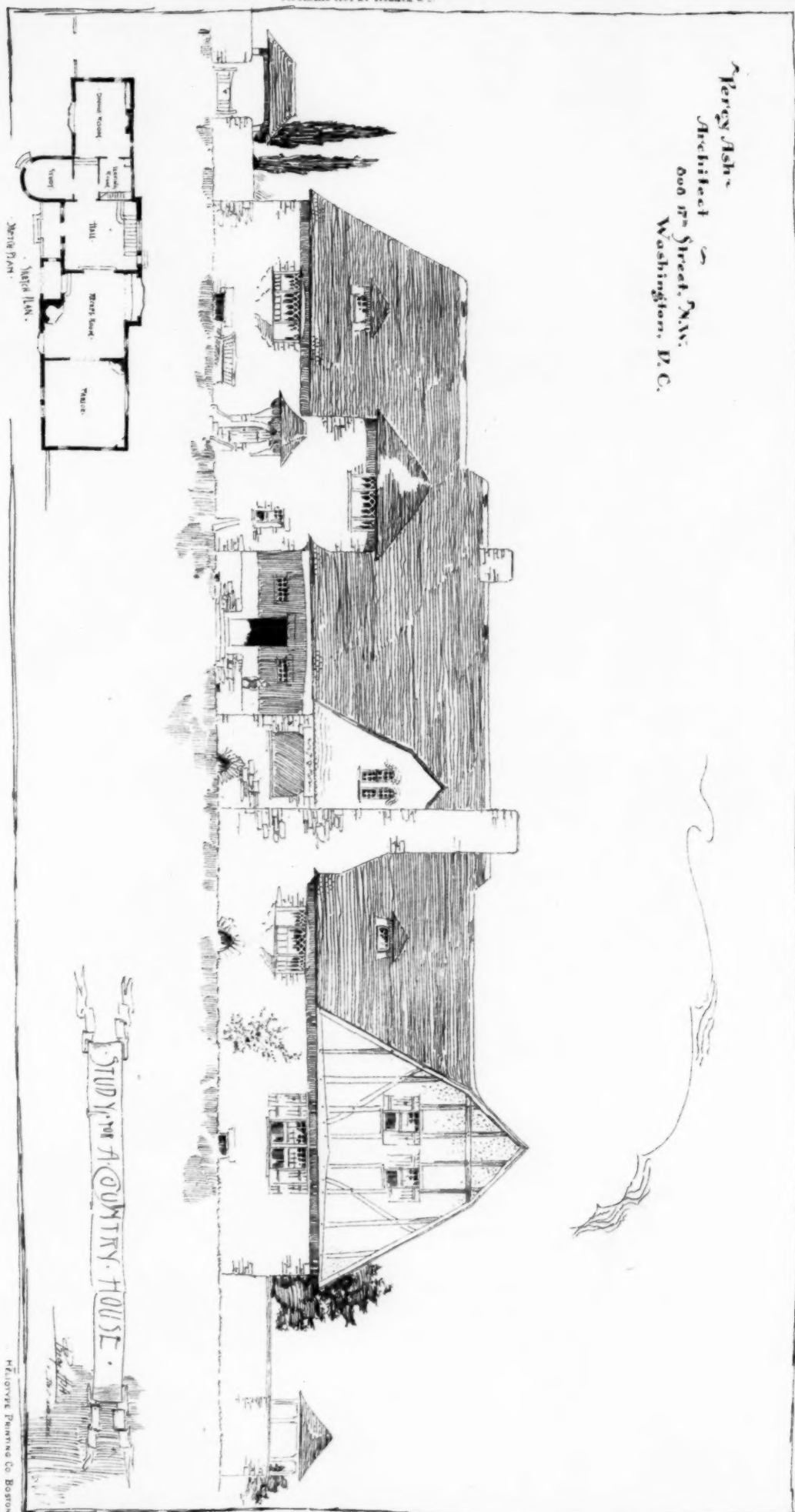
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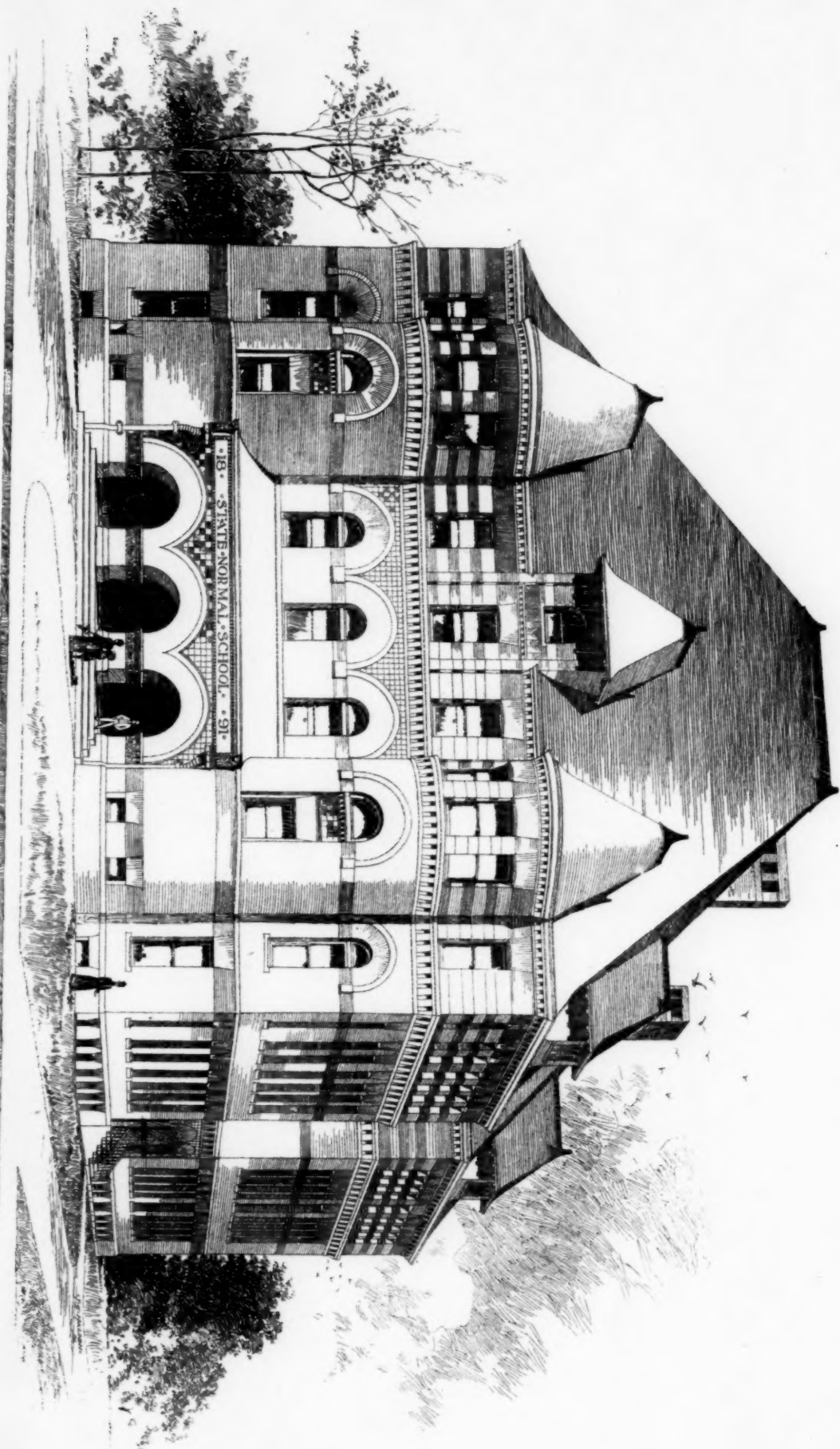
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STUDY IN A COUNTRY HOUSE.

H. Ash

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