

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XXXVII.

Copyright, 1892, by TICKNOR & COMPANY, Boston, Mass.

No. 870.

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

AUGUST 27, 1892.



SUMMARY:—

The Architect's Certificate.—Proposals by Mail.—Does the Architect's Commission form Part of the Cost: French Party-wall Case.—A London Trade School.—Influence of Trade Schools on the Handicrafts.—Spring Cupboard-catches.	125
ARCHITECT, OWNER AND BUILDER BEFORE THE LAW.—XXIV.	127
TWO ISLANDS OF THE CARIBBEES.	128
CONSTRUCTION.—XII.	130
COMPARATIVE MUNICIPAL BUILDING LAWS.—XI.	133
THE "GRAVENKASTEEL" OR "CHATEAU DES COMTES," GHEENT.	134
ST. CLOUD.	136
ILLUSTRATIONS:—	
Main Entrance, City-hall, Cambridge, Mass.—New York College for the Training of Teachers, New York, N. Y.—Stable at Grand Rapids, Mich.—Houses for Philip Whitlock, Esq. and Oscar Cranz, Esq., Richmond, Va.—Entrance to the Snell, Heitshu & Woodard Building, Portland, Oregon.—Entrance to the United Bank Building, Portland, Oregon.	
Additional: Entrance to the Château des Comtes, Ghent, Belgium.—Worcester Cathedral.—Monument to Joan of Arc, Rouen, France.—English and American Evangelical Churches.—Hôtel de Ville, Brussels, Belgium.—Well Court (Workmen's Houses and Club-room), Edinburgh, Scotland: Three Views and Plan.	136
NOTES AND CLIPPINGS.	140

A RATHER important decision, on a novel point, is reported in the *Builder*.¹ It is generally known that, under the ordinary contract, where the production of the architect's certificate is made an indispensable preliminary to payment, nothing will excuse the production of the certificate, unless it is waived by the parties, except fraud or mistake on the part of the architect; and if a contractor has agreed to procure such certificate before he obtains payment, he must, if required, either get it, or allege, and be prepared to prove, that the architect wrongfully withheld it from him. As a matter-of-fact, fraud on the architect's part is very seldom shown; but an owner in England had, it seems, so much confidence in his architect that he would not allow the suspicion of fraud even to be raised against him, and drew up a contract for his builder to sign, which expressly provided that the architect's certificate should not only be final and binding, but should not be set aside, or attempted to be set aside, by reason of any technical or legal defects, or for any pretence, suggestion, charge or insinuation of fraud, collusion or confederacy. It seems that a controversy arose over the contract, and the counsel for the builder, probably fearing that the architect's decision would be against him, endeavored to cast an anchor to windward by preparing the way for having his claim admitted without it. As the contract made the architect's certificate necessary and binding, even though it might be fraudulent, collusive, and filled with legal and technical defects, the learned counsel was rather at a loss to discover some ground on which he could have it set aside; and finally hit upon the plan of trying to get the part of the contract relating to it declared void, on the theory that it was against public policy for a man to agree to be bound by the fraudulent decision of another, and that an agreement to that effect was, therefore, not binding, just as a contract to commit a crime is void in law. It is only fair to the architect, as the *Builder* says, to mention that no evidence of fraud on the part of the architect was produced. Whatever claims of that kind the lawyer might have had were concealed in his own breast, waiting until he should have cleared a way for introducing them by getting the clause in the contract forbidding their introduction annulled. Unfortunately for him, this attempt proved vain. The judge said that, if people, with their eyes open, chose to agree to such a contract, the court would not set it aside; and, as the whole fabric of the plaintiff's case seemed to rest upon the possibility of dodging the architect's certificate, the decision of this point ended the suit.

¹ *Tallis vs. Jackson*.

ANOTHER case,² also reported in the *Builder*, shows the present state of English law on the subject of the acceptance of proposals by mail. One S., who owned some houses in Liverpool, gave H., who lived in Birkenhead, an option in writing, good for fourteen days, for the purchase of the houses, for the sum of 750*l*. The next day S. repented of his offer, and sent H., by mail, a letter withdrawing it. The letter was posted in Liverpool at 1 p. m., and was not received by H. until after 5 p. m. Meanwhile, H. had written to S. a letter, unconditionally accepting the offer. This letter was posted in Birkenhead at 3.50 p. m., more than an hour before S.'s letter of withdrawal was received, but was not delivered in Liverpool until after office hours, so that S. did not get it until the next day. Then followed a dispute between S. and H. as to whether the transaction had been concluded or not; and the question was carried to the Court of Appeals, which decided that S.'s offer was open for acceptance by H., until H. had received the letter withdrawing it; and that, as H. accepted it while it was still open for him to do so, the acceptance was good and the bargain binding. As this decision is in accordance with what has been the uniform doctrine of English courts in such cases for many years, and as the case seems to have been a particularly simple one, it is strange that a lawyer should have advised a client to carry to the Court of Appeals what appears to have been so weak a case as that of S. If an architect should advise, or even consent to have anything to do with the construction of a house on a foundation which he had reason to suspect to be insecure, he would be compelled by the lawyers to pay the whole value of the house if it should fall down; yet the same lawyers will encourage a client to carry from court to court a controversy in which they know, or might know, if they took any trouble to study the decisions, that he has not the smallest chance of success, and after thus deluding him nearly to his ruin, will take from him most of his remaining property as payment for their "services."

A QUESTION, which not unfrequently comes up in American practice, is asked, and answered, in accordance with French law, in *La Semaine des Constructeurs*. A correspondent wishes to know whether, in reckoning the cost of a party-wall, for the purpose of determining how much should be paid by one wishing to use it, the commission of five per cent, paid to the architect under whose care the wall was constructed, should be included as a part of the cost; and he asks also whether the fee for reckoning up the cost should be paid by the person wishing to purchase rights in the wall, or by the original owner. The Jurisprudence Committee of *La Semaine* replies to the first inquiry that the law seems never to have been settled by actual decisions. It is claimed by some authorities that the architect's fee has nothing to do with the value of the wall, and that it is this of which the would-be purchaser is required to pay a part. On the other hand, the great French professional association, the Société Centrale des Architectes, supported by good legal authority, maintains that the architect's five per cent should be added to the value of the masonry, in determining the sum which is to be taken as the true cost of the wall. The Jurisprudence Committee of *La Semaine* does not quite agree with either side. Article 660 of the Code Civil provides that where a wall has been raised by one of the joint owners, the other may acquire the right to use the raised portion by paying one-half "of the expense which it has cost." Evidently, the architect's fee is here a part of the cost, and should, without question, be shared between the two proprietors. The next article of the Code, No. 661, provides, however, that any wall adjoining the boundary of an estate may be made a party-wall by the owner of the contiguous estate, upon paying to the original proprietor one-half the value of the wall. Here, as the Jurisprudence Committee think, the architect's commission, which is not a part of the value of the wall, considered as a piece of masonry, is not to be included in reckoning the amount to be shared between the parties.

AS our laws on the subject are totally different, it is impossible to argue from the French Code to our own cases; but it seems to us at least questionable whether the Jurisprudence Committee have interpreted even their own law

² *Henthorn vs. Fraser*.

correctly. Why the care of the architect does not fairly add one-twentieth to the value of the wall built under his direction we cannot understand. They would hardly maintain that an entire house gained nothing in value from having been designed and supervised by a competent architect, instead of unskilled mechanics. If they thought so, any real-estate agent could speedily undeceive them; and if the architect's work adds to the value of the whole building, why does it not add its due proportion to the value of the outside walls, which he has planned, specified for and supervised?

IT is obvious that, where half a wall is to be purchased with the ground on which it stands, the value of the ground is to a certain extent a matter of opinion, which must be decided by experts, or by agreement; and it is quite possible that the framers of the Code thought it best in this case to have the value of the wall itself determined in the same way; just as our party-wall agreements sometimes read that the person subsequently using the wall shall pay half the cost, and sometimes say that he shall pay half the value at the time when he uses it; but there seems to be no reason in either case why the higher market value of a house built under an architect's care should not be considered to apply, at least to the extent of five per cent, to its side walls. As to the second question, which party should pay for estimating the value, *La Semaine* says unhesitatingly that the purchaser is bound to pay for it, under the general rule of the Code, Article 1593, which, treating of sales in general, says that the expense of deeds or transfers, "and other accessories of the sale," shall be paid by the buyer.

THERE is no doubt that the demand for trades' schools, or "craft schools," which are very much the same thing, is rapidly increasing, and is now far greater than the supply. In London, a craft school, established only a year ago, by private subscription, through the efforts of Mr. Llewellyn Smith, in the poorest district of the city, has already more than three hundred pupils, whose fees cover nearly two-thirds of the expenses of the school. In this school drawing, designing, woodwork, wood-carving and metalwork are taught, on what seems to be a rather new system. Although, of course, the training given will be of the greatest use in the practice of any mechanical profession, it is not, as it would be in a trade school, adapted to any particular branch, but is arranged solely with a view to developing the hand, eye and taste of the student. With this idea, the pupils are required to make careful drawings of the work which they intend to execute, and carry it out afterwards in strict accordance with the drawings. The exercises are arranged in a series, carefully graduated from the simplest to the most difficult, and cover an extensive field, the wood-working course alone occupying two years. We have in this country, in our manual-training schools, something very similar, but the courses in the manual-training schools are not usually so comprehensive, and they have been, as a rule, adapted to younger pupils than those who fill the London Craft School. In Boston, the School of Mechanic Arts, conducted by the Massachusetts Institute of Technology, gives perhaps the nearest approach to the craft-school training; but the London scheme aims to develop the taste of the students, as well as the manual skill, while the School of Mechanic Arts, although it teaches textile designing, does not otherwise concern itself much with aesthetics. Whether the new Industrial High School, which has just been provided for Boston, will partake more of the character of a craft school, a manual-training school, a trade school, or a school of mechanic arts, probably no one can say; but its curriculum is likely to be studied with careful reference to what has been done elsewhere, and the fruits of others' experience utilized judiciously for the benefit of the Boston boys. Meanwhile, there is no question that similar schools are needed in every large town. Wherever they have been founded, either in this country or abroad, they are filled with eager students, anxious to learn what they know will be of so much use to them, and happy, like all young people, to be able to gratify and develop the inborn childish love of using tools and making things.

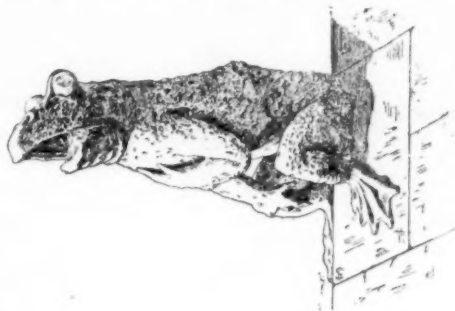
IT is interesting to speculate on the influence which such schools, when they become more common, may have on the arts and handicrafts of the future. Unquestionably, their first effect will be to raise greatly the standard of workman-

ship, which has, in most trades, fallen very low. Architects realize, perhaps better than any one else, the horror and contempt with which a fourteenth-century stone-cutter or blacksmith would look upon the work of the present day. With all our excellent materials, improved machinery, and engineering skill, we cannot construct vaulting, or cut and set stone, or make joining, or forge iron, with anything like the skill of the workmen of the Black Prince's time; while the exquisite taste with which the mediæval artisans carved a capital, or undercut a moulding, or worked a linen-fold panel, or forged a door-handle, has failed altogether to descend to their successors. As the workmen of the present day have just as many fingers, and just as large brains, as those of the thirteenth and fourteenth centuries, there must be some discoverable reason for the decline in their power of using their faculties. Probably the superior manual skill, and technical knowledge of the mediævals, was the result of their long apprenticeship; and the thorough discipline maintained by the guilds, but whether it was the guilds which imparted artistic knowledge and perception to their younger members, and, if so, what means they employed for the purpose, are questions as important as they are difficult to answer. No doubt, the new craft schools, in their different forms, will do very much to replace the personal instruction which the mediæval master gave his apprentices; but whether they can give artistic power also, and, if so, which of them can do it best, we have yet to see.

DR. JAMES JACKSON PUTNAM, of Boston, who has had much experience with the ailments and misfortunes of children, writes to the Boston *Transcript* to call the attention of architects and builders to the danger of providing cupboard and closet doors with latches which can only be opened from the outside. A week or two ago, four little children, in a town near Boston, shut themselves into a cupboard, which had a latch opening only from the outside, and three of them died of suffocation before they were discovered and released. Dr. Putnam thinks that, in all but the fatal result, many families have had similar experiences, and says that, not long ago, he was told of a case where a nurse, left in charge of a two-year-old child, went into a closet which, like the closets in many builders' houses, had a knob only on the outside. The child, as babies often do, seeing the door open, shut it, locking the nurse in. There was an open fire in the room, and unprotected stairways in the hall just outside, and the faithful nurse, anxious for her charge, succeeded, by talking to it, and amusing it through the locked door, in keeping it near her for two hours, when some one came to her relief. Dr. Putnam mentions a device familiar to architects, in which a brass button, slightly projecting, and kept out by a spring, holds the door by springing into a circular depression in the striking-plate, and says, what is true, that such a fastening, which can be opened by a push from the inside, is far better for a closet or cupboard than a slip-latch, which holds the door secure against force from the inside. Architects will, however, we think, say that these catches, while excellent for the doors of book-cases, or cupboards, are not so well adapted for the full-size doors of closets, on account of the shrinkage of such doors, which, in winter, draws the two parts of the fastening so far apart that the door will not catch, although the Ayer sash-fast, to which Dr. Putnam refers, can be adjusted to meet a moderate shrinkage by a turn of a screwdriver which at the same time weakens the action by releasing the tension on the spiral spring. There is, however, no difficulty in providing for the safety of children in other ways. Closet doors, for example, should always have knobs on the inside, and generally have them in houses built under the direction of architects. To leave them off is a piece of parsimony characteristic of the meanest class of speculating builders, and it would not be amiss to make it a criminal offence, by means of a clause added to the building law. Cupboards are much less used now than they once were, and it is the experience of most architects that slip-latches, which, from the settlement of floors, and yielding of joints and hinges, soon refuse to do their duty, are much less convenient, as well as less safe, than small barrel-bolts, which do not act automatically, so that no one can fasten himself in with them, although, as in the case of a lock and key, they can be fastened from the outside.

ARCHITECT, OWNER & BUILDER BEFORE THE LAW.¹—XXIV.

THE STATUTE OF FRAUDS AND LIMITATIONS.



Gargoyle, Chateau de Blois. From Havard's "Dictionnaire de l'Ameublement."

WHERE are certain cases, as was mentioned in the first part of this book, where the law interposes to prevent disputes and misrepresentation by means of special statutes, providing that contracts of certain kinds, in regard to which there is most likely to be misapprehension or error, shall not be valid, or enforceable at law, unless they are made in writing, and signed by at least one of the parties interested. These special statutes are known as the Statutes of Frauds and Limitations, and may sometimes be of serious importance to builders.

STATUTE OF FRAUDS OF MAINE.

The first part of the Statute of Frauds and Limitations of Maine reads as follows:

"No action shall be maintained in any of the following cases:

1. "To charge an executor or administrator upon any special promise to answer damages out of his own estate;
2. "To charge any person upon any special promise to answer for the debt, default or misdoings of another;
3. "To charge any person upon an agreement made in consideration of marriage;
4. "Upon any contract for the sale of lands, tenements or hereditaments, or of any interest in or concerning them;
5. "Upon any agreement that is not to be performed within one year from the making thereof;
6. "Upon any contract to pay a debt after a discharge therefrom under the bankrupt laws of the United States, or assignment or insolvent laws of this State;

"Unless the promise, contract or agreement, or some memorandum or note thereof, is in writing, and signed by the party to be charged therewith, or by some person thereunto lawfully authorized; but the consideration thereof need not be expressed therein, and may be proved otherwise."

AGREEMENT NOT TO BE PERFORMED WITHIN A YEAR.

So far as builders are concerned, the portion of the statute which most interests them is that which provides that contracts for work which is not to be performed within a year must be in writing. Probably nine-tenths of the contracts made with builders are verbal, and a large part of these are for work which is very unlikely to be performed within a year.

Fortunately for them, the courts take an indulgent view of the law, and usually hold that if the contract could have been performed within a year, even though the agreement did not require it to be so, the Statute of Frauds does not apply to it. A man once agreed verbally to allow another to come upon his land at any time within ten years, and cut certain trees. Some years later the land was divided, and when the tree-cutter came after his property, he was sued for damages as a trespasser, on the ground that the original contract was void. The Supreme Court, however, held that he might have cut all the trees within one year, if he had wished to do so, and that therefore the contract was valid.

In another case,² a man agreed verbally to work for another five years, or as long as he should be agent for a certain company. If he had simply agreed to work for the other for five years, this promise would probably have been held void for want of writing; but, in a subsequent controversy, it was decided that the contract was valid, because he had qualified

his agreement to work for five years by adding the words "or as long as he should be agent for the company," and he might have been discharged by the company within a year, so that the Statute of Frauds did not apply to the transaction.

In a New Hampshire case,³ it was held that if the time of performance might arrive within a year, even though it should be highly improbable that it would, the contract did not come within the Statute. The Court said, "The Statute (of Frauds) does not apply to any contract, unless by its express terms, 'or by reasonable construction, it is not to be performed, that 'is, is incapable in any event of being performed, within one 'year from the time it is made.

"If by its terms, or by reasonable construction, the contract 'can be fully performed within a year, although it can only be 'done by the occurrence of some contingency by no means 'likely to happen, such as the death of some party or person 'referred to in the contract, the statute has no application, and 'no writing is necessary.

"If the agreement can be fully performed by either of 'the parties within the year, and it is so performed, the agree-'ment of the other party is not within the statute, though it 'may be impossible to perform it within a year."

In applying the law to building contracts, the question would be whether the agreement excluded the possibility of completion within a year or not. A verbal contract⁴ for building a house, made in New York, October 1, 1828, provided that the house should be done "before the close of the year 1829." A dispute arose about the agreement, and the defendant claimed that it was void, under the Statute of Frauds. The Supreme Court⁵ decided otherwise, saying, "The agreement set forth 'in the declaration in this case is not for the building of a 'house after the expiration of one year, but is to be performed 'at the farthest within fifteen months. There is nothing in 'the agreement prohibiting the defendant from completing the 'contract within six months, or a shorter period. Suppose he 'had done so, and sued the plaintiff for compensation for his 'labor and materials found, would it have been permitted to 'the plaintiff to have said that the contract was not to be per-'formed within a year, and therefore it was not obligatory on 'him? Most clearly not. And if obligatory on one party, it 'is equally so on the other. The defendant might have per-'formed the contract within a year, and it is therefore not 'within the statute."

SUNDAY CONTRACTS.

The statute law in most, or all of our States, interferes with contracts⁶ in one other way, by providing that agreements made on Sunday shall be void, whether they are in writing or not. Nevertheless, an agreement⁷ signed on Sunday, but ratified on some other day, will often be held to be valid, the question of its validity depending on the wording of the statute, and various other circumstances.

MISREPRESENTATION OR MISTAKE.—FRAUDULENT CONTRACT NOT BINDING.

It is a very common but erroneous notion that if a man has once been inveigled into signing a contract, he cannot escape from it, even though he should find out afterward that he had been grossly deceived in regard to it. Although the law presumes that men will use ordinary caution in their business transactions, and will do nothing to relieve those who fail to do so, it fully recognizes the fact that no prudence can always protect a man against fraud, and it may be relied upon to prevent, so far as legal principles will permit, the person guilty of the fraud from gaining any advantage from it. Even where, instead of fraud, there has been only a mistake, it will generally be found that, if the mistake is clearly established, and it was not one which might have been avoided with ordinary care, the law will rectify the error, or relieve innocent parties from the consequences of it, provided this can be done without injustice to other parties, who are equally innocent, and more careful.

In an Illinois case,⁸ a man brought plans and specifications

¹ Blanding vs. Sargent, 33 N. H. 239. Sonch vs. Strawbridge, 2 C. B. 808, 815. Wells vs. Horton, 4 Bing. 40, 43. Blake vs. Cole, 22 Pick. 97. Kent vs. Kent, 18 Pick. 569. Lyon vs. King, 11 Met. 411. Tattersson vs. Suffolk, 106 Mass. 56. Moore vs. Fox, 10 John. 244. McLees vs. Hale, 10 Wend. 426. Shute vs. Dorr, 5 Wend. 204. Linscott vs. McIntire, 15 Maine 201. Russell vs. Slade, 12 Conn. 445.

² Plimpton vs. Curtiss, 75 Wend. 337.

³ Clark vs. Pendleton, 20 Conn. 495. Lockwood vs. Barnes, 3 Hill 128. Esty vs. Aldrich, 46 N. H. 128. Ellieott vs. Peterson, 4 Md. 476.

⁴ Catlett vs. Tr. M. E. Ch., 62 Ind. 365.

⁵ Perkins vs. Jones, 26 Ind. 499.

⁶ Martine vs. Nelson, 51 Ill. 422.

¹ Continued from No. 852, page 52.

² Roberts vs. Rockbottom Co., 7 Met. 46.

to a painter, and asked him for an estimate. The painter was too busy to examine and take measurements from the plans, and the owner explained them to him. Upon these explanations the painter made a bid, which was accepted, and he sent his men to the building to begin the work. He then left town for three weeks. On his return, he found that the work was not as explained by the owner, and that some extra work had been added, the value of all that had been done being \$900, instead of \$350, the contract price. The owner refusing to pay more than the contract price, the painter brought suit, and it was decided that the contract was invalid, by reason of the misrepresentations made as to the amount of work, and that he was entitled to recover the actual value of the work done. Moreover, in reply to the claim that the painter ought, if the work to be done proved not to be as represented, to have notified the owner before going on with it, and thereby involving the owner in a much larger expense than he had contemplated, the court decided that, having been absent from the town, he was excused from the obligation to give such notice.

It should be observed, however, that in most cases a court would insist on the necessity for giving a notice of the kind, and that the painter, if he had not happened to have so good a

CONTRACTOR SHOULD GIVE NOTICE ON DISCOVERING MISTAKE.

reason for not giving it, would have found it hard, after doing the work, to collect \$900 for a job which he knew that the owner thought he was to have done for \$350.

This principle has been expressly laid down by the courts. In two cases¹ it has been held that, if a contract has been made for work to be done at a stipulated price, and it is discovered before the work is commenced that a misrepresentation has been made in respect to its value, the party engaging to do the work may repudiate the contract; and if he does not do so, but goes on and performs it, he can afterwards demand no more than the contract price.

It has, however, been decided in California² that where mistake or misrepresentation in regard to the subject-matter of a contract affects only certain stipulations of a contract, as, for example, where the conditions which would affect the time of completion have been erroneously stated, only those stipulations of the contract which are affected by the error are invalidated, and the others remain in full force.

In a somewhat similar case³ in England, a contract was made for building a house. After the contract was signed, it was placed in custody of the architect, who then surreptitiously made, or allowed to be made, a material alteration in it, the alteration being in the provision with regard to extras. Some

CONTRACT MAY NOT BE ENTIRELY VITIATED BY FRAUD.

extra work was done, but the payment for it was refused, on the ground that the contractor had not complied with the provisions of the contract relating to such work, such compliance being, by the contract, a condition precedent to the right to recover payment. The contractor then sued for payment for the extra work on *quantum meruit*, on the ground that the contract was void on account of the alteration, or, at least, that the defendant could not avail himself of it. On trial, it was held that the contract, although altered, was still binding on the plaintiff, or, at least, might be looked at to see what the terms were, and that the plaintiff could not recover on *quantum meruit*.

[To be continued.]

ELECTRIC LIGHTING IN EUROPE. — The ancient Republic of Andorra, on the southern slope of the Eastern Pyrenees, says a foreign correspondent of the *Electrical World*, with a population of 8,000, has never yet seen an electric lamp or a gas-burner. On the other hand, the little semi-independent territory of Monaco has more active electric-lighting plants than any city in Europe, in proportion to its population, having three central stations besides two gas-works, with a population of only 10,000. Paris has a surprisingly small number of electric lights, and Nice, with a population of 100,000, has not a single electric lamp for public lighting and few at all. Toulouse has probably the best system of incandescent lighting in Europe, but Milan is said to be the best lighted city on the Continent. Milan has two large central stations almost entirely equipped with American machinery. One of these stations is built on the site of an old monastery and religious frescoes may still be seen on the walls of the building. The wires instead of being carried along the streets on poles are suspended from brackets placed under the eaves of the houses. It is said to be a satisfactory method.

¹ *Saratoga, etc., vs. Row*, 24 Wend. 74. *Lloyd vs. Brewster*, 4 Paige 537.

² *Verzan vs. McGregor*, 23 Cal. 339.

³ *Pattison vs. Luckley*, 10 L. R. Ex. 330.

TWO ISLANDS OF THE CARIBBEES.

MARTINIQUE.



Savane, Fort de France.

If you would find the perfection of insular beauty, mountains of great altitude, cliffs with grand proportions, richest tapestry of tropical vegetation, silver sands overhung by palms — the realization of an artist's dream — you should sail to the Caribbee Islands.

They form a crescentic chain extending over some seven degrees of latitude, from latitude 17° to Trinidad Island, in latitude 10°. You will find here not only every variety of climate between temperate and tropic, but every beautiful aspect of vegetation, from the sugar-cane of the coast to the feathery tree-ferns of the cool and pleasant "high-woods," with their giant trees and tangle of vines and "bush-ropes." Along the coast, all the fruits for which the West Indies are noted: custard-apples, sapodillas, guavas, mangos, sour-sops and the score or two of others more familiarly known to us of the North.

In the high woods are numerous rare plants and trees, such as the great *figuier*, or wild fig; the *clusia montana*, with a purple fruit like a fig, a plant resembling a pineapple, with long, attenuated leaves; the *Pitcairnia*; delicate ferns, and a peculiar tree-fern called the *Cyathea Imrayana*, after a late resident of Dominica, Dr. Imray. The most conspicuous tree is the great *gommier*, the *Bursera gum-mifera* from which the Carib Indians hew out their long canoes.

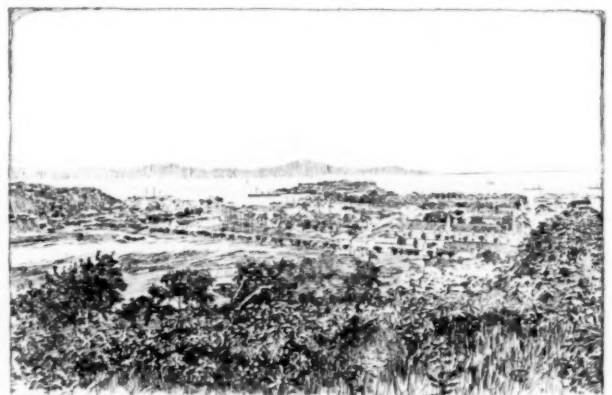
As you climb higher, you find the ground carpeted with a curious lycopodium, unlike anything of its family elsewhere found. But it was not my intention to write of the aspects of nature in these islands so much as of their inhabitants and houses. About midway the chain lies Martinique, in latitude somewhere near fifteen degrees north of the equator.

It consists of a congeries of mountains some fifty miles in length, with deep-water bays, grim promontories, fertile valleys and a vegetation unsurpassed for beauty and exuberance. Its principal port is St. Pierre, situated on a broad bay three miles in length, with water in front of it so deep that vessels at anchor there have to run out many fathoms of chain. Its houses, of stone and brick, covered with tiles, mellow-red in tone, are perched at all angles, but line regular streets that are narrow but straight.

The sidewalks are mere cat-paths, separated from the streets by deep gutters, through which, every morning, swift streams course from the hills and lose themselves in the bay. These living waters serve to cleanse the city and carry away the garbage. Every morning, hundreds, yes, thousands, of black and yellow servants emerge from the huts and houses with high earthen jars on their heads, the contents of which are dumped into the streams. Babies are washed in them, held by their hair or their girdles, lest they be swept away, and even dishes may be seen piled in heaps along the curbs.

In the morning the servants thus disport themselves in the streets, in the afternoon their masters and mistresses may be seen on the promenade leading to the river, or strolling through the avenues of the *Jardin des Plantes*, celebrated more than locally for its horticultural rarities. These Creoles are dressed in the height of the Parisian fashion, but the lowlier creatures wear costumes simpler yet more gorgeous, and decidedly more becoming.

There are, perhaps, 160,000 inhabitants in Martinique, the great majority colored, and many of the quarter and eighth castes, or

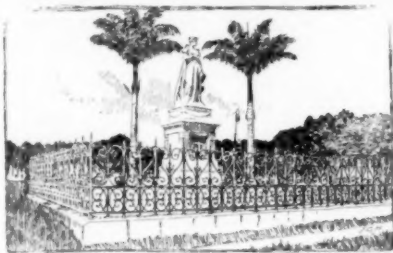


Fort de France, Martinique.

quadroons and octoroons, are noted for their beauty. With their dresses of the last century, high-waisted, loose, flowing, in bright colors, and their superabundance of ornamentation, these octoroons of Martinique are striking and attractive.

Less conspicuously placed than St. Pierre, on the shore of the deep bay of Port Royal is the other important town of the island, Fort de France. It is a handsome place, with a large *savane*, or park-like square, in the centre of which is a statue of the most famous daughter of Martinique, that one-time Empress of France and wife of the First Consul, Josephine. It is, perhaps, about her, more than about the island itself, that the interest of the stranger centres.

It may be that, even at this late date, a few particulars about Josephine and her family may not come amiss. From a "*Life of the Empress Josephine*," published in Paris, 1857, it appears that the



Statue of Josephine, Martinique.

first West-Indian ancestor of Josephine, M. Joseph Tascher de la Pagerie, her grandfather, landed in the Antilles in the year 1726. That he was a personage of rank, appears from his request, four years later, for the registration of his letters of nobility, a "formality which the noblemen coming to those isles never omitted." This re-

quest was granted, but not till 1745. In 1734 he married M^{lle}. de La Chevalerie, a young lady belonging to a rich family of the island.

In May, 1757, there arrived in the island of Martinique, as Lieutenant-Governor of all the French West Indies, the Marquis de Beauharnais. The name was then well-known, and there were five of the family, officers in service, upon the registers of the navy. On June 10, 1760, there was baptised in the church of St. Louis, Port Royal, a son of the governor, Alexander de Beauharnais, to whom Madame de Renaudine, daughter of M. Tascher de la Pagerie, stood godmother.

In November, 1761, Lieutenant Tascher de la Pagerie, son of the first of the name in America, was married to M^{lle}. Des Verger de Lanois, of an ancient family resident here. Within a year, the English had taken Martinique from the French and Lieutenant Tascher, who had acquitted himself bravely in its defence, was treated with great regard by the commander of the English forces, and permitted to return to his estates. He had a plantation at Trois Ilets, just across the bay of Port Royal, and from the hills above the house his noble wife had witnessed the storming and capture of Fort de France. As a reward for his services, M. Tascher was awarded a pension, as was also his brother. At Trois Ilets, in a house still standing (though in ruins), Josephine was born June 23, 1763. Here she passed the happiest years of her life. When she was about four years of age, her father's residence was destroyed by a hurricane, and the family took shelter in the sugar-house of the estate, which also was to be seen here but a few years ago. Here they resided ten years, it is said, while the head of the family devoted himself to the cultivation of sugar and coffee. The Taschers were wealthy, as the islanders computed wealth, having one hundred and fifty slaves, and a large acreage on the slopes of the hills facing Port Royal.

It seemed to have been a great disappointment to M. and Mme. Tascher that no son was born to them, and they gave to their first-born daughter the name of Marie Joseph; and, as she died soon after, they called the second Josephine, in honor of the Joseph Tascher who first came to the Antilles. At the age of ten Josephine was sent to the convent-school at Port Royal and passed her time, subsequently, there and on the plantation at Trois Ilets, until she arrived at the age of sixteen. Memorials of this famous woman are not numerous in Martinique. In the city park stands the beautiful statue of marble, which was exhibited at the Paris Exposition of 1857, and gained the approbation of the emperor. In the little



Fort de France, Martinique, Les Pitons.

church at Trois Ilets may be seen the tombstone of her mother, and in the city-hall at Fort de France, the marriage-register of her parents. The union of Josephine with young Beauharnais seems to have been brought about by his godmother and her aunt, Mme. de Renaudine. It was in 1779 that Josephine landed in France, and she was married in December the same year.

In June, 1788, she returned to the place of her birth, taking with her Hortense. Writing to a friend in France, after her arrival home at Trois Ilets, she gives expression to the joy she feels at finding herself in the midst of friends and relations, "who once loved and

still love me tenderly. Nature, rich and sumptuous, has covered our fields with a carpeting which charms as well by the variety of its colors as of its objects. She has strewn the banks of our rivers with flowers, and planted the freshest forests around our fertile borders. . . . I love to hide myself in the green woods that skirt our dwelling-places. . . . How many charms has this retreat for one in my situation!"

In 1790, in the month of October, she returned to France and never again saw her beloved island. There, after the horrors of the Revolution, she met and wedded Napoleon Bonaparte, who, like her, was island-born, and not native to the soil of La Belle France.

It was as a naturalist seeking strange birds, that I first visited Martinique. There was not the prejudice there ought to have been against itinerant bird-collectors and I easily secured permission to "gun," even in the suburbs of the city of St. Pierre. Our American



The Sugar-house, Trois Ilets.

representative, at that time, was Consul Garfield, since deceased, who took charge of the collections I had made on the South American coast, and allowed me to make the Consulate my headquarters. Peace to his ashes! He was a prince among good fellows, and he could make the best rum punch on the island.

A venerable and distinguished photographer, M. Hartmann, introduced me to the director of the *Jardin des Plantes* and secured me permission to shoot within its sacred precincts. Here I found many valuable birds, but my guide was in constant dread of snakes; for the island is infested with venomous serpents, the dreaded "iron lances," for the bite of which there is no remedy.

The youthful hunters of birds here use blow-guns, or long hollow canes, through which they shoot pellets of clay. The clerk of whom I bought my blow-gun told me, in his best English, that these boys used balls of "land," meaning earth, or clay. These clay bullets are compressed in a mould, which is sold with the blow-guns, the whole "outfit" costing but three francs.

In the garden, of a morning, I would often find the youngsters catching birds by means of a gummed pole, either a palm-rib or a bamboo, the end of which was smeared with bird-lime, and with a fluttering captive attached as a decoy. In the sweet scented garden, with its rank-growing tropical ferns, its centipedes, tarantulas and "iron lances" lurking beneath plants of exquisite shape, and color, I lingered many days, but still it was with relief that I turned to another island of the Caribbees, to complete my work.

BARBADOS, ISLAND OF FIG TREES.

The islands of the Caribbees proper are of volcanic origin, but there are three outlying islands of coral formation, Antigua, Barbuda and Barbados. Of these, Barbados is the most important, surpassing, indeed, any of the chain in the amount of its productions. It is only twenty-one miles in length by fourteen wide, but contains a population of 160,000, or about a thousand to every square mile of cultivable land. To be sure, there are less than 20,000 white people, but the blacks are, perforce, energetic and industrious, and the annual exports, mainly of rum and sugar, exceed in value the sum of \$5,000,000. Its capital, Bridgetown, contains a population of about 40,000 and is prettily built on the shore of Carlisle Bay.

Barbados was discovered by some Portuguese, who, finding here a luxuriant growth of fig-trees, from the branches of which hung masses of beard-like foliage, called it "Barbados." First visited by English in 1605, it was then found deserted, and the crew of the "*Olive Blossom*" in command of an English Knight, Sir Olive Leigh, took possession of it in the name of King James. In 1624, the first colony was planted, and continued to flourish until 1650, when it contained 20,000 white men and a large number of negro slaves. It was then a royal colony, and so devoted to the interests of King Charles that when Lord Protector Cromwell sent a fleet and an army to bring the people to terms, the latter made stubborn resistance. In 1657, in addition to the negro slaves, the planters bought several thousand Scotsmen, taken prisoners at the battle of Worcester, and sold into slavery at 1,500 pounds of sugar per head. Although at first barbarously treated, many of them finally became themselves proprietors and planters, and there have been no white slaves for at least two hundred years.

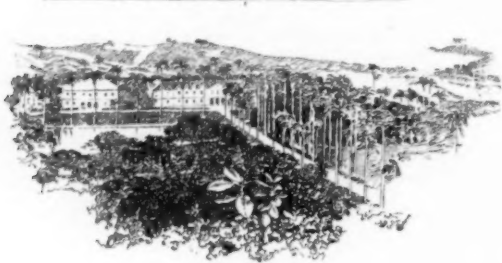
The emancipation of the negroes, fifty years ago, was not attended by the disastrous consequences of this act that befell the other islands, owing to their number and the scarcity of arable land. With



Church at Trois Ilets, Martinique.

a population of near a thousand to the square mile, the black man must either work or starve, and, although there is no worse brute to be found in these islands than a "Badian nigger," neither is any laborer more active and intelligent.

Having enjoyed almost undisturbed prosperity for three hundred and fifty years, and having continued in English hands since its first settlement, Barbados is distinctly English, and devoted to the



Barbados Codrington College.

mother country. Here, more than anywhere else, you find English customs, and families that trace their ancestral line back to noble blood of Britain.

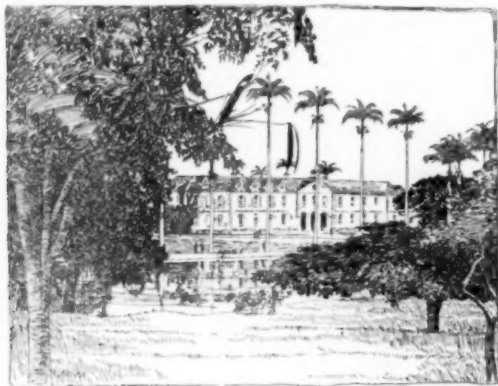
Once let the visitor obtain the *entrée* of 'Badian society, and he will get a taste of real old West-Indian hospitality. It is hot there, certainly, and there are no mountain-retreats, as in Martinique and Dominica; but there is the "ice-house," where cooling drinks are dispensed, and whither resort the seafarers and wayfarers at every convenient opportunity.

As thoroughly English as Martinique is thoroughly French, the architecture betrays this fact at a glance. There are no finer buildings in the West Indies than their public structures, no more elegant houses than the town-dwellings of the wealthy planters. But it is in the country districts that Old England is brought to mind, for, were it not for the tropical character of climate and scenery, one might fancy himself in the rural parts of Great Britain. Their churches and chapels-of-ease, with masses of ivy and adjacent churchyards, are exact pictures of what may be seen in the mother-land. It has been my privilege to attend a country service at a chapel of this sort, as the guest of a hale old planter, and, if there was anything more pleasant than the gathering at the service, it was the meeting with the rector, after the service was over, with pipes and liquid refreshment for three, beneath the shade of a widespread mango tree.

The most important educational establishment of the islands is located here, in Codrington College, founded in 1716, three years before De Foe wrote "*Robinson Crusoe*." It is surrounded by sugar estates, as every available acre of Barbados is cultivated, at a distance from town; and within its ivy-covered walls the students find seclusion from the world, if not the gratification of every taste. Here are avenues of palm-trees, where the "cabbage" palm, the majestic *oreodoxa*, uplifts its beautiful coronet of leaves. I cannot imagine a more delightful retreat, for scholar or man of leisure.

The island has been compared to a great and beautiful garden, so thoroughly cultivated are its plantations, and so delightfully embossed with tropical trees.

Good roads traverse this little kingdom in every direction, and from Bridgetown one may sally forth in any kind of vehicle, and view the land at ease. A popular winter resort, I think Barbados



Codrington College, Barbados.

is destined to become, in time. Within a few years a large hotel has been erected at Hastings, only a short distance from Bridgetown, where there is everything to attract, such as pure air, sea-bathing, fishing, good riding, pleasant scenery. The beautiful flying-fish may be seen in the waters about, or rather skimming the waves, and tropical fishes abound in great variety. There is no hunting here,

as there are no forests, but in the island of Tobago, next south towards Trinidad, are forests of great extent, overrun with strange animals. A remote district called "Scotland," in the northeastern part, displays rocks and caves and petroleum springs, and an occasional wild monkey. The people living in this section somewhat resemble our Southern "crackers," and are said to be the degenerate descendants of the white slaves of two hundred years ago.

Barbados has direct connection with the United States by the Brazil line, and the "Quebec" line steamers, which latter also voyage amongst the other islands of the chain. When winter comes again and the desire comes upon you for fresh scenes and milder air, depart from the beaten track of travel and venture among the Caribbees.

FREDERICK A. OBER.

CONSTRUCTION.—XII.

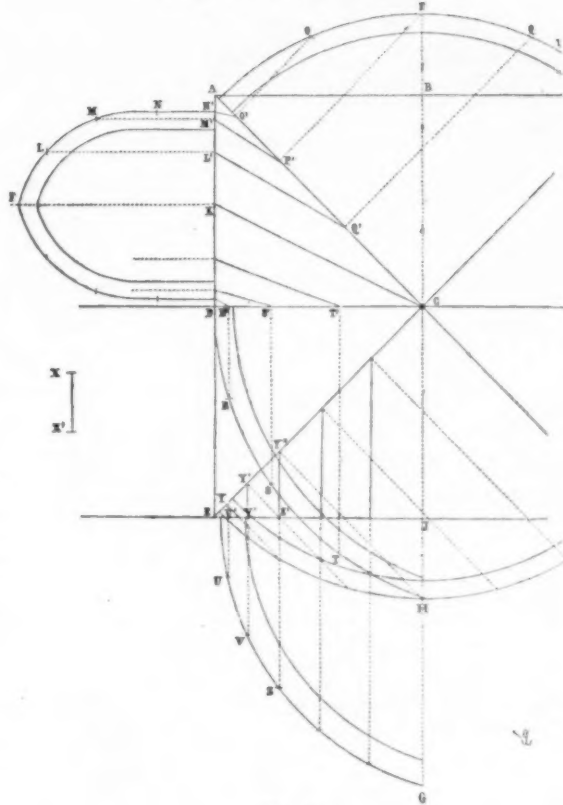


Fig. 55.

WHEN we compare this structure with those that are contemporaneous with it in France proper, we are astonished at the wisdom and the experience of the Norman architects, who, at the beginning of the twelfth century, were already able to construct vaults on pointed arches, and arranged the capitals in as many members as they had arches to receive. But before following the rapid progress of the Anglo-Norman vault and exhibiting the singular results to which the architects beyond the Channel arrived, toward the middle of the thirteenth century, we must first examine the means used by French builders to close the triangles of the Gothic vaults. The general principle must precede the varieties and the exceptions.

Let Figure 55 be the plan of a vault with pointed arches covered by a transverse arch, according to the method of the first Gothic builders, AB being the semi-diameter of the principal transverse arch, AC the semi-diameter of the pointed arch, AD the wall-arch and DC the semi-diameter of the transverse arch cutting the triangle AEC into two equal parts.

The wall-arch must be our first consideration.

Let us suppose the stones manageable, so that a mason can easily lay them by hand, and let them have the width XX' (a width varying from .08 centimetres to .15 centimetres in this sort of building).

We project the extrados of all the arches upon a horizontal plan. These projected figures give us for the wall-arch, with its stilt, the broken curve AFD ; for the principal transverse arch, the broken curve EG ; for the pointed arch, the exact circular quadrant AI ; for the intersecting transverse arch, the broken curve DH .

Let us not forget that, the pointed arch being semicircular, the intersecting transverse arch must have a radius CH equal to the radius CI ; that, in ordinary cases, the principal transverse arch must have a radius JG shorter than the radius CI , and that the wall-arch must have with its stilt, a radius KF shorter than that of the principal transverse arch.

The width of the end stones of the filling being XX' , we must find

¹ From the "*Dictionnaire raisonné de l'Architecture Française*," by M. Viollet-le-Duc, Government Architect, Inspector-General of Diocesan Edifices, translated by George Martin Huss, Architect. Continued from No. 867, page 86.

out how many times the extrados of the half-wall-arch $A F$, including its rise, contains $X X'$; suppose it to be four times; then we mark the dividing points L, M, N . So we have four rows of stones.¹

Referring the wall-arch back upon its horizontal projection $A D$, the point N taken upon the vertical part of the wall-arch falls on N' , the point M on M' , the point L on L' , and the point F of the key on K . We then divide $A I$, the half of the extrados of the pointed arch, into four parts, and mark the points O, P, Q . Referring that curve



Fig. 56.

back in the same way upon its horizontal projection $A C$, we obtain upon that arch the points O', P', Q' , C .

We proceed, in the same manner with the intersecting transverse arch $D C$, whose projected extrados is $D H$. We divide that extrados into four parts, and mark the points R, S, T .

Revolving the arch upon its radius $D C$, we obtain in horizontal projection the points R', S', T', C . Then joining the point N' to the point O' ; M' to P' ; L' to Q' , K to C , etc., by straight lines, these lines give us the horizontal projection of the vertical planes through which the intrados sections of the end stones must pass. This being obtained, the principal transverse arch governs the number of end stones in the vaults closing the triangles E, J, C .

The standard divisor $X X'$ having given us upon the extrados of the principal transverse arch, projected to $E G$, six divisions of stones, we mark the points U, V, Z , etc., and working as before we obtain, upon the line of horizontal projection $E J$ of that transverse arch, the points U', V', Z' .

Dividing in the same way the extrados of the pointed arch into six parts, and projecting these divisions upon the line of the plan $E C$, we obtain the points Y, Y', Y'' , etc.

We then join the point U' to the point Y , the point V' to the point Y' , etc., and we have the horizontal projection of the vertical planes through which the intrados sections of the end stones must pass.

This diagram is not made in the building-yard.

After having divided the extrados of the wall-arches and of the principal transverse arches, governing them, according to the number of the end stones given by the width of the blocks, we divide into equal parts the extrados of the pointed arches, as we have just shown, and we proceed at once to the building of the vaults without movable centres; this is the method used for giving in horizontal projections the lines N', O', M', P', L', Q' , etc., and $U' Y, V' Y'$, etc., which we have drawn upon our diagram.

Let us see in what this method consists.

The builder says, for instance: "The line $C K$, joining the key of the pointed arches to the key of the wall-arches, will have a versed sine of .50 centimetres"; then the mason, accustomed to make this sort of vault, has no need to know more in order to build, without a diagram, the entire triangle of filling $A C D$. It is sufficient for him to take the distance $C K$ or $C J$, and draw (Fig. 56) $C' K'$ upon a plank, and then erect in the middle of this line a perpendicular ab of .50 centimetres, and pass an arch through the three points $C' b K'$. Having the drawing of this curve with him, he builds at least one third of each of the sides of his filling, as a wall. It suffices him to measure with a string, the length of each row of stones, and carry that length around upon the arc $C' b K'$, and then see what versed sine that chord gives for the portion of the arch so cut off; that versed sine is the one to be taken for the closing row of stones.

The first third of the filling has so nearly a vertical arrangement that the stones keep their places of their own accord, just as the mason lays them, as seen in Figure 57. But above the first third, or thereabouts, he needs the aid of a curved pattern, since the rows of stones grow longer in proportion as one approaches the key. Now, because these rows grow longer, it would be necessary to cut a templet for each of them, which would be tedious and expensive. He must accordingly have two patterns, arranged as shown in Figure 58, being longer, together, than the line of filling at the key, and each alone being no longer than the row of voussoirs, too sloping to be set in without the aid of a support. Each of these patterns, cut out of a plank about .04 centimetres thick, has in the middle a slot, hollowed out, concentric to the curvature of the standard arc, of which we were just speaking (Fig. 56).

With the aid of two wedges C passing through these slots, we

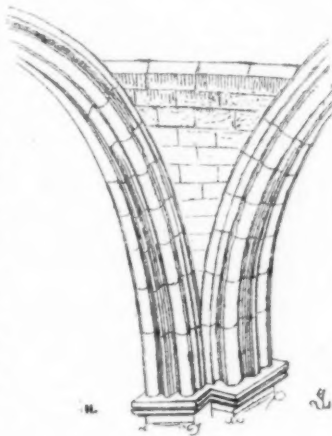


Fig. 57.

make the two patterns firm, and at every row of voussoirs can elongate them at will, by sliding them one against the other. The patterns are fixed upon the extrados of the arches, by means of two iron angles, $A B$, nailed at the extremities of the curves; the mason must

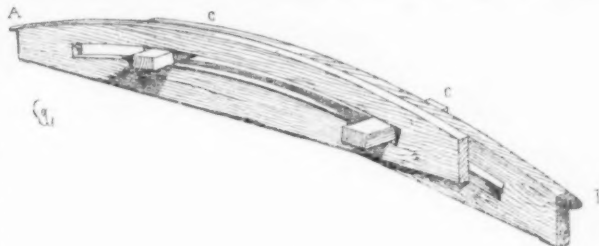


Fig. 58.

take care, after having placed the tips $A B$, upon the points marked upon the arches, to let the surface of the pattern hang vertical before fixing it to the sides of the arches, whether by pins or by a handful of plaster.

Thus the workman closes the fillings of vaults in accordance with the diagram (Fig. 55); in other words while giving to each row of voussoirs, in the filling, a sufficiently marked curve to bend them together and throw their weight upon the arches, he is none the less obliged to keep that curve vertical, for he must place his curved pattern under each line separating these rows of stones as seen in Figure 59 and not under the middle of these rows themselves. It is not without reason that they must place the patterns in a vertical plane, and thereby cause the edge of the bed of each row of stones to pass through this vertical plane.

These beds (Fig. 60) on the intrados being curved, it results that the section $C D$ is found to have a greater development than the section $D B$ which governs the number of rows of stones, and even then the section $D A$, although in horizontal projection the line $D A$ is longer than the line $D C$. The mason must take account, at each row of stones, of this excess of development, and give to each of these rows an end stone presenting the surface drawn in E . The workman then, must be guided by a mechanical device: for the curved pattern, always set vertically, gives necessarily the form to be given to the end stones. If the mason closed the fillings with rows of voussoirs whose end stones were of equal size throughout all their extent, he would be obliged, on reaching the key, to account for the surplus of development given by the section $C D$ over the section $D B$, and he would have two final rows of stones presenting on the intrados a surface analogous to that represented in G , which would have an unpleasant effect and would oblige him to employ, at this point, stones of much larger size than anywhere else. Being obliged, through the vertical position of the curved pattern, to make the inner edge of the bed of each row of stones keep within a vertical plane, the mason succeeds unconsciously in distributing among all these rows the surplus of development caused by the concavity of the vault. All this is much simpler to execute than to explain, and we have never found any difficulty in adopting this method in practice.

A skilful mason, aided by a boy who brings him the required stones and mortar, can cover the triangle of a vault without the aid of any machine, without centering, and without other tools than his hatchet and templet. When once the workman has understood the structure of these vaults (which does not take long) he lays the rows of voussoirs with great ease, having only to touch them lightly with his hatchet in order to prevent their parallelism. Almost always when he has acquired practice, he gives up the slot patterns, and contents himself with two curves that he fastens with two pins, lengthening them at every row, for the beds of these stones being very little inclined, except near the key, a slight support is enough to hinder them from slipping on the mortar. Each row when set forming an arch, the pattern is taken away, without causing the least movement.

It must be said that these stones are seldom very thick and that

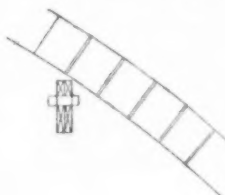


Fig. 59.

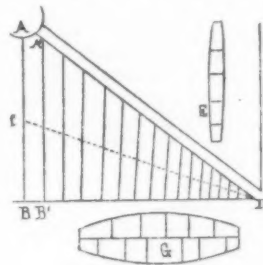


Fig. 60.

many fillings in great Gothic vaults, especially at the end of the twelfth century, have no more than from 10 centimetres to 12 centimetres of thickness.²

¹ In order not to complicate the figure we suppose a very limited number of divisions of filling-stones. The operation is the same, whatever be the division of the filling-stones.

² The fillings of the great vaults in the cathedral of Paris have only 10 centimetres of thickness.

This method of building the vaults is not the only one; it belongs only to Ile-de-France, the district about the city of Beauvois and Champagne, during the second half of the twelfth century, while in other provinces less rational means are adopted. In Burgundy, thanks to

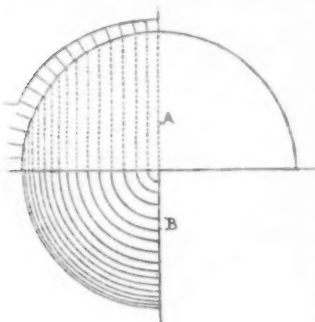


Fig. 61.

special kinds of limestone, composed of thin courses with rough surface, and adhering firmly to mortar, they for a long time built their vaults of plastered masonry, filled-in over wooden centres.

The chancel vaults of the abbey church of Vezelay, built toward the end of the twelfth century, present a singular mixture of the methods adopted by the builders of Ile-de-France, and of Burgundian traditions. One sees how much the Burgundian workmen, skilful draughtsmen as they were, were perplexed about giving the voussoirs of

their filling the proper shapes; unable to make the exact drawing, they experimented wildly, making the haunches of the vaults of materials cut as best they could; then, not knowing how to close these fillings, they finished them off with rough stones plastered together.

This was not a method, but a make-shift.

In the midst of the provinces comprised in ancient Aquitaine, the habit which the builders of the tenth and eleventh centuries had contracted of closing their structures with domes was so deeply rooted that they did not until very late understand the Gothic groined vault, and adopted its appearance, but not its true structure.

Every one knows that the voussoirs composing a dome give, in horizontal projection, a series of concentric circles, as Figure 61 shows. A being the cross-section, and B a quarter of the horizontal projection of a hemispherical dome.

When the Gothic system of construction prevailed in the Royal domain, and when architects saw the advantage to be derived from it, they at once wanted to adopt it in all the western provinces of the Continent. But these various provinces, although attracted by the form, the bold procedure, and the facilities offered by the new architecture for overcoming obstacles hitherto insurmountable, could not tear themselves abruptly away from the traditions so powerfully rooted among the builders, and there resulted a sort of compromise between structure and form. In the twelfth century we see arising, all along the line reaching from Perigord to the Loire, to Angiers and beyond, vaults which in structure are true domes but which try to simulate the appearance of groined vaults. These are domes under which two diagonal arches have been built, rather as a concession to the taste of the time than as a requirement for solidity; for, in fact, these pointed arches, generally very weak, support nothing, but often are even attached to the fillings and maintained by them. This fact is of great importance, for we shall soon see what were its consequences. Nevertheless, these builders of domes soon saw that the structure of their vaults was by no means in harmony with their apparent form. The tendency was already impressed upon nearly the whole of present France by the end of the twelfth century; people had to submit to the mode of construction invented by the artists of the North; they must abandon Romanesque traditions, which were worn out, and which the people rejected as insufficient for their needs, and as the living expression of that monastic power against which the national spirit was rising. The schools that were submissive to the dome made a first concession to the new mode of construction; they understood that the pointed diagonal arches were built in Gothic structures to carry the fillings, so instead of laying rows of filling-stones, as they had done at first, regardless of the pointed arches, as indicated in Figure 62, they took the extrados of these pointed arches as a base of support and laid the rows of stones, not from the transverse or wall-arches toward the pointed arches, like the builders in Ile-de-France, but from the pointed arches to the transverse and wall arches, intercrossing them at the key.

Figure 63 will explain this arrangement.¹

This construction was less rational than that of the northern vault, but it gave the same section; that is to say, from A, the key of the transverse or wall arches, to B, the key of the pointed arches, the triangular fillings A B C form a re-entrant angle, a hollow groin. But since these meetings A B of the rows of stones, produced a bad effect, and offered a difficulty to the mason, who needed at that line A B a wooden curve to

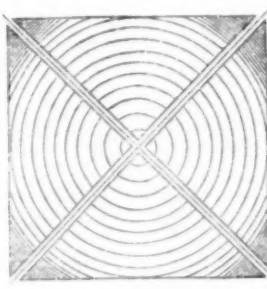


Fig. 62.

support each row of stones while he laid them; they stretched a rib of stone from B to F to hold the ends of the rows of stones and to conceal their seams.

At the end of the twelfth century, Aquitaine was Anglo-Norman, as well as Maine and Anjou. This system of vaults not only pre-
vailed in these countries, but even crossed the channel, and was adopted in England.

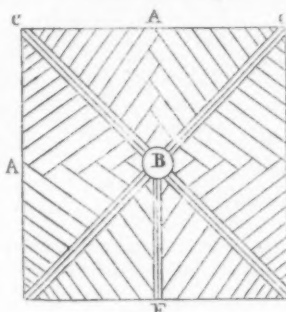


Fig. 63.

Little by little, during the first years of the thirteenth century, they abandoned it in the provinces on the Continent, in order to adopt finally the mode of Ile-de-France; but in England it remained, spread, became improved, and soon led the builders into a system of vaults opposite in principle to the French system.

The manner of laying the rows of filling-stones of vaults upon the arches, borrowed in Ile-de-

France from the Roman groined vaults, and in England from the dome, had singular results.

In France, the surfaces of the fillings always remained concave, while in England they ended by being convex on the intrados, or rather by forming series of reversed curvilinear cones intersecting, and by generating forms quite opposed, therefore, to their origin.

But when one studies Gothic architecture, he soon recognizes that the reasoning, the logical consequences of a principle once admitted proceed with inflexible rigor, even to the production of results apparently very strange, extravagant and far removed from the point of departure. To him who does not lose the traces of the incessant attempts of the builders, the transitions are not only perceptible, but logically deduced; their onward movement is irresistible; but they appear to be the result of caprice, if for an instant one drops the clue. Moreover, no one should accuse those of disloyalty who, not being builders, judge what they see without understanding the origin and the meaning; what we can reproach them for, is the wish to impose their judgment upon others and to blame the artists of our time who think that they find, in this long labor of the human mind, resources and useful teaching. Every man can express his opinion upon a work of art, by saying: "This pleases me," or "This does not please me"; but no one is permitted to judge a product of the reason otherwise than by reasoning. It is free to every one to deny that a perpendicular let fall upon a straight line forms two right angles; but to wish to hinder us from proving it, and, above all, from recognizing it, is to carry the love of ignorance too far.

[To be continued.]

A TALL CHIMNEY. The largest chimney on the Pacific coast, the third in point of size in the United States and the fourth in the world, is being built in this city. The broad column of bricks is now to be seen high above the roofs of the houses in its vicinity, and it will soon tower above every factory chimney in the city. The structure is being put up by the Edison Electric Light and Power Company on Jessie Street near Third, in connection with a new building 75 feet front, 165 feet deep and 52 feet high. The chimney will be 175 feet above the pavement, and will rest on foundations, below the street level, of solid concrete 9 feet 8 inches thick and 28 feet square. The interior diameter for the entire height is to be twelve feet. At the base the chimney has an exterior diameter of 18 feet 6 inches, and the outside diameter of the cap will be 14 feet. Inside for a height of 73 feet, there will be a detached fire-brick lining with an air-space between it and the interior surface of the chimney. The object of this lining is to protect the chimney from the expansion and contraction incident to the varying degree of heat. As the base is of concrete so is the topmost ring of the chimney. Laid in the artificial stone of the cap and intended to bind it firmly together, are seven hoops of one-inch wire rope. Between base and cap machine-made brick is used entirely, it being estimated that 275,000 bricks will be required to complete it. The concrete ring will be 4 feet deep, and the ornamental brick and concrete capital of the chimney will be 16 feet high. The only vertical openings in the chimney will be one about the level of the roof of the building in order to repair the fire-brick lining and to clean it, and one at the base through which to remove soot and ashes. From the roof an iron ladder will rise outside the chimney to the very top, so as to afford a means to repair the exterior when necessary. This ladder would, if connected by copper wires to the earth, form a lightning conductor. The latter has not been provided, however, it being considered unnecessary, as there is no instance in the history of the city of a chimney or building of any kind having been struck by lightning. The sole duty required of this enormous chimney is to afford a natural draught to twenty-eight boilers, which will furnish the motive power to six engines of 1,200 horse-power each, or 7,600 joint. The cost of this chimney is estimated at \$10,000. — *San Francisco Chronicle*

¹ Vaults of the cloisters of Frontfroide, near Narbonne; of the aisles of the Cathedral of Ely; of the cloister of Westminster (England); and of the aisles of the Church of Ely.

COMPARATIVE MUNICIPAL BUILDING LAWS.—XI.

[Note:—In these tables bracketed letters invariably refer to preceding passages in the same column.]

Cornices.

Boston:—*a.* Wall finished with stone cornice shall have greatest weight of material of such cornice on the inside of the face of the wall.
b. Cornices shall be of incombustible material.
c. With wall carried up to boarding of roof.
d. Cornice higher than roof shall have masonry carried to top of cornice, and covered with metal like a parapet wall.

Baltimore:—

Brooklyn:—*e.* No stone or iron cornice shall project more than thickness of wall on which it rests, and stone shall run through wall.
f. Greatest weight of material of cornice shall be inside face of wall.
g. Wooden gutters or cornices shall be firmly secured by irons not more than 7' apart.

For gutters less than 12" wide, such iron shall not be less than 1" x 2". For wider gutters, such iron shall not be less than 1" x 2 1/2". At ends, said iron shall be fastened to side walls, and others of said irons shall be fastened to floor of roof beams.

Provided bracket gutters may be built in wall, secured by straps at least every 2'.

Charleston:—

Chicago:—*h.* Stone cornices shall not extend more than 36" beyond the face of wall, and their preponderating weight shall be on the wall.

All cornices, gutters, eaves and parapets (above first story of business buildings, and above 30' from sidewalk of other buildings) shall be of incombustible material.

Metal cornices shall be rivetted together with rivets not more than 2" apart, and supported by iron brackets of 1" x 1 1/2" iron, or heavier, placed not more than 4' apart, and firmly secured to wall.

The roof or covering of cornices may be sheathed with wood, provided it is entirely covered with metal.

Or a composition roof may extend within 6" of the front if that 6" is covered with metal.

Cincinnati:—**Cleveland:**—

Denver:—*(a).* All cornices other than brick or stone on brick buildings within the fire-limits shall be secured to the walls with iron anchors, independent of any woodwork.

Exterior cornices, gutters and other projections within the inner fire-limits shall be of incombustible material. (c); (d).

Detroit:—*l.* No cornice shall be of wood, except on dwelling-houses not exceeding two stories in height.

District of Columbia:—*j.* Cornices or roof decorations shall be made of incombustible material approved by the Inspector.

k. Cornices shall be secured to walls with iron anchors independent of woodwork. (c); (d).

Kansas City:—*(a).* *l.* So that cornice shall firmly balance on wall.

m. Exterior cornices or gutters more than 45' above level of sidewalk shall be constructed of incombustible material secured to walls by iron anchors independent of woodwork. (c); (d).

Louisville:—*n.* No unprotected cornice or projection of wood shall be built above top of third story.

Memphis:—*(p).* All cornices shall be built of fireproof material, with fire-stops every 25'.

Milwaukee:—**Minneapolis:**—*(a); (l).*

Incombustible cornices shall be well secured to walls. (c). Cornices higher than roof shall have walls built to top of cornice.

Nashville:—*q.* All exterior cornices and gutters shall be of stone, brick or iron.

Newark:—*r.* Wooden cornices and gutters shall be firmly secured and fastened to iron brackets built in wall and anchored to roof beams.

s. Buildings over 55' shall have fireproof cornices anchored with iron anchors.

New Orleans:—

New York:—*t.* Exterior cornices and gutters shall be of fireproof material, and the greatest weight of that material shall be on the inside of outer line of wall on which cornice rests, in proportion of three of wall to two of cornice in weight, allowance being made for the excess of leverage produced by the projection of the cornice beyond face of wall.

u. Fireproof cornices shall be secured to walls with iron anchors independent of woodwork. (c); (d).

v. Party-wall shall in all cases extend up to above the planking of cornice, and be coped.

Omaha:—Cornices other than brick on brick buildings shall be secured to walls by iron anchors independent of woodwork. (c); (d).

Philadelphia:—*w.* Inspectors have powers to direct construction of cornices.

Pittsburgh:—*(w).***Providence:**—*(a); (l).*

Projections not exceeding 12" may be built over any street more than 20' wide, provided they be firmly secured, and shall not extend beyond a line drawn upward at angle of 45° from a point 8' above sidewalk, nor project more than 4' from building.

Incombustible cornices shall be secured to walls independent of woodwork. (c); (d).

St. Louis:—*(a); (l).*

u. The lookout must be wrought or cast iron framework to which to secure cornice. (c), (d), well flushed in joints with hydraulic cement-mortar.

San Francisco:—Greatest weight of material composing cornice shall be on inside of outer line of wall supporting it, in the proportion of 4 of wall to 2 of cornice in weight, allowance made for excess of leverage by projection of cornice. On brick buildings there shall be no projection of wood.

All external projections of ornamental character exceeding 6" in height and 6" in projection shall be of fireproof material. If of iron rivetted with nuts not more than 2" apart, supported by wrought-iron brackets not more than 2' apart (k), (c), (d), coped with fireproof material.

Wilmington:—

Piers, How Built.

Boston:—*a.* All brickwork shall be of merchantable, well-shaped bricks, well laid and bedded, with well-filled joints in mortar (as required by Section 19, Law of 1892) well flushed up every course with mortar.

Bricks, when laid, shall be wet or dry, as Inspector may direct.
b. Piers and walls shall have caps or plates, when needed, sufficient to properly distribute load.

Baltimore:—

Brooklyn:—*c.* All piers shall be built of good, well-burnt brick of hardest quality, well cut when laid, laid in cement-mortar.

d. Every isolated pier less than 10 superficial feet at base, all piers supporting walls built of rubble stone or brick, piers under iron beam or arch or girder, or under arch or lintel supporting wall, shall, at intervals of not less than 30" in height, have built in bond stones not less than 4" thick, of diameter not less than diameter of pier, except that piers on street above curb may be 4" less.

e. Walls or piers under girders or columns shall have bond-stones at least 4" thick, and, if in wall, at least 2' long; and if in pier, the full size of it every 30" in height, and shall have capstone of cut-granite or bluestone, at least 8" thick, the size of pier, or in a wall 2' long, and the thickness of wall, and at least 8" thick.

Charleston:—**Chicago:**—**Cincinnati:**—**Cleveland:**—

Denver:—*f.* Brick piers under lintels, girders or columns of brick buildings, when the span is over 10', shall have cap iron or plate at least 2" thick the full size of pier.

Detroit:—**District of Columbia:**—

Kansas City:—*g.* All piers shall be built of the best quality of good, well-burnt, hard brick, laid in cement and sand mortar, well wet when laid in warm weather, well bonded, with through courses level and bedded each course.

h. Brick piers under lintels, girders and columns of brick buildings shall have cap iron at least 1 1/2" thick, full size of pier.

Louisville:—

Memphis:—*(f).* Every isolated brick pier less than 9 superficial feet at base supporting any beam, girder, arch or column on which wall rests, or lintel spanning over 8' and supporting a wall, shall, at intervals of not more than 30", have a bond-stone not less than 4" thick, or cast-iron plate of equal strength, full size of pier.

k. All piers built of stone or good, hard, well-burnt brick laid in cement-mortar.

l. For piers fronting on streets, bond-stones may conform to kind of stone used in trimmings.

m. Wall or pier entirely of brick or stone, supporting iron lintel, girder, column or post, shall, under such, have base-stone, cut-granite or bluestone at least 12" thick, or iron plate of equal strength, or a combination of both.

Milwaukee:—

Minneapolis:—*n.* Brick piers shall be built of good, hard-burnt brick of uniform size, laid in cement and sand mortar, with uniform joints throughout, facing and backing, and of sufficient size to carry safely load they are intended to carry.

Joints not to exceed 2" in thickness.
 A whole course over surface of pier shall be laid, and joints flushed full of mortar before next course is laid. The top of pier shall finish level for capstone, plate or other covering.

Brick piers shall not be more than eight times higher than width of base.

Every brick pier 16" x 20" or less shall have one or more binders built therein, either of iron not less than 1" thick, or of stone not less than 6" thick. All binders full size of pier. Distance between any two binders or between either of them and cap or base shall not exceed 4'. All cap and base stones full size of pier.

Under all lintels, girders and columns shall have cap iron at least 2" thick, or capstone at least 12" thick, full size of pier.

External piers may have plate reduced in size to allow 4" of brickwork between plate and weather.

Nashville:—**Newark:**—**New Orleans:**—

New York:—*o.* All piers shall be built of stone or of good, hard-burnt brick laid in cement-mortar.

p. Above footings, piers shall be built up, probably bonded, to height required to receive capstone of cut-granite or bluestone at least 12" thick, or an iron plate of equal strength, and not less than 12" wider each way than post or column it supports.

The cap set solid.

(f); (k); (l).

When iron lintel or iron or wood girder, column or post rests on wall entirely of brick or stone, the said lintel, girder, column or post shall set on base stone of cut-granite or bluestone at least 12" thick, or iron plate of equal strength, or both combined, of such thickness as needed to properly transpire weight.

Outside piers with inverted anchors between piers shall be secured to adjacent piers by suitable iron rods and plates.

Omaha:—Brick piers and buttresses shall be bonded with through courses, levelled and bedded each course.

Brick piers under lintels, girders or columns of brick buildings shall have cap iron at least 2" thick full size of piers.

Philadelphia:—**Pittsburgh:**—

Providence:—Isolated brick piers shall be built of good, hard, well-burnt brick.

Every brick pier shall have one or more binders built therein, either of iron not less than 1" thick, or of bluestone not less than 3" thick, or of granite or sandstone not less than 5" thick; these binders full size of pier, except on street front above curb, where they may be 4" less in diameter. The distance between any two binders or between binder and cap or base shall not exceed 4'.

Under all lintels, girders or columns isolated piers shall have cap-iron not less than 1" thick, or a capstone of cut-granite at least 8" thick, or of bluestone at least 4" thick, all the size of pier. An external pier may have plate reduced in size to allow 4" of brickwork between edge of plate and weather.

St. Louis:—All brick piers shall be built of best hard, well-burnt brick laid in clear cement-mortar, two parts sand and one part cement, bricks well wet when laid.

Isolated brick piers under all iron lintels, girders or columns shall have a cap of iron or cut-stone, full size of pier, laid in bed of mortar.

San Francisco:—All piers shall have granite caps not less than 10" thick, with level beds or iron caps of equal strength, the projections of brick not to exceed 2".

In stores, warehouses or factories more than 25' wide, without partition walls, the piers shall have inverted arches between each column or pier supporting a wall, or not less than two footing-courses 12" thick, large, well-shaped stones laid crosswise. And the pier above shall be built with brick or stone, properly bonded, to height required to receive a capstone of granite not less than 11 1/2" thick, not less than 12" wider each way than the size of post, pillar or column placed upon it; said cap set solid.

Every isolated pier of less than 10 superficial feet at base, and all piers supporting a brick or stone wall, or under any arch, girder or beam supporting a wall, shall have bond-stones at intervals of not less than 30" in height, and of thickness not less than 5", the full size of pier, top and bottom beds level.

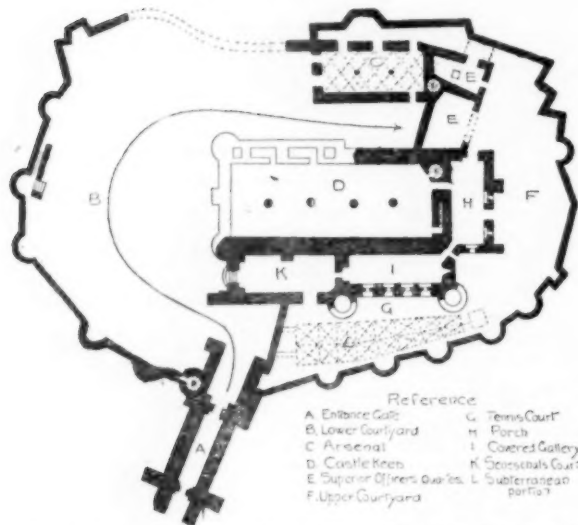
Wilmington:—

Compiled by H. A. PHILLIPS.

¹ Law of 1892.

THE "GRAVENKASTEEL" OR "CHATEAU DES COMTES," GHENT.¹

Restored View of Château des Comtes, Ghent



Plan of Château des Comtes, Ghent, showing the Existing and the Restored Walls

THE origin of Ghent may be traced to a remote epoch. It is supposed that the first dwellings were erected upon some rising ground between the Scheldt and the Lys, known as Mount Blandin, where the inhabitants, doubtless, took refuge against the inundations which, even in our time, periodically submerge the left bank of the Lys and the right bank of the Scheldt towards Tronchiennes and Ledeburg. Numerous Roman remains testify to the fact that the town was already inhabited in the days of Nero (53 A. C.), perhaps, at an earlier date still, judging by the vestiges of a temple of Odin, the Mercury of the Germans, that was destroyed by the early Christians on Mount Blandin.

Ghent, originally, called *Heerehem*, "the home of the lords," was probably a centre of maritime defence for the Romans, and served to protect the coasts of Flanders against the invasions of the pirates of the north. Traces may still be found of by-roads leading to Oudenburg, Bouchout, Antwerp, the mouth of the Scheldt, and Zeeland. Certain authors attribute to the Romans the cutting of the mysterious artificial waterway known as Otho's Ditch (*le fossé d'Othou*) which would appear to have been made in the time of Constantine Chlorus (290) to resist an invasion of the northern hordes. This canal placed the port of Ghent in communication with the Braekman, the Western Scheldt, and the Zwyn.²

In 620 St. Amand, who came to preach Christianity at Ghent, founded upon the site of Odin's temple the Abbey of St. Peter.³ In 630 St. Bavon undertook the conversion of the barbarians north of the Scheldt, and founded the Abbey of St. Bavon,⁴ around which a kind of floating population gathered itself. The group of buildings thus formed was called Ganda, or Gandavum, and gave its name to the whole agglomeration.

In 811 Charlemagne established dock-yards at Ghent for the purpose of fighting the Normans. This fact confirms the hypothesis of the previous cutting of the canal of Otho, for without the existence

of a double fluvial communication between Ghent and the sea, by means of the canal on the one hand and the Scheldt on the other, there could have been no motive for selecting it as a centre of maritime defence, which otherwise would have been better found by Charlemagne farther down the river at Rupelmonde, a place that commands the mouth of nearly all the rivers of Western Belgium.

It is said that Eginhard, Charlemagne's secretary and son-in-law, was placed in authority over the two abbeys of St. Peter and St. Bavon, each retaining, however, a distinct dominion. The abbots of St. Peter's held sway over the centre (*Keure*) and the post of *Heerehem*, while the abbots of St. Bavon continued to proselytize the Pagans of the Marches between the Scheldt and Otho's ditch, a district known as Wasda, or the land of woos.

The abbey of St. Peter depended upon the imperial diocese of Cambrai, while St. Bavon formed part of the diocese of Utrecht and held authority over the Marches of the German Empire.

In 852 Baldwin Fercus (Baudouin bras-de-fer) and Regnier "au long col" defended Neustria and Lotharinga against the Normans.

The history of these two warriors presents the curious analogy that both had quarrelled with their chiefs on account of clandestine marriages with the daughters of the latter, and that both were reconciled to their irate father-in-laws and confirmed by them, with their children after them in their high functions. Baldwin, who had married Judith, the daughter of Charles the Bald, became Marquis of the Flemings. Being declared the champion of the kingdom, he established a military frontier to the north of Flanders by constructing the castles of Bruges and Ghent, and possibly at intermediate stations as well.

This was the origin of the old castle of Ghent placed beyond the Lys, and answering to the type of a frontier stronghold destined to act against the northern regions, while holding in check the turbulent population of *Heerehem* to the south and separated from the Wasda by the ditch of Otho.

The Castle of Baudouin bras-de-fer, restored by Arnould le Vieux, occupied by Wichmann, was reconstructed in 1180 by Philippe of Alsatia, Count of Flanders, upon his return from Syria, as set forth by a carved inscription upon the entrance of the gate. If it is not possible to fix the exact date of this reconstruction, it is at least certain that it offers the first example of a mediæval stronghold showing the influence of the Syrian type brought back by the Crusaders, and that it was erected at least fifteen years earlier than the famous Château Gaillard des Andelys, built by Richard Cœur de Lion in 1196, and generally supposed to be the most ancient specimen of a Romano-Byzantine fortress in Europe.

The Château des Comtes was abandoned as a princely residence in 1353 by Count Louis le Mâle. He took up his abode in the more splendid palace known as the Cour des Princes, of which the ruins are also to be seen at Ghent. This was the birth-place of Charles V.

The ancient castle became a state prison, and sheltered behind its walls the unhappy Countess Jacqueline de Baviere. In 1419 it became the seat of the Council of Flanders, which had held its meetings hitherto at Lille. In 1779 it was divided into lots and sold at a public sale to a contractor called *Brisemaille*.

Thenceforth the Château des Comtes lay dismembered and forgotten behind factories, workshops, and laborers' dwellings, until the only trace that remained of it was the stone archway of the entrance, overlooking the Place Ste. Pharaïde, that strangers looked up at curiously. In 1829 a cotton mill, belonging to M. Couvreur, being destroyed by fire, some archaeologists in Ghent petitioned against its reconstruction, but lost their case, nobody at that time understanding the historical value of the old castle. It was only two years ago that some architects, antiquarians and artists, under the guidance of M. de Maere de Limnande, formerly deputy of Ghent, succeeded in inducing the municipality of the town and the Belgian Government to acquire the territory, and to deliver the building from the parasitical constructions that overlaid it. To-day the ruins, being disengaged, present the aspect of imposing vestiges of a feudal fortress, of which no counterpart can be found save in Syria.

Such as the castle appears to-day it constituted the citadel (*kasteel*, *hof*, *burg*) of a military town, separated from Ghent by the Lys. This town was the town of the Counts of Flanders (*Gravenstad*). Beyond the Lys there was an entrance yard (*voorhof-voorburch*) serving at one and the same time to protect the frontier and to hold in check the town of Ghent, which was the suburb or faubourg.

Of the *Gravenstad* no trace remains to-day, but its limits may be determined by the ancient ditches and the direction of the streets. It was bounded on the south by the Lys, on the west by the Lieve, on the east by the ancient ditch of Otho (actually the Sas Canal) and on the north by a canal, filled in and built over by the Rue des Corroyeurs.

The *Gravenstad* possessed four gates or bridges, like the Roman camps.

The principal gate was on the west, leading to Bruges (*hoofde brugge*, corrupted into "beheading bridge," because beheadings took place there. "Hoofde" in Flemish has the double signification of principal and head). It was the *porta decumana* of the Romans.

The Gate of the County on the south, giving access to the town of Ghent (*Grave brugge*).

Besides this there were the Gate of the Burg grave, or Viscount, on the north (*Brug-grave brugge*); later, the Gate of St. Eloi, from

¹ Paper read by General Wauwermans, President of the Archaeological Society of Antwerp.

² Otho's ditch still exists in Ghent. It has been partly covered over and forms a street which runs before the University Library, formerly the Abbey of Banteloo.

³ St. Peter's Abbey, which commands the town of Ghent, is now used as a barracks. The church is well worth a visit.

⁴ This abbey was transferred to the St. John's Church, now called Cathedral of St. Bavon, by Charles V., when he wanted to build a citadel on the spot where St. Bavon first established his monks. The ruins of the old abbey still remain near the Station du pays de Waes, and are most interesting. Their Roman origin is indisputable. They form now a museum.

the name of a neighboring convent; and the Grey Gate (*Gravue poort*) the *pretorium* of the Romans, giving access to the Wasda. Before this last gate stood a small castle (Chastelet) where the court of justice of the Wasda held its sittings.

In the interior of the Gravenstad, the Graven Kasteel, or Castle of the Counts, and their residence, stood at the northeastern angle. The Church of Sainte Veerle, to-day of Ste. Pharaïlde, stood at the southeastern angle.

The ruins of the castle as it was rebuilt by Philippe d'Alsace are in perfect preservation, though complicated by later additions, whose origin and purpose it is not always easy to determine.

We enter them by a gate on the place of Ste. Pharaïlde, which is still intact, and find ourselves in a low court-yard before a large and powerful keep. If we leave it to our right in passing between it and a building called a chapel—though more probably it served as an arsenal (*salle d'armes*) surmounted by an upper story, containing, no doubt, the lodgings of the superior officers—we arrive in an upper court-yard (*kaets plaets*, or tennis-court, *cour du jeu de paume*) where two buildings abutting against the donjon may be observed, the one a kind of porch, the ancient chamber of archives or greffe of the tribunal of Flanders, and a covered Roman gallery. Under this yard are vaulted dungeons, that served probably as prisons. The whole is encircled by thick walls in good preservation, flanked by towers built *en encorbellement*.

Besides the entrance-gate, the chapel or arsenal, and in the upper court the building that we have named (the covered gallery) are remarkably well preserved. The keep, which formed a rectangular edifice of enormous dimensions and of a great height, is unfortunately partly demolished in one of its angles.

Beneath the building which we suppose to have contained the officers' quarters, connected with the keep by a mediæval vault of very curious construction, a subterranean prison of great interest has been discovered. Dungeons, or *oubliettes*, of whose purpose no doubt can be entertained, have been found also under the keep.

Excavations made on the south side of the keep have led to the discovery of a primitive subterranean story, evidently anterior to the overlying construction, which dates from the days of Philip of Alsatia. It has crenelated apertures upon a level with the soil, which seems to prove that it was only buried in consequence of the filling-in of the upper court. It bears indications of having been constructed in the time of Baudouin bras-de-fer or Arnould le Vieux, 849.

This last discovery is of importance, as it testifies to an advanced art of construction among the Flemish people in that remote age and which they introduced in all probability into England.—*The Builder*.

ST. CLOUD.



Tomb at Boulogne-sur-Seine. From *La Semaine des Constructeurs*.

THE ruins of St. Cloud have been sold at auction. All that war and time had left of the beautiful palace, where kings and emperors loved to take their pleasure, has been knocked down to a speculative purchaser as so much old building material. The most austere champion of equality, the most rigid and soulless of economists, must feel something of a shock that such an edifice should meet with such a doom. That Frenchmen should desire to remove a conspicuous monument of the humiliations, the sufferings and the disasters brought upon their country by a cruel invasion is natural enough, nor is it strange that the rulers of the republic should be eager to obliterate the last traces of a building, each stone

of which is saturated with the memories of dynasties gone by. But there is something repulsive in the manner in which they have chosen to carry out their decision. If the relics of the once favorite abode of the Bourbons and the Napoleons were publicly sold for a few score pounds from any wish to exhibit a democratic contempt for monarchical traditions, the proceeding was childish as well as paltry. The associations and the memories that lingered round St. Cloud cluster as closely about half-a-dozen other palaces which adorn the environs of Paris. They are part, and not the least glorious part, of the history of France, and it is idle to seek to erase them from the recollection of mankind by any process of physical destruction. On the other hand, if the sale was ordered without any thought of the sentiments which such an act was certain to evoke, the persons who decreed so crass a piece of Philistinism are blessed with little of that discernment and tact which we habitually ascribe to Frenchmen. The Government might have undertaken the necessary work themselves. To condemn the remains of a noble historic monument, inseparably connected with some of the most brilliant episodes and some of the most illustrious personages in the annals of France, to be carted away as rubbish by the highest bidder, is an outrage against enlightened patriotism, under whatever pretexts it may be perpetrated.

Although the fame of St. Cloud as a royal residence dates from the ministry of Mazarin, the place was celebrated for its military importance from very early days. It commanded a very ancient bridge over the river, and in the wars of the Burgundians and the Armagnacs it was the scene of frequent combats. Englishmen may be interested to be reminded that in 1358 the town was captured and burned by their forefathers. In the religious strife of a later age St. Cloud again played a considerable part, and it was in the castle as it then stood that the knife of Jacques Clément ended the life of Henri III. The rare natural beauty of the scenery began to attract men of wealth and taste so soon as the fashion of rearing splendid country-houses in the neighborhood of the court sprang up among the ruling classes. Catherine de' Medici sometimes lived there, and the magnificent and aspiring Fouquet, the friend of Madame de Sévigné and the patron of La Fontaine, showed his usual good judgment in building a residence in this delightful spot. Both the demesne of Catherine de' Medici and the demesne of Fouquet formed part of the magnificent park which Louis XIV acquired for his brother Gaston of Orleans. The trick by which the great King is said to have obtained the property at an under-value is well known. Hervard, the Comptroller of Finances, had bought it out of the immense gains of his lucrative post. Mazarin, according to the story, asked him what it had cost him. The Comptroller was afraid to tell the truth, for to have done so would have involved an admission of the vast profits of his place. He named a ludicrously inadequate sum, and the next day the royal notary attended upon him with the intimation that his royal master desired to purchase St. Cloud at his own valuation.

The new lords of St. Cloud lavished upon it every ornament which the taste of the age could devise and a boundless command of money could procure. The most famous architects, the most ingenious engineers and the most celebrated painters of France in the bloom of the "*Siècle de Louis XIV*" did all that art could do for the embellishment of the residence of the only brother of the King. The beautiful gardens, which were laid out by Le Nôtre, were adorned with cascades and fountains designed by Mansart, and inferior only to those of Versailles and Marly, while the walls of the principal apartments were covered with the dainty work of Mignard. Their efforts, in the judgment of contemporaries, were crowned with success. In all the ring of splendid palaces grouped around Versailles, St. Cloud was the noblest and the most beautiful. "It was," says Saint Simon, "the home of all delights."

To this home "Monsieur," as the King's brother was styled in the jargon of the court, took home his charming bride, the fascinating and unhappy Henrietta, daughter of our own Charles I. The *fêtes* which the newly-wedded couple gave to the King outshone all the previous revelries of that magnificent society. Soon afterwards, the greatest of French pulpit orators was delivering over Henrietta's coffin perhaps the most memorable of all his discourses. The sudden death of "Madame" in the flower of her youth was the first of the domestic calamities which shrouded the close of the great reign in gloom. Like those which followed, it gave rise to dark rumors of poison, which the more sober judgment of posterity rejects. Henrietta was succeeded by a princess of a very different stamp, but not less dear to the students of the court life of those days. The widower married the daughter of the Elector Palatine, and became by her the father of the Regent Orleans. The anecdotes told of "Madame de Bavière," as she was commonly called, are innumerable, and her own voluminous correspondence with the German relatives to whom her heart always turned forms a most amusing and instructive, if not a very edifying, picture of the men and women with whom she lived. Louis XIV, to his credit, always loved and honored the sturdy German independence of his sister-in-law, and when at last "Monsieur" fell down in a fit and died after a stormy interview with the King, Louis allowed her to continue to occupy St. Cloud. It was here that the Regent received Peter the Great when that extraordinary man was startling Western Europe by his genius, his extravagancies and his brutalities; and here Louis Philippe d'Orléans spent unheard-of sums in festivities before he sold the château and grounds to the unhappy Marie Antoinette.

Under the Empire, St. Cloud was the theatre of many memorable scenes. It was in the Orangerie, indeed, that Napoleon took the first decisive step in that career which placed him upon the throne, when on the 18th Brumaire his soldiers expelled the Five Hundred at the point of the bayonet. Here, too, he signed the act proclaiming himself Emperor; here, in the "Galerie d'Apollon," he celebrated his civil marriage with Marie Louise of Austria, and here he seems to have lived by preference when in France. During the Restoration St. Cloud was equally favored. It was in the palace that Charles X signed the ill-fated *ordonnances* which led to his downfall, and it was within its walls that he spent "the disastrous days of July." The third Napoleon seems to have loved St. Cloud, as did his famous uncle, and it was at St. Cloud that he bade farewell to the Empress on the eve of his last campaign. It is the remains of this princely dwelling, so rich in historic memories and in historic lessons which surely the republic has no cause to dread, that the rulers of the republic have sent to the hammer. We cannot pretend to read of such a deed without sorrow.

"Men are we, and must grieve when even the shade
Of that which once was great has passed away."

—London Times.



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

MAIN ENTRANCE, CITY-HALL, CAMBRIDGE, MASS. MESSRS. LONGFELLOW, ALDEN & HARLOW, ARCHITECTS, BOSTON, MASS.

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

THE general view of this building was published in our issue for July 23, last.

NEW YORK COLLEGE FOR THE TRAINING OF TEACHERS, NEW YORK, N. Y. MR. W. A. POTTER, ARCHITECT, NEW YORK, N. Y.

THE New York College for the Training of Teachers received its charter from the Board of Regents of the University of the State of New York, January 12, 1889. The charter was issued in response to an application from the promoters of the College, stating that it was their desire to establish and conduct a purely professional school for the training of teachers; that the elements of a secondary education were not to be taught at the proposed college, but were to be required of candidates for admission; that the object of the college would be to give instruction in the history, philosophy and principles of education, in psychology, in the science and art of teaching, and also in manual training, and the methods of teaching the various subjects included under that head; that a school of observation and practice would be maintained in connection with the college; and that a course of instruction and practice of not less than two years was to be organized, the completion of which, to the satisfaction of the trustees and faculty of the said College, might entitle the candidate to the degree of Bachelor of Pedagogy.

In the early days of the College its chief function was to arouse a public interest and educate public sentiment on the subject of manual training. To this end extensive lecture-courses were conducted, publications were issued and widely circulated in this country and in Europe, and a creditable record was achieved in promoting the new cause. These services received acknowledgment both from those actively engaged in the work of the schools and from those charged with the distribution of the Peabody, Slater, and other funds.

At the present time, when manual training has become a permanent possession of the schools, the need for agitation and argument has been succeeded by a demand for ways and means, and the New York College for the Training of Teachers is now devoting itself to the work of developing courses of study, coordinating these subjects with the other subjects of the curriculum, and training specialists able to undertake the work of supervision in school systems. In such constructive work, the existence of a complete school system in organic relation to the college is an indispensable factor. In this respect it differs essentially from such institutions as Pratt Institute and Drexel Institute. It does not lie within the province of this college to attempt such extended technical work in any department as is undertaken in those institutions; but, on the other hand, it must always teach all the manual training that is taught in schools, and it will always be able to appeal to those teachers of manual training who value the opportunity to study manual training in relation to education above extended technical training.

It is important to note that the earning capacity of the College has steadily increased, so that last year it was over fifty per cent of the total expenditures, and, further, the College has never had a debt, but has met promptly all demands, even up to a yearly budget of \$60,000; that while salaries have steadily increased, tuition-fees have increased in much greater ratio, and the need of supplement-

¹The marriage of Napoleon and Maria Louisa was celebrated in the Salon Carré of the Louvre.—Eus.

ing earnings by gifts has steadily decreased, the entire salaries account being almost met by tuition-fees, interest on endowment and other earnings, while the gifts are applied almost wholly to meeting what may be designated as "fixed charges," an item which has remained relatively stationary during the past four years, and which, with the items of rent and equipment removed, might be expected to show material and permanent decrease.

The Board of Trustees, therefore, have pleasure in announcing that Mr. George W. Vanderbilt, one of the Board, has given twenty lots to serve as a site for new buildings on One Hundred and Twentieth and One Hundred and Twenty-first Streets, between Amsterdam Avenue and the Boulevard; that an endowment fund of \$100,000 has been paid in, and pledges for \$75,000 in addition have been received. In order to complete the work, the sum of \$500,000 will be necessary, and subscriptions to this amount are requested of the people of New York. With these funds it is proposed to erect on the above site two buildings: the main building for the College, containing, besides a hall and lecture-rooms, the School of Observation and Practice, the gymnasium, the Bryson Library and the laboratories of the Departments of Psychology, Science and Domestic Economy; and the Arts Building for the Departments of Mechanic Arts and of Form Study and Drawing, and their appropriate museums, exhibits and libraries.

Contracts have been made to erect a part of the main building on One Hundred and Twentieth Street, together with the east wing, and it is proposed to complete this portion of the scheme in the spring of 1894, at which time the lease of the building now occupied by the College expires.

It is worthy of note that in building the proposed Mechanic Arts Building, New York City will be provided for the first time with a manual training-school on a purely educational basis, not only accommodating students, but also offering complete professional training to those intending to teach; and that in providing a building for the other departments of the college, the citizens of New York will give recognition to a movement that is destined to form an important and unique addition to its university system.

Subscriptions toward the building-fund can be sent to the Chairman of the Building-committee, Mr. Spencer Trask, care Spencer Trask & Co., Bankers, 10 Wall Street, New York City.

STABLE FOR MR. SWEET, GRAND RAPIDS, MICH. MR. T. RONEY WILLIAMSON, ARCHITECT, PHILADELPHIA, PA.

THE building is brick—two tones of native brick, a salmon red, dark and light; the roof and gables, shingles stained.

HOUSES FOR PHILIP WHITLOCK, ESQ.: MR. CHAS. H. READ, JR., ARCHITECT, AND FOR OSCAR CRANZ, ESQ.: MR. M. J. DIMMOCK, ARCHITECT, RICHMOND, VA.

THESE houses are at the corner of Grace and Second Streets, and are built of red brick and Virginia brownstone. The corner house cost \$15,000, its neighbor \$22,000.

ENTRANCE TO THE SNELL, HEITSHU & WOODARD BUILDING, PORTLAND, OREGON. MR. I. HODGSON, JR., ARCHITECT, PORTLAND, OREGON.

ENTRANCE TO THE UNITED BANK BUILDING, PORTLAND, OREGON. MR. I. HODGSON, JR., ARCHITECT, PORTLAND, OREGON.

[Additional Illustrations in the International Edition.]

ENTRANCE TO THE CHATEAU DES COMTES, GHENT, BELGIUM.

[Gelatine Print.]

WE are particularly glad to encounter in the *Builder* the account, published elsewhere in this issue, of one of the many interesting relics of Spanish domination in the Low Countries, for at the time we took the negative for this plate the process of destruction was nearly complete yet was daily revealing new and interesting finds upon which, unfortunately, we had not the time to spend which their proper comprehension demanded.

WORCESTER CATHEDRAL.

St. WOLFSTAN of Worcester, says the *Builder*, founder of the Norman cathedral, is recorded by William of Malmesbury to have burst into tears while watching the pulling down of the earlier Saxon church built by St. Oswald, exclaiming, "We wretched ones destroy the works of the saints." Apart from the question of inferiority in architectural design, which did not form the basis of the saint's regret, his words might find an echo in the consciences of cathedral architects of our own day, professional and amateur, at Worcester and elsewhere. The rebuilding of both the east and west fronts of the Cathedral, for the mere purpose of consistency in style, and the abrogation from the choir and Lady Chapel of features later than those of the ordained period of Early English, as "debased," as well as the demolition of the magnificent Guesten Hall, form a record sufficient to justify reasonable regret.

It, however, says much for the architectural value of the Cathedral, besides qualifying censure upon its restorers, that it still remains a

building of marked beauty and interest. Professor Willis, who was carefully optimistic about the doings of his contemporaries, wrote in 1863, before the choir was "restored," that of "Great English cathedrals and conventual churches it is inferior to very few in interest and value, when considered with respect to the history and practice of mediæval architecture"; and, adding the words "and of restoration in modern times," we may adopt his opinion.

The See of Worcester was founded in the seventh century, and St. Dunstan of Canterbury was among the early holders of the bishopric. He was succeeded by St. Oswald, who founded a Monastery of Benedictines, into which he absorbed the original secular canons of the cathedral, and erected the Church of the Virgin, removed for a grander edifice by St. Wolfstan. The latter saint was the last of the Saxon bishops, and a man of sufficient character and power to be recognized by the Norman conquerors, whose two kings he faithfully served until his death in 1095. An interesting link with the Saxon church exists in the design of the baluster columns of the wall arcade of the slype, which, if not themselves relics re-used from St. Oswald's Church by Wolfstan, are of marked Saxon character and distinct from the other Norman work. He began the erection of the Cathedral which we now see in 1084, and it was sufficiently advanced in 1088 for the monks to enter into. In a document of Wolfstan's, dated May 20, 1089, he incidentally reveals some of the first principles of mediæval architects in stating that he added to the monastery by "the construction and ornamentation of a church (*ecclesie constructione et ornatu*)."

In simple constructive beauty apart from ornaments, which at that period were archaic and crude, the crypt, with its twelve vaulted aisles and apses, and the impressive circular vaulted chapter-house of his immediate successors, which remain to us, are unrivalled; the crypt being the most perfect of the four Norman ones—Winchester, Gloucester and Canterbury are the three others—both in proportion and completeness of design, and the chapter-house being the patriarch of the subsequent polygonal ones so characteristic of English mediæval design. The crypt occupies the space beneath the present choir, and with its apse defines the eastern limit of the Norman church. It is uncertain whether a Lady Chapel then existed farther eastwards or not. The width of the church was not varied later, and the nave extended to the full length of the present church, the southwest entrance to the cloisters marking the limit. The piers of the central tower, now cased with fourteenth-century work, the walls of the great transepts, the north and south aisle walls of the nave, the slype abutting on the south transept, and the basement of the refectory on the south side of the cloister, with the southeast entrance adjoining, all indicate that Wolfstan's cathedral, west of the choir, was co-extensive with the present church. Besides the crypt, slype and undercroft of the refectory, the Early Norman remains are fragmentary though unmistakable, two fine arches in the east walls of the transepts exist which opened into chapels now destroyed, that on the south replaced by an Early English building, into which the Norman arch now opens. An Early capital protrudes from the southeast pier of the tower in the choir aisle, and Norman masonry shows in the northeast pier in the triforium. Another capital is in the east bay of the north aisle of the nave, and in the same wall the Norman columns and caps of the north door remain. Upon the opposite side five large, simple and unmoulded semi-circular headed recesses exist for altar tombs, and two early Norman vaulting shafts mark the junction between the re-building of Wolfstan's nave in the Early English period and the transitional Norman work of the two westernmost bays. A characteristic of considerable beauty in the earliest Norman work, which is not to be found in that of the later period, is the use of two building-stones of varied colors in horizontal bands, as in early Italian marble masonry. One stone used was the creamy-colored oolite from Bath, and the other a gray-green stone from Higley, on the Severn. In the subsequent work a red sandstone was largely employed, and a fine general effect of warmth of tone and variety obtained. Two circular stair turrets of the early Norman masonry project into the western angles of the transepts in an unusual but picturesque manner, and afford a very favorable surface for the banded masonry.

Wolfstan held a synod in the crypt in 1092, and it is interesting to recall the fact of the original use of the apse in the early basilicas for this purpose, to which the plan was adapted, and not for the purpose of the sacrum or chancel, for which it offers no accommodation or convenience. The apse of the crypt and of the presbytery above had seven radiating bays, with concentrating vaults upon the inner arcade and central column of the crypt, the width of the presbytery being subdivided below by three ranges of columns and vaults into four aisles, the aisles above, with a central range, and also the north and south chapels opening from the transepts, making in all twelve vaulted aisles in the crypt. The northern chapel and the outer aisles of the apse have disappeared, but the construction of the early vaults, as also in the slype and chapter-house, is perfectly sound to-day. The chapter-house, which is slightly later than Wolfstan's work, has a lofty central column, with a simple splayed capital and circular abacus, from which the vault, divided by boldly-moulded ribs into ten bays, springs; two tiers of wall-arcading surround the walls, the lower recessed for seats, and the upper of a simple interlacing type. Perpendicular windows have replaced the Norman ones, and in the same period the exterior walls were squared from the Norman circular plan into a decagon with angle buttresses. The two western bays of the nave are of the latest type of Norman, in

which pointed and round arches are both used. The ground story is almost sufficiently advanced in type of moulding and carving to be called Early English, with fully pointed arches, but the triforium which is of two bays, within severe pointed enclosing arches, encloses small arcades of round Norman arches, ornamented with a simple zig-zag, and curious rosettes arranged upon the tympanums. The clerestory also divides the round and pointed styles without mingling them, it consisting of a central wide round-arched opening, with Norman ornaments flanked on each side by a narrow steeply-pointed opening. The shafts of the ground story and vaulting piers are delicate, and clustered, with square and splayed abacuses. The vaulting shafts of the easternmost of two bays rest upon the earlier Norman banded pier, before referred to at the level of the triforium. The nave vault over these Transitional bays is of later date, but the vault of the south aisle is of contemporary work, also that to the southwest entrance passage to the cloisters which adjoins. Three western doorways existed in the end wall; all were blocked up until recently, when the great west window was erected, and with it a modern Norman portal made for the nave, the arches for the doors to the aisles are traceable in the wall. Otherwise no Norman or Transitional features remain to be recognized in the west front, except the angle turret buttresses and the restored round-headed windows above the aisles in the triforium, with later tracery insertions. A beautifully elaborated pointed Norman doorway exists, unrestored, to the southeast entrance passage to the cloisters, of a different type to the other Norman work, and its isolated position at the end of the earlier passage suggests that it was the work of a different time. In the south wall of the great transept there are fine late Norman windows, with round arches with a bold zig-zag enrichment; these are now obscured by the great organ. The restoring purists removed a Perpendicular window from the upper story of this wall to place in the Norman wall an Early English triplet, while in the opposite north transept they replaced the eighteenth-century Perpendicular window with a Geometrical tracery one, a concession, doubtless, to the variety of dates in the removed windows.

The original Early English work of the choir and presbytery is exceedingly fine; it was begun in 1224, at about the most vigorous period of the style as a native growth, and the design of the Lady Chapel and choir can compare boldly with Lincoln or with Salisbury, which was erecting at the same date, and not to any disadvantage. The carving is rich and pure, and much fine figure-sculpture was used, some of which remains in the spandrels and tympanums of the triforiums and wall arcades. The proportion of the extended choir, eastern transepts and Lady Chapel externally produce the same happy effect as at Lincoln, the lantern tower standing nearly midway between east and west. The internal proportions, though, of course, on a much smaller scale, are not dissimilar; the height of the choir, raised as it is upon the Norman crypt, and continuing the ridge line of the nave, being reduced to the moderate height and full width of the Lincoln choir; but eastwards Worcester has the advantage, for as soon as the limit of Wolfstan's apsidal crypt is passed, the Lady Chapel resumes the lower level of the nave floor, and the additional height being thrown into the ground-story piers, an effect of loftiness is obtained which is very dignified. This increased effect of height was evidently sought for in the design, as the eastern transepts, though of the same approximate height as the great transepts, are considerably narrower. The width of the bays in the Lady Chapel eastern transepts and sacrum are also less than those of the choir, thus aiding in apparently increasing the height eastwards.

But before the beautiful and extensive work of the Early English epoch was undertaken, the usual fires, falls of towers, and wonders worked at tombs, had occurred. Eight years after Wolfstan's death Worcester was destroyed by fire, with the church and castle, and the preservation of the bishop's tomb from the falling embers and lead of the roofs, shows that his contemplated choir and apse had been erected and roofed-in over the crypt. The Transitional work towards the end of the twelfth century which replaced Wolfstan's was itself destroyed by fire in 1201, of this, however, the western bays of the nave remain, and the then new tower is recorded to have fallen previously, in 1175. We also read of the fall of two towers besides, in a storm, and, as there were no western towers, it is conjectured that smaller towers or turrets adjoining the transepts must be referred to. In the midst of these disasters wonders began to take place at the tomb of Wolfstan in 1201, upon St. Valentine's Day, and continued increasing to a considerable extent during the ensuing year, so that a commission appointed by the Pope visited Worcester on St. Giles's Day, and inquired into them and reported. The result was that St. Wolfstan was canonized in May, 1203, and the flow of offerings continued to an extent which justified the re-building of the eastern end of the cathedral in 1224 by Bishop William of Blois. The cathedral had meanwhile been repaired and re-dedicated after the fire, and the works had evidently extended over some years. King John, who had visited the tomb of St. Wolfstan in 1207 in state, contributed to the cost of the reinstatement of the cloister after the fire of five years previously, he had died in 1216, and his body was brought from Newark and interred in the choir between St. Oswald and St. Wolfstan. A fine sixteenth-century decorated effigy and tomb now mark his resting-place, and one fears that the favor he showed to Worcester and its Saint, rather than even blind respect for his office, have preserved in the very centre of the choir of a Christian church the effigy of the worst king politically and morally that England has had. It is indeed a wonder

that Cromwell's soldiers, who mutilated every saintly image in the building, spared his nose and face, perhaps he was left in cynical respect for the memory of the departed monarchy.

The repaired Cathedral was dedicated in 1218, in honor of St. Mary, St. Peter, St. Oswald, and St. Wolfstan, on June 7, in the presence of Henry III and many distinguished persons, when the remains of St. Wolfstan were placed in a magnificent shrine. The miracles continued after the interment of King John, and, with the undoubted sympathy of his son, the re-erection of the choir and the eastward extension was commenced. The best use was made by the monks and bishop of the tide of gifts and profits from the miracles while it lasted, as it soon after began to flow down the Severn to Gloucester, to the shrine of Edward II. It is recorded that Bishop William of Blois began the new work of "the front." Professor Willis remarks that in Mediaeval documents the front of the church is usually the east end. This would be, therefore, the wall of the Lady Chapel, and involved the demolition of the superstructure of the Norman crypt recently re-dedicated, and extending up to the tower. The new choir, with its vault, was loftier than its predecessor, and the bays were wider than those of the Normans, rising with their pointed arches higher still in proportion. The triforium was, however, lower than the corresponding Norman story, but the clerestory was similar in height. A secondary arcade at the back of the triforium, against the wall which encloses the space over the aisles, gives much the same effect of interlacing arches as in St. Hugh's much-discussed arcades at Lincoln. The shafts clustering around the piers are of Purbeck marble, now of that peculiar color produced by ill-directed attempts at polishing. They are jointed with metal bands, and as it is stated in Leland's *Itinerary* that Bishop Giffart decorated the columns of the east portion with small marble columns having joints of gilt brass, considerable discussion has arisen not only as to the chronology of the work—the bishop reigning from 1269 to 1302, the building being commenced in 1224—but as to the rings and their use. It does not seem to have occurred to Professor Willis even that the marble shafts are bedded with lead seatings, and that this narrow seam of lead was decorated by the rounded brass ring with which we are familiar at Westminster. The presence of an iron cramp connecting the shaft with the pier has been rightly understood as provided for the purpose of attaching the shaft after the settlement of the pier; but this has nothing to do with the brass ring and lead bedding, the existence of which can be tested by scratching the surfaces. Many instances will occur to the mind of these Purbeck grouped shafts which have been crushed, bent and split vertically owing to the settlement of the central pier, but the plan adopted at Worcester has avoided such results.

Bishop William, who initiated the works, and probably saw them partly vaulted, if not entirely, before his death in 1236, lies buried in the middle of his work, before the altar of the Lady Chapel. His effigy is a singularly complete and beautiful work of the thirteenth century, showing the full vestments, which were formerly ornamented with jewelled settings.

The rebuilding of the nave was not undertaken until the next century, it being commenced by Bishop Cobham, who occupied the See from 1316 to 1327. The condition of the Cathedral at this time appears to have been that the magnificent choir and Lady Chapel had been completed, by means of the pilgrims' offerings, much as we see them now, that the twelfth-century tower, however, which fell down in 1175, had not been rebuilt, the adjoining transepts had been damaged by it and now evidence Transitional and Norman work in their lower stories only, the upper portions being of Perpendicular date, without connecting links to the earlier period, and the nave of Norman and Transitional work. We find that so late in the thirteenth century as 1281, Bishop Nicholas of Ely, formerly of Worcester, bequeaths a legacy for the rebuilding of the tower, but as no work of that date remains, it is probable that the expenditure was deferred until Bishop Cobham undertook the reconstruction of the north side and aisle of the nave completely. He lived to complete the clerestory and to vault the side aisle throughout, the main wall, however, stopping at the two westernmost bays, which he left, of the Transitional nave. This early fourteenth-century work is a good example of the Decorated style. The shafts and mouldings, though not so bold as in the earlier work of the choir, are full and rich, not suffering from the over-refinement of the later work. The plan of the earlier nave was adopted, the heights of the ground and triforium stories being altered, but the total height to the springing of the vault remaining the same; springing-stones were built-in for the vault, which was not added for some considerable time; a rectangular chapel was built in the second bay of the aisle from the transept, and vaulted with the north aisle. Professor Willis gives a summary of the fourteenth-century works obtained from the notes of Dr. Hopkins, a prebendary of the Cathedral from 1675 to 1700, which he found in the Baker MSS. in the Harleian Collection, as follows:

1320.—Prior Braunston built the gestic hall. 1372.—Refectory and cloyster built. 1374.—Tower or belfry. 1376.—Stone vault over the quire under the belfry, and over St. Thomas' altar. This is explained by the fact that the quire at that time was placed under the belfry. 1377.—The vault over the nave of the church, the library, treasury and dormitory. 1378.—The water gate. 1379.—The infirmary and stalls in the quire. 1380.—The west window. 1380.—The north porch of the church.

The north wall of the nave being rebuilt in the early part of the fourteenth century, and the south wall and vault not being undertaken till fifty years after, the condition of the church with one side Norman, the end Transitional, and the other side of new Decorated construction, can be imagined with difficulty, as a temporary roof only could have been used. The slackening of the tide of pilgrims and their gifts probably hastened the completion of the nave, as the late fourteenth-century south wall and aisle, of Early Perpendicular detail, do not display the care and skill or beauty of the Northern wall, which it closely follows in general design. The mouldings are attenuated, and the shafts overthinned, and scrappy little carved capitals take the place of the rich bands of foliage which make the Decorated capitals. The vault, perhaps with the exception of the two western bays, which were the work of Bishop Wakefield 1375-94, was built by Abbot Horton, who died in 1377, and is ingenious and beautiful. The unity of design secured at Worcester is unusual in Mediaeval work, the Transitional, Decorated and Perpendicular portions all come together as harmonious parts, well connected into a whole by the vault; there is no definite breach of intention or contemptuous ignoring of earlier work so often seen elsewhere. As much of each period is retained as possible, probably not only out of respect for the work of the patron saint, but also, in the later portion, from motives of economy. It also appears that the works were never wholly given up to the unrestrained will of one individual; the existence of the large monastery acted as a balance to the power of the bishop, as we find agreements between bishop and convent respectively for the execution of fixed portions of the work in the cases of Bishops William of Blois and Cobham. Simultaneously with the work in the nave the reconstruction of the tower was undertaken; the Norman piers remained as a core, and were cased with the fourteenth-century shafts and mouldings; the springing of the arches was raised to the new level of the nave vault in 1374, the vaulting under the belfry completing the work in 1376. Bishop Wakefield's work remains in the north porch and the inner arch of the great west window, filled-in a few years ago with geometrical tracery inconsistent in style with everything in the Cathedral, and he was buried under the two bays of his vault at the west end.

Of later Perpendicular work there remains the very fine chantry of Prince Arthur, son of Henry VII, on the south side of the choir, an interesting example of the early development of the traceried vaulting that so rapidly attained the beauty exemplified in his father's later chapel at Westminster. Perpendicular tracery was freely inserted in the earlier windows. The principal internal work, however, was the vaulting and decoration of the great transepts. The walls above the ground stories, which are Norman, were panelled with an early cusped treatment, with mullions and transoms that form strings and vaulting ribs, and are an early attempt at a complete panelling of the wall-surface, which later became prevalent, as at Canterbury and Gloucester.

The cloisters, now completely restored, are of this period. The vaulting is boldly moulded with finely-carved bosses. It springs from the south wall of the nave, without any relation to the buttresses which mark the internal vaulting bays. The piers on the inner walls around three sides of the garth have square openings in them, somewhat of the character of a continuous hagioscope. The chapter-house had windows inserted and a new face given to it at this time. A most interesting series of apartments between the chapter-house and the south transept also belong to this period; they are the treasurer's chambers, and have a communicating passage to the southeast chapel of the choir. They are roofed with a flat four-centred vault, and have a vaulted gallery leading to other smaller chambers, perhaps used as dungeons. Upon the opposite side of the church, in the north choir aisle, is a picturesque oriel window of similar date, projecting from the outer wall as a watching-loft. This must have been reached from the chamber over the northeast chapel now destroyed, and was used by the sacrist or watching friars. There are also evidences that the large room over the north porch was used as a dwelling in connection with the Cathedral. The triforium gallery over the south aisle is now used as the Cathedral library, the books being recently removed there again from the chapter-house. It is lighted by Perpendicular windows above the south aisle.

A finely-moulded stone Perpendicular screen, a fragment of which has been preserved, is fixed in the arch opening to the choir from the south transept. The pulpit in the choir was erected there in 1748, but is of Perpendicular date, and was formerly in the nave.

Reformation times and Worcester will always be connected with the great Bishop Latimer, the most vigorous reformer and eloquent preacher of his time. In his day there was a "fair stone cross in the churchyard, which was the usual preaching place, as at St. Paul's, London. There were also seats for the chief of the city on the north side of the church, but south from the cross, much resembling those of St. Paul's." There is no memorial of Latimer in the Cathedral, or indeed anything but the name of the place and See to remind us of him; but his fame will not suffer by this neglect.

The choir seats and stalls of 1379 were removed from under the tower to the presbytery, their present position, about 1537, on the establishment of a Dean and Chapter, and Renaissance canopies placed over them at a later period. These remained when Professor Willis wrote in 1862 that they "are valuable specimens of wood-work," they were, however, removed at the "Restoration" of the choir, and nothing put in their place. The Cathedral suffered much

damage after the battle of Worcester at the hands of Cromwell's soldiers, and substantial repairs were made in 1712, partly at the cost of the Government, to replace the damage. At this time a buttressing wall was erected across the northeast transept to prevent the piers of the choir from falling, and the wall was pierced with four quatrefoils of bold design.

The great north transept wall was rebuilt in 1748, with a Perpendicular window of the period and turrets, by a local architect, Mr. Wilkinson, who erected St. Andrew's, Worcester, and displayed a tendency to the most attenuated form of spire and pinnacles. Successive alterations were made to the east and west windows. In 1812 a new altar-screen was erected, and finally, in 1857, extensive restorations were undertaken, under the late Mr. Perkins of Worcester, and Sir Gilbert Scott was called in to design the "Restoration" of the choir. Of all this work, and the elaborate reredos, it is exceedingly difficult to speak even descriptively. One has a lingering fear that the enthusiasm with which it was regarded twenty years ago has already changed to dislike, and fearing lest this feeling should also prove ephemeral, it may be better to leave the modern work at Worcester to the tender mercies of the next generation, who may safely regard it as the *ne plus ultra* of Liberal "Conservative Restoration."

MONUMENT TO JOAN OF ARC, ROUEN, FRANCE. M. LISCH, ARCHITECT.

THE monument which the people of Rouen have just erected to the memory of Joan of Arc is placed in the Plateau des Aigles, in front of the Church of Bon Secours. Every traveller who has visited the fair capital of Normandy is familiar with this beautiful hillside, from whence the whole panorama of the city and the valley of the Seine can be viewed. It would have been difficult to select a happier site than this plateau, surrounded by calm and peacefulness, and already consecrated to pious uses. The monument touches the crest of the hill, and then stretches boldly up into the void above, and overhangs the rapid slope which descends towards the road between Rouen and Paris. The white structure could not better detach itself than against the sombre green of the hillside. From the site can be perceived all the points of the wide-spreading horizon which surrounds the city, and even several of the hilltops which rise far beyond those which immediately encircle the city. From Rouen this dwelling of Joan of Arc is admirably harmonized with the temple of Mary, whose isolation, to be sure, it intrudes upon, without, however, injuring its aspect, and without masking it from any point of view. Especially after the sun has passed the meridian the grand lines of the two façades are lighted by its rays, and imperatively attract the gaze not only of the travellers who frequent the quais or traverse the bridges from one bank to the other, but even of those who circulate through a certain number of the streets of Saint-Sever and its suburbs, and also of the numerous arrivals who enter the city by the Avenue Riboudet. So from the foot of the statue of Joan one enjoys one of the most splendid and surprising panoramas that can be met with in all France. We will not attempt to describe it, referring the reader for that to the excellent little book of the Abbé Sauvage from which *La Construction Moderne* has derived the facts used in this article.

The original scheme for the monuments dates from the year of 1866, at the time at which Monseigneur de Bonnechose, archbishop of Rouen, began to take the necessary steps; but it is to his successor, Monseigneur Thomas, that must be credited the merit of finishing this difficult undertaking. It was to M. Lisch, an able architect, with whose works some of our readers are already acquainted, that the authorities of the diocese entrusted the realization of their project. In consequence of unforeseen difficulties, the first idea had to be changed several times, yet although M. Lisch's first conception had to undergo various changes, it rather benefited by them than lost. It is a fact that the monument of Joan of Arc, in spite of its perfect unity is the result of two conceptions—first, the primitive conception of a monument rather limited in its intention, and intended to be seen from near at hand, as a consequence of which its gracefulness was to be the dominating characteristic; and second, a complementary scheme for a monument destined to be seen from a great distance, and therefore demanding, in the first place, great grandeur and majesty of line. Consequently, the architect found himself in the presence of a difficult problem, one might almost say one that was paradoxical; namely, to find a gracious monument of small dimensions, so as not to overshadow the Church of Notre Dame de Secours, yet at the same time vast enough not to have a finicky air; graceful enough to give pleasure from a near point of view, and yet gaining in importance as one recedes from it. This problem (whose treatment certainly seems at first sight contradictory) M. Lisch has solved by taking advantage of the very defects of the site which was selected for it.

The Plateau des Aigles, which was selected as the best site of all those which Rouen offered—a selection which those who are familiar with the contemporary history of the city can easily guess—offers doubtless a magnificent position; but it was necessary to choose a place which should not be too isolated yet one which must be as near as possible to the Church of Bon Secours. Its dimensions must be unimportant enough not to do wrong to the graceful chapel of Notre Dame; but on the other hand it was to be feared that a monument at such small scale would be wholly lost on the vast

plateau. In order to give his monument all the amplitude that it deserved, the architect resolved in the first place to bring it as near as possible to the end of the hill's crest. He did more than this. He resolutely hung it out into the void by profiting by the incline of one of the undulating sinuosities which there descends to the very base of the hill. In this way, he found a means of giving to his base on the side of the city itself all the width and height that he desired, without augmenting the mass or making it heavy on the side of the plateau, from which is the natural approach to the monument. And finally the upper part of the monument gained in lightness by being profiled against the sky, or against a far distant horizon of an extremely soft tone; while the portion not in sight to one approaching from Bon Secours gained in importance through cutting with its whiteness the sombre background of the grass-clad hillside. Nevertheless, there was one difficulty. In place of sloping towards Rouen, the slope of the site selected ran in the other direction toward the Cemetery of Bon Secours. M. Lisch did not hesitate to undertake a piece of levelling, so happily planned that in spite of a difference of ten metres in height, which he had to correct, no one would today doubt that in this respect any force had been applied to nature.

As we have said the monument is composed of two entirely distinct and independent parts, although they are intimately connected into a single whole. The first portion, the most considerable, so far as mass is concerned, is nothing more nor less than a pedestal destined to receive the principal structure, and giving it more importance from the city side, and this side is the side invisible from Bon Secours. To give an idea of it, imagine a cube or rather a gigantic die, half-buried in a hollow, the upper line of which touching its upper side sweeps down to the lower angle almost following a diagonal drawn from the summit to the base. This arrangement leaves entirely free the upper surface and the whole of one side of the cube. It makes two other sides invisible and reduces the third pair almost to the figure of a rectangular triangle. This arrangement, which affords a rather ungraceful profile, will be eventually somewhat hidden by the growth of evergreen shrubs. In order to arrange the structure in this way, it was necessary to build out the upper platform into the void, and place the façade, upon which it is supported, upon an inclined plane formed in large part by made ground, which is often channelled by rain. Thus the foundations themselves had to be deep, in order to reach the clay, which, after all, was not very far distant. This clayey subsoil, which rapidly decomposes in the air, is fairly unalterable when it is itself, as here, covered with a layer of loam and sod. Moreover, in front of the construction they built a terrace twenty-eight metres long, also itself founded on the hard-pan and solidly built of brickwork and surmounted with a stone parapet. The floor of this terrace is paved with sandstone and decorated with pebbles. The terrace façade, which is seated upon this first terrace, is built of grit-stone, from the quarries of the Oise. The interior is all of silicious brick with the exception of the chapel. It is bonded with chains of cut stone of the same general character as the grit-stone. Its width at the base is 17.20 metres. At the summit it measures only 16 metres with a height of 11 metres. In these figures are not included either the cornice or the balustrade which crowns the platform. This fair piece of walling, which is perpendicular at its two angles, is bowed out at its middle, where it describes a curve having a radius of about 1.60 metres. It gives it an air of movement at the same time that it adds to its power of resisting the pressure of the hillside behind. It is, moreover, fortified by four powerful counterforts, whose heads serve as seats for the pedestals of the balustrade above. These buttresses cut into three panels the exterior of the curved portion of the base. In the middle panel is a full-centred doorway, which gives access to the chapel, and three superposed little windows which admit light to it. In the two remaining panels, gigantic yet elegant palm branches happily interrupt the monotony of the lines of bonding stones. These palms have been gilded, so that they may be seen from a distance. On the flanks project two wings with the intention of giving to the whole an effect of greater width without increasing the breadth of the main front. These wings carry light pavilions crowned with domes and finials. The upper platform, neglecting these wings, measures 16 metres square, that is, about 260 metres. Approach is had to this by a flight of steps 11 metres wide, the steps being nine in number. These steps face the church. Upon each flank is a flight having thirteen steps, but only 2.60 metres wide. The whole platform is surrounded by a stone parapet about a metre high. For the curved portion this parapet is replaced by an open-work balustrade, which supports machicolations themselves serving to connect the heads of the four buttresses. This forms a balcony from which one can enjoy the panorama which we have already described.

The terraces, as well as the front and side platforms are paved with granite, and pains have been taken to give them a very slight slope sufficient to carry off the rain-water through four gargoyles, which vomit out onto the lower terraces. In the centre of the platform rises the principal portion of the structure, in which rests the statue of Joan of Arc. It is a charming piece of Renaissance design which recalls the elegant art introduced amongst us by the Cardinal D'Amboise. It has quite a family air with the fountain of St. Sauveur, which, during two centuries and a half, was the guardian of Joan's memory at Rouen. It consists of a six-sided pavilion, which is composed in the first place of a sub-basement, then an arcaded story, with cornice and pediments, and finally of a dome with its lantern. The sub-basement seems at first sight to rise directly from the

granite platform, but as a fact its hard foundations are bedded in mortar upon the rock of the hill itself. Each of the faces of this sub-basement measures 2.4 metres in breadth from pilaster to pilaster, for each angle is concealed in a square pilaster about 0.60 metres wide, decorated with carved cartouches. The front which overlooks Rouen in front of the statue is ornamented with a great frame destined to receive an inscription. Scroll-work and a charming piece of sculptured flower-work give the *motif* an air of elegance. In the place of honor is an escutcheon bearing the pontifical tiara; above, horns of plenty pour out fruits and flowers, and in the midst a cup serves as a point of support for a kind of basin formed of denticulated foliage which flares out about 80 centimetres in front of the façade and supports an open-work balustrade, which forms a balcony. Of the two façades of the sub-basement those nearest the inscription correspond with two staircases arranged on the quadrant of a circle, each composed of twenty steps and 1.70 metres in width. These give access to the platforms and the pedestal of the statue. The three other faces are closed by simple balustrades, each decorated with a cartouche and a rose at the middle. The arches are full centred, as demanded by the French Renaissance. They are borne by piers square in plan on the outside, but within of pentagonal form. One of the angles of the pentagon is engaged in one of the sides of the exterior piers. The three others are decorated with arabesques for the full height of their lateral faces but for only half of the middle face, the lower part of which is occupied by consoles bearing genii. The faces of all the piers are ornamented with lozenge-work, each portion of which encases a piece of decoration. Medallions ornament the centre and half medallions the extremities of the columns, which are crowned by capitals identical in form but varying in treatment.

It is to be remarked, moreover, that no *motif* is repeated in this rich ornamentation, which adds so much honor to the artists directed and chosen by M. Felix Bonnet, whose reputation has long passed beyond the confines of Rouen. Above the entablature runs a series of decorated pediments crowned with censors. At the angles rise pinnacles, whose domes are sown with heraldic scallop-shells (otherwise called St. James's shells), while niches are formed in their sides which receive light garlands. These pinnacles crown the piers, and serve as finials. At each angle a gargoyle discharges the water from the gutter.

If the exterior of the edifice is rich, the interior charms through its simplicity. Some mouldings at the springing of the arches, some eggs and darts among them, some frames wrought together in the flat frieze of the dome; in the drum of the dome a lining of polychromatic faience, which is later to be replaced with mosaic, and this is all there is in the interior, where it was important that observation should be wholly concentrated on the statue of Joan of Arc. The total height from the floor to the spring of the dome is seven metres, not including the pediments which surmount the entablature. The arcades are 5.6 metres from the keystone to the ground, and the span is 1.66 metres. The internal diameter of the dome is 3.5 metres, with a rise of 2.5 metres at the key. The centre is open, to allow the entrance of light through a glass sash fixed at 1.15 metres above the key. Although the interior dome is circular, the exterior dome is polygonal in form: it is of lead, covered with imbrications, and decorated at its angles with gilded ribs enriched with crochets of graceful form, with horizontal rings and other ornaments, likewise gilded. It rises 4.4 metres above the entablature. Its upper part is imbedded in the base of the lantern. This, together with its base, has a height of 3.4 metres, including the crowning feature, which bears the statue of the Archangel St. Michael and the dragon, which he tramples beneath his feet. The statue, three metres in height, is entirely gilded, like the ribs, rays, volutes and other ornaments that decorate the lantern. The lance of St. Michael finishes with a cross, and serves as a lightning-rod. All electric fluid which may discharge through it passes through the body of the dragon, and by a chain terminating in a proper ground. In fine, the central edifice, which shelters the statue of the heroine, has a mean breadth of 4.4 metres; that is, without counting its capitals, cornices and gargoyles and other projecting portions, and a total elevation of twenty metres above the upper granite platform, which platform itself is eleven metres above the floor of the subterranean chapel and the lower terrace, which is considered simply as a subordinate feature. The monument has, therefore, a total height of thirty-one metres.

ENGLISH AND AMERICAN EVANGELICAL CHURCHES.

This plate is copied from the *Deutsche Bauzeitung*.

HOTEL DE VILLE, BRUSSELS, BELGIUM.

AMONG all the public buildings of Belgium the Town-hall in the capital is the best known to strangers. This is owing, no doubt, to its picturesqueness. Like other buildings of its class throughout the country, it does not stand back from the adjoining houses for the sake of effect, yet from all points of the square it appears impressive. Since the electric light was introduced in Brussels it appears every night under conditions which the builders could not have foreseen, but somehow it gains rather than loses, and offers unexpected contrasts of light and shade.

The front extends for about 250 feet, but the depth of the older

part is not more than 50 feet. The tower rises to a height of 370 feet, and the inhabitants believe it to be the finest in all Belgium, not excepting the tower of Antwerp Cathedral.

At the first glance the Town-hall appears to be constructed on a uniform plan, but the difference between the windows in the right and left parts makes it plain that the building was not all erected in one period. At one time there was more variety in the parts than is seen at present, but from time to time ornamentation was removed in order to bring the façade nearer to uniformity of style. The sides are not as well known as the front, although they are capitally designed.

There is no certainty about the designer of the Brussels Hôtel de Ville. The evidence appears to be in favor of Jacques van Thienen, who was employed in 1405. The completion of the tower was entrusted to Jean de Ruysbroek in 1418.

WELL COURT (WORKMEN'S HOUSES AND CLUB-ROOM), EDINBURGH, SCOTLAND: THREE VIEWS AND PLAN. MR. SYDNEY MITCHELL, ARCHITECT.



AN OLD ANECDOTE OF VIOLET-LE-DUC. — A book by M. Rouvet has just appeared in Paris which contains an anecdote of Viollet-le-Duc which is worth repeating. In July 1870 he was in Switzerland, and one day he was on the Schwarzenberg Glacier at a height of about 9,000 feet. With him was Baptiste, the guide, who marched in front, and the two were attached by a rope. The guide had passed over a crevasse, but when Viollet-le-Duc attempted to cross it he failed and fell into the abyss. The guide tried to pull him out, but instead he found himself gradually descending. The architect perceived that his companion was about to share his fate in trying to save him, and he asked if Baptiste had a family. The response was "A wife and children." "Then," said Viollet-le-Duc, "I shall cut the rope," and he kept his word. He then fell, but a block of ice which was about 30 feet lower stopped his descent. When Baptiste saw that for a short time there was less danger he went in search of four stout peasants, and three hours afterwards Viollet-le-Duc was extricated. In spite of his perilous position the ruling passion was strong with the artist, for, although he was almost covered with stalactites, he contrived to make drawings of the novel effects which he was able to perceive. In his book on the Alps he mentions his fall as if it were a fortunate accident. It is well to have evidence that Viollet-le-Duc could think of others, for too many people believe that he was selfish and insincere. — *The Architect*.

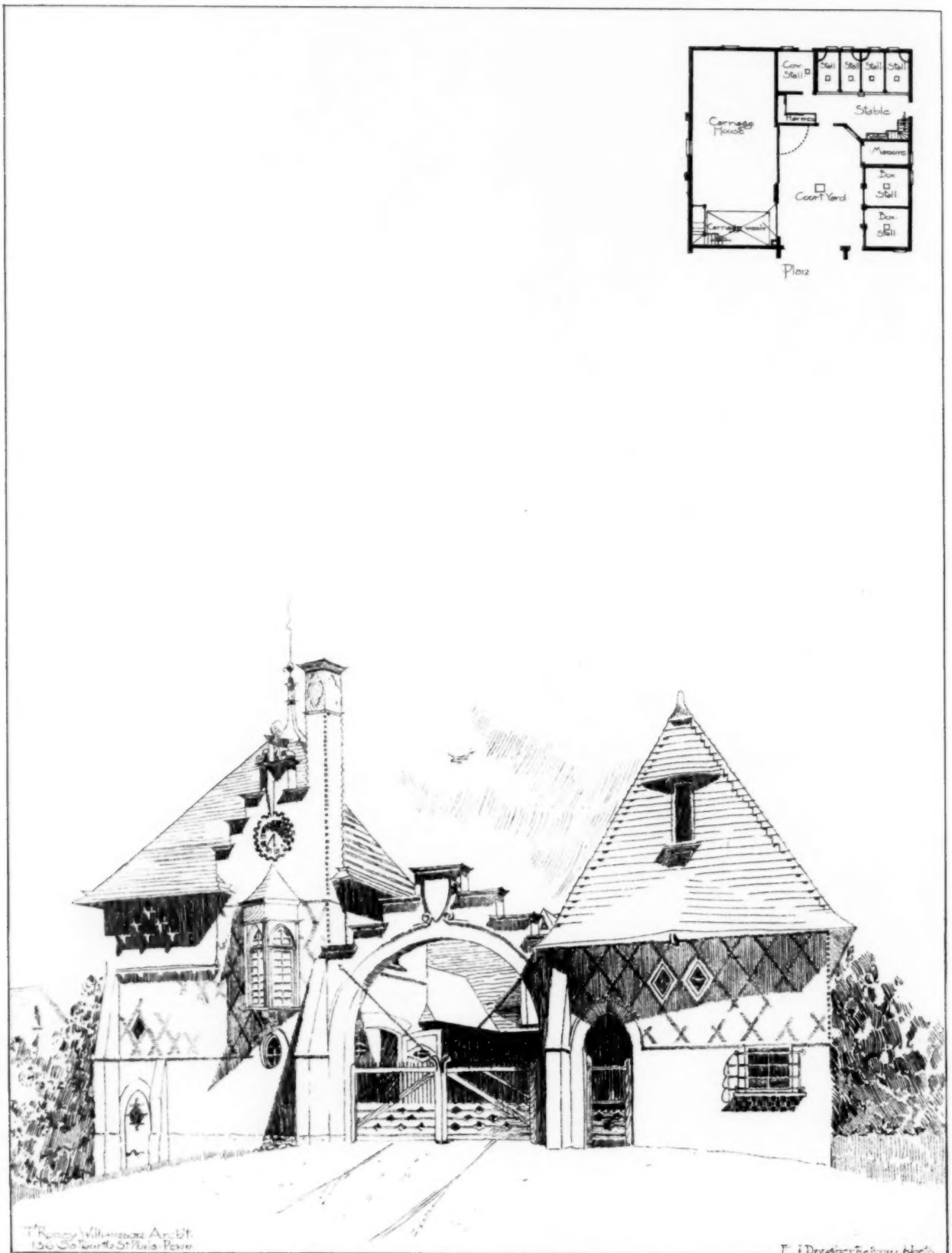
THE COLUMBIAN EXHIBITION AT GENOA. — Genoa having cut the question short by raising a monument to Columbus with the inscription "*A Colombo la patria*," has determined to insist upon the fact by instituting the Columbian or Italo-Americana Exhibition. This exhibition, although it is called Italo-Americana, refers almost exclusively to South America. The great feature of the exhibition is the "Egg of Columbus." It is an extremely bizarre monument which cannot be said to form an epoch in the history of architecture, nor is it likely to initiate a new school. Every egg calls to mind either a breakfast or a lunch, and this association of ideas has inspired the architects of Genoa with the plan of building a large restaurant in the shape of an egg. The egg of Columbus is of brickwork and measures 36,000 cubic feet, within which are various rooms, which serve as a restaurant. The egg is a little flattened at the base to insure its remaining upright. The door is round and so are the other openings, which serve as windows to give light to the three floors of the edifice. The partition walls are painted in frescos relating the history of Columbus and the discovery of America. A lover of statistics has made a calculation of the number of omelettes which could be prepared with that egg were it a real one, and of the number of persons whose appetites could be assuaged by that omelette, and of the dimensions of the hen that could lay it. — *N. Y. Mail and Express*.

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

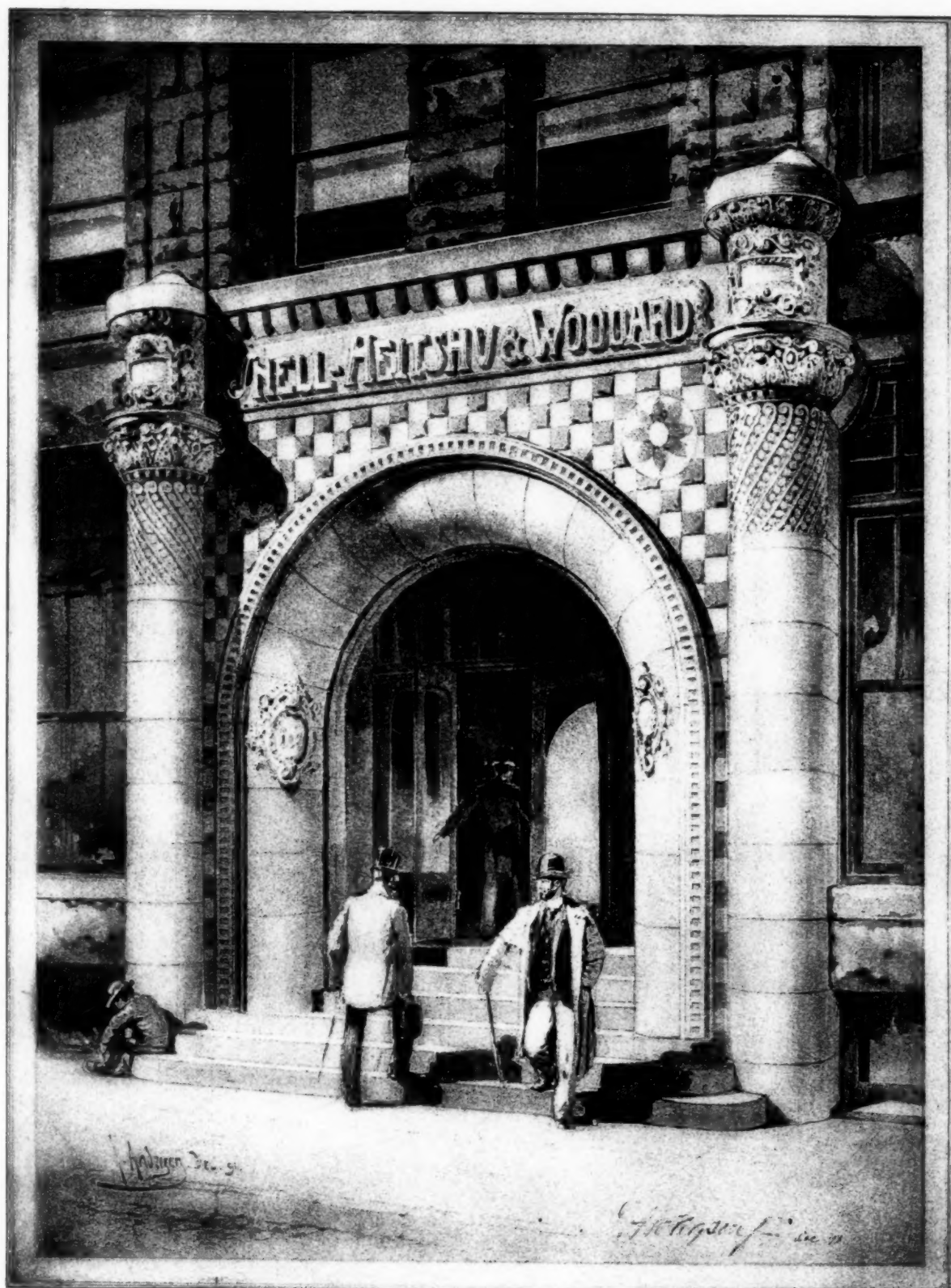
A BAROMETRICAL STONE. — One of the most curious stones in the world is found in Finland, where it occurs in many places. It is a natural barometer, and actually foretells probable changes in the weather. It is called "*semakuir*," and turns black shortly before an approaching rain, while in fine weather it is mottled with spots of white. For a long time this curious phenomenon was a mystery, but an analysis of the stone shows it to be a fossil mixed with clay and containing a portion of rock-salt and nitre. This fact being known, the explanation was easy. The salt, absorbing the moisture, turned black when the conditions were favorable for rain, while the dryness of the atmosphere brought out the salt from the interior of the stone in white spots on the surface. — *St. Louis Globe Democrat*.

the
e
t
r
y
l
e
s
n

e
t
r
g
a
of
r
is
i
re
ie

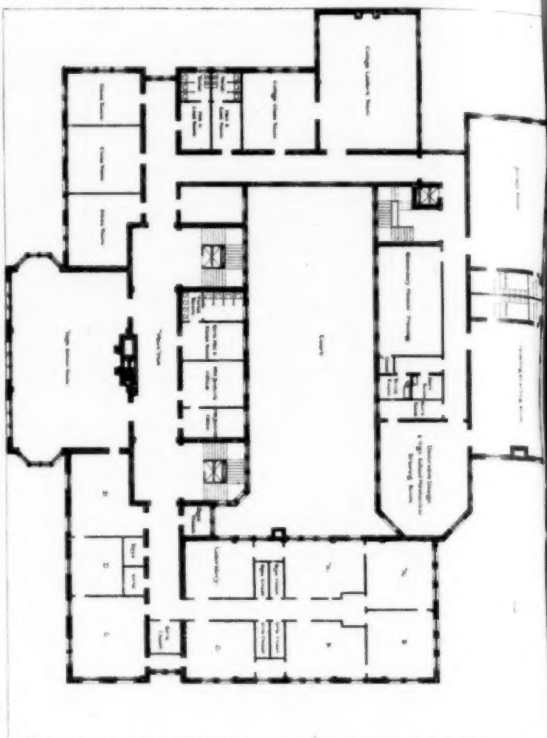


STABLE FOR MR. SWEET AT
Grand Rapids Mich

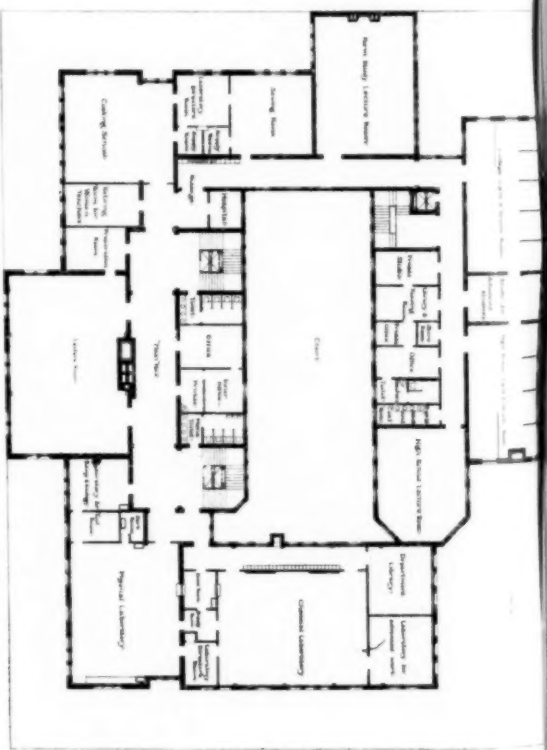


ENTRANCE TO BUILDING OF SNELL, HEITSHU & WOODARD, PORTLAND, ORE.
J. HODGSON JR. ARCHT

HELIOTYPE PRINTING CO. BOSTON



Second Story Plan



Fourth Story Plan

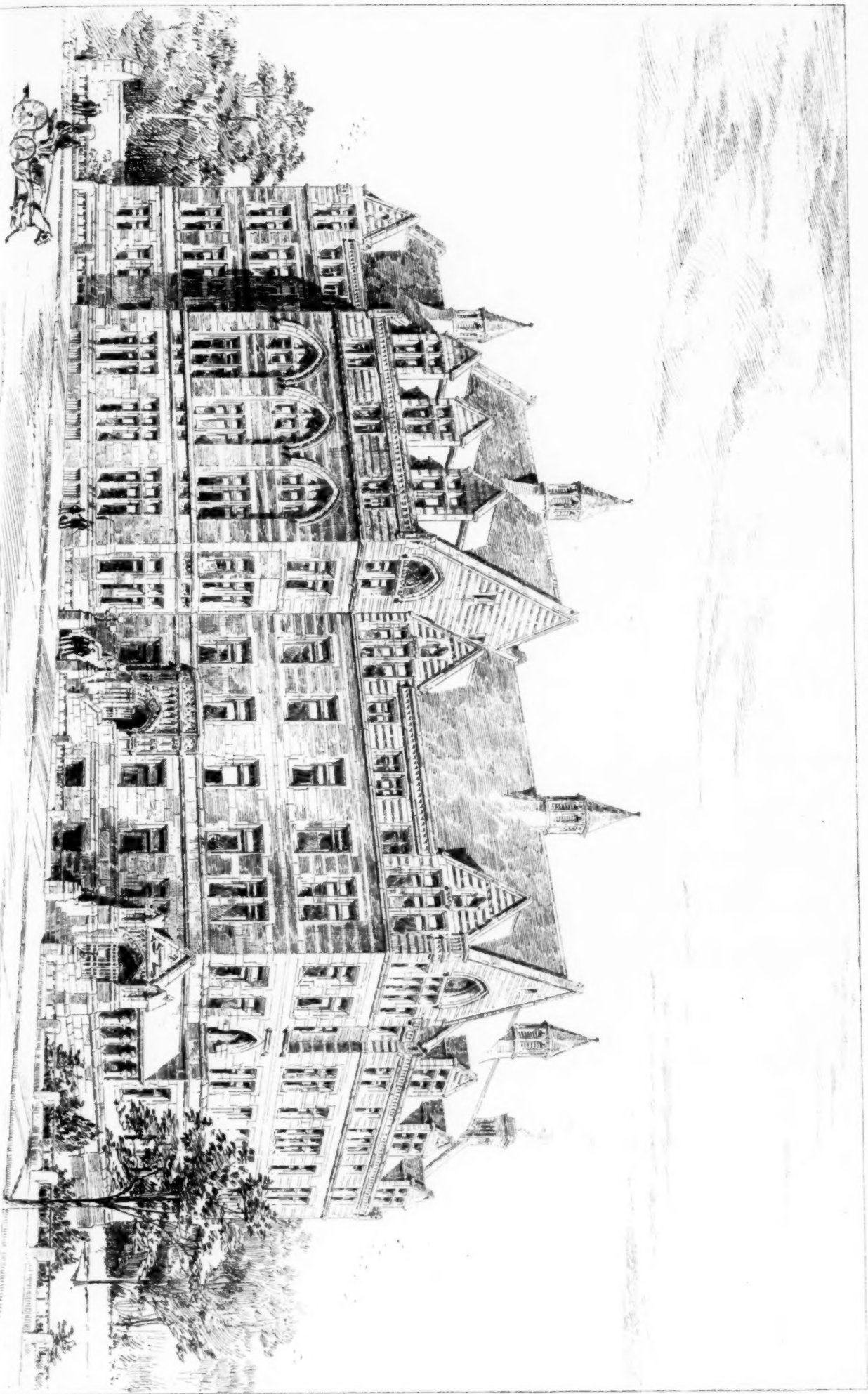


THE NEW YORK COLLEGE FOR THE TRAINING OF TEACHERS
WEST 120TH ST., NEW YORK CITY

No. 870

AMERICAN ARCHITECT AND BUILDING NEWS, Aug. 27. 1892.

COPYRIGHT 1892 BY TUCKER & CO

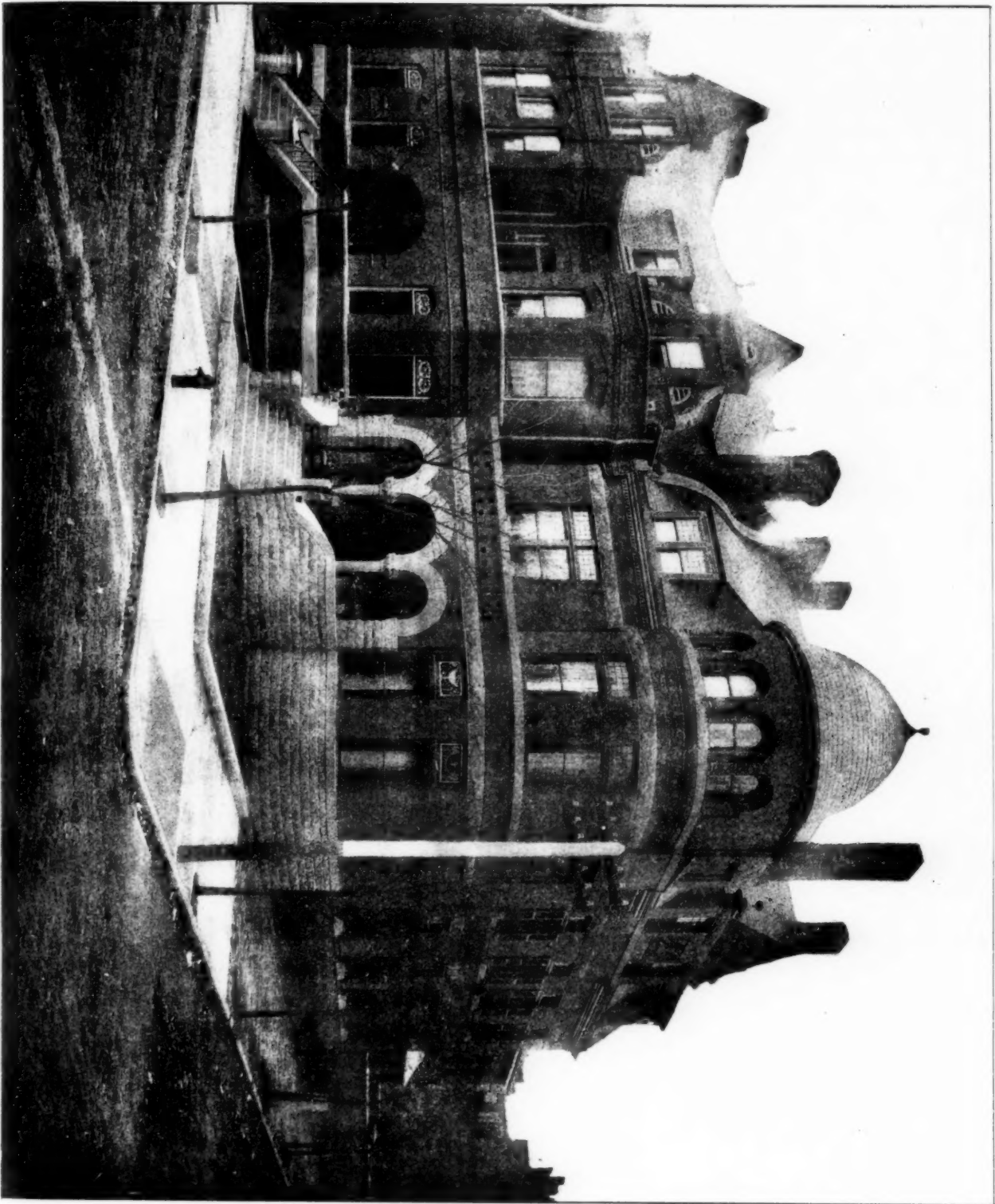


View of the

CHAS. H. REED JR. ARCHITECT.

COR. GRACE & 2ND STREET.

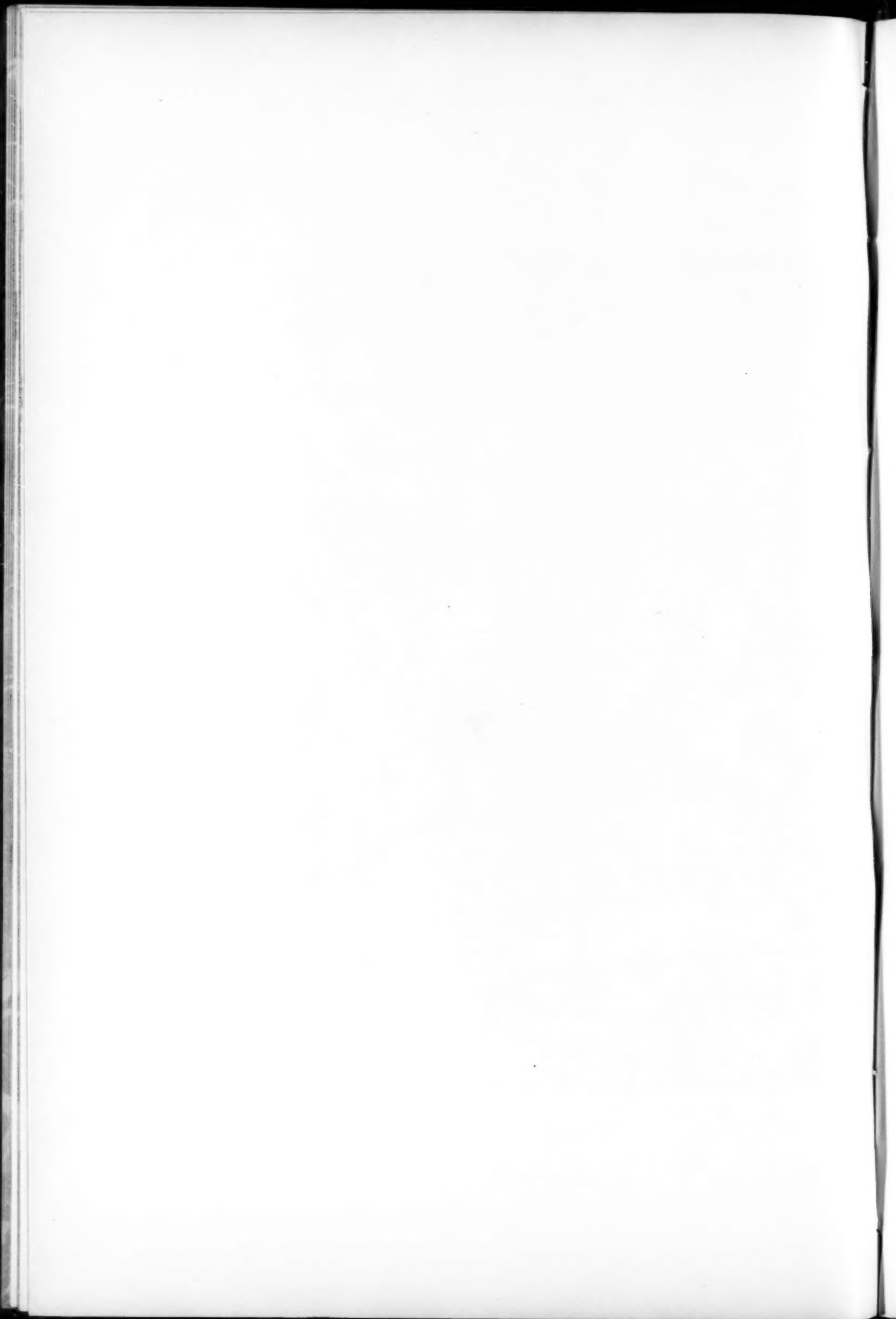
M. J. DIMMOCK ARCHITECT.



RESIDENCE OF MR. PHILIP WHITLOCK.
CHAS. H. REED JR. ARCHITECT.

COR. GRACE & 2ND STREET.

RESIDENCE OF MR. OSCAR CRANZ.
M. J. DIMMOCK ARCHITECT.



THE UNITED BANK BLDG ENTRANCE.
J. HODGSON JR. ARCHT. PORTLAND OR.

