

PRICE 13 CENTS.

543 117

AUGUST 8, 1891.

THE
AMERICAN ARCHITECT
AND BUILDING NEWS

VOL. XXXIII

* REGULAR EDITION *

NO. 815.



ARCHITECTURE

ENGINEERING

DECORATION

TICKNOR & COMPANY

CONSTRUCTION

BOSTON MASS.

CONTENTS.

EDITORIAL SUMMARY.
ARCHITECT, OWNER AND BUILDER BEFORE THE LAW.—V.
GERMAN ARCHITECTURE.—I.
THE DOLPHIN IN ORNAMENTATION.—V.
AMERICAN ARCHITECTURE THROUGH ENGLISH EYES.—II.
THE COLORADO AUTOMATIC REFRIGERATOR SYSTEM AT DEN-
VER, COL.
SLOW BURNING CONSTRUCTION.
RECLAIMED LAND AT PUGET SOUND.
COMMUNICATIONS.
NOTES AND CLIPPINGS.
TRADE SURVEYS.

DESIGN FOR CHURCH, CHAPEL, PAROCHIAL RESIDENCE AND
SCHOOL, SAN ANTONIO, TEX.
HOUSE AT PITTSBURGH, PA.
DRAWING-ROOM AT NO. 2, PRINCES' GATE, LONDON, ENG.
PULPIT IN THE CHURCH OF THE NOTRE DAME, BURGES,
BELGIUM.

Additional Illustrations in the International Edition.

THE PRINGSHEIM PALACE, BERLIN, PRUSSIA.
[Gelatine Print.]
HOUSE AT ROSCOFF (FINISTERE) FRANCE.
GATEWAY AND FIREPLACE IN THE SAME HOUSE.
DESIGN FOR FACADE OF THE CHURCH OF THE HOLY TRIN-
ITY, CORK, IRELAND.
KINMEL PARK, ABERGELE, WALES.
ENTRANCE FRONT OF THE SAME.
GARDEN FRONT OF THE SAME.
EAST END OF THE SAME.
FOUNTAINS HALL.

ILLUSTRATIONS.

GRACE CHURCH, NEW YORK, N. Y.
[Gelatine Print issued with the International and Imperial Editions only.]
MASONIC BUILDING, DOVER, N. H.
HOUSE AT WILLIMANTIC, CONN.



THE SANITAS TRAPS AND CLOSETS

Are the SIMPLEST, CHEAPEST and most SCIENTIFIC APPLIANCES in the market.

These Specialties have the approval and endorsement of Archi-
tects, Builders, Engineers, Superintendents, Plumbers and Medical
Authorities, and their acceptance by the owner of the building is
assured if he is made to realize the saving affected by their use.

In one building a Chicago Architect saved his client two
thousand dollars by using the SANITAS Traps instead of the ordinary S. Trap.

We shall be glad to correspond with parties not already familiar with the
merits of these goods.

SMITH & ANTHONY STOVE CO.,
BOSTON,

Makers and Proprietors of SANITAS Appliances.

54 Gold Street, NEW YORK.

210 Lake Street, CHICAGO.



PART TWO NOW READY.

ARCHITECTURE

OF THE

RENAISSANCE IN ENGLAND

A Series of Views and Details from Buildings erected between the years 1560-1630, with Historical and
Critical Text; [Six Parts, Folio, each containing Twenty-two Plates, Eighteen of which are
from Photographs specially taken for the work, and the others from Drawings by
the Authors. With Letterpress illustrated by numerous Sketches.]

By J. ALFRED GOTCH, F. R. I. B. A.,

AUTHOR OF "A COMPLETE ACCOUNT OF THE BUILDINGS OF SIR THOMAS TRESHAM."

Assisted by W. TALBOT BROWN, A. R. I. B. A.

The Size of the Plates will be 14 in. by 10 in., on Fine Paper 19 in. by 14 in.

The Price to Subscribers will be \$8.00 per part net, in Portfolio; to Non-Subscribers, \$10.00.

Two Parts now ready for delivery. The remaining Parts will be issued at intervals of Two or Three Months.

TICKNOR & COMPANY, Publishers, 211 Tremont St., Boston.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XXXIII.

Copyright, 1891, by TICKNOR & COMPANY, Boston, Mass.

No. 815.

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

AUGUST 8, 1891.



SUMMARY:—

Iron and Concrete Construction in Bridge-building.—Counterfeiting the Government Stamp on German Iron.—The Proposed Mosaic Pavement for Cologne Cathedral.—Drinking-water Wells in Cities.—A Large Microscope	77
ARCHITECT, OWNER & BUILDER BEFORE THE LAW.—V.	79
GERMAN ARCHITECTURE.—I.	81
THE DOLPHIN IN ORNAMENTATION.—V.	82
THE NEW YORK CANCER HOSPITAL.	86
THE COLORADO AUTOMATIC REFRIGERATOR SYSTEM AT DENVER, COL.	88
SLOW-BURNING CONSTRUCTION.	89
RECLAIMED LAND AT PUGET SOUND.	90

ILLUSTRATIONS:—

Grace Church, New York, N. Y.—House at Pittsburgh, Pa.—Pulpit in the Church of Notre Dame, Bruges, Belgium.—Design for Church, Chapel, Parochial Residence and School, San Antonio, Tex.—Masonic Building, Dover, N. H.—House at Willimantic, Conn.—Drawing-room at No. 2 Prince's Gate, London, Eng.	
Additional: The Pringsheim Palace, Berlin, Prussia.—House at Roscoff (Finistère), France.—Gateway and Fireplace in the Same House.—Design for Façade of the Church of the Holy Trinity, Cork, Ireland.—Kimmel Park, Abergele, Wales.—Entrance Front of the Same.—Garden Front of the Same.—East End of the Same.—Fountain's Hall.	90

COMMUNICATION:—

The Cost of New York County Court-house.	91
NOTES AND CLIPPINGS.	91

A NEW application of a combined construction of concrete and iron has been made in Germany, where a considerable number of bridges have been built, consisting of arches of concrete, in which a network of iron wires or rods has been imbedded, near each surface. The theory of arches shows that such structures generally fail by the opening of the joints, either at the extrados or the intrados, according to the form of arch and the manner of loading. It is found that the use of a good cement in the joints aids powerfully in preventing the rupture of the arch, and it is a natural inference that the reinforcement of the resistance at the inner and outer surface by the tensile strength of iron would still further increase the security of the whole. Experiment has shown that this theory is correct; and an arch of concrete, formed as nearly as possible to include the line of pressure in the middle third of its thickness, and containing, near the intrados and the extrados, a network of strong wire, is found to have a surprising resistance. The most important bridge of the sort, as we learn from *Le Génie Civil*, seems to be a foot-bridge over a river at Bremen; but the Southern Railway of Austria has recently constructed, with permission of the Government, several highway bridges in the same manner. As nothing in the way of materials is needed but the centering, the wire, and sufficient Portland cement, sand and gravel, the construction is easy and cheap. In the German examples, cross bars were combined with longitudinal wires, to form a sort of gridiron, but, in practice, it seems as if a wire netting could be made, which would be cheaper, more easily put in place, and equally good. Obviously, the same construction might be adapted to making floor arches, or vaulting spaces of any sort; and architects will do well to keep it in mind.

THE *Revue Industrielle* makes some serious charges against certain iron and steel manufacturers in Germany, which, with all due allowance for political prejudice, appear to be well founded; and, as the quality of manufactured iron and steel is a matter which concerns the whole civilized world, a public duty is imposed upon the technical press to call attention to the necessity of taking nothing for granted as to the properties of structural metal purchased in open market. Twenty years ago, Professor Reuleaux, of Berlin, made a severe criticism of German methods of iron manufacture. Cheap and bad ("billig und schlecht") he declared to be the character of German work; and it does not appear to have been much improved since his time. The *Revue Industrielle*

gives a novel theory of the system by which the German iron manufacturers have succeeded in "poisoning," as it says, all the markets of the world with their products, which we will let political economists comment upon as they feel disposed. Germany, as is well known, protects its industries, the manufacture of iron included, by a tariff, and the French editor thinks that the iron workers, who are sure of being able to sell most of their product at home, at a good price, send their surplus stock abroad, and are quite content if they can get for it about what it costs them to make. Naturally, the stock to be sent away as surplus includes the refuse of the manufacture, and it appears to be bad enough; but this is not the only complaint which the *Revue Industrielle* has to make against the manufacturers. It seems that an action for libel was recently brought against a Westphalian journalist, who accused certain manufacturers of evading taxes. The journalist defended himself, in the trial, by endeavoring to establish the truth of his assertions, and, incidentally, of others, of a still more serious character, which he then made for the first time. Among other things, he accused a personage of great importance, the head of an immense foundry and rolling-mill, of having practised, with the complicity of his subordinates, a systematic course of fraud. Under the law, steel in Westphalia must pass an official inspection, and each piece found satisfactory to the inspector is stamped with the Government mark. The director of the works, as the story goes, had counterfeit punches made, with which he had such pieces as he saw fit stamped with a counterfeit of the Government mark; and a vast amount of inferior steel material, which would not have passed the official inspection, was sold at a low rate, with what purported to be the Government guaranty of its excellent quality. The inspector's stamp was frequently changed, probably to avoid just this sort of fraud, but the enterprising director changed the imitations also, until he had formed, in sixteen years, a collection of fifty-seven fraudulent stamps, the impressions of which are to be found, we are told, on a vast number of steel rails both in and out of Germany. The disclosures of the journalist and his witnesses have produced a considerable sensation, which is not lessened, so far as the Opposition press is concerned, by the fact that the enterprising director holds various official honors; and it is reported that he has not been the first person in the business to counterfeit the Government stamp. However that may be, there is considerable reason in the demand made by some of the radical journals, that, when a railway accident occurs, through the breaking of a bad rail, or the failure of an unsound axle, and the imperfect pieces shall be found to have the counterfeit stamp, the persons at whose instance the false guaranty was put on them should be held criminally responsible for the consequences of their selfish dishonesty.

THE Cathedral at Cologne, according to the *Wiener Bauindustrie-zeitung*, is to have a complete pavement of Mett-lach mosaic, a portion of which has already been laid. This portion is in the south choir aisle, and consists of five sections, separated from each other by borders of colored marble. Within these borders are groups of coats-of-arms, with names and inscriptions, commemorating the twenty-eight archbishops and spiritual princes of Cologne. The main part of the choir is to be occupied by representations of human life and labor, the orders of Church and State, the Christian community, and so on; while in other parts of the building are to be shown the signs of the Zodiac, the four quarters of the heavens, the tribes of animals, the four temperaments, the four elements, and the four winds, all from the designs of Professor Essenwein. Although these subjects may be very Gothic, and therefore archaeologically correct, it seems a pity that the noble church cannot be decorated with something better than archaeology. Even the history of the mediæval archbishops of Cologne, filled as it is with tales of cruelty and ambition, is better worth recalling than the fables which suggested to our ancestors holy thoughts, but which awake in the moderns only contempt and ridicule. We know that until within a very few years it has been considered highly reprehensible in an architect to say that what purported to be reproductions of the figures in mediæval stained-glass and other decorations were not the most correct and religious adornments for ecclesiastical edifices of the present day; but we hope and believe that the time will soon come

when the Chinese imitation of the serious and reverent mediæval work will be looked upon as shocking by all who have feeling enough to imagine what modern religious art might be; and we are quite sure that a great many architects share this sentiment. Let us think, for example, of the martyrs of the early Christian Church, and picture to ourselves the scenes with which the Catacombs were familiar, the groups of starved and trembling friends gathered about the victims brought in bleeding from the arena; the love-feasts, where nobles and slaves met to exchange the kiss of Christian peace; the humble funerals of the hunted and proscribed people whose only happiness in this world had been their hope of the next. Of all these sufferings and consolations the Catacombs still speak, in the inscriptions and symbols cut by affectionate but unskilful hands upon their walls; and among the symbols, none is more eloquent than the rude figure of the Lamb of God, which is repeated frequently, as if those oppressed, but resolute souls found in the thought of the Divine patience an admonition which they needed to have constantly before them. It is characteristic of the present religious art, that the modern explorations of the Catacombs, instead of leading to the study of the history of the people who kept the Christian religion alive in them, through years of persecution, seems to have suggested only the idea that the symbols which they left might be made commercially valuable as a sort of fetish; and Alpha-Omegas, XP's, and so on, are set up everywhere, with the professed object of exciting religious thoughts in persons who have not the slightest idea what they stand for. Moreover, the commercial idea is, naturally, that if a thing is good, the more specimens of it there are in circulation the better; and, as there is a limit to the wall-space in churches available for carving or painting these hieroglyphics, they are applied, with shocking want of feeling, to the floor; and, to this day, the manufacturers advertise "full lines of Agnus Dei tiles for pavements," without exciting the disapproval of any one, except a few architects and archaeologists. It would be interesting to hear what the martyrs would say to an invitation to trample on their most beloved emblem, in their promenades about the buildings which purport to be devoted to the faith for which they died; and even in some less sacred representations, which are to be introduced into the floor at Cologne, such as those of the Four Elements, to say nothing of the coats-of-arms of some of the arrogant and worldly archbishops, there is a flavor of falseness, and wilful disregard of historical and scientific truth, which would repel the great mediæval doctors of the church perhaps even more strongly than modern men of education.

IT is astonishing to find a technical journal of the ability and influence of the *Wiener Bauindustrie-zeitung* bewailing the "rash and radical" pursuit of novelty, which, "in London, Paris, New York, Boston, Vienna and Budapest," among other towns, has led to the "tossing overboard" of the good old custom of having pumps and wells in city dwellings. In old times every town house had its court-yard, and in every court-yard was a well; and to this day a regulation stands on the statute-book of many cities, as, for example, of Munich, by which every house is required to have a well. The *Bauindustrie-zeitung* regrets that even court-yards are left out of many modern houses, while wells are omitted still more frequently, the people who build the houses depending upon the public water-supply to provide them with what they need. This seems to the *Bauindustrie-zeitung* very foolish. If the public water-supply should give out, which, as it says, frequently happens through the freezing of the pipes in winter or during droughts in summer, the householder is helpless unless he has a well to fall back upon. It is true that in cities the public water-supply should generally be used for cooking and drinking, leaving the well-water for washing; but, in emergency, it says, the well-water may be used for drinking. Moreover, it thinks that a well is a valuable resource in case of fire, and says that the information which is gained in digging a well in the court-yard, in regard to the geological formation under the foundation, is of great practical value.

WE had thought that, at this late day, the dangers of city wells were generally understood, but it seems that people need occasionally to be reminded of them. One of the last wells which was left open to public use in London

is known to have caused the death of more than a thousand people during a cholera epidemic; and it is not too much to say that every well in such a city as New York or Paris or Vienna is liable to become a focus of typhoid fever, or cholera, or diphtheria infection. It is useless to try to prevent people who have the well-water from drinking it. Unless it is brackish, like the water of some of the New York wells, it is generally much sweeter and more sparkling than the water drawn from the city pipes, and is always cooler, so that it will be used for drinking, regardless of the risk. Nor is it only ignorant persons who use it. For a long time, the offices in the Western Union Building in New York were regularly furnished with drinking-water from an artesian-well in the cellar, and it has been found in most of our cities that nothing short of a compulsory filling of wells will prevent the dangerous use of water from them. Whether it is possible to regulate them so that they can be used without risk is doubtful. In New York, where water is comparatively dear, many wells are bored or driven in business buildings to supply water for the elevator-tanks, and sometimes for the plumbing apparatus, and perhaps for the boilers; but it may be presumed that the water from all of them is contaminated with sewage, and, even if no one drank it, there is a possibility that its evaporation, after washing the floor or walls with it, might set free germs which, floating in the air, would be ready, on meeting with a favorable subject, to propagate terrible diseases. As to the use of wells in case of fire, it is hardly necessary to say that an ordinary well would not supply an American steam fire-engine for five minutes, and that no other means of raising the water in it, and applying it to the fire, would be of much service; and the idea that any information as to the strata under the building could be gained by digging a well, which could not be equally well obtained by boring, at a small fraction of the expense, will amuse architects.

A MONSTROUS microscope is being built at Munich, by the Poeller Physical-Optical Institute, for exhibition at Chicago in 1893. It is intended for projecting images upon a screen, and electricity is used, not only for producing the necessary light, but for regulating the focus, centering the specimen to be examined, and cooling the apparatus. The last object, which is a very desirable one, as the heating of the instrument by the artificial light, which, in this case, is an arc of eleven thousand candle power, sets up disturbing currents of air, deranges the focus by expansion, and affects the objects unfavorably, is attained in an ingenious manner. A small copper cylinder, filled with liquid carbonic acid, under a pressure of about three hundred and fifty pounds to the square inch, is connected with the microscope in such a way that the opening of a valve throws a drop of the acid, in fine spray, over the portions of the instrument most exposed to the heat. The liquid immediately evaporates, producing intense cold, and reducing the temperature of the metal with which it is in contact to the desired point. The opening of the valve is automatically effected by an electric regulator, and the consumption of the liquefied gas is very slow. The magnifying power of the instrument is enormous. Under ordinary conditions it is arranged for magnifying eleven thousand diameters, but, by immersing the lenses in vaseline oil, more powerful objectives can be used, which will magnify sixteen thousand diameters. Some idea of the effect may be had by reflecting that, with the more powerful objective, one of the almost invisible worms known to children as "vinegar eels" would appear on the screen as a serpent more than a hundred feet long; while the finest flour would be shown as a heap of enormous boulders. The cost of building this gigantic instrument is said to be only about nine thousand dollars. If it could be bought for anything like that sum, it would be well worth securing for this country. It will, presumably, be utilized at Chicago for revealing the secrets of Lake Michigan and Schuylkill River water to American audiences, at so much a head; but for certain purposes, as, for instance, in the study of botany and vegetable physiology, it seems as if it might be valuable, after its career as a scientific show is over.

FROM mere suggestion to perfect performance is in these days so short a step that architects will do well to consider the ways and means of laying-on cold air to their buildings, after one of the methods described in another column.

ARCHITECT, OWNER & BUILDER BEFORE THE LAW.¹—V.CONTRACT THROUGH ADVERTISEMENT.²Evangelical Church for Wiesbaden. From *Deutsche Bauzeitung*.

A VERY common way of engaging the services of an architect is through advertisement. A person, or more commonly, a public body, wishing to build, advertises in the newspapers, or sends out circulars, inviting architects to send in competitive designs, and proposing certain inducements, usually in the way of a prospect of employment, for them to do so. Where this is done, every architect who prepares and sends in designs in accordance with the terms of the circular is thereby made a party to a valid contract between himself and the parties issuing the circular or advertisement, which he can enforce in any court, if the advertiser is responsible for his actions, or is authorized to bind any one else. This last is an important reservation, as committees and public officers often exceed their authority in such matters, and their dupes find, after it is too late, that no one is bound by their action. Details on this point will be given later, in treating of builders' contracts.

Where the advertiser is responsible for his acts, or is properly authorized to act for some one else, the stipulations of the contract between him and any or all persons who comply with the terms of his invitation are precisely those of the written or printed invitation or advertisement, without variation or modification of any kind.

STRICT ADHERENCE NECESSARY TO TERMS OF COMPETITION.³

If this principle were more fully recognized by competing architects, and by the promoters of competitions, and more energetically enforced by persons who suffer from the violation of it, architectural competitions would be much more satisfactory affairs than they are now. There is no question that where the time for submitting designs is limited, or where the proposed cost is restricted, or the details of accommodation specified, or the scale of the drawings, or the manner of rendering, exactly defined, only those designs which fulfil the conditions are entitled to be considered, and their authors could

probably prevent, by injunction, the consideration of any which did not comply with the instructions, or, if one should be chosen which violated the stipulations, could very possibly recover damages for the breach of the contract made with all of them by the failure to award the premium in the manner agreed.

The most important case of the kind which has yet been decided in this country involved a slightly different point, the plaintiff having been deprived of the advantage promised by the invitation, after his plan had been adjudged to be the best.

The St. Louis Exposition and Music Hall Association, through its Secretary, sent to Mr. Thomas Walsh, among other architects, a document reading as follows:

"DEAR SIR,—At a meeting of the Board of Directors of the St. Louis Exposition and Music Hall Association, held on the 18th day of April, 1883, the following resolutions were adopted:

"First. That all architects, residents of this city, and five non-residents, be invited to prepare and submit designs.

"Second. That from those presented by residents, seven, which shall be considered the most meritorious, shall be accepted and awarded five hundred dollars (\$500) each, and the five presented by non-residents shall each be awarded the same amount. All designs for which you pay five hundred dollars (\$500) shall be the property of the Association.

"Third. That it should be understood that any foreign architect may submit a design, but if not accepted as the most meritorious of all, he will receive no compensation, and his design shall be returned.

"Fourth. The architect who is successful shall not receive five hundred dollars, but he shall be engaged as architect and superintendent, and shall be paid, for performing such duties, the usual commissions as adopted by the American Institute and the St. Louis Institute of Architects.

"Fifth. That all architects entering for competition shall so notify the president or secretary on or before May 5, 1883."

There were other stipulations, as to scale of drawings, etc., and one that the cost should not exceed \$400,000.

Mr. Walsh prepared drawings in accordance with this document, and his plans and "specifications" (perhaps description) "were," as his petition said, "upon examination and consideration by the defendant and its Board of Directors, considered and declared as the most meritorious of all those that had been submitted to it under said proposal, and that the same were accepted by said defendant as such, and thereby the plaintiff became and was the successful architect within the purview and meaning of said proposal; and the plaintiff says that the defendant after so accepting his designs, plans, elevations, sections and specifications, retained the same, and still retains the same, and is now using the same, in part, in the construction of the building."

The petition further averred the plaintiff's tender and offer to assume and perform the work of architect and superintendent, and his present readiness and willingness to assume, perform and discharge the same, and asserted that "the defendant, wholly unmindful of and in disregard of its just and legal obligations and duty in the premises toward the plaintiff, has refused, and still does refuse, to engage the plaintiff as architect and superintendent as aforesaid, to the damage of the plaintiff in the sum of twenty thousand dollars."

The Circuit Court sustained the defendant's demurrer to this petition, on the ground that it did not state facts sufficient to constitute a cause of action. No question was raised as to the sufficiency of the proposal and acceptance to constitute a binding contract, but the defendant objected that nothing in its proposal implied an obligation, in any event, to employ as architect and superintendent the person whose design should be found the most meritorious or acceptable of all that might be submitted, and that, therefore, the plaintiff had no right of action for the defendant's refusal to employ him.

The plaintiff contended that such obligation appeared in the fourth clause of the proposal, which said: "The architect who is successful shall not receive \$500, but he shall be engaged as architect and superintendent," etc.

The case was taken to the Court of Appeals, which, after reviewing the facts, said: "The question is, then, who is the person intended by the expression, 'the architect who is successful,' and to whom the promise is made that he shall be engaged as architect and superintendent upon the terms specified?" The defendant answered that the expression meant, not the architect presenting the best plan, but the one who should be, in fact, employed by the defendant. "In other words," said that the Court, "the defendant means only to promise that the one who shall be, in fact, employed as architect and superintendent shall 'be engaged as architect and superintendent.' The unreasonableness of this interpretation is not limited by its imputation of tautology and surplusage.

¹ Continued from Page 71, No. 660, Aug. 18, 1888.

² Symmes v. Frazier, 6 Mass. 344; Loring v. City of Boston, 7 Metcalf 409; Wentworth v. Day, 3 Metcalf 352; Gilmore v. Lewis, 12 Ohio 281; Hunt v. City of Utica, 18 N. Y. 442; Pierson v. Morch, 82 N. Y. 503; Ryer v. Stockwell, 14 Cal. 134; McLeod v. Meado, 77 Cal. 87; Furman v. Parke, 1 Zabriskie 310; England v. Davidson, 11 A. & E. 856; Lancaster v. Walsh, 4 M. & W. 16; Williams v. Cowardine, 4 B. & Al. 621.

³ Walsh v. St. Louis Exp., 16 Mo. App. 592. Affirmed, 90 Mo. 459.

The whole tenor of the proposal demonstrates that no such application of the words was thought of in its framing." Again, the Court said, "by the plain words of the proposal, the offer of the superintendency is held out to the architect who shall surpass all others in the excellence of his design." "That this stimulus is intended for all is obvious from the reading of the first, second and third clauses."

The defendant's counsel argued that it could not have intended to bind itself to an appointment of the successful competitor as superintendent of the work, because that might necessitate the appointment of one personally unfit to be entrusted with such a position, but the Court said that this idea was "entitled to no consideration upon a demurrer to the petition." The judgment of the court below was reversed in favor of the architect. The Music-Hall Company appealed the case again to the Supreme Court of Missouri, which affirmed in every respect the decision of the Court of Appeals.

The experienced reader will probably not agree with the court in thinking that the expression, "the successful architect," was used in the invitation without any thought of its possible uncertainty of meaning. So many tricks are played upon architects by means of expressions which they are intended to interpret in one way, but which the other party interprets later in another way, to their disadvantage, that it is hard to believe that this one was employed without the idea that it might be utilized, if desirable, to escape just obligations towards the architects who might be misled by it. However, any suspicion of fraud will tell very seriously against the party which tried to take advantage of it, and the court took the most favorable view that it could of the intentions of the Music Hall Company.

A CONTRACT BY ADVERTISEMENT IS A WRITTEN CONTRACT.¹

A contract of this kind, formed by a proposal or invitation on one side, and compliance with its terms on the other, has been decided to be a contract in writing, and, therefore, not subject to the provisions of the Statute of Frauds. This is an important decision, as many of the engagements which architects hope to obtain through competition could not be completely fulfilled within a year, and a parol agreement to employ them for services intended to extend through a longer period would be void.

REVOCATION OR MODIFICATION OF PROPOSAL BY ADVERTISEMENT.

Like any other proposal, that made by advertisement or circular may be revoked or modified, provided the revocation or modification is made before it has been accepted by doing work in accordance with it. Very commonly, the terms of competition programmes are changed by subsequent notice, either by extending the time, or in some other way, often at the suggestion of competitors who happen to be on good terms with the promoters. Where such changes are made before an intending competitor has done any work on his plans, the modified terms, if he has received the notice, will form a part of his contract; but those who have done work in accordance with the original programme, which will be made useless by the change, would probably be entitled to compensation for their trouble.

EXTENSION OF TIME.

In the case of an extension of time, it would be more difficult to show damage, but there is no doubt that unscrupulous architects, who have the ear of the promoters of a competition, and who know that the merit of a plan is usually proportionate to the time spent on it, sometimes favor, at the beginning, the restriction of the time within which the designs must be submitted to a very inadequate space, and, at the last moment, when the plans of their rivals have been hurriedly completed, while their own have been progressing quietly and carefully, obtain an extension of time, sufficient to enable them to bring their own well-studied projects to completion, but not large enough to tempt the other competitors to do their work all over again. It is, therefore, highly desirable that no changes should be made in competition programmes after they are once issued, or that architects interested should, as soon as possible after receiving such documents, propose the changes which they think necessary, in order that all the competitors may be notified without delay.

¹ *Ryer v. Stockwell*, 14 Cal. 134; *Ellis v. Abell*, 10 A. R. 226 (Ontario).

ACCEPTANCE MUST BE CLEAR.

In all matters of this kind, the architect must be sure that the proposal made in the circular or letter of invitation is perfectly clear, and that his acceptance of it, by doing work in accordance with it, is no less clear, for the law will not do much to help a man who does not clearly understand other people's propositions, or who makes his own in a manner not easily comprehended. It is common, for example, for building committees to incorporate in their circulars of invitation to architects conditions which are incompatible with each other, as, for example, setting a limit of cost in one clause, and, in the others, demanding an amount of accommodation which cannot possibly be had for anything like the sum named. In such cases, architects must, at their peril, obtain from the committee a vote, saying which provision is the one to be complied with. It is not sufficient to obtain an individual opinion from a single member of the committee; such an opinion does not bind the committee; and all the architects who keep their designs down to the limit of cost are liable to have them rejected, because they do not give the accommodation desired, while those who provide the accommodation are equally liable to be thrown out because the execution of their designs will cost too much; and in neither case will they have any redress; while the committee, having obtained all the suggestions and information that it wanted, is free to engage the architect whom it had all along intended to employ.

Even where no fraud on architects is intended, the instructions for competitors are often so carelessly drawn that it would be difficult to enforce any rights under them, as, for instance, in a Chicago competition, where the area of each room was specified, and nearly twice as much space was required on the second floor as on the first. It would obviously be difficult to comply with this condition, yet an architect who violated it might find it hard to hold the promoters of the competition to the other stipulations of the proposal.

TERMS OF CHOICE OF A DESIGN.²

Again, the terms of the choice or acceptance of a design are often so vague as to mislead architects. The County Commissioners of Cook County, and the Common Council of the city of Chicago, arranged to build jointly a court-house and city-hall, united in one grand structure, and invited competitive designs, offering several prizes in money. The majority of the joint committee representing the city and county awarded the third prize, of \$1,000, to Mr. Tilley. The city and county authorities confirmed the award, by a resolution, which, however, provided that "nothing herein or in said report contained shall be construed as indicating a preference for either of said plans as to which shall be finally adopted, from which the said building shall be erected." Mr. Tilley was paid his prize-money, and, soon after, the County Commissioners and the City Council adopted, each separately, the following resolution:—

"That the plan known as 'Eureka,' (Tilley's) or number five (5) in the collection, be, and is hereby, selected and adopted as the plan after which to build such court-house and city-hall, (the Board of Commissioners of Cook County concurring), subject to such changes and modifications as may hereafter be determined upon by the common council of the city of Chicago and the county board, provided the estimate of the architect who presented said plan as to the cost of construction of the building shall be verified."

Tilley then went over his figures of cost again, without being asked to do so. Soon after, differences arose between the city and county authorities, and the county appointed another architect. Tilley then sued the city and county jointly for five per cent on the estimated cost of the building, his bill, as presented, amounting to \$145,481.45. He proved, at the trial, that he had verified the cost, and was confirmed as to the correctness of his estimate, of thirty-five cents per cubic foot, by several architects. He offered to prove the cost and value of his plans; that by the usage and custom of architects, in the absence of a special contract, the superintendence of the construction of a building belonged to the architect whose plans were adopted; that, by the usage and custom of architects, where prizes for plans were offered, the plans of the successful competitors belonged to them, and, if subsequently adopted as the plans to build by, were always paid for in addition to the

² *Tilley v. Cook Co.* 13 Otto, 155.

prize itself; and he offered evidence to establish the value of his services in verifying the estimated cost.

All this evidence was excluded by the court. There was no evidence that his plans were ever used, or that any contract was made with him beyond the adoption of the resolution quoted above. The court held that the adoption of this resolution "was not a proposition, but simply the expression of a purpose to build their structure after the plans of the plaintiff, subject to such changes and modifications as might thereafter be determined upon by the Common Council and the County Board." "The resolution was not adopted at his instance or suggestion." He did no act, nor did he give any assent. "There was no mutuality, and, therefore, no consideration, both of which are necessary to a contract." The resolution might have been reconsidered and rescinded the next day, and the architect might have refused to furnish his plans and superintend the building. The Council and Board would have had, in that case, no claim against him, and he, in return, had none against them.

As to the custom of architects which he offered to prove, the court thought that it really was that, if the building was erected according to his plans, he was entitled to pay for them. "That would be such an acceptance and adoption of his plans as would give him the right to compensation therefor, and the right to superintend the erection of his building and receive the usual remuneration;" but a custom which bound a person who merely announced his intention to build in accordance with a certain plan, to pay for it if he did not use it, and to pay its author for superintending a building never erected, would be absurd and unreasonable, and, therefore, not binding. If the plaintiff had offered to show that after the passage of the resolution the defendants had erected their building according to his plans, then the evidence of the custom would have been pertinent. As to the evidence of the value of the work expended in verifying the cost, the court held that there was no implied contract to pay for services voluntarily rendered by the plaintiff, and of which no use was made by the defendants, and the evidence was properly excluded.

VOLUNTEERED SERVICE.¹

It may be said that, in general, courts do not look with much favor on competitions. If architects choose to enter contests in which no definite promises are made to them by responsible parties, the law will not supply the promises; and judges are quite ready to believe, from their own observation, that architects are willing to do a good deal of work without them; and, as in Mr. Tilley's case, they will give no help in recovering pay for volunteered service. An architect in Missouri made plans for a building, and took them to the owner of the land, who told him that, if he built, he would employ him as architect. Afterwards the owner employed another architect. The first one sued for compensation for his plans, but was defeated, the court holding that nothing was due him for his services. These services, it said, were rendered "under hope of being employed to superintend," and the owner was not bound to make any return for them.

THE VALUE OF COMPETITIVE DRAWINGS.²

A case of a different kind, of considerable importance for architects who engage in competitions, may close this part of the subject. The Trustees of the Touro Almshouse, in New Orleans, advertised for competitive designs, offering a single premium of \$500. In response to the advertisement, Dr. Egbert delivered to the agent of the Adams Express Company at Carlisle, Pa., a set of plans, to be transmitted to New Orleans, and prepaid the freight. The agent of the express company omitted to mark the package prepaid, and when it arrived at its destination the Almshouse Committee refused to pay the freight. Some months later, after the competition had been decided, and the \$500 awarded to some one else, the mistake in marking the package was discovered, and the box again sent to the committee. At the request of the express company, the committee was convened to consider the plans, and found that they were unsuitable, not having sufficient provision for ventilation, and that they would not have received the prize in any case. The jury in the court below, when Dr. Egbert sued the express company for damages, awarded him \$375. The Supreme Court reversed the decision. Egbert's

counsel cited an English case,³ in which a prize had been offered for the best plan and model for a machine for loading coal from barges into vessels, the plans and models to be sent in by a certain day. The plaintiff sent a plan and model, but, through the negligence of the railway company, they did not arrive until after the appointed day. The English court appeared to be of the opinion, although the point was not directly raised, that the proper measure of damages was the value of the labor and materials expended in making the plan and model, and not the chance of obtaining the prize, the latter being too remote a ground for damages. Justice Pattison said that the right principle on which damages were recoverable was that the goods were made for a special purpose, which has been defeated by the negligence of the defendants, and thus they had become useless. The Pennsylvania court, however, thought that if Dr. Egbert's plans were unsuitable, he was not damaged by having them mislaid, and could recover only a nominal sum, and said that, if the plaintiff's competition for the prize had proved unsuccessful, "the time and labor would have been lost, without any breach of the contract."

The professional reader will be inclined to disagree with the Pennsylvania judge, and to think that Dr. Egbert suffered a real damage by the loss of his plans. Even the unsuccessful competitors in such an affair, if their designs are made with reasonable skill, are benefited by having them shown to the committee or to the public. It often happens that a plan which does not receive a prize, or which is obviously unsuitable, attracts by some quality the attention of persons who keep its author in mind for future employment, and architects who enter much into competitions find it for their interest to have their names as widely known as possible. All advantages of this kind Dr. Egbert lost by the negligence of the express company, and it certainly seems as if he were entitled to compensation for them.

(To be continued.)

GERMAN ARCHITECTURE.⁴—I.

ROMANESQUE AND GOTHIC STYLES.



THE monuments remaining in Germany dating from Roman times are not especially numerous or important except along the Rhine; the rest of the vast territory occupied by the Germanic peoples was much less rich than were the two Gauls in constructions reared by the foreign rulers. Notwithstanding this fact, architecture in Germany was Roman in style before and during the Carolingian period.

Down to the tenth century the churches were copies of antique basilicas. The Cathedral of Treves, which is on a square plan, one hundred and thirty feet on each side, with three aisles divided off by four columns and covered with exposed timber work, dates from the sixth century; it exhibits in the details a rough imitation of Roman forms. Religious edifices were also occasionally built on an octagonal plan. The

¹ Allen v. Bowman, 7 Mo. App. 29.

² Adams Express Co. v. Egbert, 36 Penn. St. 300.

³ Watson v. Ambergate, 15 Jurist, 448.

⁴ From the French of Lambert and Stahl, in Planat's *Encyclopédie de l'Architecture et de la Construction*.

chapel of Charlemagne's palace at Aix-la-Chapelle bears evidence of Byzantine influences; it is polygonal in shape and belongs to the eighth century. This is the only fragment left from the great emperor's numerous palaces in Germany. A few basilicas of the Carolingian era have come down to the present day. Basilicas with two choirs, the principal one on the east the other in a niche on the west, appeared in the ninth century. The crypt was beneath the choir proper, which was raised, and sometimes this disposition was repeated under the other choir. But, notwithstanding these various innovations, the architecture of the period was Roman in general disposition and details alike.

The disturbances following the Carolingian era effectually arrested all progress in the arts and it was only in the eleventh century that any considerable intellectual movement was again felt. From that time onward a German national art may be seen outlining itself, gradually freeing itself from Roman dictation and presenting in its *ensemble* and details a new and original character.

In the eleventh century the plan of the basilica underwent some modifications; the choir and transept were enlarged. The crypt became general, the cubical capital superseded the ancient type. The nave and side-aisles were for a long time yet covered with exposed timber-work and two towers were reared on the west, quite detached from the church itself. During the second half of the eleventh century vaulted basilicas were introduced into the Rhenish districts; columns were little by little replaced by piers, the latter being sometimes used alone and sometimes alternating with the columns.

In the twelfth century the Romanesque style reached its maturity; the edifices of this period are characterized by a noble simplicity and are the productions of a well-poised and settled art.

The thirteenth century witnessed the appearance of a so-called transitional architecture, which nevertheless exhibits Romanesque structures of signal importance, not only in size but also in the beauty of their style. This period is remarkable for the amplitude of the plans, the picturesque grouping of the different parts and for a multiplicity of towers, one of which surmounts the cupola covering the intersection of the nave and transept. In addition to this unusual number of towers—in some cases there are as many as seven—the church architecture of the time is still farther characterized externally by rows of arches beneath the cornice, which impart a peculiar richness to the choir and transept and are sometimes even carried around the entire edifice. Examples of this type are especially common in the Rhenish districts, where it long withstood the inroads of Gothic art.

This last style had made its appearance in Germany in the middle of the thirteenth century when it had already reached an advanced stage of development in France. After crossing the Rhine it ceased to grope its way slowly and ere long it attained the height of its perfection; early productions of the style are now rare.

In the fourteenth century, when Gothic architecture was in its maturity in Germany, the principle of verticalism was carried to the extreme limit; all horizontal lines gradually disappeared; the façades lacked the noble proportions and the tranquil divisions of the French cathedrals in the interior; the capitals were done away with so as not to interfere with the soaring effect of the architecture, and the ribs were thrown off directly from the pillars, without any intermediary element whatever.

A common representative type of the German Gothic is seen in the church with three aisles of equal height, in German the *Hallen Kirche*. This disposition gives the edifice a singular character of grandeur, equality and simplicity. The side-aisles were broadened to the width of the nave at the same time that they were raised to its height; the pillars were disposed in squares making the vaults of equal dimensions. This general plan, which had already been applied to the Romanesque basilica in Westphalia, came into common use during the Gothic period, especially for parish churches. The cathedrals and churches belonging to religious orders generally maintained the more costly and more picturesque disposition of a nave with lower side-aisles.

The fifteenth century saw the abandonment of those principles on which Gothic art was based, namely, truthfulness in construction and the exercise of a wise discrimination in decoration. Stone was now cut to imitate wood; consoles for the support of weights were made to represent interlacing

branches; the general dulness and listlessness was succeeded by a great enthusiasm for the past, and yet there is an ingenuity, a picturesqueness, in many of the arrangements, as well as a boldness in the dispositions, that makes the childishness displayed in the details and the lack of constructive simplicity tolerable.

The Gothic style still retained a sufficient hold at the beginning of the sixteenth century to enable it to cope, in civil architecture, with the aggressive spirit of the Renaissance down to the first quarter of the seventeenth century. The later style was often forced to submit to compromises and it never completely shook off the yoke of Gothic tradition in its ecclesiastical constructions.

A study of the development of German architecture and of its relations with that of neighboring countries from the eleventh to the sixteenth century would far overpass the limits of this sketch; the schools are many in number and vary in the different provinces according to climatic conditions and the character of the building material accessible.

Naturally, broad differences exist between the basilicas of the south, which are usually built of handsome sandstone, easy to work, and the stern rural churches of the north, painfully reared, course by course, with irregular blocks of granite; moreover, in the same section of the country these primitive edifices bear but slight resemblance to somewhat later ones in which brick was employed either exclusively or together with granite. Again, to confine ourselves to religious structures, the cathedrals of the Hanseatic cities, whose powerful masses of brick have the air of fortresses, have but little in common with the ornate architecture of the southern churches.

We therefore refer, the student to those portions of our articles on Romanesque and Gothic architecture in which we have treated of these styles in Germany. We will turn our attention in the following pages more especially to Renaissance art; its study is of more vital interest to the majority of architects since it is of more frequent application.

(To be continued.)

THE DOLPHIN IN ORNAMENTATION.¹—V.

THE ORNAMENTAL DOLPHIN.

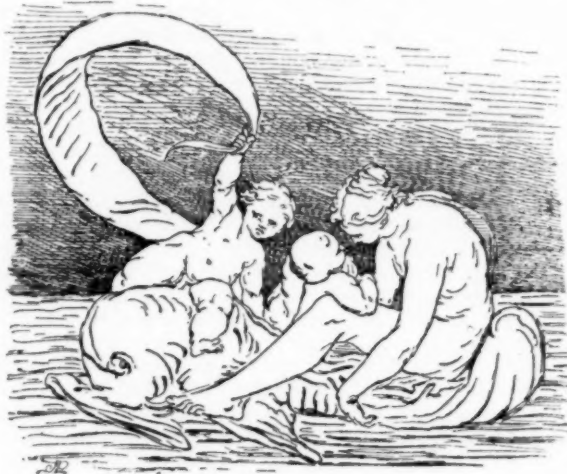


Fig. 34.

THE different modes of disposing or grouping dolphins in decoration are not very numerous, although great variety is allowed; they can be summed up into seven principal types. We find this animal: (1) *alone*; (2) *in line*; (3) *facing one another*; (4) *back to back*; (5) *bound or interlaced*; (6) *beheaded or only the head*; (7) *unnatural*.

THE DOLPHIN ALONE.

Introduced alone in a composition, the dolphin is to be seen not only in paintings and sculptures, medals and bronzes, but also on cascades and fountains, on ceramics and arms, on furniture, stuffs, ironwork, etc., in short on all those articles that are the products of art applied to industry; he also occupies a large place in heraldry. Then, according to circumstances, he is represented in two distinct fashions; either with the accessories of water—waves, sea-foam or aquatic plants—or without any representation of the element in which he lives. All depends on the idea to which he is applied, for he can be used with numerous attributes, as we already know he is by

¹ From the *Revue des Arts décoratifs*. Continued from No. 813, page 58.

turns: symbol, language, personification of many ideas, sentiments and power, or finally an ornament pure and simple.

When he accompanies Venus, Cupid, Galatea or any marine goddess, he almost always keeps an entirely natural aspect, as on the epitaphs or tombs of the primitive Christians. It is amidst waves,



Fig. 35.

which he gently cleaves or strikes with his rounded and vibrating tail, that he escorts the car of the deities of the sea or takes part in their sport, as he is shown to us in many mythological paintings; or as when he draws the car of the daughter of Nereus or the conch-shell of a nymph (Figure 34, drawing from Cangiage); or again when he is driven by hand, with whip or trident, by a Cupid, boldly seated astride as we see on this gutter (Figure 35), an example drawn from Campana's collection. He is represented also by the artist who interprets the legend of the poet Arion or the legend of the seamen punished by Bacchus. On the border of basins, amid foaming waters, he bathes his belly and fins of marble or bronze in the water to which he gives life or replenishment. Sometimes he comes out from the waves, and like a true amphibian, sinks down into the reeds in the remotest part of a park or, at the turning of a walk, stands erect in the centre of a symmetrical ornamentation

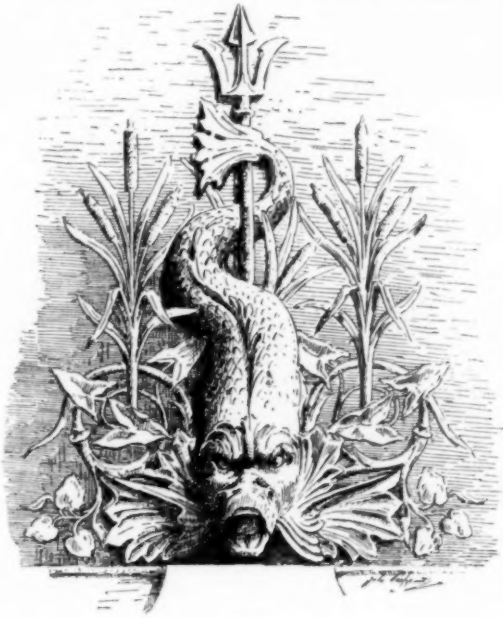


Fig. 36.

backed up against a wall to form a fountain, as at Grenoble (Figure 36); or else, as at the royal palace of Caserta, he has been cast ashore upon large rocks, from which position he casts up everlastingly a shower of pearls which are illumined by the sun.

Having at length become a sort of superior being, a speaking emblem, or considered only as a motive of common ornamentation, he is entirely set apart by the decorator. No more water, arums, flames, reeds or arrow-plants, he alone, naked or clad, will suffice during centuries to signify a great deal or to decorate richly. With the ancients we have seen him expressing the presence of the sea, indicating, on painted vases or on medals, a port for a maritime power. Poised



Fig. 37.

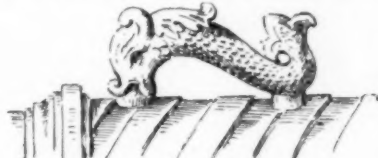


Fig. 38.

upon Poseidon's hand he characterizes the great god. On gems, cameos, images, he speaks to the Christian, to the beloved spouse, to the lover, to the friend, a conventional language full of charm. On the seal adopted in 1502 by Aldo Manuzio, he represents rapidity restrained by an anchor, which can be graphically translated by "make haste slowly" (Figure 37). Signifying velocity, it is the

dolphin again, who for a long period forms the handles of guns (Figure 38. Polish work). As a characteristic signet of the oldest sons of French kings, the dolphin is stamped on every object belonging to them or under their power; this was done to such an extent



Fig. 39.

Fig. 40.

that to-day the dolphin is used as a clue by the collectors for different kinds of furniture which were expressly made for the dauphin or the dauphine, his wife. He accompanies the crown of France (Figure 39), and is used in the same manner as the porcupine, the salamander, etc., in the decoration of castles and armor (Figure 40. Crest



Fig. 41.

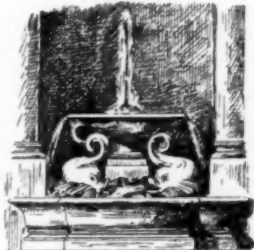


Fig. 42.



Fig. 43.

of a helmet lost by Francis I at the battle of Pavia, now at the Museum of Madrid). Alone again, he decorates perfectly the round, oval, square or rectangular forms of decorative elements in porcelain, tapestry, embroidery, paintings, panels and balusters, thanks sometimes to his own varied undulations and sometimes to

the elegant suppleness of the innumerable blossoms with which he is ornamented. In such cases the most entire freedom is left to the artist (Figure 41. From the Louvre).

Finally in heraldry, which is subject to invariable rules, he occupies a determinate position and, is called by different names according to the enamels with which he is embellished. He can be placed in three differing ways, namely: *Straight*, when the head and tail are turned towards the dexter (right hand) side of the shield; *bent*, when the extremities are directed towards the bottom of the shield; *turned*, when the extremities are directed towards the top. Moreover, although keeping those positions he can be; *illuminated* if the enamel of the eye is of different colors; *lored* if it is the fins; *barbed or bearded* if it is the beard; *crested* if it is the crest; *swooned* if the mouth is open and the eyes shut; *crowned* if the head is surmounted with a crown as on the arms of France, the design of which is given above.

DOLPHINS IN LINE.

Those that are called dolphins in line are single dolphins, very often similar, so that the decorator ranges them symmetrically by

either of these positions they are entirely free and independent of each other, or bound by some fetters or by their own bodies. In this last manner they come under the category of bound or interlaced dolphins.

The dolphins looking at each other

are in quite a number of examples, placed literally face to face; they are used in that way as a starting point, or as a centre for numerous ornamentations, flowery curves, foliages, different kinds of animals, personages and attributes. When so placed a small space remains between them: in such case the something missing in the axis of symmetry is replaced very

often by the presence of a foreign body, the knob of a door, the opening of a lock, a bracket, or something of that kind.

Consequently the decorator almost always arranges the dolphins on the right and left of a central motive, more or less important, and they thus seem to have a charge to keep. At the fountain in the Via Borgo Nuovo at Rome, near the Vatican, the dolphins are placed on each side of the second part of the monument; they support the great basin with their rolled tails and at the bottom throw out two jets of water crossing each other (Figure 43). In an Italian work, they are shaped as handles for a large and very high or tall "cande-

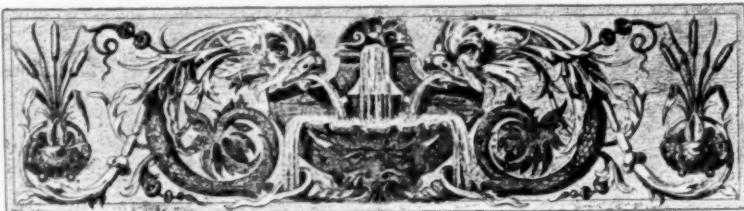


Fig. 44.

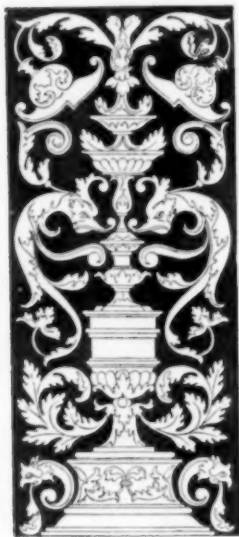


Fig. 45.



Fig. 47.



Fig. 49.



Fig. 50.



Fig. 46.

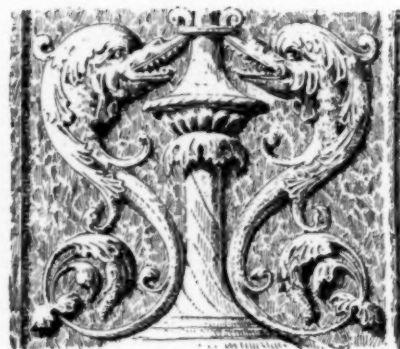


Fig. 48.

repetition or alternation on straight or curved lines. Generally this method is used for the string-course of a basement, for fronting a lavatory, around the shaft supporting a large basin, at the foot of a chandelier, or in the crenellations of a shell-shaped capital, in the style of the one indicated by Berain in one of his drawings (Figure 42). For the same reason they were sometimes arranged in a radial way, at the centre or at the margin of a circular surface.

DOLPHINS FACING EACH OTHER.

Although examples of the first two modes of using dolphins are very numerous, the ornamentists have used them most frequently in pairs; because they were almost always introduced in compositions symmetrically disposed either in height or width, and especially as

lieri," (Figure 45); in the Gallery of Apollo, at the Louvre, they line a fountain, which is a part of the numerous and powerful compositions of Berain (Figure 44); on a fragment of arabesques coming from the Château de Blois (Figure 46) they support a shell with the ends of their snouts, and, with their blossoming tails, help an imaginary creature to maintain his very difficult position; finally on the alms-purse, drawn by Jan Van Mabuse, they seem to watch the lock as faithful guardians; likewise on a cash-box in the museum at Berlin (Figures 21 and 22).

DOLPHINS BACK TO BACK.

As the dolphins often are facing each other in ornamental compositions, so also we often see them back to back, although they

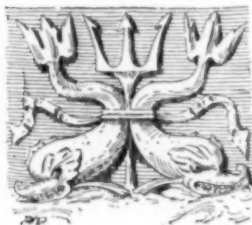


Fig. 51.



Fig. 51b.



Fig. 52.

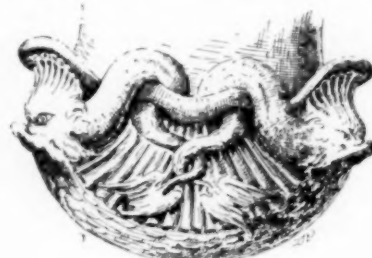


Fig. 53.

bases for arabesques. In such cases these animals can be presented in two differing ways, namely: looking at each other, face to face; or on the contrary they can be placed back to back. Finally in

perform the same functions and occupy similar positions towards each other, or towards the central motive. To give special examples would be useless, and besides, many fragments have been

seen in the first part of this study. We will indicate only the particular case of dolphins crossing each other, back to back, and grouped by Nicoletto of Modena, in order to frame a small cupid's head (Figure 47.)

BOUND OR INTERLACED DOLPHINS.

When two dolphins are grouped for bases, at the uniting point of the two similar or similarly disposed parts decorators have recourse,



Fig. 54.

almost always, to a very simple device, which consists in binding together the two animals with a species of elegant and light hyphen, laying a rather special stress upon it. This continuity of motive where the bodies touch tangentially, cross or are interlaced, is secured by applying this bond — at the snout, as at Blois (Figure 48), at the tail as at Sienna (Figure 49), to both mouth and tail, as on this band composed by Egenoff in 1533 (Figure 50) or at the middle of the body, as on this Venetian console, now at the museum of Hamburg (Figure 51). In this case the most noticeable methods of fastening are: rings, ribbons, garlands of pearls, flowers, leaves or fruits, sometimes with circular rollings (Figure 51b, Sienna) and also sometimes by means of a stalk, from the inside of which starts a new blossoming, like that in this fragment of bordering (Figure 52) coming from the "*Epigrammata antiquae urbis*," printed in 1521, by Giovanni Mazocchi. In the case of crossing, the secondary fastening is suppressed, and the twinings of the two dolphins form the junction point.

This method of ornamentation brings out some very graceful results and can be employed in several original ways. To note only a few examples we would say that the belly of a vase by Bouchardon unites the dolphins by the tails (Figure 53); that Boucher fastens them by the body in order to form the flattened base of a fountain,



Fig. 55.



Fig. 56.



Fig. 56a.



Fig. 55a.



Fig. 55b.

the superior shell of which is supported by them, and it happens very often that the dolphins cross and roll themselves up and around a central object, such as a trident (Figure 54). From a church in the department of l'Aisne, an oar or a column shaft (Figure 55). From a drawing by Bouchardon. Finally when two dolphins are coupled to form those beautiful Renaissance door-knockers, which are shown with such pride in Italy, the dolphins are more often interlaced around a metallic ring or fastened together by masks, genii or mythological deities, as is well indicated by these two door-knockers from Bologna (Figure 55a, b.)

BEHEADED DOLPHINS OR THE HEAD ALONE.

The custom of using the dolphin's head alone, either to form a motive of ornamentation, or to give to an object a fanciful and original shape seems to go back to the beginning of the Italian Renaissance. Therefore it may be taken for granted that when the artists applied themselves to using the dolphin as an ornament, they at the same time thought of making use of the head alone in several

instances and especially for the making of those rich and elegant casques or helmets, a specialty which was kept by them during many, many years. From the numerous examples which reach us we have a right to think that this is the case.

Considered as the starting-point, or as the termination of light ornaments or their interlacings, the dolphin's head can be seen in painted decorations, designs, sculptures, wrought or cast-iron panels, marquetry, porcelain, niellos, etc., even in ancient



Fig. 57.

Chinese art, as on the handle of a famous vase in the ancient collection of Gallichon (Figure 56.) Among models of the kind we wish to point out especially a small design upon gold ground, composed at the height of the Renaissance, by a miniature painter for the "*Life of the Dukes of Urbino*," belonging to the Vatican Library (Figure 56b); the back of a choir-stall in marquetry, made in 1620, in the church of Saint Catherine, at Kremnitz, Hungary (Figure 57) and a cast-iron panel (Figure 58.)

Indeed the sixteenth century was the time when the casque was ornamented with a luxury unknown theretofore; every one had an insatiable desire for making a show of his riches and good taste; every one struggled and strove, the customers with ostentation and pride, the designers and carvers in originality and talent. To their engravings, gildings and damaskeenings, their chiselled and hammered ornaments, the jewellers, again and still again, added rich and delicate conceits incapable of resisting the thrust of the spear, the slightest blow of the battle-axe. Consequently these splendid pieces of armor were used only on parade, in the beautiful tournaments, royal fêtes, and pompous receptions. They were eagerly sought for by Maximilian, Francis I, Charles V, etc., and by the powerful lords of their acquaintance.

Very often also they were presented as gifts to sovereigns by the Pope. The decoration very often consisted in furnishing or crowning the casque with a fantastic being, chimera, bird or mask, so as to add to the terror and fright that the warrior inspired in his adversary, according to the custom and belief of early times. The head

of the dolphin, ponderous and quaint, was well adapted to seduce an artist and to furnish him with numerous resources; and it soon took prominent rank among the capricious creations. When we look at the shape of this deformed head, the folds and the numerous protuberances which it presents, its frightful eyes, the sharp teeth which



Fig. 58.

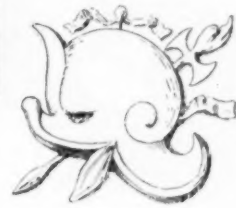


Fig. 59.

seem ready to bite, the crest and unevennesses which accompany the head, it can be quickly perceived how easy and charming it is to draw from this motive a casque with grinning face, and how it encourages, one to call upon all the resources of his art and imagination. In this line Italy and Spain produced marvels, and France

has had some artists worthy to be opposed to the best foreign masters. Many of these *chefs d'œuvre* have reached us; the museums possess numerous specimens, prodigiously unique and varied, which alone

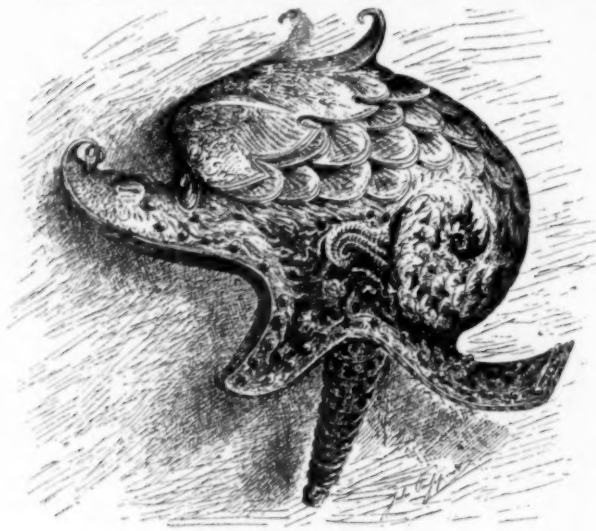


Fig. 60.

deserve special study. As examples we will point out only three types: first, a simple casque (Figure 59) sculptured on a bracket at Venice, and which seems to indicate the first idea; the other two are choice works and can be considered as priceless gems (Figure 60



Fig. 61.

is from the Armeria Real of Madrid, and Figure 61, from the Musée d'Artillerie at Paris).

Besides these two applications, the head of the dolphin is used very often to ornament some more common and useful objects. It has been



Fig. 62.

in use for many years for the terminal end of down-spouts and faucets of fountains, as a kind of diminutive of the functions often filled by the whole animal in large fountains and basins of rich mansions. The oldest model of the kind is pointed out by Viollet-le-Duc, in his "Dictionary"; it is sixteenth-century work, and is made of cast-iron; it can be seen at Orleans (France) opposite the royal porch of the cathedral (Figure 62). From that time forth the example was followed many times, but the improvements brought about by the architects and founders are of little importance; these improvements were especially carried out on the face, the more or less open mouth, and the ornamental interpretation or work of the crest and the beard.



Fig. 63.



Fig. 63b.

vase into another, the dolphin was used also, and especially his head alone, to ornament faucets in silver, copper and wood. In general these instruments, which are made for elegant objects, are of small size (Figure 63) and very often decorated with secondary ornamentation, even personages, or scenes commemorating the exploits of the followers of Silenus or the worship of Dionysius Exiguus.

As a curiosity only, for it is perhaps a unique example, we will point out, the use that Heinrich Vogtherr made of the dolphin's head, in one of his fancy capitals, which forms a plate in his collection entitled "*Petit livre d'art*." In this conceit the beard of the central mask is formed by a dolphin on either side (Figure 63b).

[To be continued.]

AMERICAN CONSTRUCTION THROUGH ENGLISH EYES.¹—II.

THE "CANCER HOSPITAL," NEW YORK.



THE building bearing the above title, occupies a site at the corner of 8th Avenue and 106th Street adjacent to and overlooking the Central Park, New York. It is designed in the style of what is known as French Gothic and is built of Belleville stone and red pressed bricks, the roofs being covered with dark slates.

The walls of the corridors and hall on the ground-floor are faced with yellow bricks finished with a neat stuck joint, the dado to a height of three and one-half feet being of dark red brick, the upper parts of walls being also relieved with red brick courses at intervals, laid with black joints.

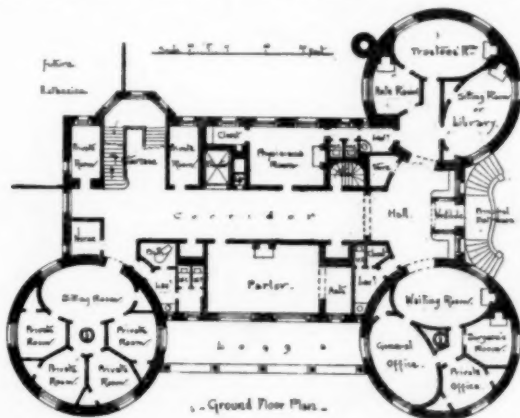
The remaining walls throughout the building, except basement-story, are executed in plaster with a plain hard-finished surface. The floors of the ground-floor, hall, etc., are laid with marble mosaic designed in a simple but effective diaper pattern in two colors, the squares being marked by double lines of salmon-colored pieces with a filling of a light yellow ochre tint: the result is as pleasing as it is simple, and produces the brightness and appearance of cleanliness so desirable in institutions of its class.

The stairways are constructed of iron and slate; the risers, carriages and strings all being of iron. The whole of the ironwork exposed to view is finished in copper bronze paint, and the hand-rail is of polished oak.

The plan is arranged upon the circular-ward method and the rooms occupy the several floors named below:

The basement rises partly above the surface of ground and is lighted by large windows. It is used chiefly for heating and ventilating purposes. The ground-floor is arranged for administration, but also contains rooms for private patients. The first and second floors are devoted to wards, rooms for private patients and the dining-room. The third-floor contains the operating-room, kitchen service and bedrooms for the staff and nurses.

The building is heated by steam. Fresh air is supplied from a court above the street level, it is then forced by a fan into the cellar and passing between the steam coils is warmed before rising through

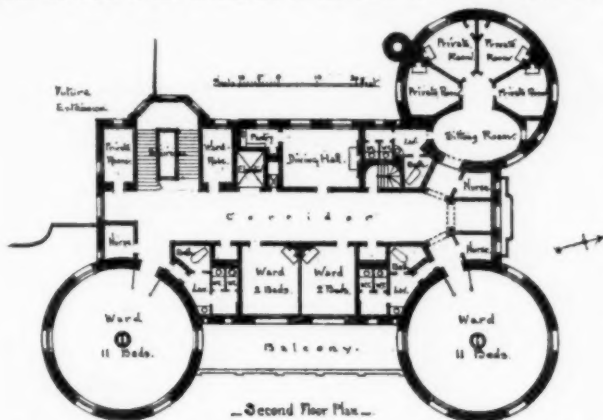


air ducts in the walls into all rooms. Foul air is extracted by power in the attic and is discharged at top of roof.

A point of vital importance in a building designed for the treatment of a class of diseases in which purity of air is essential, is a perfect system of ventilation and it is in this building that such an

¹ Continued from No. 807, page 170.

example is to be seen. The air of each ward can be changed with closed doors and windows every five minutes without production of annoying or dangerous draughts. In one of the wards which has been devoted to the treatment of the most offensive cases, almost



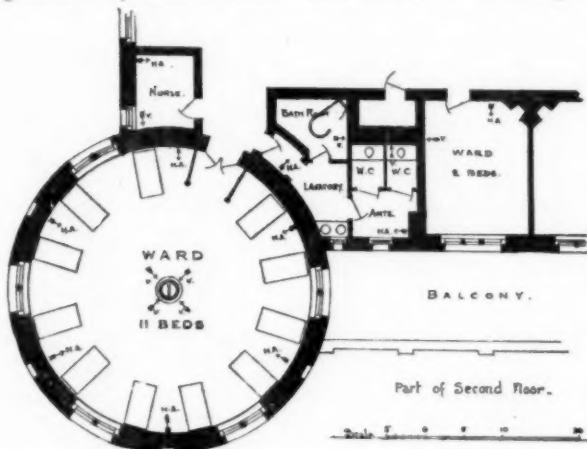
—Second Floor Plan—

absolute freedom from unpleasant odors has been secured by the aid of thorough disinfection and rapid change of air.

This is the first hospital with circular wards erected in the United States, and is considered in many respects superior to the usual parallelogram form. The experience gained thus far shows that for wards of forty feet diameter built in towers, accommodating eleven patients in each ward, the circular form presents unquestionable advantages: ample light is secured by the disposition of windows at the sides of the ward; the absence of angles and corners promotes cleanliness, the patients are under the immediate eye of the nurse to a degree impossible with the parallelogram form; the radiating arrangement of beds permits greater space between the heads of the beds; the more ready access to the patients saves much labor on the part of the nurses and the very cheerful aspect of wards of this form of construction is not without value in depressing cases of illness.

The heating and ventilating arrangements in this structure are exceedingly good and the details are, briefly, as follows: The boiler-room has been fitted with two boilers, space being left for a third if found necessary, on extensions being made at any subsequent period. These boilers are of steel four and one-half feet diameter, seventeen feet long, with thirty-inch drums and fifty-two three-inch tubes in each. The shells are each eighteen feet long, which forms a twelve-inch smoke-box on one end connected with an iron pipe three feet in diameter, this crosses the boiler-room and descends to the floor, where it enters an underground flue to the base of a circular brick-stack, ninety feet high. Each boiler has twenty-five superficial feet of fire-grate and the average pressure of steam is sixty pounds. The steam at this pressure is supplied to the pumps and machinery in the laundry as well as to the radiators throughout the building, adjoining the boiler-house, which serves for laundry and servant's rooms. High-pressure steam is also supplied to blower engine and to the pump of the hydraulic elevator. The heating in the residence proper is reduced in pressure by a regulating valve. In moderately fair weather, the exhaust steam from the blower engine and the pump alone are sufficient to warm the building.

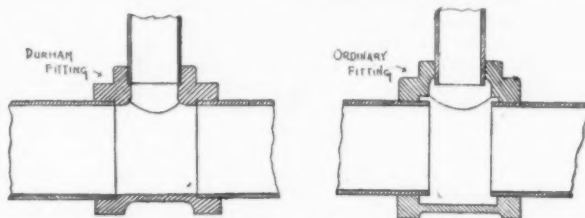
The ventilation scheme adopted is that of indirect radiation, the heating coils being placed in the basement, suspended from the ceiling immediately under the base of each hot-air duct connecting the



floors over, by which arrangement the engineer is enabled to regulate the quantity of warm air required in each apartment.

The boilers are supplied from pumps through a two-inch pipe which drops down as it approaches the front of the boilers and separates into two one-and-one-half-inch branches with stop and check valves fitted to each branch. The steam is directed from the front of the drums by six-inch pipes leading to a cross connection of

the same diameter. The main pipe, after allowing a three-inch branch to supply the pumps and laundry fittings, is continued across the boiler-room and drops down to an underground duct, leading to main building. The blow-off cocks at back of the boilers are connected to a one-and-one-half-inch pipe, which is carried to the pump room and enters the blow-off tank. The return water from the main building is taken back through the duct, by a three-inch pipe, which empties into the return-water tanks. All deficiency in the return water is compensated for by a three-fourths-inch Croton supply-pipe. The return-water tank is cylindrical, thirty inches in diameter and four feet long, composed of heavy boiler-plate with cast heads; at one



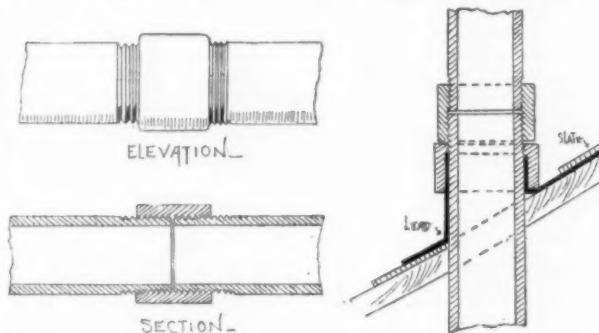
end is fitted a man-hole and on the other a water-gauge. The tank is, however, not under pressure and a one-and-one-half-inch vapor pipe is carried up through the roof.

The laundry machinery is worked by a vertical "Nagle" engine, at the back of the room, which receives its steam by a branch from the steam main of the other two boilers. The exhaust-pipe is dripped into a trap and runs along the wall to the feed-water heater, which is used to heat the feed-water when the heating system is not in use. The exhaust steam enters the top of the feed-water heater through a branch pipe from the exhaust main and the condensed water escapes through a drip-pipe receiving in its course the engine exhaust-pipe.

The hot-water tank is placed near the ceiling and is supplied from the street service through a one-and-one-half-inch branch. This tank can be heated by exhaust steam or live steam, as may be required. Immediately under the hot-water tank is placed a large cylindrical drip-tank, which receives all the condensed water, it also receives the blow-off from the boilers.

The drainage is executed on the "Durham system" which may be broadly described as a combination of scientific design, proper materials, and correct mechanical construction. The design of work, the materials used and the workmanship employed are an entire departure from the methods used in ordinary plumbing work. The result so gained is a system of pipes which are independent of the building for support, which cannot be cracked or broken, and whose joints are permanently gas-tight. The apparatus, constructed of wrought-iron steam-pipe and heavy cast-iron fittings of special shapes, all screwed together, is elastic under pressure and at all points invulnerable.

The screw threads on the pipes and in the fittings are cut by machinery to a standard gauge, so that they exactly correspond. The threads are slightly tapering and the farther the pipe enters a fitting, the tighter becomes the joint between the two; the threads are covered with a thick paste of red lead and oil, and the pipes are then screwed home by means of steam-fitters' chain tongs, by which a powerful leverage can be exerted. The joints are therefore very simple, easily made and require no skill, a laborer can make a tighter screw-joint in one minute, than a plumber with his materials, could make in an hour. Another advantage with this system is that examination of drains and soil-pipes can be made at any time without the expense of tearing up. There is no objection to these pipes being in sight everywhere, no joints are made between the thickness of floors, the pipes are painted or bronzed, according to position, and



look like ordinary steam-pipes. In this hospital 300 running-feet of Durham pipes are in view.

Hand-holes closed by screw-plugs are provided at every change of direction and with the aid of a wrench the resident engineer in charge of the building can examine the interior condition of the drains or remove any obstruction.

The pipes are of uniform thickness made from sheets of rolled iron and tested before using to 500 lbs. pressure per square inch and are manufactured in lengths varying from 17 to 24 feet.

The system is fully covered by patents and the fittings are manufactured solely by the Durham Company. There is a slight difference between the ordinary steam-pipe screw shoulder fitting and the Durham patent fitting: the advantages offered by the latter will be seen by the sketches. The fittings are all cut to the grade required by each run of drain-pipe the minimum fall being $\frac{1}{4}$ -inch per foot. Where short lead waste-pipes from baths, bowls, sinks, etc., connect with the iron piping, brass screw-nipples are provided to which the lead work can be soldered.

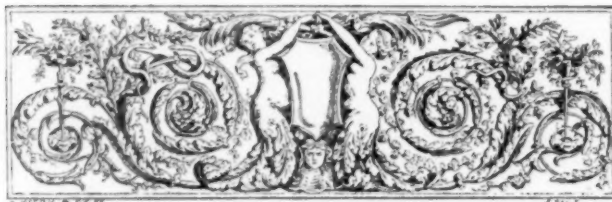
The ventilating-pipes are carried up through the roof and the connection with roof is formed by an iron screw-down cap over the edges of the lead flashing which is made into a circular apron form and dropped over the standing-pipe, the lower flange or base of which is covered with slates on the upper side of pipe. A coupling is screwed on over the roof connection into which an extra piece of pipe is screwed and carried to the desired height above the line of roof. The economy in the use of this class of work is very considerable, inasmuch as little or no repairs are necessary while the superior hygienic conditions secured by its adoption is apparent to all who recognize the importance of shutting out sewer-gases. Smaller pipes are used because of the absolute interior smoothness and are one inch in diameter less than is safe for ordinary plumbers' work.

The floors of the bath-rooms, lavatories, etc., are formed of large slabs of slate resting on moulded iron beams.

The closet fittings, etc., are provided with a wrought-iron screw flange floor-plate for connecting with soil-pipe which passes through the iron beams with wrought-iron hangers. The convenient and compact arrangement of the simple and successful systems of heating, ventilating, and drainage with the well-lighted corridors and staircases, the abundance of sun-light and fresh air with the circular instead of rectangular form of ward, make this building a perfect model of its kind.

A. A. Cox.

THE COLORADO AUTOMATIC REFRIGERATOR SYSTEM AT DENVER, COL.¹

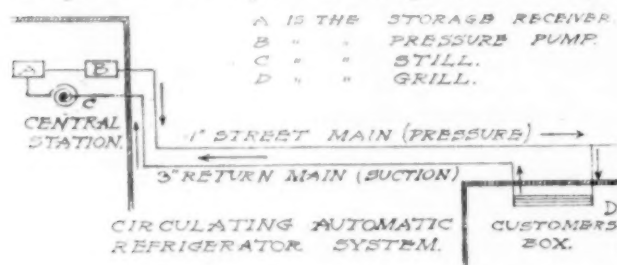


XVIII Century Rinceaux by P. G. Cauvet. From Havard's "Dictionnaire de l'Aménagement."

AN interesting and commercially successful experiment in furnishing a refrigerating medium through a main, in the same manner as steam, gas or water is supplied, has been going on in Denver, Col., for nearly two years. As the enterprise has proved of merit, and is likely to be adopted in nearly all large cities, and, as information on the subject is hard to be obtained, I furnish a brief from a report which I made to the City Counsellor of St. Louis, where a similar company had applied for a franchise to lay mains through the streets.

Originally, freezing-machines were made for obtaining ice, and providing customers with this product. After that the aim was to furnish the refrigerant to a cold-storage warehouse adjacent to the ice-machine, and from there the step was easy to supplying any refrigerator along a line of mains. In these machines all liquids which readily evaporate have been experimented with. Since the days of Carré, ammonia has been accepted as the best, because of its affinity for water, and because it is non-explosive, non-inflammable, and by its odor gives immediate warning of any leak or damage. Ammoniacal liquor of the proportion 29 parts pure ammonia to 71 parts water has been determined by many experiments to be the cheapest and most efficient.

The process consists, essentially, in the forcing of this liquor through the main to the point where refrigeration is desired; the



sudden increase of space at that point, so it may quickly vaporize, and the absorption by water, to return on a suction line to the

¹ A paper by A. McL. Hawks, Jr. read before the American Society of Civil Engineers and published in the *Transactions* of that Society.

central-station; the redistillation of the ammonia, and the removal of heat during the process. So that the system is practically automatic and once charged is run continuously, and, barring accidents, without loss.

In March, 1889, the company installed the plant, consisting of one 30-ton ice-machine, about two miles of mains (with connections for twenty-nine boxes having an air-space of 70,000 cubic feet), and the cold-storage warehouse of 50,000 cubic feet capacity. The main is one of the striking features of the plant. It is a 1-inch wrought-iron pipe and is not only capable of caring for the 70,000 cubic feet of air-space now in use, but, by the installation of another 30-ton machine, can care for 150,000 cubic feet. The valves in the box connections have a clear opening of $\frac{1}{8}$ th of an inch, which will serve for any ordinary cold-storage room. Beyond these valves is an inch connection with a grille of $1\frac{1}{2}$ -inch pipes on the ceiling of the room, at the far end of which is a $1\frac{1}{2}$ -inch return pipe to the 3-inch main leading back to the central-station.

As the work was entirely in the line of an experiment the cheapest and most convenient materials were used. The conduit is a box about 20 inches square, made of rough planks, and encloses the 1-inch main, the 3-inch return, box connections, and electric wires for detection of leaks or any disarrangement of the plant. The box is divided into sections, and each section has pipes coming to the surface of the ground at the curbline of the street. By means of these "smelling-pipes" a leak or break can be traced up to the section, and then to the very connection which is at fault. An improvement in the conduit, which will be adopted in all future work, is the use of vitrified clay instead of wood. All the specials, as originally put in, were enclosed in large specials of cast-iron, and the space securely packed with rubber. As the slightest leak of the ammonia turned the packing into "sponge rubber," which exerted an expansive pressure sufficient to burst these cast specials, new designs of wrought-iron were adopted, and all cast-iron fixtures were taken off. With the exception of these and a few minor details, no changes have been necessary, and in no case has any customer been cut off for more than three hours, and not a single loss or damage has been caused by this company. The electric connections through the conduit, to notify the central station of breaks, are not quite perfected, nor are the electric valves at the boxes for automatically regulating the temperature in each box a thorough success; due, probably, more to the diminutive size of the opening ($\frac{1}{8}$ th of an inch) than to any defect in the principle.

A patrol regulates these things at present, but it is expected soon that the defects will be regulated and the plant will become thoroughly automatic. The main features, however, have been demonstrated to be thoroughly practicable, and no great changes will be made in them.

In May, 1889, the first customers were connected with the mains, and tests were made to show the advantages of the system. Two similar boxes, with similar contents for preservation, the one fitted for ammonia freezing, the other one-third filled with ice, were tested by thermometers placed in various parts. After about eight hours, the ice had reduced the temperature from about 62 to 47 degrees Fahr.; after nearly two days to 41 degrees Fahr., and that seemed to be the limit. But by the ammonia process it could be lowered to 40 degrees Fahr., or even lower in less than fifteen minutes; the air in this case was dry and pure (all moisture collecting at once on the grill overhead in the form of frost) instead of damp and moist; and meats, fish, etc., once frozen, remain so during the whole period of storage. In one case a piece of meat was kept six months and then cooked and eaten, and the difference in flavor between it and fresh meat, could not be detected. As soon as business was commenced a problem was met in the regulation of prices. Old ice bills were consulted, and a basis of so much per cubic foot of air-space in the box was decided upon. But in some cases this was so manifestly unjust that an arbitrary price was agreed upon. Later researches, based on steam-heating calculations, show a surprising agreement with the old ice bills, and what seemed impossible on the former basis is shown to be very reasonable. So all new contracts are made on the later schedule of exposed surface and openings.

All customers express themselves as very well pleased with the system and its results. The third of their box formerly devoted to ice is a clear gain, as the grill overhead occupies no space that is ever used. The temperature, instead of being a varying quantity, dependent upon the arrival of the iceman, and never below 40 degrees Fahr., can be reduced to any degree above 25 degrees Fahr. in a few minutes, and maintained within 2 degrees Fahr. of the same. Instead of the usual moist, disagreeable air of an ice refrigerator, it is dry, sweet and clean; and the opening of a valve takes the place of the iceman's visit—with all uncomfortable circumstances. So enthusiastic over it are some customers that I cannot refrain from quoting two extracts. One consumer says: "The Colorado Automatic Refrigerating Company's system is absolutely perfect, and is something that a butcher needs to use for only one week to make him feel that he is rescued from one of the greatest evils of the butcher's business, namely, the price, trouble, labor, and dirt, attendant upon handling natural ice;" and another writes: "To-day, if ice was given me gratis, and even placed in my box free of charge, I would not use it, and exchange my present method of obtaining cold air." These go to show the way the system is regarded by all who know it thoroughly, and that it has passed through the experimental stage to a well settled business enterprise.

In this connection the following extract from the *Kansas City Times* may be of interest:

"Kansas City will be the first city in the world to experiment with a system which promises to introduce cool air into any business house or residence in the city. More than that, it is proposed by this system to make ice in refrigerators at one-third the present low cost of that rather expensive summer luxury. The men at the head of the scheme are Daniel O'Keefe, T. B. Bullene, E. H. Phelps, and H. R. Clauss, who have organized the O'Keefe Public and Private Combination Refrigeration Company.

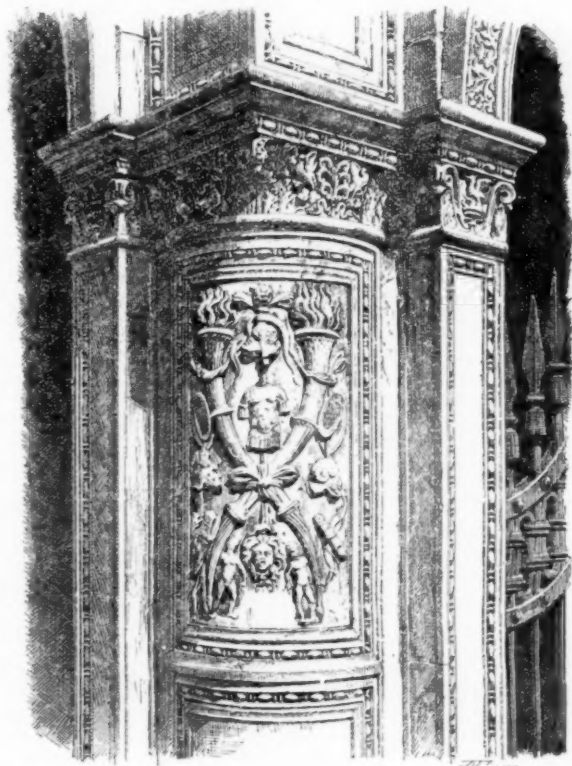
"Daniel O'Keefe of Kansas City is the inventor of the system, and says that he has been at work on it since 1868. He argues that if the scheme of heating buildings by hot air is successful, why cannot the cooling of them by cold air be equally as successful? At the central station will be ammonia and air compressors, brine and vacuum pumps, brine and air-cooling tanks, and receiving and discharging connections.

"The conduits first laid will be 22" in diameter, with four separate chambers. The upper and largest one will contain cold air. The two lower ones will be used for discharging and returning the anhydrous ammonia brine. In the centre of the conduit will be a vacuum chamber. The air can be introduced into any house at a reasonable cost, and the temperature can be regulated easily from 70° to zero. The liquid can be used for freezing purposes, and Mr. O'Keefe claims that ice can be made for one-third the present cost. Mr. O'Keefe expects that one of the greatest features of his scheme will be the use of the air as a disinfectant in the sick-room.

"It is claimed that the plant and conduits can be placed in operation for about \$250,000. The ordinance provides that 2,000 feet of conduits shall be in use within two years, and that work shall be begun under the provisions of the franchise within six months after the passage of the measure. O'Keefe declares that all the pipe will be laid before October 1. The work is to be done under the direction of the city engineer and the Board of Public Works, and a ten-thousand-dollar bond is to be given to insure the city. When the company desires hereafter to make extensions the Board of Public Works is to be authorized to grant permits under proper instructions, with the provision that no excavations shall interfere with any pipes, sewers, or other underground mains.

"Mr. O'Keefe says that the system will be perfectly safe, low pressures alone being used in the conduits. The process is entirely different from the brine-cooling system now in use at the packing houses and breweries."

SLOW BURNING CONSTRUCTION.



Angle Motive from the Ospedale Comennale, Venice. From *La Semaine des Constructeurs*.

THE Continental Fire Insurance Company has issued the following in circular form, the requirements including the St. Louis board specifications:

Walls.—The walls must be of the best construction, of standard thickness, as specified below, and not reduced by flues or for any other

purpose. The walls must be corbelled out to receive the floor, unless a ledge is made by reason of the wall receding to a smaller dimension. Thickness of walls must be as follows: The upper two stories next to the roof, 13 inches; the next two below, 18 inches; the next two below, 22 inches; the next two below, 26 inches; the next two below, 30 inches.

Party walls must be four inches thicker than the above on all stories except the story next to the roof, or be ledged or be corbelled. Parapet or fire walls to pass at least twenty-four inches above the roof. Walls over one hundred feet in length must be four inches thicker than the standard thickness, unless there are cross walls of equal height, or solid buttresses with a section area of 300 or more square inches, placed not more than eighteen feet apart and extending to the top of the wall.

Flues, if any, must have walls not less than eight inches thick, well laid in mortar and pointed and of sufficient area for the service required. No beam or woodwork to enter the wall within eighteen inches of the interior of any flue. Chimney tops must not be less than four feet above the roof.

N. B.—Unless the sand used in making mortar is good sharp sand, cement mortar should be used. This is very necessary in many sections of the country where both sand and bricks are of inferior quality. Cement mortar is, of course, preferable in any section and under any circumstances.

Columns, Girders and Beams.—The wooden columns, girders and beams should be of such dimensions as to easily bear their respective strains after allowing one and one-half inches for charring on all exposed sides, but in no case shall any one of their dimensions be less than eight inches. They must be planed smooth on all surfaces which may be exposed to action by fire. Bore the cores of the columns one and one-half in diameter, and ventilate near the top and bottom by half-inch hole transversely through the column. Special provisions must be made at points which are liable to dry rot, to secure ventilation around the timbers. Beams, if of wood, should not be bolted through the walls but rest upon a plate in the wall, on the upper side of which is a transverse fin which fits into a groove across the under side of the beam, and firmly secured to it by wedges, the upper edge of the beam at the end should be rounded. Iron columns, girders and beams where exposed must be incased in a fireproof covering of terra-cotta or fire clay. Wrought-iron being more liable to rust than cast iron, should not be covered with plaster of Paris or cement. Lime mortar will not rust the iron.

Floors.—Floors must be laid directly on the beams and girders without joists, and be of the following construction: The under or heavy floor plank must be planed on the exposed surfaces, splined or tongued and grooved, and not less than the following dimensions: For bays of eight feet or under, three inches; bays of ten feet or exceeding eight, four inches; bays twelve feet or exceeding ten, six inches; for bays over twelve feet, eight inches in thickness; for long bays it is recommended that the floors be made of plank on edge fastened closely together, but no bay must be over fifteen feet.

The floors must be made waterproof by some approved material laid between the top and under flooring. If paper is used there must be a double thickness of rosin sized paper or roofing felt. Top floor to be hard wood, at least seven-eighths inches thick, tongued and grooved. All joints between the walls, columns and floors must be calked or provided with some approved waterproof joint. The best construction requires a slight inclination of the floors to the water vents which must be provided on all floors where the water can be carried either through the walls or down into drains. Openings in the floor for steam and all other pipes must be protected by a section of larger pipe made water-tight in the floor and extending three inches above it. If it is necessary to make holes in the floor for belts or shafts, metal jackets must be carried through the floor extending three inches above it and be water-tight.

Bulkheads.—Bulkheads must be constructed of heavy plank not less than three inches in thickness and planed on all exposed surfaces.

Roof.—The roof must be constructed of heavy plank tongued and grooved or splined, and not less than three inches thick and dressed on the other side. Covered externally with metal, composition, slate or tile. Openings, if any, to be standard.

Cornice.—Cornices must be of brick, stone, terra-cotta, or metal on metal brackets bolted into the walls. There shall be no openings into the building or attachments to wood or ends of timbers.

Stairways and Elevators.—Stairways and elevators must be placed in a brick shaft, the walls of which must extend at least twenty-four inches above the roof of the building and all openings into it must be protected by standard fire-doors, and have sills three inches above the floor. In cases where stairways cannot be placed in a brick shaft, or where they do not run through all the floors, they must be constructed as follows: The entire stairway must be of incombustible material; at some portion of the stairway between each floor, a standard fire-door must be provided, which shall be furnished with some self-closing device, and the portion above or below said door, must be rendered air-tight by being closed in by brick, terra-cotta, concrete, or iron frame, with metal lathing plastered on both sides. The floor must be raised three inches around the head of such stairway to prevent water from going down the stairway.

Interior Finish.—All walls and partitions to be brick, tile, terra-cotta, or iron frame with iron lath and plastered. No wooden lath or furring will be allowed. Where wainscoting is used no hollow space is to be left behind it.

Woodwork should not be painted or varnished. Fireproof paint for the underside of the floors and other woodwork may be used, but it is preferable not to paint the heavy woodwork until it has been up for some time.

Exterior Openings.—All openings exposed by other buildings within forty feet must be covered above the first floor with standard shutters; when exposed by a special within fifteen feet, the openings on first floor must also be provided with shutters.

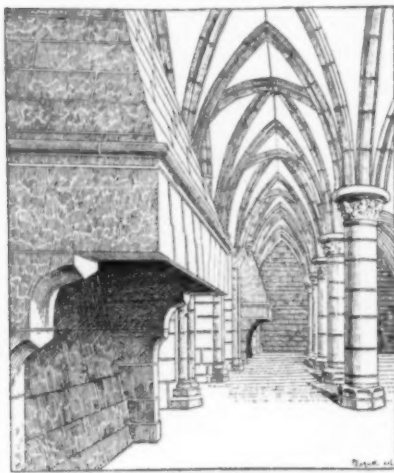
A standard fire-door or shutter for protecting openings as required

should be constructed of pine or other soft wood (hard wood should never be used, as the charcoal of soft wood holds the nails better than that of hard wood) of two thicknesses, of matched boards, at right angles to each other, or crossing diagonally, securely covered with I C tin, 14 x 20, on both sides and edges, with folded lap joints, the nails for fastening the same being driven inside the lap. The hinges, bolts and latches should be secured or fastened to the door or shutter after the same has been covered with the tin. Sheet-iron should not be used as it is too heavy to allow of the lap or folded joint. In covering the woodwork the tin should be placed round the edge and folded down at the top and bottom of the side of the door, making a mitre in the folding. In a room having an atmosphere liable to rust the tin, "lead" sheets should be used instead of "tinned" sheets.

Instead of closing by hinges and latches, doors are preferably arranged so as to run on inclined slides placed overhead, the doors being suspended on each slide by means of suitable iron pulleys or trolleys. The pitch of the rails should be about $1\frac{1}{2}$ inches to the foot. They may be secured open by a fusible metal link, which would yield to a rising temperature and close the door automatically, and should be about three inches larger than the opening covered, on all sides. Care should be taken to make them tight at the bottom, where there should be an iron or stone sill sufficiently close to the bottom of the door to prevent the passage of flame.

If hinged doors are used they should shut into a rabbet in the masonry or into an iron frame rabbet, or may have a three-inch lap outside of the opening in the wall. Where the frame is of wood it should be as securely covered with tin as the door itself.

RECLAIMED LAND AT PUGET SOUND.



Hall of the Chevaliers, Mont-Saint-Michel, France. From Havard's "Dictionnaire de l'Aménagement."

here has steadily increased, and the work of reclaiming has attracted wider and wider attention.

The tide-marsh lands of Southern California are not improved so extensively, because when they are diked the absence of rain renders it impossible to freshen them; but the rainy season here lasting from October to March brings enough water to keep them in good condition the year round.

The marsh lands are mostly within three miles of salt-water, along the outlets of streams that have brought down from the mountains rich alluvial deposits. These bottoms are classified as tide-marsh prairies and as spruce or brush tide-marsh lands. The former, which stand about on the level of ordinary high water, rarely a foot above, are covered with grasses when in a wild state. They are nearest the salt water. Above them, lying one or two feet above the level of ordinary high tide, are the brush tide-marsh lands, overgrown with spruce or brush. All marsh lands in Washington above the level of the highest storm tides are called fresh-water or beaver marshes. Beaver dams, stopping the drainage of both uplands and bottom lands, have retained with the water alluvial matter which, with the growth of peat and the decay of vegetable matter growing in such swamps, forms a soil often from fifty to one hundred feet deep.

In Washington there are about 100,000 acres of marsh prairie and from 120,000 to 150,000 acres of brush tide-marsh lands. The distribution is about as follows: Near the mouth of the Columbia or Wallcut River, 1,610 acres, and on Chinook River 1,475 acres. There are around Shoalwater Bay, on the Pacific coast, about 15,000 acres of open marsh, and from 5,000 to 10,000 acres of brush and spruce marsh, as follows: West and south of the bay, 1,649 acres; on Bear River, 979 acres; on Bone and Palix Rivers, 2,500 acres; on Nasalle and Nama Rivers, 5,000 acres; on Willapa River, 8,000 acres, and on the east side of the bay, mostly spruce marsh, 3,000 acres. On the south side of Gray's Harbor, also on the coast, are 29,000 acres; on the east side, where the Chehalis River empties, 29,000 acres, and on the north side 25,000 acres, or a total of 83,000 acres, of which 20,000 acres are open tide-marsh prairie. There are 20,000 acres more on the Chehalis River itself.

On the ocean coast north of Gray's Harbor to and including Neah

Bay are 20,000 acres tide marsh, over one-third of which is open marsh. On the south side of the Strait of Fuca are 2,000 acres; on Hood Canal and on the west side of Puget Sound, 4,000 acres, and on the east side of Puget Sound there are in Pierce County, 5,800 acres; in King County, 1,250 acres; in Snohomish County, 20,200 acres; in Skagit County, 50,000 acres; in Whatcom County, 4,000 acres; in Island County, 4,000 acres, and in San Juan County, 600 acres.

Before this land can be cultivated it must be diked and drained. The improvement of the tide marshes began about 1864 by a few settlers in the two counties lying north of Seattle, Snohomish and Skagit. The difficulties were many and the progress slow for five or ten years, but as soon as the era of experiment was passed the progress to wealth was steady and rapid. Tide-marsh farmers have literally made fortunes.

The cost of diking and draining of course varies widely with different tracts, but it is conservative to say that it takes \$20 an acre to dike and drain an average tide-marsh farm, and as much more to fill up holes and sloughs and to fit the ground for cultivation. If spruce or brush marsh it costs from \$20 to \$50 an acre to clear. Improved, this land for farming purposes is worth from \$100 to \$300 an acre. West of the coast range not over 1,000 acres are improved, but upon the Puget Sound tide-marsh lands up to 1885, \$175,000 had been spent upon 150 miles of dikes in Skagit County, \$50,000 on 37 miles in Snohomish County, and \$20,000 on 15 miles in other counties.

Exact estimates for to-day are impossible to obtain, but those familiar with the matter say that there are on the Puget Sound 250 miles of dike, costing \$200,000. Much of the money has been spent of late in improving old dikes. A local paper, in describing the tide-marsh lands recently, said:

"Nearly all tide-marsh land in Skagit County is under dike and about two-thirds of it in cultivation. Snohomish County has over one-half under dike and about one-third cultivated. Not to mention immense crops sometimes secured on single tracts, following are actual total results of good and bad farming for large areas of Skagit County tide-marsh land in 1888: On 10,820 acres were produced 15,530 tons of oats; on 2,330 acres were cut 6,940 tons of hay, and 6,000 acres, mostly in meadow, pastured 1,735 cattle, 755 horses, 1,356 hogs, and 550 sheep.

"In many instances from a farm of 160 acres of well-improved diked tide marsh there will be sold yearly 10,000 bushels of oats, 100 tons of hay, and \$1,000 worth of dairy products, fruits, and vegetables. In addition, a large number of cattle, horses, and hogs will be fed, and all farm produce that can be profitably consumed on the place will be raised. With diked land in good condition 100 bushels of oats, 80 bushels of barley, 60 bushels of wheat, and 4 tons of hay per acre are common crops. The great problem is thorough drainage. The rise and fall of the tide allows drainage by the tide gates through the dikes. With proper interior ditches and underdraining the average yield shows a tendency to increase rather than decrease from year to year."

The first crop raised is usually oats; afterward, hay or grain, vegetables, and fruits are produced. The most enduring and productive marshes are not right on salt water, but in the river deltas, where salt and fresh waters meet. — *New York Times*.



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

GRACE CHURCH, NEW YORK, N. Y. MR. JAMES RENWICK, ARCHITECT, NEW YORK, N. Y.

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

HOUSE FOR J. Z. T. ROBITZER, ESQ., PITTSBURGH, PA. MR. C. M. BARTBERGER, ARCHITECT, PITTSBURGH, PA.

THE materials used in building this house are buff brick with bluestone finish, the roof being covered with Akron diamond-shaped tiles.

PULPIT IN THE CHURCH OF NOTRE DAME, BRUGES, BELGIUM.

This example of the curious carved oak pulpit for which Belgium is so famous dates from 1742.

DESIGN FOR CHURCH, CHAPEL, PAROCHIAL RESIDENCE AND SCHOOL. MR. D. C. E. LAUB, ARCHITECT, SAN ANTONIO, TEXAS.

MASONIC BUILDING, DOVER, N. H. MESSRS. HARTWELL & RICHARDSON, ARCHITECTS, BOSTON, MASS.

HOUSE FOR FRANK M. WILSON, ESQ., WILLIMANTIC, CONN. MR. C. T. BEARDSLEY, JR., ARCHITECT, BRIDGEPORT, CONN.

DRAWING-ROOM AT NO. 2 PRINCE'S GATE, LONDON, ENG.

[Additional Illustrations in the International Edition.]

THE PRINGSHEIM PALACE, BERLIN, PRUSSIA. HERREN EBE & BENDA, ARCHITECTS.

[Gelatine Print.]

HOUSE AT ROSCOFF (FINISTERE), FRANCE. M. A. THOMAS ARCHITECT.

We give this week two additional plates in illustration of the house published last week.

GATEWAY AND FIREPLACE IN THE SAME HOUSE.

DESIGN FOR FACADE OF THE CHURCH OF THE HOLY TRINITY, CORK, IRELAND. MR. ARTHUR HILL, ARCHITECT.

KINMEL PARK, ABERGELE, WALES. THE LATE W. EDEN NESFIELD, ARCHITECT.

ENTRANCE FRONT OF THE SAME.

GARDEN FRONT OF THE SAME.

EAST END OF THE SAME.

FOUNTAIN'S HALL.



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

THE COST OF NEW YORK COUNTY COURT-HOUSE.

NEW YORK, N. Y., August 3, 1891.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—Referring to your first editorial in to-day's "American Architect" allow me to say that your statement as to the manufactured cost of our new Court-house is very far below the mark.

I recollect the late President Upjohn saying (it was before the southern wing was added) that he should not have been afraid to take the contract for the building alone—of course, not for "the three shades" nor other "fixings" and furniture—at one million dollars. (And, by the way, I think the present Mr. Upjohn has told me he built his very fine and extensive Connecticut State Capitol for a million.) But, some years subsequently, Mr. R. G. Hatfield, who, after the fall of the Ring, was employed to audit all the accounts covering the real or alleged expenditures on the Court-house, told me his footing-up of the figures for structure, fixtures and furniture showed a total of seventeen million dollars, or nearly three times the six million you name. I do not now recall whether the exact figure was somewhat over, or somewhat under his total, but those were the round numbers.

A. J. BLOOR.



VELASQUEZ AS A COURT OFFICIAL.—Apropos of Frémiet's statue of Velasquez exhibited at last year's *Salon* the following extract printed by the *Architect* amid its "Tesserae," may be of interest. Upon the return of Velasquez from an artistic mission in Italy, in 1651, the King, as an especial mark of favor, conferred upon him the office of aposentador mayor, or quartermaster-general of the royal household, an office of great dignity and much emolument. The fatigues of courtly etiquette and the solemn duties of aposentador mayor weighed in course of years heavier by far upon the body and soul of Velasquez than either age or the labors of his artistic career. We can hear with a certain patience of this richly-endowed artist devoting the best years of his life to the painting of royal countenances and the splendors of a solemnly magnificent court, which was at once bigoted and licentious, because through these works of Velasquez's pencil we receive the most valuable historical commentary. But when we read of the duties of this high aposentador mayor being, amidst countless others, of a scarcely more important, but not less tedious character, than the providing of lodgings for the King and his train in all progresses; the placing of His Majesty's chair and removal of the cloth when the King dined in public; the issuing of keys to new chamberlains, and the setting of chairs for cardinals and viceroys who came "to kiss hands," it is difficult to say which feeling becomes most dominant in one's mind, disgust at the stupid blindness of a King who, professing to appreciate art and Spain's greatest painter, devoured this painter's life with ceaseless calls

upon him for personal attendance on daily occasions of senseless, solemn etiquette; or regret that Velasquez should so weakly and complacently have yielded to this slavery of pomp. A solemn and festive meeting of the two courts of France and Spain, to celebrate peace and the nuptials of Louis XIV and the Infanta Maria Teresa, having been arranged to take place in the summer of 1660 in the Isle of Pheasants, in the river of Bidasoa, Velasquez was despatched in March of that year to superintend the erection of a magnificent pavilion upon this islet, which, as neutral ground, has witnessed so many strange events connected with the annals of France and Spain. But not alone had the renowned aposentador to superintend the building of this pavilion; but he had to prepare the Castle of Fuenterrabia for the reception of his royal master and to provide lodging for the royal train all the way from Madrid to the Bidasoa; and this gorgeous train travelled with oriental numbers and magnificence. When we read that "the baggage of the royal bride would alone have served for a small army"; that "beside personal equipments she carried a vast provision of presents, amongst which were two chests filled with purses, amber gloves and whisker cases for her future brother-in-law, the Duke of Orleans"; that "the grandees of the household vied with each other in the size and splendor of their retinues"; that "the cavalcade extended six leagues in length, so that the trumpets of the van were sounding at the gate of the Alcalá de Henares, the first day's halting-place, ere the last files had issued from the gates of Madrid"; and that "the whole journey through Burgos and Vittoria was a triumph and a revel," one can form some faint idea of what hurry, excitement and fatigue must have overwhelmed the old painter, accustomed even as he had been throughout his life to court etiquette and pompous festivities. Add to which, Velasquez had to await the King's arrival at San Sebastian for two months, superintending his preparations for the reception of the royalties; to be in attendance upon Philip when he did arrive at San Sebastian; and during the three weeks of his stay there, pending the final negotiations, and "when His Majesty's table was sometimes nearly overturned by the throngs of French who came to see him dine"; that he attended Philip to Fuenterrabia and was actively employed by his office throughout the week of pomp which the two courts passed on the frontiers of the two kingdoms. These grand and glorious festivities terminated his career. Though apparently in his usual health during the excitement of his fatiguing avocations, "a report of his death," says Stirling, "preceded him to Madrid, and he found them bewailing his untimely end; but the tongue of rumor had spoken in the spirit of prophecy; his worldly work was done, and fate forbade the pageants of the Pheasants' Isle to be recorded by his inimitable pencil." On July 31, Velasquez was seized, on retiring to his apartments after attendance upon His Majesty, with feverish symptoms, which greatly alarmed his physicians. After receiving every possible attention he expired in the afternoon of August 6, 1660. After lying in state, the body was conveyed with almost royal pomp at night to the parish church of San Juan. Eight days later expired the wife of Velasquez, Juana Pacheco, the daughter of Velasquez's old master and his first biographer. The husband and wife repose in one grave.

MOLASSES AS A FUEL.—The Planter, of New Orleans seriously suggested a curious method of utilizing one of the big products of the States as special industry. The large sugar crop of Louisiana for the present year promises increased trouble in getting rid of the lower grades of molasses, the output of which will probably reach 300,000,000 pounds. This molasses is sold for 5 to 7 cents per gallon when a customer can be secured; but the bulk of it is wasted by either running it into huge pits or into the river and bayous. It was formerly converted into rum, and this would seem to be a profitable enterprise at present prices. But The Planter now proposes to use it as a substitute for coal as fuel on the plantations. This journal figures out that the lowest grades of vacuum pan molasses contain from 20 to 25 per cent of sugar, which cannot be extracted by existing machinery. Estimating a barrel of such molasses to be worth, net, 50 cents or \$1, and a barrel to hold 550 pounds of molasses, the molasses would be worth 1 or 2 cents a gallon and from 1-11 to 1-5 cent a pound. Pittsburg coal brought to the sugar-house furnace has for about 10 years cost 1-5 cent per pound. This molasses burns with a high heat in combination with wood or wood fiber, so that by sprinkling it on the bagasse (the dry stalks of the sugar cane after the saccharine juice has been pressed from it) an excellent fuel of great heat power is obtained. In this way, estimating that only half the molasses produced is used for fuel, a substitute will be furnished for 75,000 to 100,000 tons of coal. That is more than enough for the manufacture of all the sugar of Louisiana.—*Engineering News*.

ARABIC BUILDINGS IN EGYPT.—The report of the Committee for the Preservation of Arabic Buildings (*Comité de Conservation des Monuments de l'Art Arabe*) for 1890 has just been published. It is evident from this report that, while apparently a considerable amount of useful work has been done by the Committee in the way of repair, a considerable amount of mischievous restoration has also been carried out; and it is a matter for conjecture whether, upon the whole, the detrimental work does not overbalance the useful work executed under the auspices of the Committee. With regard to the tomb on the north-east side of the mosque of the Sultan Barkouk, containing the remains of the Sultan's daughter, it was resolved to completely restore the tomb and rebuild the cupola. A tender was accepted for repairing the bronze domes of the mosque of the Sultan Barkouk according to a specimen submitted with the tender. Franz Pachá a member of the Committee, was of opinion that the silver inlay had been better executed, but on comparing the new work with the ancient inlay it was found that the work was the same. The Second Commission have resolved to rebuild the staircase in front of the principal gateway of the Mosque el-Mouyayed. The mosque of Ahmed Ibn Toulon, a magnificent building dating from the year 877, is about to undergo considerable alterations at the expense of the Committee. A sum of £330 Egyptian (about £338) was expended on this building in 1885. The

Mosque el-Mouyayed, which is figured in Coste's work "L'Art Arabe," is to be restored at a cost of £4,000 Egyptian. — *John Hebb, in the R. I. B. A. Journal.*

A LARGE PLANK.—The *Northwestern Lumberman* reproduces a photograph of a redwood plank that is 16 feet by 5 inches wide, 12 feet 9 inches long, and 5 inches thick, and is about 90 per cent clear. It was taken from a tree 35 feet in diameter and 300 feet high. According to its rings it was more than 1,500 years old. The tree was cut 28 feet from the ground, and the plank was hewed out of the stump, representing a section taken from near the heart to the bark. After it was displaced it was lowered by block and tackle, with a locomotive for power. In the way of labor its cost represents the time of two men for a month, simply to prepare it in the rough for shipment. To this the cost of transportation must be added, making a total of about \$3,000. It was moved by water to San Francisco. After being on exhibition some time, a car was especially prepared to transport it to Chicago. This was done by cutting a slot in the centre of a flat car, in which stirrups were pendent. The plank was placed on edge in the slot, its lower edge being within about a foot of the ties. The plank was cut on the lands of the Elk River Mill & Lumber Company, in Humboldt County, Cal., is the property of J. L. Harpster, of Eureka, and B. F. Noyes, of San Francisco, and is on exhibition in Detroit, Mich., whence it may be sent to East Saginaw and elsewhere, to finally bring up in Chicago at the world's fair. The plank shows coarseness of growth, with richness of figure, and a finish such as the highest quality of material and the best efforts of Berry Brothers, the varnish manufacturers, of Detroit, can secure.

PRINCE EDWARD ISLAND TUNNEL.—The Prince Edward Island tunnel which the Canadian Government propose to construct for the purpose of connecting Prince Edward Island with the mainland has been the subject of a report by Sir Douglas Fox, from which we learn that the tunnel with its approaches will be somewhat over 9 miles in length. The greatest depth of water in the channel is 90 feet with a rise of 6 feet at spring tides and 3 feet at neaps. The distance from shore to shore is 13,200 yards, or say 13,500 yards from shaft to shaft. The shores on either side are well adapted for railroad approaches, varying from 15 feet to 35 feet in height, the soil being largely of red clay. About 5½ miles of line will be necessary to connect the shafts with the railroad systems on either side of the channel. Unfortunately, the gauge of the Prince Edward Island lines is 3 feet 6 inches while the Canadian lines are constructed on the standard gauge. Sir Douglas Fox recommends that the tunnel should be 18 feet in diameter so as to suit the standard gauge and to pass the largest sized cars on the Intercolonial Railroad. The cost of such a tunnel lined with brick 1 foot 10-12 inches thick in the dry portions, and with cast-iron plates where feeders occur, he estimates at 140¢ per lineal yard, or say, 1,890,000¢. for the cost of the work from shaft to shaft, or allowing for the land tunnel and providing a sum for contingencies, 2,225,500¢. Before commencing work he recommends that borings should be made in the channel down to the carboniferous bed-rocks, after which much closer estimates as to its cost could be made. — *Engineering.*

CALDERON'S "RENUNCIATION OF ST. ELIZABETH."—No picture could ever have been advertised better than Mr. Calderon's "Renunciation of St. Elizabeth," which, after any amount of public protest and discussion, has now been made the subject of a solemn inquiry in the House of Lords. It was Lord Stanley of Alderley who consented to take the Marquis of Salisbury to task on this delicate subject, and who thus became the means of providing the Peers with a brief period of unexpected amusement. Lord Salisbury disposed of the matter by treating it in his best vein of cynical banter. He had only seen the picture, he said, in the form of a wood-cut when it was called "Zeeo showing her back to the members of the County Council." After dealing this stab, he asked Lord Alderley whether he was prepared to lay down a canon for the guidance of art in regard to clothing, and suggested that painters and policemen did not regard drapery from the same point of view. He then referred to several of the most famous pictures of old masters in which feminine saints, clad in innocence only, had appeared for many years without creating scandal or suffering in reputation, and closed with the characteristic comment that, inasmuch as Mr. Calderon's canvas had been bought for the Chantrey collection, which people talked about but did not go to see, it was not in the least likely to do appreciable damage to public morals. — *New York Evening Post.*

THE RUSTING OF IRON AND SOFT STEEL.—Some experiments were recently made at the Riverside Iron Works, Wheeling, W. Va., on the comparative liability to rust of iron and soft Bessemer steel. As stated in *Engineering*, a piece of iron plate and a similar piece of steel, both clean and bright, were placed in a mixture of yellow loam and sand, with which had been thoroughly incorporated some carbonate of soda, nitrate of soda, ammonium chloride, and chloride of magnesium. The earth as prepared was kept moist. At the end of 33 days the pieces of metal were taken out, cleaned, and weighed, when the iron was found to have lost 0.84 per cent of its weight and the steel 0.72 per cent. The pieces were replaced and after 28 days weighed again, when the iron was found to have lost 2.06 per cent of its original weight and the steel 1.79 per cent.

PROPOSED CREMATORIUM FOR LONDON.—The Commissioners of Sewers of the city of London practically have declared themselves in favor of cremation by ordering their Sanitary Committee to report upon the advisability of erecting a crematorium in the cemetery at Ilford. Mr. Malthouse, one of the board, pointed out that 91,243 bodies were buried last year in the cemeteries of the capital, that in many places they lay fourteen deep, that the situation was growing worse every year, and that a reform of some kind was imperative. High medical

authority had declared already that the state of the cemeteries demanded the intervention of the Government. Cremation, he said, was the only practical alternative of burial, and would soon be adopted, if the cost were reduced, as the prejudice against it was disappearing very quickly. — *New York Evening Post.*

A NEW FIND AT MILO.—Milo, the island of the Cyclades in which the famous "Venus of Milo" was discovered, has again been the scene of the unearthing of a splendid example of ancient Hellenic art. The new "find" is the marble statue of a boxer, somewhat above life-size, which is almost as perfect after its burial under the dust of centuries as it was when it came fresh from the hands of its sculptor. The statue has been shipped to Athens, where a commission of Greek archaeologists, aided by some members of the German Archaeological Institute in Athens, will report upon the period of its origin and its probable creator. — *Pall Mall Gazette.*

WORK ON LONDON'S GREAT TOWER.—Nothing has been heard of late of the Watkin Tower, which is to rival in London the altitude of the Eiffel Tower. The work has, nevertheless, been going steadily forward, foundations for the tower being completed and the laying out of the grounds considerably advanced. On the invitation of the Chairman and Directors an inspection of the works was made a few days ago by a number of members of Parliament and others. — *London Daily News.*

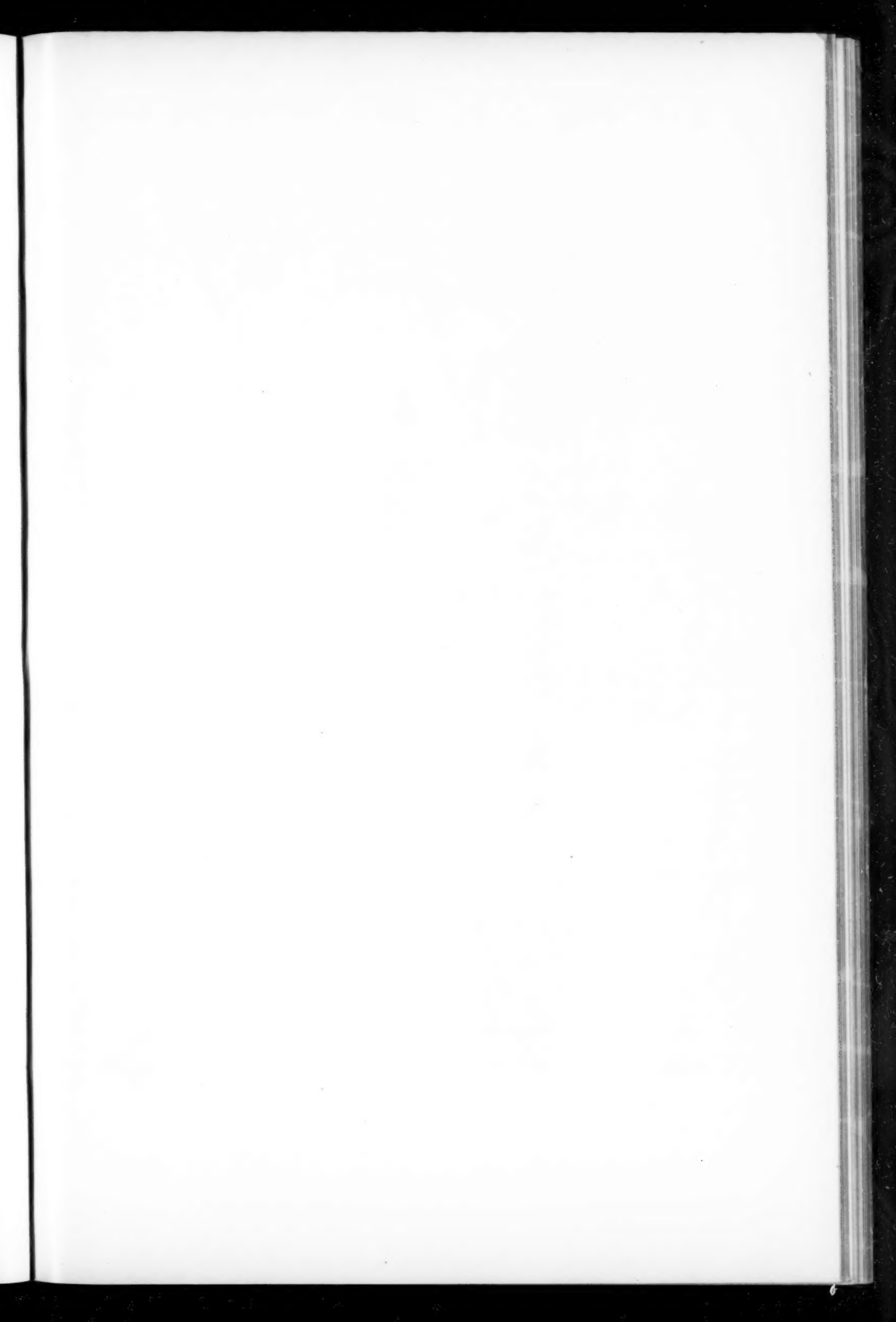
STATUE OF THE JAPANESE GOD OF WAR.—In the Japanese capital there is a gigantic image of a woman, made of wood and plaster, and dedicated to Hachiman, the god of war. In height it measures 54 feet; the head alone, which is reached by a winding stairway in the interior of the figure, being large enough to comfortably hold twenty persons. The figure holds a huge wooden sword in one hand, the blade of the weapon being 27 feet long, and a ball 12 feet in diameter in the other. Internally the model is fitted up with extraordinary anatomical arrangement which is supposed to represent the different portions of the brain. A fine view of the country is obtained by looking through one of the eyes of the figure. The admission to all parts of the structure is two cents.

Japanese tradition says that during the time of the Te-Shomeng rebellion, in 1522, hundreds of cords of wood were piled around it and fired, but that the sacred object itself failed to burn, or to even be scorched by the flames. — *Cincinnati Commercial-Gazette.*

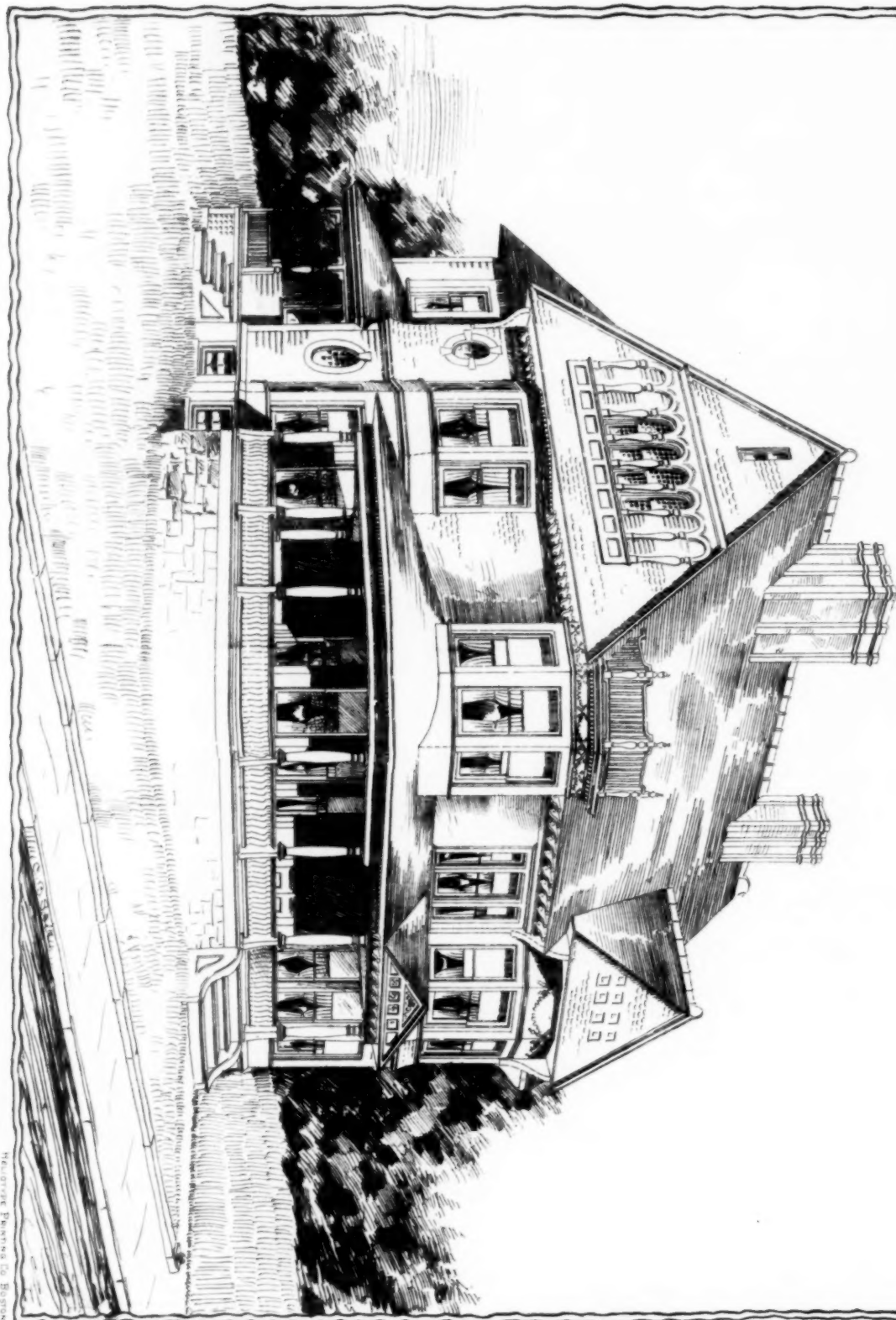
USES OF WOOD PULP.—Wood pulp is now extensively used as a composition for mouldings and decorative purposes in private and public buildings. In the manipulation of this composition, beautiful effect can be obtained by mixing in it the various aniline colors—strong or tinted—or those known as metallic colors. Bronze powders of varied colors may also be used with pleasing results. By the use of this material all the better qualities of fine-grained wood are obtained without any of the drawbacks of shrinking or expanding on account of atmospheric conditions, says the *Pittsburgh Dispatch*. The extent to which the wood-pulp business has been developed in this country is not generally known. The inroads on our forests, which the growing consumption for railway ties, building and the requirements of the press involve, are enormous. So serious has this matter become, it is stated, that, unless each state passes a law for the encouragement of tree-planting, so that our woods can be replenished, there will soon be a tree famine. As giving an inkling of the magnitude of the general consumption of wood pulp, a correspondent states that for a single edition of a prominent daily paper, 17 tons of blank paper was recently required. This was the product of 67 cords of poplar. In 22 hours from the time of felling the trees it had been turned into printed papers. The process is thus divided with respect to a test case: chopping 11-2 cords of wood, 3 hours; manufacturing into pulp, 12 hours; transporting to printing-office, 1 hour and 20 minutes; wetting paper preparatory to printing, 30 minutes; printing 10,000 copies, 10 minutes. This shows the rapidity with which raw material may be turned into a finished article. When it is considered that the foregoing figures refer to only one paper in one city, and that almost every newspaper is printed from material consisting largely, and often almost wholly, of wood pulp, which is also used in the production of nearly all common and medium grades of paper for almost all uses, the magnitude of the consumption of wood in pulp making becomes apparent.

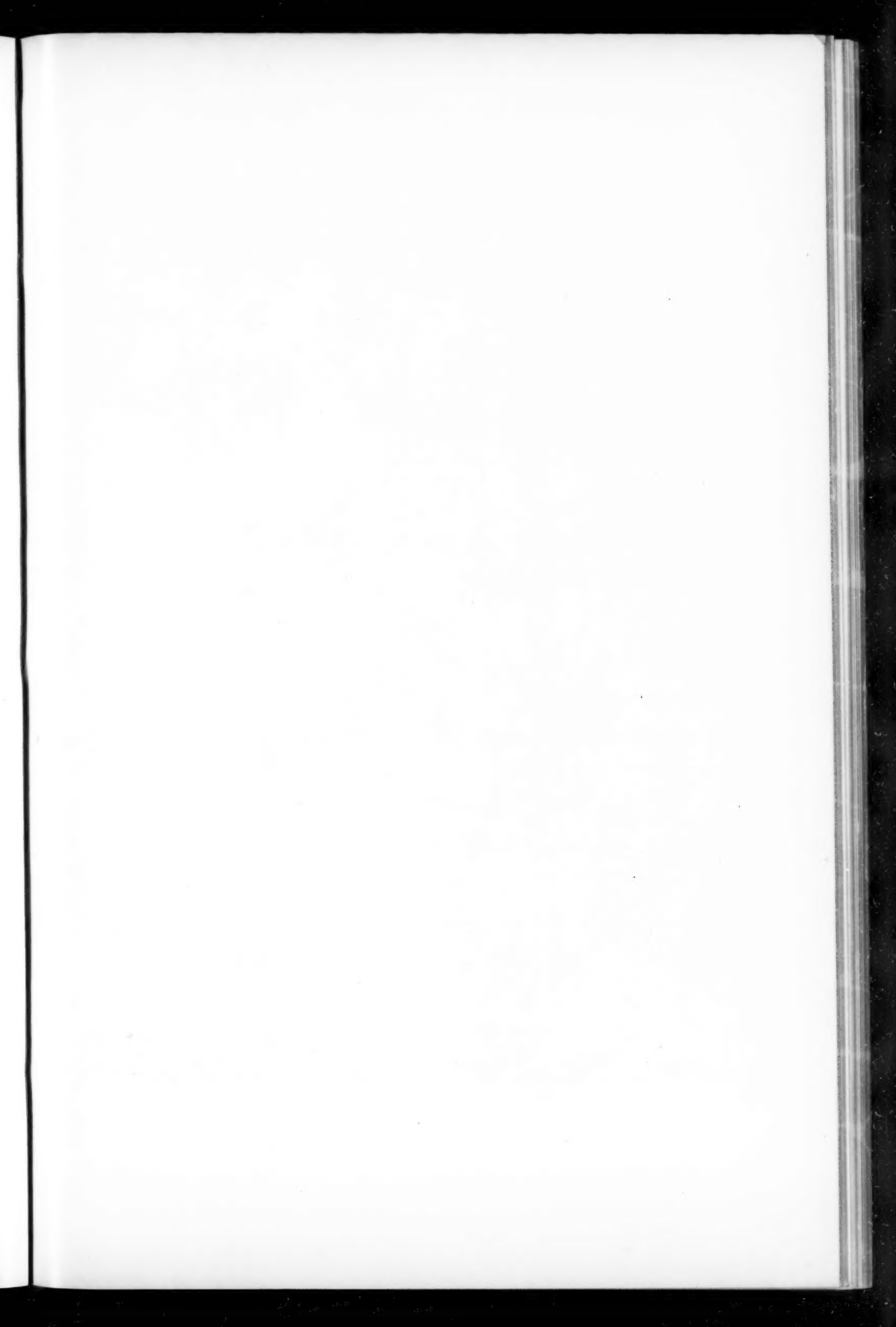
IRON HOUSES.—In Guatemala wood is scarce and very dear, owing to difficulties of transport, and as it is sent damp and used in that state for building it is specially liable to mould and rot. Iron houses are, therefore, much more suitable, especially as they are free of duty, and therefore cheaper than those made of wood, and have come into use pretty generally at Guatemala and other parts of Central America. Iron buildings are much safer in case of earthquakes, which are unpleasantly common, protect fairly well against vermin, and admit of better ventilation than the wooden shanties. The Belgians are already taking the matter up, and a merchant of that locality, established in Guatemala, is putting up a number of iron houses. British manufacturers engaged in this trade (remarks a contemporary) might do worse than give Central America attention. — *Engineer and Iron Trades' Advertiser.*

TWO OLD CHURCHES.—The oldest church in Europe is said by some who are discussing the question to be St. Martin's, Canterbury, which was built as a church before the end of the fourth century. St. Mary-in-the-Castle, Dover, was built about this time, but for nearly 200 years it was used as a garrison fuel-depot.



HOUSE: AT WILLIMANTIC: CONN.: FOR FRANK M. WILSON:
— C. T. BEARDSLEY, JR.: ARCH'T —
BRIDGEPORT - CONN.





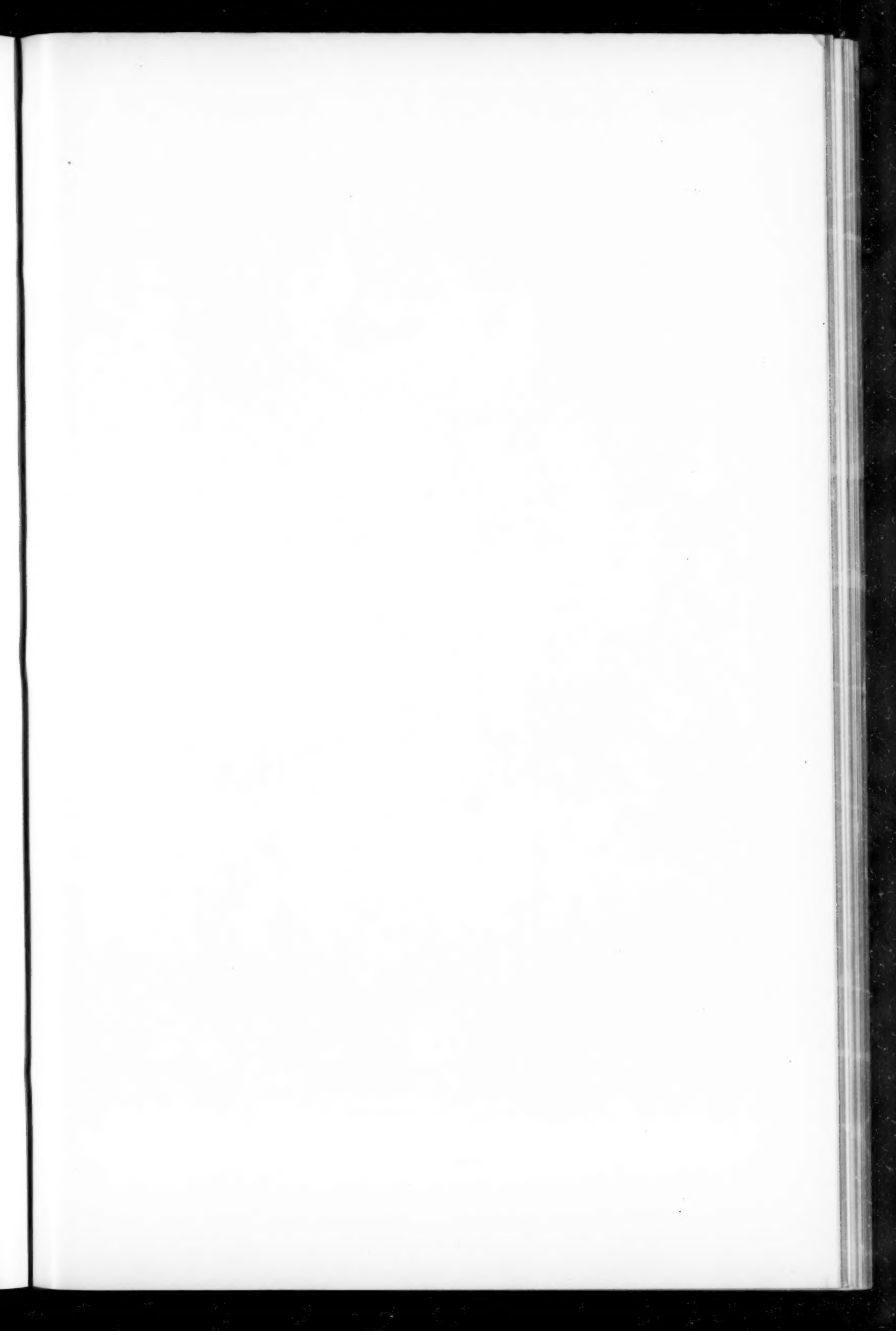
MASONIC BUILDING

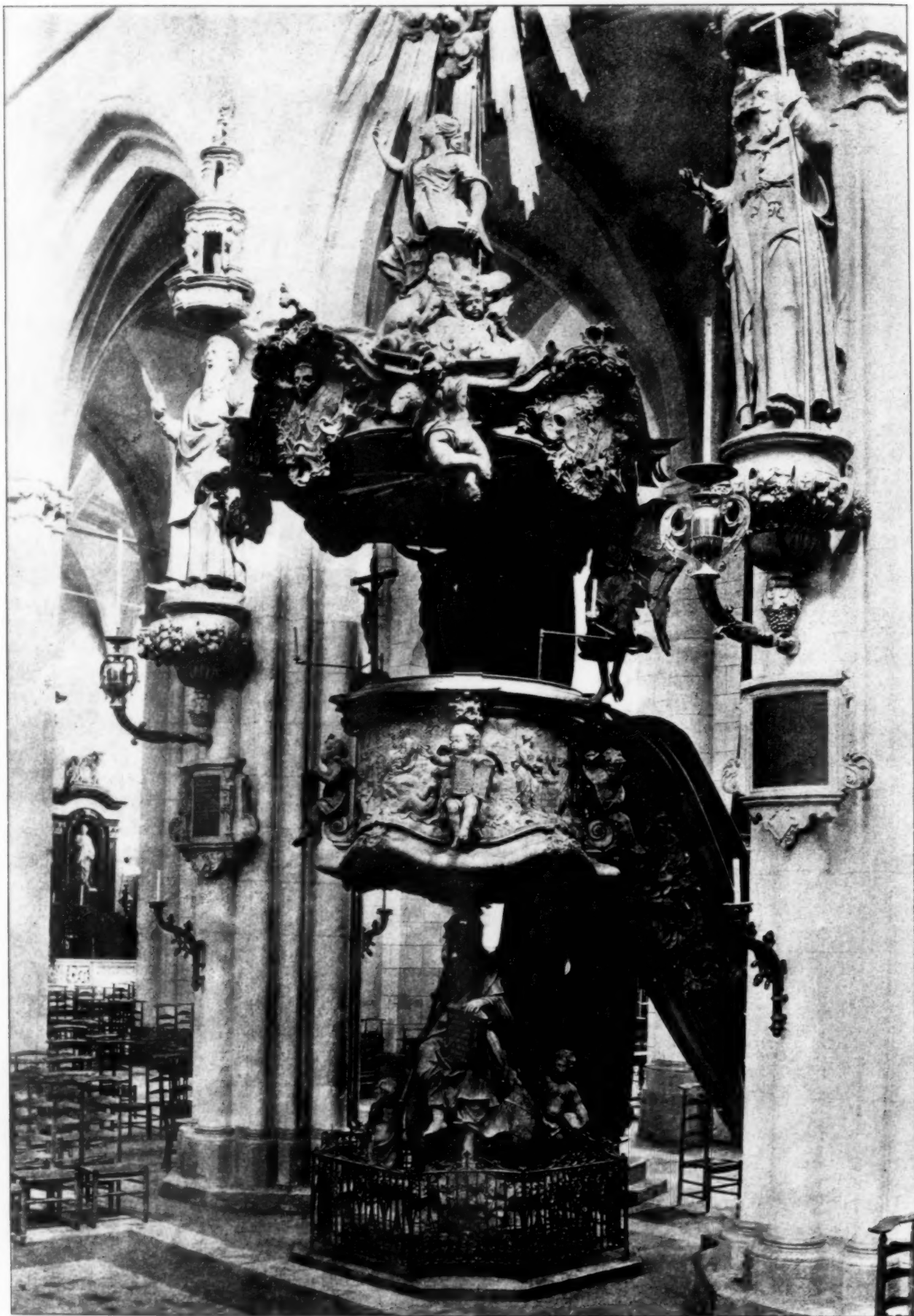
DOVER, N. H.

HARTWELL & RICHARDSON, ARCHTS.,
BOSTON, MASS.



HELIOTYPE PRINTING CO. BOSTON





THE PULPIT IN THE CHURCH OF NOTRE-DAME, BRUGES, BELGIUM.



THE DRAWING ROOM AT NO. 2, PRINCE'S GATE, LONDON, ENG. '91

HELIOTYPE PRINTING CO. BOSTON.



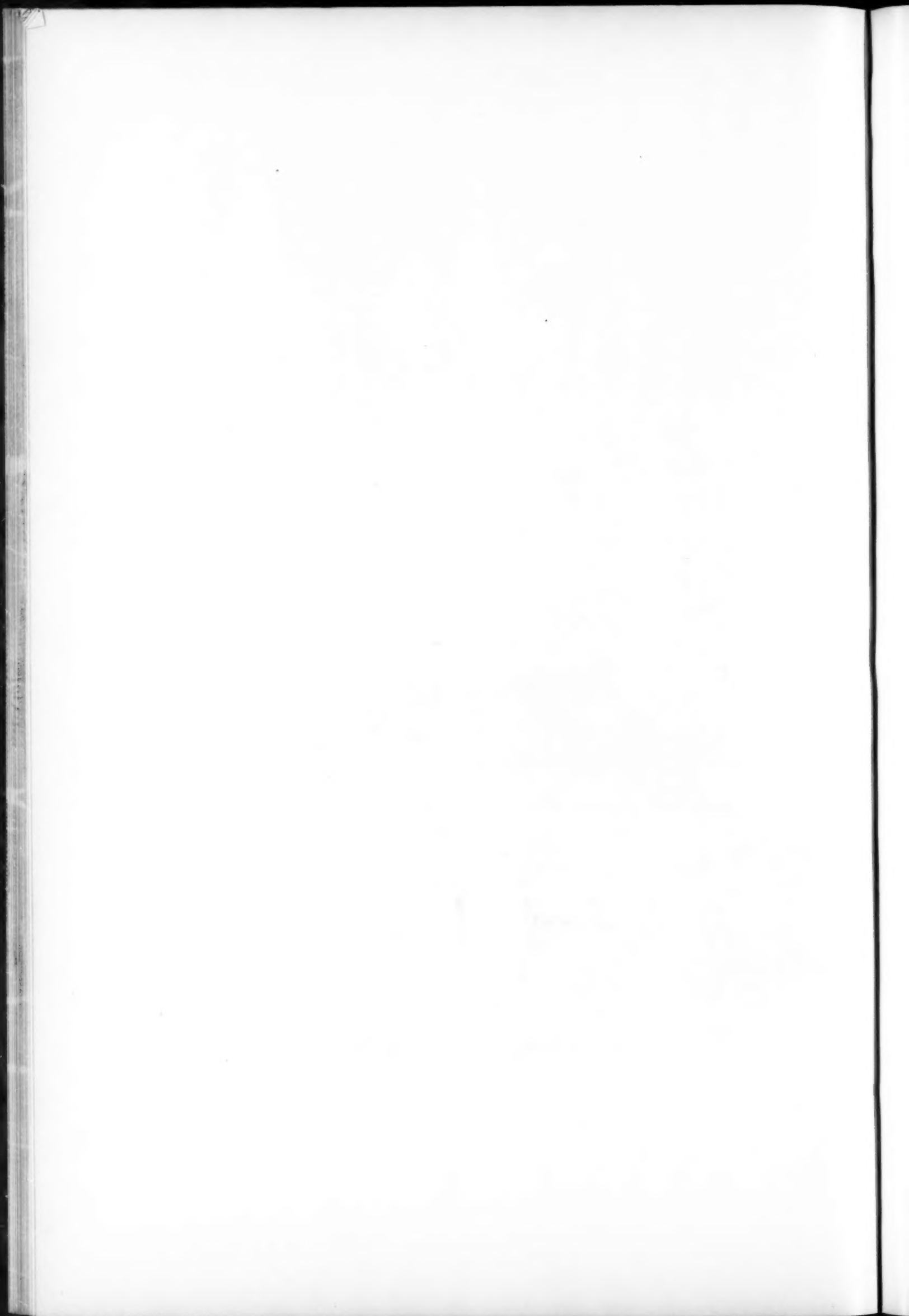


Residence of Mr John. Z. T. Robitzer.

Forbes Avenue, Pittsburg, Pa.

C. M. Berthberger, Architect
Pittsburg

HELIOTYPE PRINTING CO. BOSTON



COPYRIGHT 1891 BY TICKNOR & CO.



DESIGN FOR A CHURCH, CHATEL.
PAROCHIAL HOUSE, AND SCHOOL.
DE LAUD, ARCHITECT.
SAN ANTONIO, TEXAS.

