

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. LVII.

Copyright, 1897, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.

No. 1134.

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

SEPTEMBER 18, 1897.



SUMMARY:—

The Permitted Withdrawal of a "Lowest Bidder's" Proposal. — The Harrisburg Capitol Competition. — The Tariff and American Artists "residing temporarily abroad." — The Improvement of Copley Square, Boston. — The Illinois Examining Board for Licensing Architects. — Another personally conducted Tour with a Purpose. — The relative Expensiveness of Electric Elevators. — Artificial Silks. 93

LICENSING ARCHITECTS. 95

LETTER FROM CANADA. 97

NATIONAL ELECTRICAL CODE.—IV. 98

ILLUSTRATIONS:—

House of A. C. McClurg, Esq., Lake Shore Drive, Chicago, Ill. — Barnard College, New York, N. Y. — Rose-windows: Plates III and IV.

The Casino of Pius IV in the Vatican Gardens, Rome, Italy.— A Group of Churches. — A Group of Hotels.

Additional: Floor of the Rotunda: Library of Congress, Washington, D. C. — The Cathedral, Bamberg, Bavaria. — A Bay of the Sculpture Gallery: National Gallery of British Art, Millbank, S. W., London, Eng. — Interior of the Gallery: National Gallery of British Art.—Part of Upper Gallery: National Gallery of British Art. 100

NOTES AND CLIPPINGS. 100

A CERTAIN amount of discontent has been expressed at a decision of the Supervising Architect of the Treasury Department in regard to the award of the contract for the new public building at Paterson, N. J. The bids for the building were publicly opened August 10, and that of C. A. Moses, of Chicago, was found to be more than thirty thousand dollars less than any other. Mr. Moses was, apparently, led by this discovery to revise his figures, and ascertained, to his own satisfaction and that of the Supervising Architect, that he had made mistakes in his calculations. He was, in consideration of this, allowed to withdraw his bid and the certified check which he had deposited as security for entering into a proper contract in accordance with his bid; and all the bids were rejected, and a call for new bids issued. The consequence of all this is, as the other bidders contend, that, while Mr. Moses has reason to congratulate himself on the ruling of the Supervising Architect, by which he was saved from losing a large sum of money through a clerical error, the others, who were careful enough not to make mistakes, find that they have gone to the trouble and expense of making their estimates for nothing, and that, in addition to this, all their tenders have been made public, so that they are at a disadvantage in estimating a second time. They think, naturally enough, that, if Mr. Moses were allowed to withdraw his tender, that of the next lowest bidder should have been accepted. It is probable that the law, which regulates very strictly every detail of the award of contracts for public buildings, would not permit this to be done, so that the rejection of all the bids was the only way in which the Supervising Architect could relieve the Government from the odium of taking advantage of a mistake, to the injury of a citizen; but the other bidders are certainly right in feeling that they have something to complain of. It is said that the Supervising Architect has given notice that, hereafter, bidders who withdraw their tenders in this way will forfeit their certified checks; and this is certainly no more than justice. Years ago, before judges took it into their heads that they sat upon the bench to ameliorate the lot of mankind according to their own private views, it was an axiom in courts that the strict enforcement of contracts, while it sometimes resulted in disappointment and loss to individuals, was, in the end, the most efficient means for promoting honesty and prudence in the community; and, while a private individual may, and should, as a personal matter, consider cases of undeserved hardship, a public official cannot, in general, do so without injury to people who have been more prudent, and, in consequence, more mindful of their duty to the community. It is true that official practice everywhere generally errs on the good-natured side, by allowing contractors to make up losses, or correct estimates, or do other things which are not contemplated in the agreement; but it is equally true that the result of this disposition of public officers to make things pleasant to contractors has resulted in throwing a very large proportion of public work into the hands of reckless and

irresponsible mechanics, who offer to do work for less than it is worth, relying on the friendship or amiability of officials to get them out of their agreements with a profit; and in repelling those contractors who carry out their agreements to the letter, without depending on begging or whining or dishonesty to escape the consequences of their own acts.

THE Harrisburg Capitol matter still continues to agitate the minds of the citizens of Pennsylvania. The majority of the Capital Commission has voted to reject the report of the expert advisers and all the plans submitted; but it is reported that the Attorney-General of the State has given an opinion, to the effect that this cannot legally be done, inasmuch as the programme promises that the Commission shall be bound by the award of the experts. What the end of the matter will be, no one seems to be able to tell; but the cause of honorable dealing with the architects appears to have found a courageous defender in Governor Hastings, who told his fellow Commissioners that they were trifling with the honor of the Commonwealth in a way that would cause them regret later.

THE provisions of the Dingley tariff bill in regard to works of art have been examined by the authorities of the Treasury Department, and a ruling adopted by which such works, "the production of American artists residing temporarily abroad," are admitted into the United States free of duty. This interpretation of the law will make it possible for American students to send home and sell their sketches, but, in order to take advantage of the provision for free importation, works entitled to it must be accompanied by a certificate, made and authenticated in conformity with regulations prescribed by the Secretary of the Treasury. Paintings and statuary by other than American artists also receive attention in a curious way in the Reciprocity Provisions of the Tariff Act, which stipulate that whenever "reciprocal and equivalent concessions may be secured in favor of the products and manufactures of the United States" from any country which produces and exports "argols, brandies, sparkling wines, still wines and vermouth, paintings and statuary, or any of them," the duty upon these articles may be reduced, in the case of paintings and statuary to fifteen per cent *ad valorem*, in place of twenty-five per cent.

COPLEY SQUARE, in Boston, is just now greatly attracting the attention of those interested in municipal improvement. Although, like nearly all the Boston "squares," it is at present really a compound polygon, it is distinguished by being traversed by three important streets, through each of which many thousands of people are transported every day by several lines of electric-cars; and it is impossible to doubt that, before many years, it will become a very important business centre,—probably the most important in the city, next to the area about the intersection of State and Congress Streets. The present condition of the square, as an object of artistic interest, is simply lamentable. Two bare grass-plots, left, as it were, by an oversight, between the intersecting streets, constitute the ornamental portion of the area, and the appearance of the fine buildings which surround it, including the Museum of Fine-Arts, the Public Library, Trinity Church, and the New Old South Church, is sadly marred by the lines of Huntington Avenue, which cuts diagonally across the foreground to all of them.

THIS defect in the present arrangement being generally acknowledged, two plans have been suggested for remedying it, either of which could be carried out independently of the other, since they are in no sense antagonistic of one another, the later scheme merely supplementing and adding new force to the elements of the original scheme. The earlier of these schemes proposes the restoration of the "square" to a rectangular form by suppressing that part of Huntington Avenue which crosses the square diagonally, and diverting the Huntington Avenue traffic into the streets—widened for the purpose—on which the important buildings in the square now front. This plan would give a symmetrical space between the Public Library and Trinity Church, which might be treated in various ways, but which the Boston Society of Architects hopes may in the future be laid out as a sunken garden, after the Italian style. The later plan proposes to add value to Copley Square by introducing another broad avenue having its

entrance into Copley Square at the southeast corner in such a way as to balance precisely Huntington Avenue on the other side, thus restoring symmetry to the square by doubling the feature which now renders it unsymmetrical. A street in this direction would furnish a short and very desirable connection between the upper part of Washington Street and the street-railway systems diverging from Copley Square, and would make it possible to connect the latter, through Pleasant Street and Broadway, directly with the South Boston systems.

AS our readers know, the Legislature of Illinois has passed a law providing for the licensing of architects and the regulation of the practice of architecture. The Board of Examiners of Architects consists of Mr. Dankmar Adler, of Chicago, the President of the Board; Mr. Peter B. Wight, of Chicago, the Secretary; Mr. William Reeves, of Peoria, Professor N. Clifford Ricker, of the University of Illinois, and Mr. William Zimmerman, of Chicago. The Board has chosen a committee on examinations, consisting of the President and Secretary, and Mr. Reeves, and will soon be ready to enter upon the performance of its duties.

WE mentioned, some time ago, the excursion of the *Revue Générale des Sciences* from France to Russia and the Baltic countries, under the direction of two expert historians and ethnologists. This expedition seems to have been successful, for a second one is now announced, to start from Marseilles, September 13th, passing between Corsica and Sardinia, and through the Straits of Messina to Canea, in the Island of Crete; thence to Rhodes, and to Adalia, in Asia Minor, to Famagosta, in the Island of Cyprus; to Beyrout and Jaffa, and thence directly back to Marseilles. Two supplementary excursions are arranged, one from Beyrout to Damascus, and the other from Jaffa to Jerusalem. The intention is to follow the route of the Crusaders, studying the monuments left by them in Asia Minor and the islands of the Mediterranean; and Professor Diehl, of the University of Nancy, formerly a member of the French School at Athens, is the director of the expedition. As in the case of the previous excursion, the expense seems, to our ideas, very small, the charge for the round trip, from Marseilles back to Marseilles, ranging from ninety to one hundred and thirty dollars, according to state-room accommodation; while the trips by land, from Beyrout to Damascus, occupying four days, and from Jaffa to Jerusalem, occupying three days, add forty dollars to the total. Besides this, a reduction of fifty per cent is made by the railways for tourists from any station in France to Marseilles and return, the only condition being that they shall travel, so far as possible, in parties of five. As the excursion will have started on its way before this notice is printed, we cannot be accused of advertising the enterprise if we say that it seems to us that such excursions would be extremely pleasant and profitable to those participating in them. We cannot say that the average "personally conducted" tour in Europe, in which a number of people, with nothing in common except their dense ignorance of the language, history and customs of the countries through which they travel, are propelled around, like a flock of sheep, by a guide in many respects more ignorant, and a good deal worse-mannered, than themselves, has much charm for us; but this is a totally different affair from the private excursions for historical or scientific study which are often made in Europe by parties of friends; and the idea of the *Revue Générale des Sciences* seems to be to unite such lovers of knowledge for more important undertakings. It would be hard to find anywhere companions more refined and intelligent than people of this class in France and Germany, and we hope that these, or similar excursions, may be found of value to Americans.

THE *Builder*, which is generally good authority on electrical matters, publishes a note about electric elevators which is likely to mislead readers. It quotes a statement made in this country some time ago, by Mr. Egn, to the effect that the cost, in the United States, of lifting a "useful load" of fifteen hundred pounds, by means of electric elevators, to a height of one hundred feet, was, including the return journey, about one cent, and that, at this rate, it was no cheaper to operate elevators by electricity than by hydraulic or steam power; and says that experience in other countries shows the contrary, in Berlin, for instance, the cost of lifting a useful

load of eight hundred and fifty pounds to a height of eighty feet by means of electricity being one one-fifth of a cent, while the same work, done by hydraulic power, costs twice as much. It is hardly necessary to point out that this comparison leaves out of account one of the most important factors; that is, the speed with which the load is moved. Supposing the American elevator to lift its burden at the rate of five hundred feet per minute, which is the ordinary rate for passenger elevators in this country, and assuming, also, that one-half the power is consumed in overcoming friction, which is also about the average with the best American elevators, it is evident that to lift fifteen hundred pounds one hundred feet high in one-fifth of a minute will consume twenty-three horse-power net, or forty-six horse-power gross, taking the horse-power at the usual standard of thirty-three thousand pounds raised one foot in one minute. Supposing the cost of the current to be five cents per electrical horse-power per hour, which is probably not far from the average, and observing that, with us, the car is always counter-balanced, so that the engine runs during both ascent and descent, the cost of forty-six horse-power for one-fifth of a minute would be three-quarters of a cent, and of the twenty-three horse-power needed for lowering the car, during the same period, three-eighths of a cent, making the total cost of the trip one and one-quarter cents. With passenger elevators on the Continent, very different ideas of speed prevail, one hundred feet per minute being considered a dangerously rapid movement. Assuming, therefore, that the Berlin load of eight hundred and fifty pounds moves at this speed, we should have a consumption, for the upward trip, of two and six-tenths horse-power net, or five and two-tenths gross. Supposing, as before, the descent to take half as much power, and to consume the same time, we should have a total expenditure for the trip of seven and eight-tenths horse-power in one and six-tenths minutes, costing a little more than one-eighth of one cent, at the American price for current. As compared with the cost of steam or hydraulic power, it is to be remembered that a steam elevator plant consumes coal, whether the elevator is running or not; and a hydraulic plant, where the power is furnished by steam-pumps, as is usual, is subject to the same condition, while an electric elevator, taking current by meter, costs nothing while it is idle; so that, although it is very probable that the German figures are correct, they prove nothing in regard to the comparative economy of electric and other elevators when operated under different circumstances.

MOST people have seen the prospectus of the company which proposes to manufacture artificial silk in this country, under the Chardonnet patents; and there should be some interest in the account which the *Revue Industrielle* gives of the present condition of the artificial silk industry. It is understood that the Chardonnet silk is a form of nitrocellulose, probably made by dissolving gun-cotton in some ethereal liquid, and spinning it while soft. The lustre and tenacity of celluloid make it quite probable that a silk of composition similar to that of celluloid will be a most useful substance. Quite recently, patents have been taken out by Dr. Lehner, of Switzerland, for the manufacture of an artificial silk similar to the Chardonnet silk, but made with wood-cellulose, or, more simply, sawdust, instead of cotton, in the same way, apparently, that sawdust has been employed for making a sort of celluloid. One trouble with both the Chardonnet and the Lehner silks is that they are very inflammable, and the Lehner product is, so far, more costly than real silk; so that there is still room for improvement in the new industry, in the way of economy and safety. Meanwhile, M. Oswald Seyfert, reflecting that cotton cellulose, after being subjected to the long and costly processes of treating with nitric and sulphuric acids, dissolving in ether or amyl-acetate, and drawing into threads, is still not much more than cotton cellulose, has conceived the idea that it might be possible to treat the original cotton fibre in such a way as to give it the lustre of silk, and has patented a secret process for accomplishing this result. How a secret process can be patented in France does not appear; but it is likely that only certain steps in it have been patented. In any case, it seems to be understood that the cotton is subjected to soaking in a cold alkaline solution, followed by drying and washing. The effect is to give the cotton much brilliancy, without affecting the fibre unfavorably, or injuring its capacity for receiving dyes; and the Seyfert cotton is said to have been put already on the market, in competition with other artificial silks, at a price much lower than that of the nitro-cellulose varieties.

LICENSING ARCHITECTS.

It occurred to us that it might be an aid to those inclined to speak on the report to be made to the Convention of the American Institute of Architects at Detroit on the subject of "Licensing Architects" to have an inkling beforehand of how architects in different parts of the country felt, and we have invited architects in different cities to lay before our readers their reasons for supporting or opposing the proposed movement.

The proportion of those who replied that they had given the matter no consideration is so great that we incline to believe that the urgency of the reform—in the suggested form at least—is greatly overestimated, as well as the number of its supporters. We therefore, in publishing the few replies we have received, give the first place to those who oppose the movement.

BOSTON, MASS., September 10, 1897.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—The following is a copy of the resolution, adopted September 3d, regarding licensing architects:

Resolved, It is the opinion of the Boston Society of Architects that it is inadvisable at present to take any active steps towards the licensing of architects.

Sincerely yours, EDWIN J. LEWIS, JR., Secretary.

ST. LOUIS, MO., September 3, 1897.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—At the request of Messrs. Eames & Young, I send you herewith a copy of the resolution unanimously adopted at the last regular monthly meeting of the St. Louis Chapter, A. I. A., relative to the licensing of architects by State legislation.

Resolved, That the conditions surrounding the practice of architecture, prevalent in our State at the present time, do not make practicable the licensing of architects by examination through State legislation.

That any State legislation controlling the practice of architecture by examination in any State should, as a matter of fact, bear direct relation to the qualifications for membership in the Institute.

That it is the sense of the St. Louis Chapter A. I. A., that membership in the Institute should not be considered as conferring a distinction on a practitioner, but should be modelled upon the lines of the objects of the Institute as at present expressed in the Constitution and By-Laws.

It is, however, the sense of the St. Louis Chapter A. I. A. that Legislative Control of the practice of architecture in all States is extremely desirable, and it is our hope and intention to be able to take action toward this end at some time in the future.

Yours very truly, A. F. ROSENHEIM.

BOSTON, MASS., August 19, 1897.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—I do not believe in licensing architects. I believe that the tendency of such a system would be to increase the mechanical and mercantile practitioners and decrease the number of artists in the profession.

We do not need to encourage the practical side of the profession in this country. Of course I believe that architect best performs his work who combines adequate knowledge of the practical side of his profession with artistic ability, but the profession would be the poorer if we were not to have in it men whose practical ability is small and whose artistic ability is great.

The tendency of licensing architects would be, in my opinion, to discourage men of the latter class from entering the profession, and we would thereby practically increase the number of engineers, and decrease the number of real architects. Especially would there be such a result in this country where the practical man is, in general opinion, so much exalted above the idealist.

Yours very truly, EDMUND M. WHEELWRIGHT.

WASHINGTON, D. C., August 28, 1897.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—In reply to your letter of 25th inst. respecting licensing of architects, I beg to state that I have not given the movement sufficient consideration to justify a decisive expression of opinion. Such light as has been presented on the subject inclines me adversely to the proposition.

Yours very truly, W. M. POINDEXTER.

ST. PAUL, MINN., August 30, 1897.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—Regarding the question of licensing architects, I have given the matter some thought, and we have had the subject under discussion at our Chapter meetings here several times.

There are two sides to the question. I strongly favor some definite standard of educational requirement, or certificate for practice, which will establish for the public a definite idea of the professional standing of architects. I believe that such a requirement would conduce to the better practice of the profession, and to some extent, perhaps, to the protection of the public.

I do not believe it would make better architects, for, after all, it

is a question of individual character, and not red tape and sealing-wax that makes the practitioner. It would, however, operate to retard a class of charlatans who advertise themselves as architects, and impose upon both the profession and the public.

On the other hand, a system of licensing architects, if carried too far, leads to undue responsibilities being placed upon them by the law-making power—responsibilities which properly belong upon the contractor. This system, carried to an extreme, in France has, I understand, been the cause of considerable individual hardship, and the practice of the profession being hedged about with legal restrictions would be unfortunate in general practice.

On the whole, I favor an educational requirement, and some form of certificate or diploma issued by State authority, very much as a lawyer is admitted to practise at the bar.

Yours very truly, CASS GILBERT.

BOSTON, MASS., September 7, 1897.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—As to licensing architects I have very definite views:

A man should not be allowed to practise a profession for which he has had no training, and call himself by the name belonging to the profession. The only objection that can be made to such an idea is the assumption that it is utopian. I do not believe it to be so. My idea of the law licensing architects is that it should be made as follows:—

Graduates of well accredited Architectural Schools who have received their diplomas and degrees should be exempt.

All architects, called or so-called, practising at time of passage of act (not at enforcement of act) should be exempt.

All others should pass examinations, which shall be equivalent to the examination of the best Architectural Schools, before being permitted to practise.

Penalties under the law:

For first offence, slight fine and publication in press throughout the country.

For continued offences, increasing fine, publication in press, and finally forfeiture of right to pass examinations.

I believe a law embodying the above would within thirty years very materially diminish the worst element in our ranks.

There can be no law preventing a man from performing architectural service, but there can be one preventing his using the name of architect unless he is qualified.

Yours truly and sincerely, C. HOWARD WALKER.

CHICAGO, ILL., August 27, 1897.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—Replying to your letter of the 25th inst. I am strongly in favor of licensing architects, provided candidates be thoroughly examined by a competent commission and are only allowed to pass on merit.

Yours very truly, D. H. BURNHAM.

CHICAGO, ILL., August 27, 1897.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—Yours of the 25th inst. was duly received. My views on the subject of examination and licensing of architects were fully stated in a report which I submitted to the second annual convention of the Western Association of Architects at St. Louis, in 1886, from which the following extracts are made. This is practically all that I can say in favor of the measure then proposed, which has, with some modifications, become a law in the State of Illinois by the act of the recently adjourned legislature. The Board for examining architects has only been appointed a few days ago and has not yet had a meeting. Its members are N. Clifford Ricker, W. A. Reeves, P. B. Wight, Wm. Zimmerman and D. Adler.

I append a copy of the Illinois State Law, above referred to.

Yours very truly, D. ADLER.

"To-day we are the professional brethren of every one who may paint the word 'architect' after his name on his sign, or print it on his business card, unless the incompatibility of his qualifications and his self-assumed title shall have become unmistakably demonstrated by the most flagrant professional failures and blunders.

"The injury to ourselves arising from this state of affairs, though great, is trifling when compared with the constant menace to safety of life and limb, to health and to finances, to which every one who is about to build or about to occupy a structure already built is subjected from this cause. This matter cannot be left to the operation of the law of natural selection and survival of the fittest. While the fittest will undoubtedly survive, danger to occupants of buildings and even to passers-by on the street will lurk in the structures reared by the unfit under the auspices of clients who have come to them in ignorance as to their unfitness and deceived by their title, or who have been lured by cupidity or a misplaced spirit of economy.

"The public have the right to demand from us protection against professional charlatanism. This can be secured by a State regulation of the practice of architecture. Let no man be permitted to practise architecture without a license from a competent State tribunal, and let the condition of the granting of this license be that the applicant shall have successfully passed such examination as this tribunal may find expedient for determining his qualification for his professional work, or that, in the case of persons already in the practice of architecture, their capability shall have been determined by the successful erection of buildings of such character as may seem to constitute a sufficient test."

"The more severe the test, the greater the honor, the greater the esteem in which we will be held individually and collectively by those whose

building interests it is our desire to control. And while the law providing for this test of our qualifications will neither abolish the operations of the law of natural selection nor prevent the rise and survival of the fittest, we will have the assurance that even the weakest of our professional associates will be worthy of our consideration, and the public will have the guaranty that even the less fit are possessed of some qualification for the work that may be entrusted to them."—*Extracts from Report as above.*

A BILL FOR AN ACT TO PROVIDE FOR THE LICENSING OF ARCHITECTS AND REGULATING THE PRACTICE OF ARCHITECTURE AS A PROFESSION.

SECTION 1. *Be it enacted by the People of the State of Illinois represented in the General Assembly,* That within thirty days after the passage of this act the Governor of this State shall, by the advice and consent of the Senate, appoint a State Board of Examiners of Architects to be composed of five members, one of whom shall be a member of the faculty of the Illinois State University, and the other four shall be architects residing in the State of Illinois, who have been engaged in the practice of architecture at least ten years. Two of the said practising architects appointed as examiners shall be designated to hold office for two years from the date of the passage of this act, and the other two, together with the member of the faculty aforesaid, shall hold office for four years from the passage of this act; and thereafter, upon the expiration of the term of office of the person so appointed, the Governor of the State shall appoint a successor to each person whose term of office shall expire, to hold office for four years, and said person so appointed shall have the above specified qualifications. In case appointment of a successor is not made before the expiration of the term of any member, such member shall hold office until a successor is appointed and duly qualified. Any vacancy occurring in membership of the board shall be filled by the Governor of the State, for the unexpired term of such membership.

§ 2. The members of the State Board of Examiners of Architects shall, before entering upon the discharge of their duties, make and file with the Secretary of State the constitutional oath of office; they shall, as soon as organized, and annually thereafter, in the month of January, elect from their number a president and a secretary, who shall also be a treasurer. The treasurer shall file a bond for the penal sum of \$5,000, with the Secretary of State, to be accepted by the Governor of the State, before entering upon his duties. The board shall adopt rules and regulations to govern its proceedings, not inconsistent with this act, and a seal, and the secretary shall have the care and custody thereof, and shall keep a record of all the proceedings of the board, which shall be open at all times to public scrutiny. The secretary of the board shall receive a salary which shall be fixed by the board, and which shall not exceed the sum of \$1,500 per year; he shall also receive his travelling and other expenses incurred in the performance of his official duties. The other members of the board shall receive the sum of \$10 for each day actually engaged in this service, and all legitimate and necessary expenses incurred in attending the meetings of said board; said expense shall be paid from the fees received by the board under the provisions of this act, and no part of the salary or other expenses of the board shall be paid out of the State treasury. All moneys received in excess of the said per diem allowance and other expenses above provided for shall be held by the treasurer as a special fund for meeting the expenses of said board and the cost of an annual report of the proceedings of the State Board of Examiners of Architects.

Provided, however, that when the money in the hands of the treasurer at the time the annual report is rendered exceeds \$2,500, the amount of such excess shall be paid into the State treasury, to the credit of the State Board of Examiners of Architects.

§ 3. Three members of the board shall constitute a quorum. Special meetings of the board shall be called by the secretary upon the written request of any two members, by giving at least seven days' written notice of the meeting to each member, reckoning from the day on which the notices are post-marked, telegraphed or personally delivered. The board shall adopt rules and regulations for the examination of applicants for licenses to practise architecture, in accordance with the provisions of this act, and may amend, modify and repeal such rules and regulations from time to time. The board shall, immediately upon the election of each officer thereof, and upon the adoption, repeal or modification of its rules of government or its rules and regulations for examinations of applicants for licenses, file with the Secretary of State, and publish in at least one architectural journal and one daily newspaper published in the State of Illinois, at least twice, the name and address of each officer, and a copy of such rules and regulations, or the amendment, repeal or modification thereof.

§ 4. Provision shall be made by the board hereby constituted for holding examinations, at least twice in each year, of applicants for license to practise architecture, and any person over twenty-one years of age, upon payment of a fee of \$15 to the secretary of the board, shall be entitled to an examination for determining his or her qualifications. All examinations shall be made directly by said board, or a committee of two members delegated by the board, and due notice of the time and place of the holding of such examinations shall be published, as in the case provided for the publication of the rules and regulations thereof. The examination shall have special reference to the construction of buildings, and a test of the knowledge of the candidate of the strength of materials, and of his or her ability to make practical application of such knowledge in the ordinary professional work of an architect, and in the duties of a supervisor of mechanical work on buildings, and should also seek to determine his or her knowledge of the laws of sanitation as applied to buildings. If the result of the examination of any applicant shall be satisfactory to a majority of the board, under its rules, the secretary shall, upon an order of the board, issue to the applicant a certificate to that effect, and upon payment to the secretary of the board, by the candidate, of a fee of \$25, he shall thereupon issue to the person therein named a license to practise architecture in the State, in accordance with the provisions of this act, which license shall contain the full name, birthplace and age of the applicant, and be signed by the president and secretary, and sealed with the seal of the board. If an applicant fails to pass said examination his or her fee shall be returned.

All papers received by the secretary in relation to applications for license shall be kept on file in his office, and a proper index and record thereof shall be kept by him.

§ 5. Any person who shall, by affidavit, show to the satisfaction of the State Board of Examiners of Architects that he or she was engaged in the practice of the profession of architecture on the date of the passage of this act, shall be entitled to a license without an examination, provided such application shall be made within six months after the passage of this act. Such license, when granted, shall set forth the fact that the person to whom the same was issued was practising architecture in this State at the time of the passage of this act, and is, therefore, entitled to a license to practise architecture, without an examination by the board of examiners, and the secretary of the board shall, upon the payment to him of a fee of \$25, issue to the person named in said affidavit a license to practise

architecture in this State, in accordance with the provisions of this act. In the case of a copartnership of architects, each member whose name appears must be licensed to practise architecture. No stock company or corporation shall be licensed to practise architecture, but the same may employ licensed architects. Each licensed architect shall have his or her license recorded in the office of the county clerk in each and every county in this State in which the holder thereof shall practise, and he or she shall pay to the clerk the same fee that is charged for the recording of notarial commissions. A failure to have his or her license so recorded shall be deemed sufficient cause for revocation of such license.

§ 6. Each county clerk shall keep in a book, provided for the purpose, a complete list of all the licenses recorded by him under the provisions of this act, together with the date of the issuance of each license.

§ 7. Every licensed architect shall have a seal, the impression of which must contain the name of the architect, his or her place of business, and the words, "Licensed Architect," "State of Illinois," with which he shall stamp all drawing and specifications issued from his office, for use in this State.

§ 8. After six months from the passage of this act it shall be unlawful, and it shall be a misdemeanor punishable by a fine of not less than \$50 nor more than \$500 for each and every week during which said offence shall continue, for any person to practise architecture without a license in this State, or to advertise, or put out any sign or card, or other device which might indicate to the public that he or she is entitled to practise as an architect.

§ 9. Any person who shall be engaged in the planning or supervision of the erection, enlargement or alteration of buildings for others, and to be constructed by other persons than himself, shall be regarded as an architect within the provisions of this act, and shall be held to comply with the same; but nothing contained in this act shall prevent the draughtsmen, students, clerks-of-works or superintendents, and other employes of those lawfully practising as architects, under license as herein provided for, from acting under the instruction, control or supervision of their employers; or shall prevent the employment of superintendents of buildings, paid by the owners, from acting, if under the control and direction of a licensed architect who has prepared the drawing and specifications for the building. The term building, in this act, shall be understood to be a structure consisting of foundations, walls and roof, with or without the other parts; but nothing contained in this act shall be construed to prevent any person, mechanic or builder from making plans and specifications for, or supervising the erection, enlargement or alteration of, any building that is to be constructed by himself or employe; nor shall a civil engineer be considered as an architect unless he plans, designs or supervises the erection of buildings, in which case he shall be subject to all the provisions of this act, and be considered as an architect.

§ 10. Architects' licenses issued in accordance with the provisions of this act shall remain in full force until revoked for cause, as hereinafter provided. Any license so granted may be revoked by unanimous vote of the State Board of Examiners of Architects for gross incompetency, or recklessness in the construction of buildings, or for dishonest practices on the part of the holder thereof, but before any license shall be revoked such holder shall be entitled to at least twenty days' notice of the charge against him, and of the time and place of the meeting of the board for the hearing and determining of such charge. And on the cancellation of such license it shall be the duty of the secretary of the board to give notice of such cancellation to the county clerk of each county in the State in which the license has been recorded, whereupon the clerks of the counties shall mark the license recorded in his office cancelled. After the expiration of six months from the revocation of a license, the person whose license was revoked may have a new license issued to him by the secretary, upon certificate of the board of examiners, issued by them upon satisfactory evidence of proper reasons for his reinstatement, and upon payment to the secretary of the fee of \$5.

For the purpose of carrying out the provisions of this act relating to the revocation of licenses the board shall have the power of a court of record sitting in the county in which their meeting shall be held, and the power to issue subpoenas and compel the attendance and testimony of witnesses. Witnesses shall be entitled to the same fees as witnesses in a court of record, to be paid in like manner. The accused shall be entitled to the subpoena of the board for his witnesses, and to be heard in person or by counsel in open public trial.

§ 11. Every licensed architect in this State who desires to continue the practice of his or her profession shall annually, during the time he or she shall continue in such practice, pay to the secretary of the board during the month of July a fee of \$5, and the secretary shall thereupon issue to such licensed architect a certificate of renewal of his or her license for a term of one year. Any licensed architect who shall fail to have his or her license renewed during the month of July in each and every year shall have his or her license revoked at the discretion of the board. But the failure to renew said license shall not deprive him or her of the right to renewal upon payment of said fee.

§ 12. Within the first week of December, after the organization of the board, and annually thereafter, the secretary of the board shall file with the Auditor of the State a full report of the proceedings of the board, and a complete statement of the receipts and expenditures of the board, attested by the affidavits of the president and secretary, subject to the approval of the State Auditor.

APOLLODORUS THE ARCHITECT.—It is supposed that Apollodorus was born at Damascus. He obtained the favor of the Emperor Trajan, and was engaged on the architectural and engineering works constructed during his reign. Among them were the square in Rome, with the column in Rome, a triumphal arch, a college, a theatre for musical performances, the Ulpian basilica, a library, baths, temples, roads, aqueducts, the great bridge over the Danube. His Forum of Trajan excited the envy of Hadrian, and in consequence the architect was driven into exile on some frivolous pretext. The Emperor, in order to convince Apollodorus that he could easily dispense with his services, sent him a design for the Temple of Venus and Rome, and his opinion on it was asked. It had been prepared by Hadrian. Apollodorus answered that the emperor should have made it more lofty, and have introduced accommodation below the ground for the reception, whenever occasion required, of the machinery of the adjoining amphitheatre, and have imparted to the façade of the temple towards the Via Sacra a more imposing aspect. The statues, which were represented as seated, were said to be so disproportionate, that if the goddesses desired to stand up and walk they would not be able. As might be imagined, the artist paid for the freedom of his criticism with his life.—*The Architect.*



TORONTO AS A CONVENTION CITY. — RECENT CONVENTIONS. — LORD KELVIN ON THE NIAGARA WATER-POWER AND ON THE FUEL SUPPLY OF THE WORLD. — OTHER PAPERS READ BEFORE THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

TORONTO seems to have gained a great reputation as a city well suited for the holding of conventions. Its natural advantages as a "centre," its own beauty and its situation with regard to "excursions" render it a favorite resort, its only drawback being a limited amount of hotel accommodation. This defect, however, will probably be removed in a short time and then it will be hard to surpass Toronto for such a purpose. At the time of writing, conventions are being held by the American Mathematical Society, the Botanical Society of America, the British Association for the Advancement of Science and the American Association for the Promotion of Engineering Education. The terrible titles of some of the papers read by members of the American Mathematical Society are enough to frighten the public, but the mathematical savants do not appear to be very dreadful persons themselves, and are heartily received and welcomed and duly entertained with garden-parties and other social relaxations. Professor H. Maschke's paper, "A Theorem Concerning the Coefficients of Linear Substitution Groups of Finite Order within Variables," was a brain twister to the uninitiated, as was also Dr. Lovatt's "Certain Transformation Problems of Canonical Equations of Dynamics"; but these and others were listened to with great interest and provoked each one, more or less, interesting discussion.

In promoting engineering education the authors of the papers read with this object were naturally not so desperately scientific. Mr. C. D. Marx in his paper, "At what Point should Students engage in Specific Research and how much Aid should they receive from the Professor?" believes that "the instruction in American engineering colleges, except in the laboratories, is on a lower plane than in Austria and Germany, due to inferior preparatory training and the lack of teachers who combine theoretical training with wide practical experience." It was somewhat of a relief to drop in upon the Botanists holding their meeting in the Biological Building of the University, as one expected to enjoy the same kind of sensation of relief as is usually experienced in passing from a school-room to a garden, but one could hardly help feeling somewhat staggered on learning the title of the paper then being read, by the retiring president, C. S. Besser, of the University of Nebraska, "Phylogeny and Taxonomy of the Angiosperms."

The British Association convened on the 18th for their sixty-seventh annual meeting. The membership for this convention present in Toronto is about 1,500, made up of some 400 British members, 600 Americans, among whom are the members of the other societies convened here at this time, and, at least, 500 Canadians, who, according to an excellent arrangement, are able to become members of the Association *pro tem*, and thus take part in the meetings and benefit by the knowledge disseminated by the savants.

Among the distinguished visitors are: Sir John Evans, the president-elect; Lord Kelvin, the retiring president; Prince Krapotkin, the celebrated Russian philanthropist and scientist, now an exile from his country; the Rev. Father Potamian, Doctor of Science of the University of London, now of New York; Sir George Robertson, the famous defender of Chitral in Northern India, and a host of others from all parts, — from the United States, from England, Scotland and Ireland, from Germany, Austria and Italy, — so that probably when all have arrived every country will have its representative. It speaks volumes for the importance of the Dominion of Canada, that it should be chosen as the meeting-place for such a concourse of great and learned men.

Lord Kelvin visited Niagara on his way here and has since spoken with representatives of the press about the immense future he believes is opening up, even now, in connection with the water-power of the cataract. He stated that he looked forward to the time when all the water of Lake Erie will find its way to the level of Lake Ontario through machinery, doing more good for the world than even that great benefit we now possess in the contemplation of one of the wonders of the world, and the splendid scene we have before us in the waterfall of Niagara at the present time. "I wish I could think it possible that I might live to see the grand development. I do not hope our children's children will ever see the Niagara cataract." — (Alas for the utilitarianism of the man of science: Grand Old Niagara to end its days turning a water-wheel, like the donkey at Carisbrooke Castle!)

The first day of the Convention was given up to the reading of the Annual Report of the Council, a luncheon at the Provincial Government House and sundry garden-parties, but on the second day the members settled down to solid work, each Section being "set

going" by an address from its president. Professor Ramsay, the discoverer of argon, the third element of air, spoke of still another "gas" as yet undiscovered and unnamed, though known to exist, and gave a very interesting account of the researches and experiments conducted during the century which led up to the discovery that there existed this "gas," evidence of the presence of which is convincing to the chemist, though its nature has not yet been ascertained.

It is impossible within the limits of our prescribed space to mention all the subjects brought up by the various professors, nor are they all subjects that bear upon the purposes of this journal.

The second day closed with a magnificent official reception by the Governor-General of Canada and Lady Aberdeen at the Ontario Legislative Buildings, which were handsomely decorated for the occasion. At least two thousand guests were present and the scene was one of great brilliancy and splendor. Professor Roberts-Austen, C. B. F. R. S., of the Royal Mint, London, spoke of Canada's metals. Since the British Association met in Montreal, in 1884, interest in Canadian metals had very much increased, which was largely due to the efforts of the Canadian Geological Survey. The principal mineral products of Canada are gold, silver, copper, nickel, lead and iron. Since 1884 the annual mineral output of the Dominion had doubled. The development of the country's resources was slow, due to many causes, first of which was the conservative attitude of the Hudson Bay Company, who controlled great mineral regions, and who for many years had devoted themselves to other pursuits than mining; but Sir Donald Smith, Senator, High Commissioner of Canada in England and President of the Hudson Bay Company, had been the first to bring down specimens of Lake-of-the-Woods and Rainy Lake ore, and there was no doubt as to its value. Another reason for slow development was the lack of railway communication, and a third was a false idea of climate. As to the Ontario deposits, enough was known of the territory north of Lake Superior to satisfy one that it possessed immense mineral wealth. Apart from Ontario was the great gold country of the West, British Columbia, where since 1881 there had been an output of \$12,000,000 of gold. After alluding to the possibilities of the Yukon region, the lecturer observed that the qualities of iron and steel should not be overlooked. Iron was a necessity of the Empire. The British Navy required for its use one-half of the output of the Motherland. "Need I longer plead for the production, in Canada, of iron and steel for the protection of the Empire?" The plea was followed out by experimental evidence of the exceptional qualities for armament purposes of an alloy composed of Canadian steel and nickel.

The lecturer, with the aid of an electric furnace operated by his assistant, and through the medium of lantern-slides, gave a representation of the melting of various metals. The experiments, he explained, were intended to teach that metals were not inert, but were vibrating masses of sensitive matter strangely lifelike. The forces of evolution in the inorganic were not less majestic than those now universally accepted as pertaining to the organic world.

Lord Kelvin in a paper on the "Fuel and Air Supply of the Earth," said: "One ton average fuel takes three tons of oxygen to burn it, and, therefore, its vegetable origin, decomposing carbonic acid, and water, by power of sunlight, gives three tons of oxygen to one of atmosphere. Every square metre of earth's surface bears ten tons of air, of which two tons is oxygen. The whole surface is 510,000,000,000,000 square metres. Hence there is not more than 340,000,000,000,000 tons of fuel on the earth, and this is probably the exact amount, because probably all the oxygen in our atmosphere came from primeval vegetation. From further calculations, it may be considered as almost quite certain that Great Britain could not burn all its own coal with its own air, and, therefore, that the coal of Britain is considerably in excess of the fuel-supply of the rest of the world, reckoned in equal areas, whether of land or sea."

Saturday was an "off-day" with most of the scientists; programmes of excursions were carried out, arranged to suit the aims and objects of the different Sections of the Association. The Geological Section, under the charge of Professor G. K. Gilbert, of the United States Geological Survey, crossed the lake for Niagara. At Lewiston they visited the shore of the ancient Lake, which existed before the Falls were formed, and listened to an address by their guide, the discoverer. A trip was made up the gorge of Niagara in the electric-cars. The afternoon was spent visiting the Canadian shore in the neighborhood of the Falls, and certain curious formations known to the leaders of the party were examined. Further explorations were continued on the Sunday and the party returned to Toronto early on Monday to take part in the meetings again.

The Chemistry Section also took the trip to Niagara and after spending a short time at the Falls visited the Alkali Manufacturing Works, and were apparently much interested in the development of electricity in chemistry.

The engineers and mechanical men spent most of their time at Niagara Falls Power Company's plant.

The holiday excursions were followed by a flood of papers in every Section, lectures to which the public were admitted being given each evening. Monday witnessed the manufacture of fluorine gas, which was said to be the first occasion on which the gas had been made on this continent. Professor Meslaus, head assistant of the famous Professor Moissan, of Paris, conducted the experiment. The apparatus consisted of a bucket filled with "snow" and salt in which was immersed a U-shaped tube containing hydrofluoric acid.

Two electric-wires dipped down into the fluid and small copper tubes carried away the liberated gases. These tubes conducted to a small copper vessel which was filled with solidified carbonic acid and alcohol to keep the temperature sufficiently low, to prevent the destruction of the apparatus. Everything being arranged, the current was turned on and the gas began to form, then a number of experiments were carried on, showing that the curious gas attacked everything presented to it, bursting into flame the moment it touched charcoal, silicon, alcohol, potassium and many other elements. Unfortunately, the Professor spoke entirely in French, so that a great deal of instruction and explanation was lost to the admiring public, who, however, testified their interest in the experiments so far as they understood them by applause at the results. Professor Milne's lecture on "Volcanoes and Earthquakes" was very interesting and the lecturer exhibited an instrument hitherto, I believe, unseen in Toronto, a seismograph, whereby an earthquake disturbance in any part of the globe can be detected. By means of a similar instrument Professor Milne announced in England, on the day that it occurred, the terrible earthquake that caused so great a loss of life in Japan a few months ago.

The Convention was wound up on the Wednesday, by a general meeting, at which a number of congratulatory speeches were made.

The Committee on Recommendations reported in favor of setting apart grants to the amount of nearly \$7,000 for the furthering of the work of the different Sections, and a final banquet was tendered to Lord Lister, Lord Kelvin and Sir John Evans. The Toronto meeting was described as one of the most successful in the history of the Association and all were agreed in their admiration of Toronto as a city and of the hospitality of its inhabitants.

NATIONAL ELECTRICAL CODE.¹—IV.

HIGH-POTENTIAL SYSTEMS.—300 TO 3,000 VOLTS.

Any circuit attached to any machine, or combination of machines, which develops a difference of potential, between any two wires, of over 300 volts and less than 3,000 volts, shall be considered as a high-potential circuit, and as coming under that class, unless an approved transforming device is used, which cuts the difference of potential down to 300 volts or less.

32. Wires —

(See also Nos. 14, 15 and 16.)

- a. Must have an approved rubber insulating covering (see No. 40 a).
- b. Must be always in plain sight and never incased, except where required by the Inspection Department having jurisdiction.
- c. Must be rigidly supported on glass or porcelain insulators, which raise the wire at least one inch from the surface wired over, and must be kept apart at least four inches for voltages up to 750 and at least eight inches for voltages over 750.

Rigid supporting requires under ordinary conditions, where wiring along flat surfaces, supports at least about every four and one-half feet.

If the wires are unusually liable to be disturbed, the distance between supports should be shortened.

In buildings of mill-construction, mains of No. 8 B. & S. wire or over, where not liable to be disturbed, may be separated about six inches for voltages up to 750 and about ten inches for voltages above 750; and run from timber to timber, not breaking around, and may be supported at each timber only.

- d. Must be protected on side walls from mechanical injury by a substantial boxing, retaining an air-space of one inch around the conductors, closed at the top (the wires passing through bushed holes) and extending not less than seven feet from the floor. When crossing floor-timbers, in cellars or in rooms, where they might be exposed to injury, wires must be attached by their insulating supports to the under side of a wooden strip not less than one-half an inch in thickness.

33. Transformers (When permitted inside buildings, see No. 13) —

(For construction rules, see No. 54.)

- a. Must be located at a point as near as possible to that at which the primary wires enter the building.
- b. Must be placed in an inclosure constructed of or lined with fire-resisting material; the inclosure to be used only for this purpose, and to be kept securely locked and access to the same allowed only to responsible persons.
- c. Must be effectually insulated from the ground and the inclosure in which they are placed must be practically air-tight, except that it shall be thoroughly ventilated to the outdoor air, if possible, through a chimney or flue. There should be at least six inches air-space on all sides of the transformer.

34. Car Wiring —

35. Car-Houses —

- a. Must have the trolley-wires securely supported on insulating hangers.
- b. Must have the trolley-hangers placed at such a distance apart that, in case of a break in the trolley-wire, contact cannot be made with the floor.

¹ Rules and requirements of the National Board of Fire Underwriters for the installation of wiring and apparatus for electric light, heat and power, as recommended by the Underwriters' National Electric Association. Continued from No. 1133, page 92.

- c. Must have cut-out switch located at a proper place outside of the building, so that all trolley-circuits in the building can be cut out at one point, and line circuit-breakers must be installed, so that when this cut-out switch is open the trolley-wire will be dead at all points within 100 feet of the building. The current must be cut out of the building whenever the same is not in use or the road not in operation.

- d. Must have all lamps and stationary motors installed in such a way that one main switch can control the whole of each installation — lighting or power — independently of main feeder-switch. No portable incandescent-lamps or twin wire allowed, except that portable incandescent-lamps may be used in the pits, connections to be made by two approved rubber-covered flexible wires (see No. 40 a), properly protected against mechanical injury; the circuit to be controlled by a switch placed outside of the pit.

- e. Must have all wiring and apparatus installed in accordance with rules under Class "C" for constant potential systems.

- f. Must not have any system of feeder distribution centering in the building.

- g. Must have the rails bonded at each joint with not less than No. 2 B. & S. annealed copper-wire; also a supplementary wire to be run for each track.

- h. Must not have cars left with trolley in electrical connection with the trolley-wire.

36. Lighting and Power from Railway Wires —

- a. Must not be permitted, under any pretence, in the same circuit with trolley-wires with a ground return, except in electric-railway cars, electric car-houses, and their power stations, nor shall the same dynamo be used for both purposes.

37. Series Lamps —

- a. No system of multiple-series or series-multiple for light or power will be approved.
- b. Under no circumstances can lamps be attached to gas-fixtures.

EXTRA HIGH-POTENTIAL SYSTEMS.—OVER 3,000 VOLTS.

Any circuit attached to any machine, or combination of machines, which develops a difference of potential, between any two wires, of over 3,000 volts, shall be considered as an extra high-potential circuit, and as coming under that class, unless an approved transforming device is used, which cuts the difference of potential down to 3,000 volts or less.

38. Primary Wires —

- Must not be brought into or over buildings, except power and sub-stations.

39. Secondary Wires —

- a. Must be installed under rules for high-potential systems, when their immediate primary wires carry a current at a potential of over 3,000 volts.

The high-line insulation required for extra high-potential current tends to make the insulation resistance between primary and secondary coils of transformers a comparatively weak point, and lightning discharges would be apt to take this path to earth. With the present means of protection against transformer break-downs and the consequent liability of secondary wiring being subjected to the strain of the primary current, it is not deemed advisable to permit a primary current with a potential of over 3,000 volts without an intermediate step-down transformer. The presence of wires carrying a current at a potential of over 3,000 volts in the streets of cities and towns is also considered as increasing the fire-hazard.

CLASS D.—FITTINGS, MATERIALS AND DETAILS OF CONSTRUCTION.

[All Systems and Voltages.]

40. Wire Insulation —

- a. *Rubber Covered* — The insulating covering must be solid, at least three-sixty-fourths of an inch in thickness and covered with a substantial braid. It must not readily carry fire, must show an insulating resistance of one megohm per mile after two weeks' submersion in water at 70° Fahrenheit and three days' submersion in lime-water, and after three minutes' electrification with 550 volts.

- b. *Weatherproof* — The insulating covering must not support combustion, must resist abrasion, must be at least one-sixteenth of an inch in thickness, and thoroughly impregnated with a moisture repellent.

- c. *Flexible Cord* — Must be made of two-stranded conductors, each having a carrying-capacity equivalent to not less than a No. 16 B. & S. wire, and each covered by an approved insulation, and protected by a slow-burning, tough-braided outer covering.

1. Insulation for pendants under this rule must be moisture and flame proof.

2. Insulation for cords used for all other purposes, including portable lamps and motors, must be solid, at least one-thirty-second of an inch in thickness, and must show an insulation resistance between conductors, and between either conductor and the ground, of at least one megohm per mile after one week's submersion in water at 70° Fahrenheit, and after three minutes' electrification, with 550 volts.

3. The flexible conductors for portable heating-apparatus, such as irons, etc., must have an insulation that will not be injured by heat, such as asbestos, which must be protected from mechanical

injury by an outer, substantial, braided covering, and so arranged that mechanical strain will not be borne by the electrical connection.

d. Fixture-wire—Must have a solid insulation, with a slow-burning, tough, outer covering, the whole to be at least one-thirty-second of an inch in thickness, and show an insulation resistance between conductors, and between either conductor and the ground, of at least one megohm per mile, after one week's submersion in water at 70° Fahrenheit, and after three minutes' electrification, with 550 volts.

e. Conduit-wire—Must comply with the following specifications:—

1. For insulated metal-conduits single wires and twin-conductors must comply with Section (a) of this rule.

Concentric wire must have a braided covering between the outer conductor and the insulation of the inner conductor, and, in addition, must comply with Section (a) of this rule.

2. For non-insulated metal conduits single wires and twin conductors must comply with Section (a) of this rule, and, in addition, have a second outer fibrous covering at least one-thirty-second of an inch in thickness, and sufficiently tenacious to withstand the abrasion of being hauled through the metal conduit.

Concentric conductors must have a braided covering between the outer conductor and the insulation of the inner conductor, and comply with Section (a) of this rule, and, in addition, must have a second outer fibrous covering at least one-thirty-second of an inch in thickness, and sufficiently tenacious to withstand the abrasion of being hauled through the metal conduit.

41. Interior Conduits—

(For wiring rules, see Nos. 24 and 25.)

a. Each length of conduit, whether insulated or uninsulated, must have the maker's name or initials stamped in the metal or attached thereto in a satisfactory manner, so that the inspectors can readily see the same.

INSULATED METAL CONDUITS:

b. The metal covering, or pipe, must be at least equal in thickness or of equal strength to resist penetration by nails, etc., as the ordinary commercial form of gas-pipe of same size.

c. Must not be seriously affected externally by burning out a wire inside the tube when the iron pipe is connected to one side of the circuit.

d. Must have the insulating lining firmly secured to the pipe.

e. The insulating lining must not crack or break when a length of the conduit is uniformly bent at temperature of 212° Fahrenheit to an angle of 90°, with a curve having a radius of fifteen inches, for pipes of one inch and less, and fifteen times the diameter of pipe for larger pipes.

f. The insulating lining must not soften injuriously at a temperature below 212° Fahrenheit and must leave water in which it is boiled practically neutral.

g. The insulating lining must be at least one-thirty-second of an inch in thickness, and the materials of which it is composed must be of such a nature as will not have a deteriorating effect on the insulation of the conductor, and be sufficiently tough and tenacious to withstand the abrasion test of drawing in and out of same long lengths of conductors.

h. The insulating lining must not be mechanically weak after three days' submersion in water, and, when removed from the pipe entire, must not absorb more than ten per cent of its weight of water during 100 hours of submersion.

i. All elbows must be made for the purpose, and not bent from lengths of pipe. The radius of the curve of the inner edge of any elbow not to be less than three and one-half inches. Must have not more than the equivalent of four quarter bends from outlet to outlet, the bends at the outlets not being counted.

UNINSULATED METAL CONDUITS:

j. Plain iron or steel pipes of equal thickness, or of equal strength, to resist penetration of nails, etc., as the ordinary commercial form of gas-pipe of the same size, may be used as conduits, provided their interior surfaces are smooth and free from burrs; pipe to be galvanized, or the interior surfaces coated or enamelled to prevent oxidation with some substance which will not soften so as to become sticky and prevent wire from being withdrawn from the pipe.

k. All elbows must be made for the purpose, and not bent from lengths of pipe. The radius of the curve of the inner edge of any elbow not to be less than three and one-half inches. Must have not more than the equivalent of four quarter bends from outlet to outlet, the bends at the outlets not being counted.

42. Wooden Mouldings—

(For wiring rules, see No. 24.)

a. Must have, both outside and inside, at least two coats of water-proof paint, or be impregnated with a moisture repellent.

b. Must be made of two pieces, a backing and capping, so constructed as to thoroughly incase the wire, and provide a one-half inch tongue between the conductors, and a solid backing, which, under grooves, shall not be less than three-eighths of an inch in thickness, and must afford suitable protection from abrasion.

It is recommended that only hardwood moulding be used.

43. Switches—

(See Nos. 17 and 22.)

a. Must be mounted on non-combustible, non-absorptive, insulating bases, such as slate or porcelain.

b. Must have carrying-capacity sufficient to prevent undue heating.

c. Must, when used for service-switches, indicate, on inspection, whether the current be "on" or "off."

d. Must be plainly marked where it will always be visible, with the name of the maker and the current and voltage for which the switch is designed.

e. Must, for constant potential systems, operate successfully at fifty per cent overload in amperes, with twenty-five per cent excess voltage under the most severe conditions they are liable to meet with in practice.

f. Must, for constant potential systems, have a firm and secure contact; must make and break readily, and not stop when motion has once been imparted by the handle.

g. Must, for constant-current systems, close the main circuit and disconnect the branch wires when turned "off"; must be so constructed that they shall be automatic in action, not stopping between points when started, and must prevent an arc between the points under all circumstances. They must indicate, upon inspection, whether the current be "on" or "off."

44. Cut-outs and Circuit-breakers—

(For installation rules, see Nos. 17 and 21.)

a. Must be supported on bases of non-combustible, non-absorptive insulating material.

b. Cut-outs must be provided with covers, when not arranged in approved cabinets, so as to obviate any danger of the melted fuse metal coming in contact with any substance which might be ignited thereby.

c. Cut-outs must operate successfully, under the most severe conditions they are liable to meet with in practice, on short circuits with fuses rated at 50 per cent above and with a voltage 25 per cent above the current and voltage for which they are designed.

d. Circuit-breakers must operate successfully, under the most severe conditions they are liable to meet with in practice, on short circuits when set at 50 per cent above the current, and with a voltage 25 per cent above that for which they are designed.

e. Must be plainly marked, where it will always be visible, with the name of the maker, and current and voltage for which the device is designed.

45. Fuses—

(For installation rules, see Nos. 17 and 21.)

a. Must have contact-surfaces or tips of harder metal having perfect electrical connection with the fusible part of the strip.

b. Must be stamped with about 80 per cent of the maximum current they can carry indefinitely, thus allowing about 25 per cent overload before fuse melts.

With naked open fuses, of ordinary shapes and not over 500 ampères-capacity, the maximum current which will melt them in about five minutes may be safely taken as the melting-point, as the fuse practically reaches its maximum temperature in this time. With larger fuses a longer time is necessary.

Inclosed fuses where the fuse is often in contact with substances having good conductivity to heat, and often of considerable volume, require a much longer time to reach a maximum temperature on account of the surrounding material, which heats up slowly.

This data is given to facilitate testing.

c. Fuse terminals must be stamped with the maker's name, initials, or some known trademark.

46. Cut-out Cabinets—

a. Must be so constructed, and cut-outs so arranged, as to obviate any danger of the melted fuse metal coming in contact with any substance which might be ignited thereby.

A suitable box can be made of marble, slate or wood, strongly put together, the door to close against a rabbet so as to be perfectly dust-tight, and it should be hung on strong hinges and held closed by a strong hook or catch. If the box is wood the inside should be lined with sheets of asbestos board about one-sixteenth of an inch in thickness, neatly put on and firmly secured in place by shellac and tacks. The wires should enter through holes bushed with porcelain bushings; the bushings tightly fitting the holes in the box, and the wires tightly fitting the bushings (using tape to build up the wire, if necessary), so as to keep out the dust.

47. Sockets—

(See No. 27.)

a. No portion of the lamp-socket or lamp-base exposed to contact with outside objects must be allowed to come into electrical contact with either conductor.

b. Must, when provided with keys, comply with the requirements for switches (see No. 43).

48. Hanger-boards—

a. Hanger-boards must be so constructed that all wires and current-carrying devices thereon shall be exposed to view and thoroughly insulated by being mounted on a non-combustible, non-absorptive insulating substance. All switches attached to the same must be so constructed that they shall be automatic in their action, cutting off both poles to the lamp, not stopping between points when started and preventing an arc between points under all circumstances.

49. Arc-lamps —

(For installation rules, see No. 19.)

a. Must be provided with reliable stops to prevent carbons from falling out in case the clamps become loose.

b. Must be carefully insulated from the circuit in all their exposed parts.

c. Must, for constant-current systems, be provided with an approved hand-switch, also an automatic-switch, that will shunt the current around the carbons, should they fail to feed properly.

The hand-switch to be approved, if placed anywhere except on the lamp itself, must comply with requirements for switches on hanger-boards as laid down in Rule 48.

50. Spark-arresters —

(See No. 19 c.)

a. Spark-arresters must so close the upper orifice of the globe that it will be impossible for any sparks, thrown off by the carbons, to escape.

51. Insulating Joints —

(See No. 26 a.)

a. Must be entirely made of material that will resist the action of illuminating gases, and will not give way or soften under the heat of an ordinary gas-flame or leak under a moderate pressure. They shall be so arranged that a deposit of moisture will not destroy the insulating effect, and shall have an insulating resistance of at least 250,000 ohms between the gas-pipe attachments, and be sufficiently strong to resist the strain they will be liable to be subjected to in being installed.

b. Insulating joints having soft rubber in their construction will not be approved.

52. Resistance Boxes and Equalizers —

(For installation rules, see No. 4.)

a. Must be equipped with metal, or with other non-combustible frames.

The word "frame" in this section relates to the entire case and surroundings of the rheostat, and not alone to the upholding supports.

53. Reactive Coils and Condensers —

a. Reactive coils must be made of non-combustible material, mounted on non-combustible bases, and treated, in general, like sources of heat.

b. Condensers must be treated like apparatus operating with equivalent voltage and currents. They must have non-combustible cases and supports, and must be isolated from all combustible materials and, in general, treated like sources of heat.

54. Transformers —

(For installation rules, see Nos. 11 and 33.)

a. Must not be placed in any but metallic or other non-combustible cases.

55. Lightning-arresters —

(For installation rules, see No. 5.)

a. Must be mounted on non-combustible bases, and must be so constructed as not to maintain an arc after the discharge has passed, and must have no moving parts.

[To be continued.]



[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

HOUSE OF A. C. MCCLURG, ESQ., LAKE SHORE DRIVE, CHICAGO, ILL. MR. FRANCIS M. WHITEHOUSE, ARCHITECT.

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

BARNARD COLLEGE, NEW YORK, N. Y. MESSRS. LAMB & RICH, ARCHITECTS, NEW YORK, N. Y.

ONLY the portions of this building indicated in full black on the plans are to be built at present.

ROSE-WINDOWS: PLATES III AND IV.

[The following named illustrations may be found by reference to our advertising pages.]

THE CASINO OF PIUS IV IN THE VATICAN GARDENS, ROME, ITALY.

A GROUP OF CHURCHES.

A GROUP OF HOTELS.

[Additional Illustrations in the International Edition.]

FLOOR OF THE ROTUNDA: LIBRARY OF CONGRESS, WASHINGTON, D. C. ARCHITECTS, MESSRS. SMITHMEYER & PELZ; P. J. PELZ; E. P. CASEY.

[Gelatine Print.]

THE CATHEDRAL, BAMBERG, BAVARIA.

[Gelatine Print.]

THE erection of Bamberg Cathedral, one of the finest examples of the late Romanesque, or transitional style, and one which became of far-reaching influence upon the architecture of Franconia and Saxony, was begun in 1192. In 1237 the new edifice, although far from being finished, was consecrated with great pomp. It was erected on the foundation-walls of an old church, completed in 1111 but subsequently destroyed by fire. This is attested not only by the old mason-work, which can be distinctly followed up, but also by the ground-plan of the cathedral showing two choirs, a scheme which, in the thirteenth century, as a general thing, was no longer employed. The richly embellished east choir, shown in our plate and named after St. George, and the nave are the work of an architect who shows a distinct leaning towards Rhenish models. On the other hand, the west choir, St. Peter's choir, which was not built until after 1237, reminds the student of French work of the transitional period, the two west towers especially showing distinctly the influence of the cathedral of Laon.

The principal dimensions are as follows: total length 335 feet, total width 97 feet, width of nave 45 feet, each of the two side aisles 25 feet wide; the pillars are placed 15 feet apart longitudinally. Both choirs rise considerably above the body of the church, the east choir being reached over a flight of sixteen steps. Under this choir is located a large crypt, to which access is had from the side aisles. There is also a crypt, though of smaller dimensions, under the west choir. Both choirs terminate in apses of polygonal plan, being enlivened by arcading, dwarf galleries, etc., while the transept has square ends on both sides. There are three principal entrance portals, all richly ornamented with fine sculptured work, namely, one on each side of the east apse, leading into the side aisles, and the third about the middle of the north side of the edifice. A plan of the structure may be seen in Luetzow's "Meisterwerke der Kirchenbaukunst," where the interior is also fully described. The exterior is notable as much for the excellent proportion of the masses as for the picturesque effect of the design and the excellence of the many decorative details of the same. The name of the architect is unknown.

A BAY OF THE SCULPTURE GALLERY: NATIONAL GALLERY OF BRITISH ART, MILLBANK, S. W., LONDON, ENG. MR. SIDNEY R. J. SMITH, ARCHITECT.

INTERIOR OF THE GALLERY: NATIONAL GALLERY OF BRITISH ART.

PART OF UPPER GALLERY: NATIONAL GALLERY OF BRITISH ART.

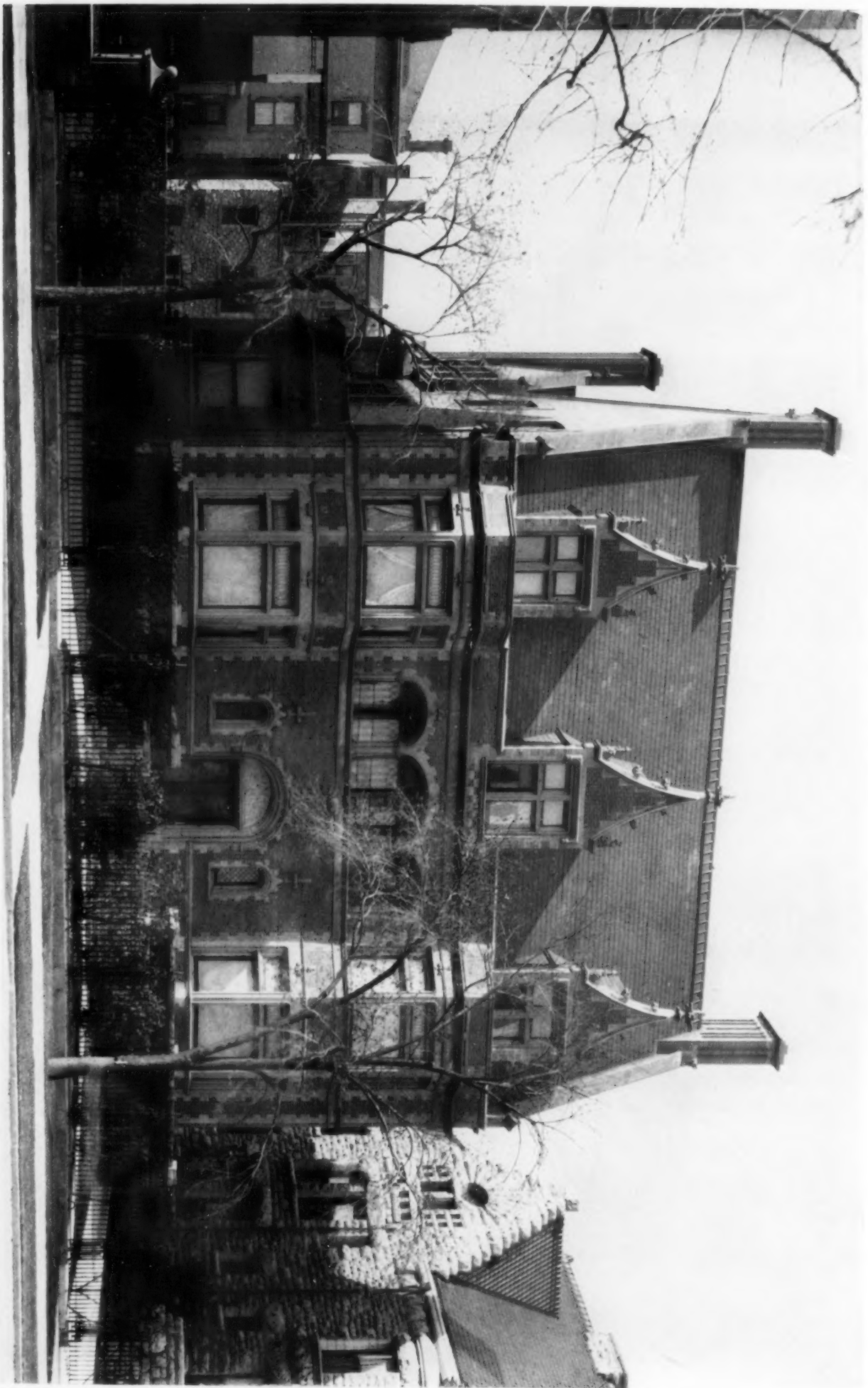


A GERMAN MUSEUM OF ROMAN ANTIQUITIES. — Mainz has a special museum of Roman antiquities found on German soil. It embraces 14,760 objects, many of them of great value. — *Exchange*.

PAY OF THE GRECIAN ARCHITECT. — The French school at Delphi has lately unearthed two slabs of limestone which bear an inscription which is of great interest, dating, as it does, from the fourth century before Christ. This inscription, which consists of about two hundred lines, gives the price of work for building operations in Greece at the period named, and from it we learn that an architect was paid at the rate of under £30 per annum. This is not a great sum, even if its purchasing power is multiplied, as it should be, by five or six. — *Chambers's Journal*.

MONUMENT TO "CATHERINE DE PAIX." — A monument has been unveiled at Péronne, France, to the memory of the Jeanne d'Arc of Picardy, Marie Fouré, otherwise known as Catherine de Paix. Péronne-la-Pucelle, as the little town is now called, was besieged in 1536 by the imperial troops under the Count of Nassau, who fired no less than 1,800 projectiles into it daily. Its defenders were commanded by Marshal de Fleuranges, Comte de Dampmartin, and a Neapolitan general, Francesco Chiaramonte, and the women appear to have acted with special bravery. On August 25, 1536, a general assault was made on the town by the besieging troops, and one of them, an ensign, was about to plant his banner in triumph on the wall when Marie Fouré performed the great act of bravery which has immortalized her name. She went up to the ensign in a friendly way and said that if he would hand over the flag to her she could fix it for him better than he could himself. The ensign handed it to her at once, offering her the pole end, whereupon she gave him a push with it, and overthrew him into the ditch after cracking his head. — *N. Y. Tribune*.

Copyright, 1897, by the American Architect and Building News Co.



HOUSE OF A. C. McCLURG, ESQ., LAKE SHORE DRIVE, CHICAGO.
FRANCIS M. WHITEHOUSE, ARCHT.

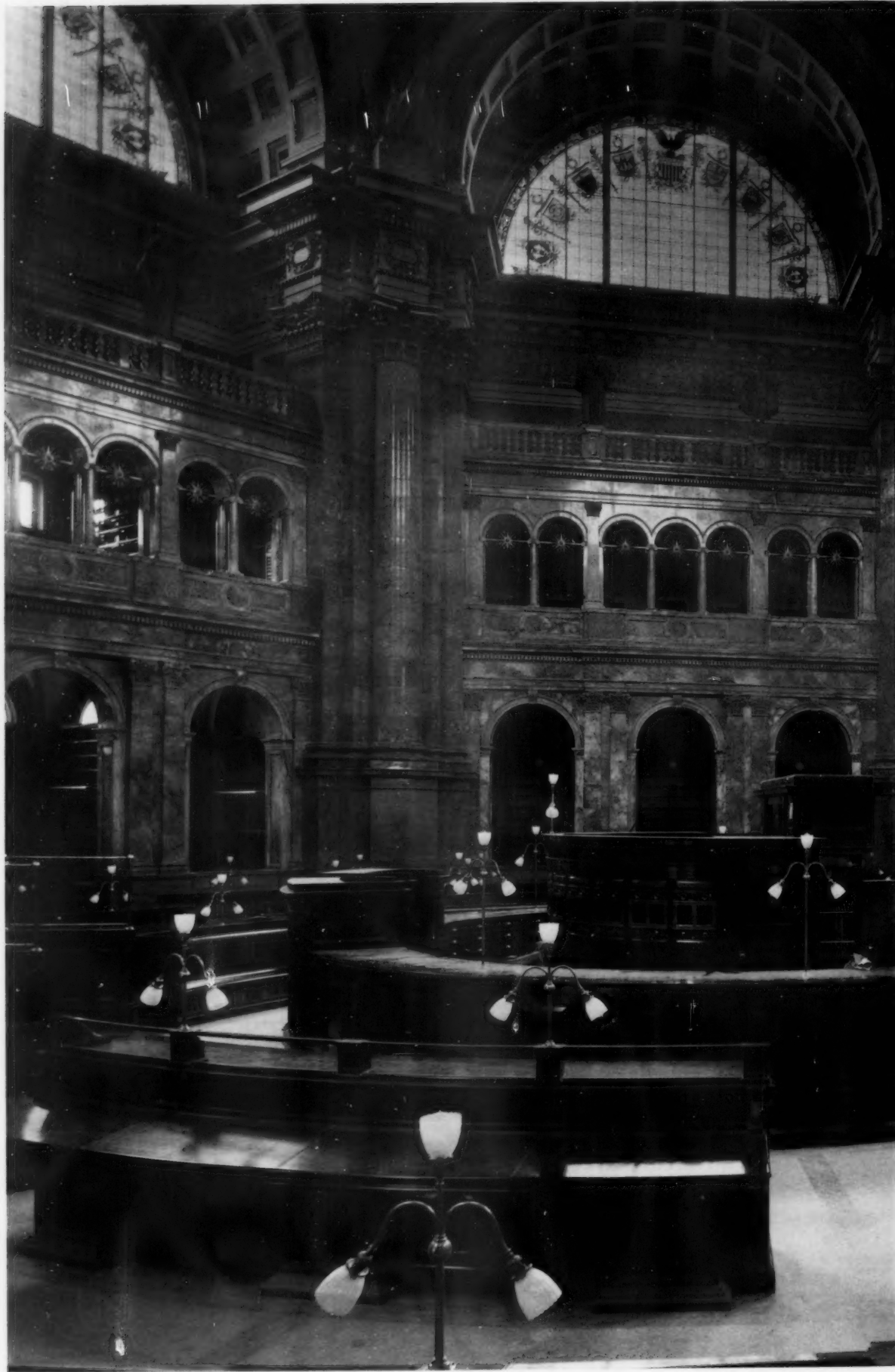
THE HELIOTYPE PRINTING CO., BOSTON



Blätter für Architektur.

Neumann & Co., Berlin.

THE CATHEDRAL, FROM THE NORTHEAST, BAMBERG, BAVARIA.



NEGATIVE BY H. M. SIDMAN, NEW YORK

FLOOR OF THE ROTUNDA: LIBRARY O

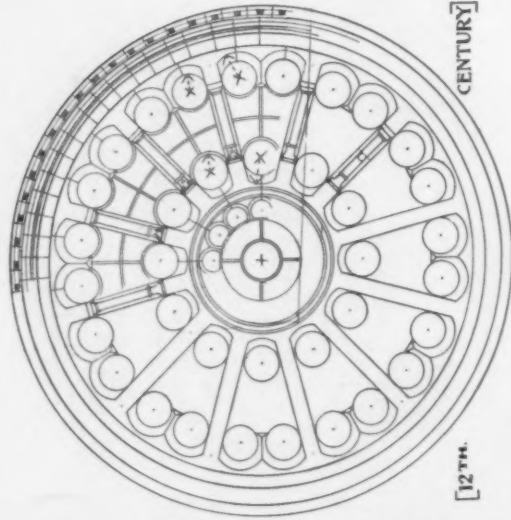
Architects: SMITHMEYER & PELZ. —



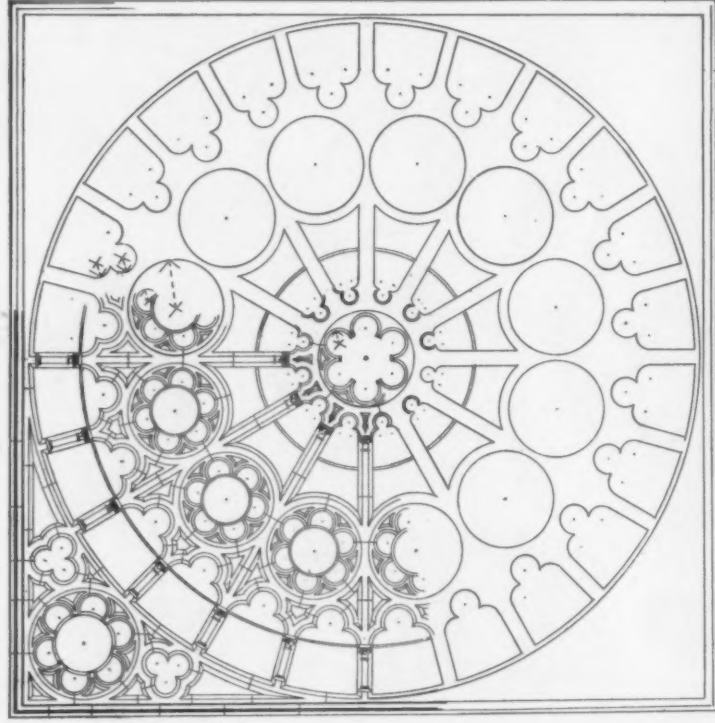
THE HELIOTYPE PRINTING CO., BOSTON

BRARY OF CONGRESS, WASHINGTON, D. C.

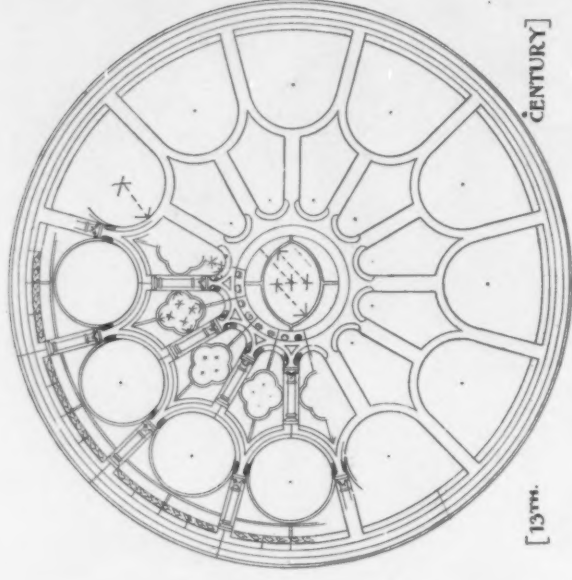
PELZ. — P. J. PELZ. — E. P. CASEY.



• ABBEY • CHURCH • BRAISNE •
• FRANCE •

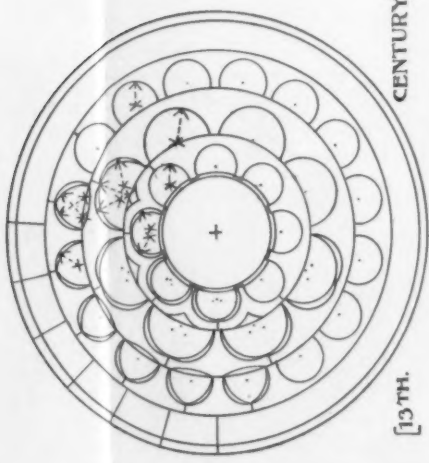


• LA • SAINTE • CHAPELLE • ST. GERMAIN • EN • LAYE •
[13TH. CENTURY]

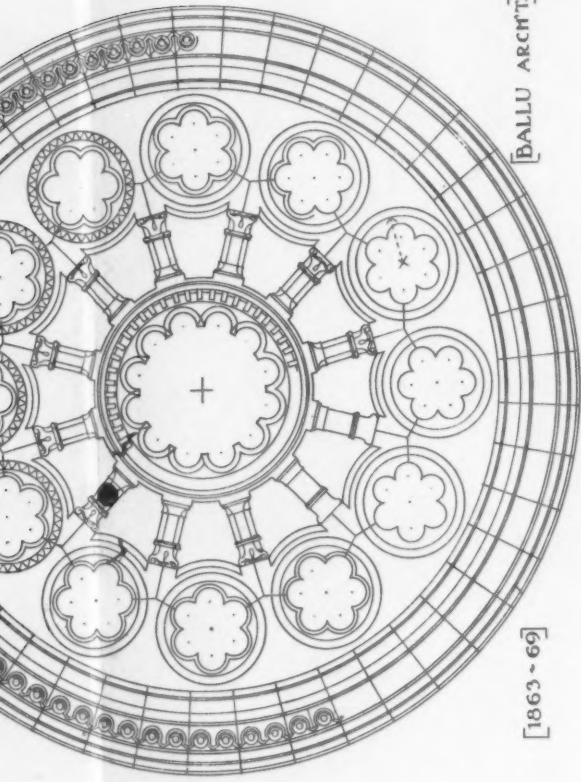


• NOTRE DAME • MANTES • FRANCE •
• WEST • WINDOW •

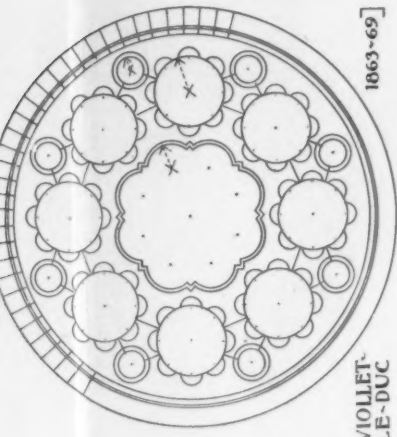
• R O S E • W I N D O W S •



[13TH. CENTURY]
 • CHURCH • AT • MONTREAL •
 • FRANCE •

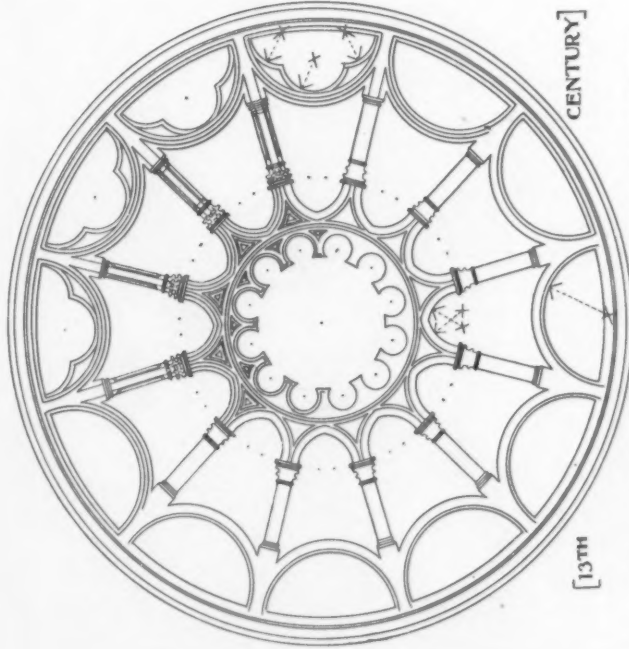


[1863 • 69]
 • ST. AMBROISE • CHURCH • PARIS •
 [BALLU ARCHT.]

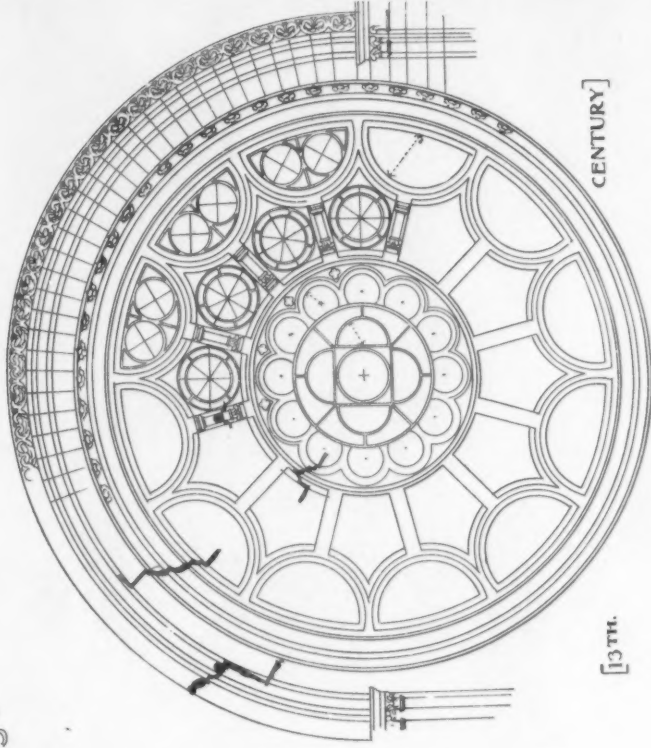


[VIOLLET • LE • DUC
 1863 • 69]
 • D'AILLANT • SUR • THOLON •
 • FRANCE •
 SCALE 0 5 10 FEET.

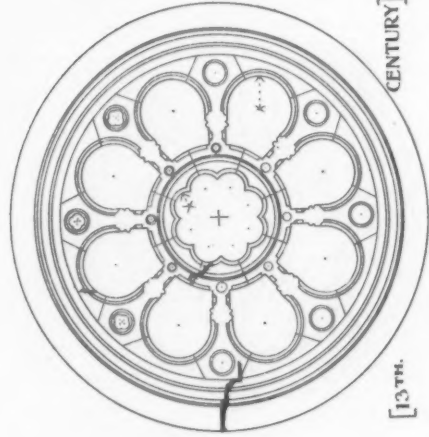
III



[13TH CENTURY]
 • RHEIMS • CATHEDRAL • FRANCE •
 SCALE 0 5 10 FEET.



[13TH. CENTURY]
 • LAON • CATHEDRAL • FRANCE •



[13TH. CENTURY]
 • CHURCH • AT • CROISSY •
 • FRANCE •



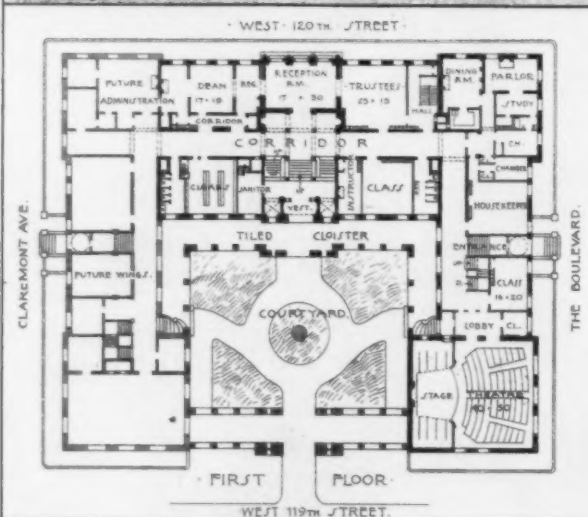
PHOTOGRAPHED BY S. B. BOLAS & CO. II, LUDGATE HILL, E.C.

THE NATIONAL GALLERY OF BRITISH ART
(THE GIFT OF
SIDNEY R. J. SMITH.



INK-PHOTO. SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

BRITISH ART GALLERY, MILLBANK, S.W.: INTERIOR OF GALLERY.
(LEFT OF MR. HENRY TATE.)
J. SMITH, F.R.I.B.A., F.S.I., Architect.



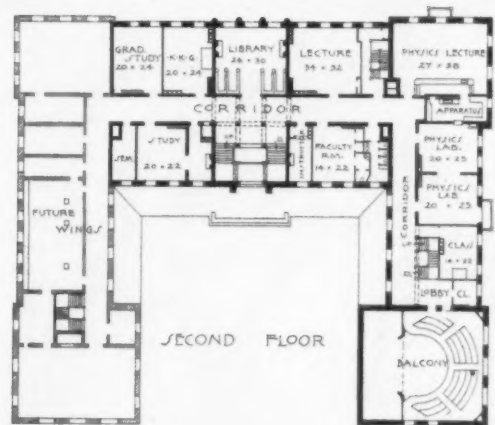
BARNARD COLLEGE, WEST ONE HUNDRED AND NINETEEN

LAMB & FOSTER

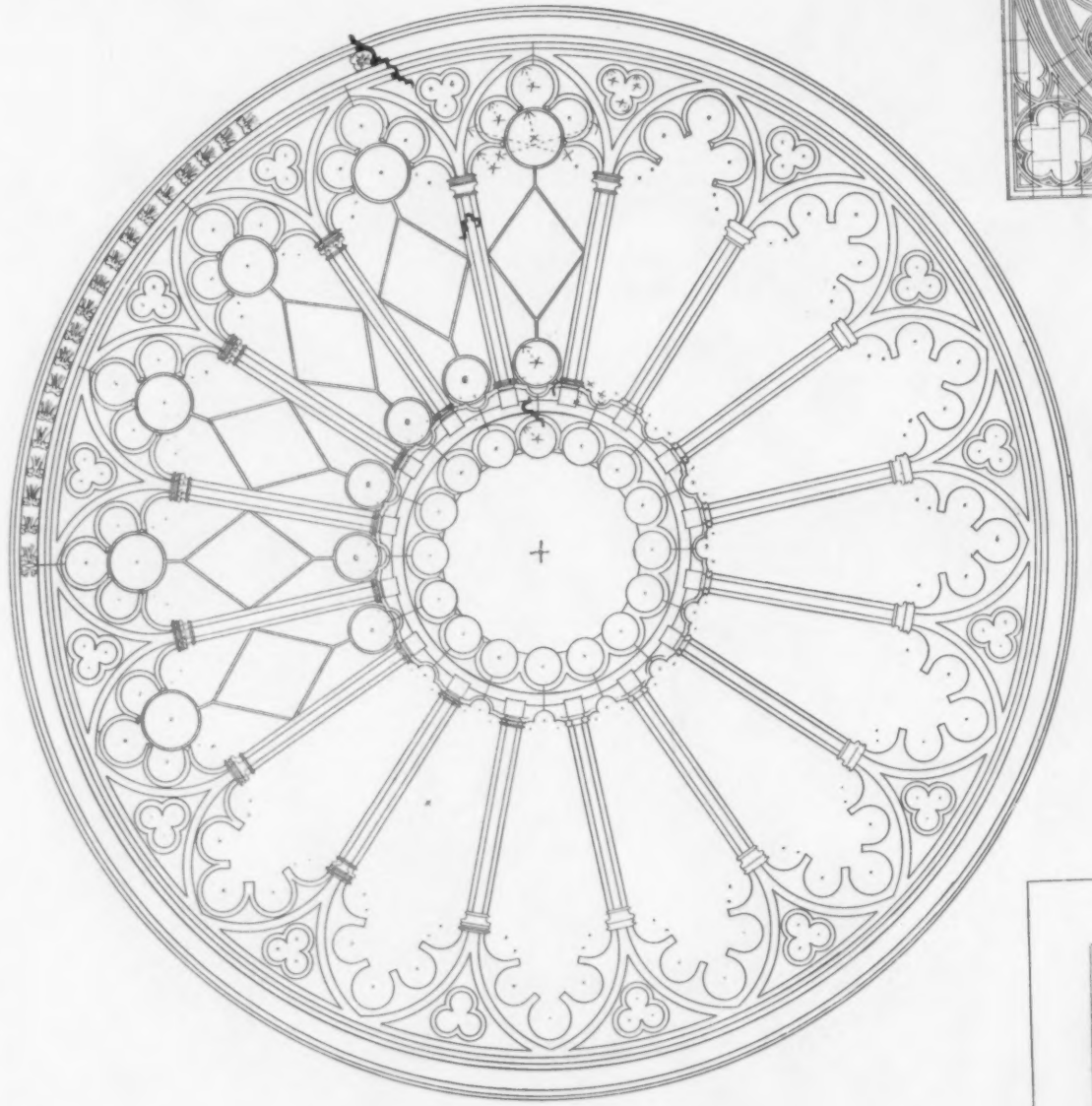


AND NINETEENTH STREET AND THE BOULEVARD, NEW YORK, N. Y.

AMB & RICH, ARCHITECTS.



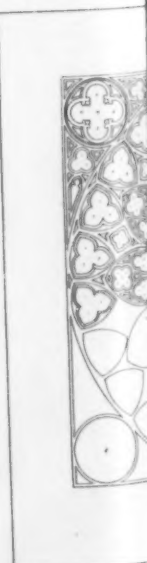
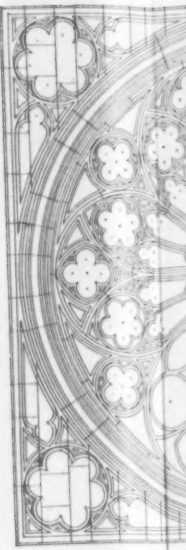
REPRODUCTION BY BOSTON

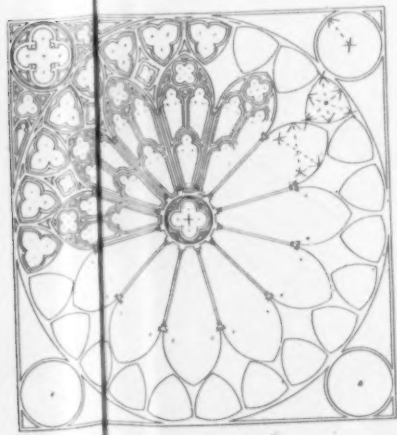


ROSE WINDOWS.
IV

WEST WINDOW.
CATHEDRAL OF SOISSONS.
FRANCE.

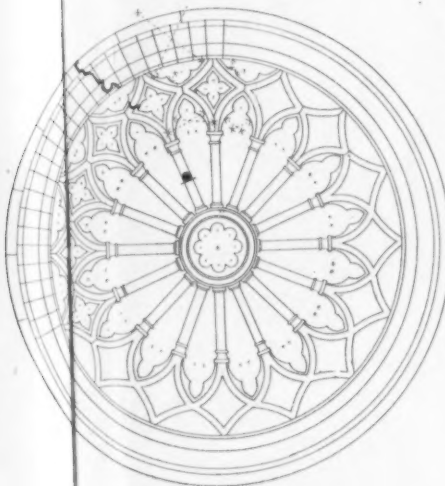
SCALE — FEET.
[13TH CENTURY]



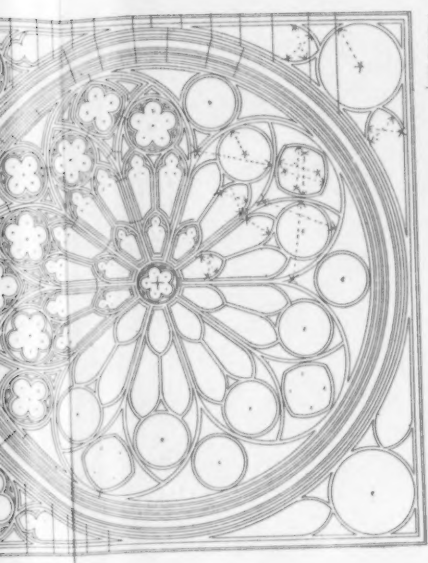


[13TH. CENTURY]

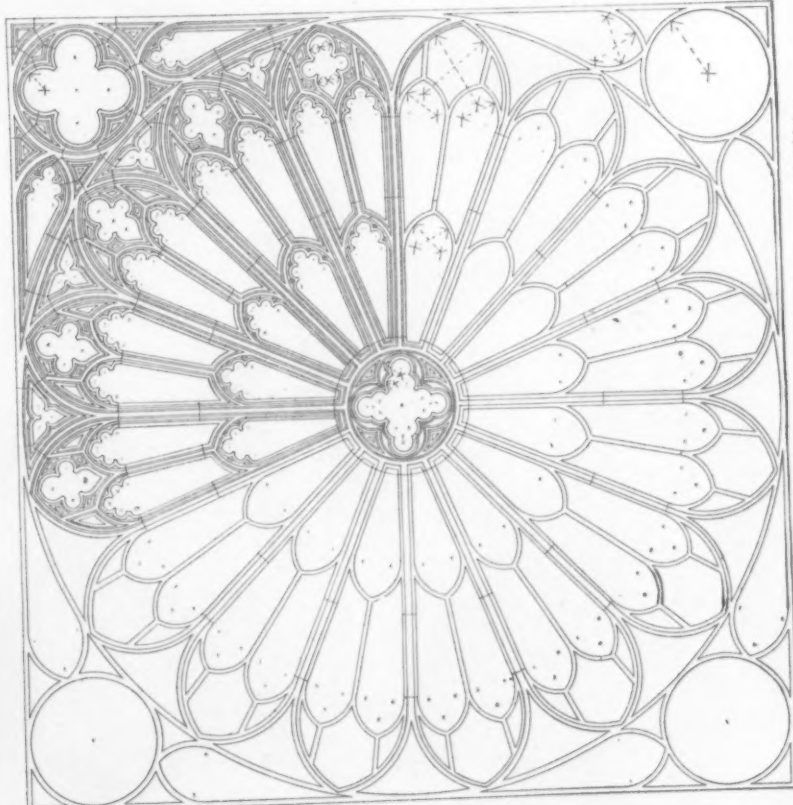
° SOUTH · TRANSEPT ·
° CATHEDRAL · SEEZ · FRANCE ·
SCALE 0 5 10 FEET



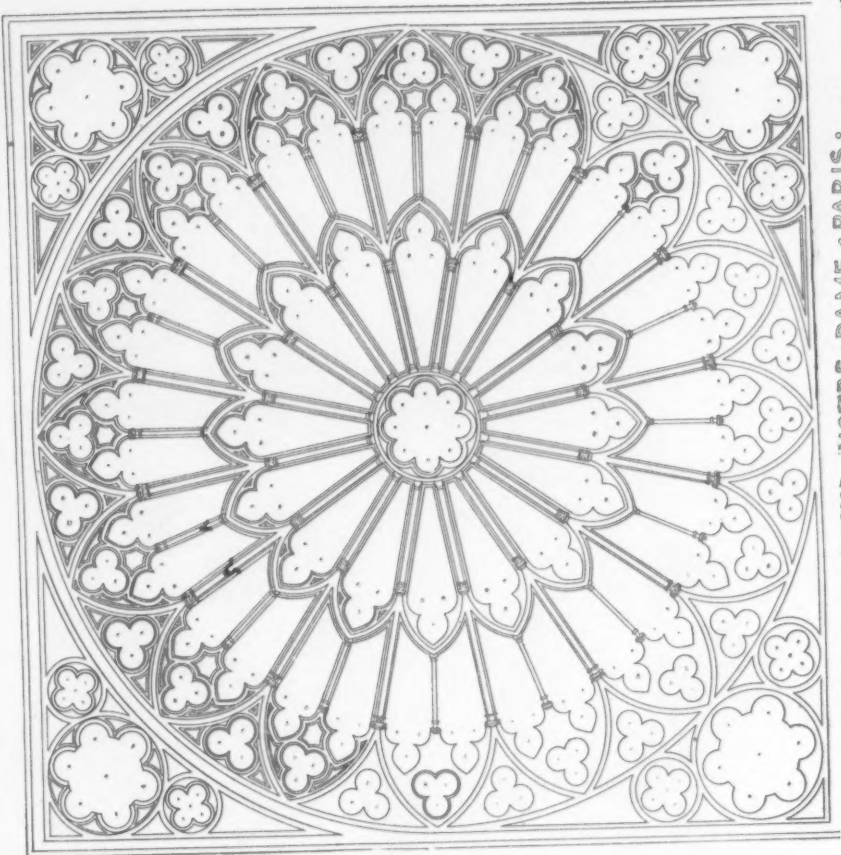
° CATHEDRAL · CREMONA · ITALY ·
SCALE 0 5 FEET



[1836-79] ° VOTIVE · CHURCH · VIENNA · [FERSTEL ARCHT.]
SCALE 0 5 FEET



° SOUTH · TRANSEPT · WESTMINSTER · ABBEY ·
SCALE 0 5 10 FEET



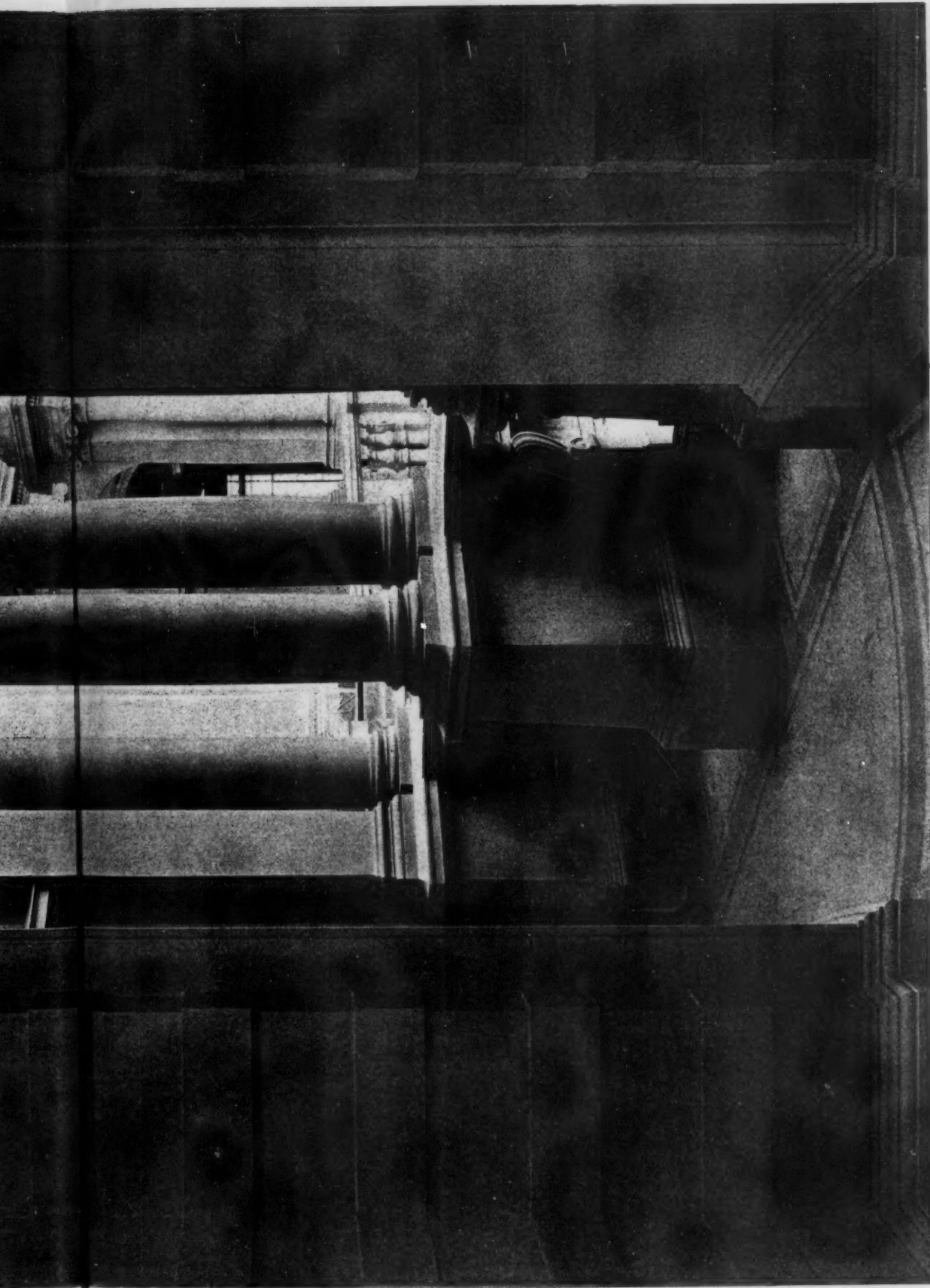
[13TH. CENTURY]

° NORTH · WINDOW · NOTRE · DAME · PARIS ·
SCALE 0 5 FEET

AMERICAN ARCHITECT AND BUILDING NEWS, SEPT. 18, 1897.

No. 1134



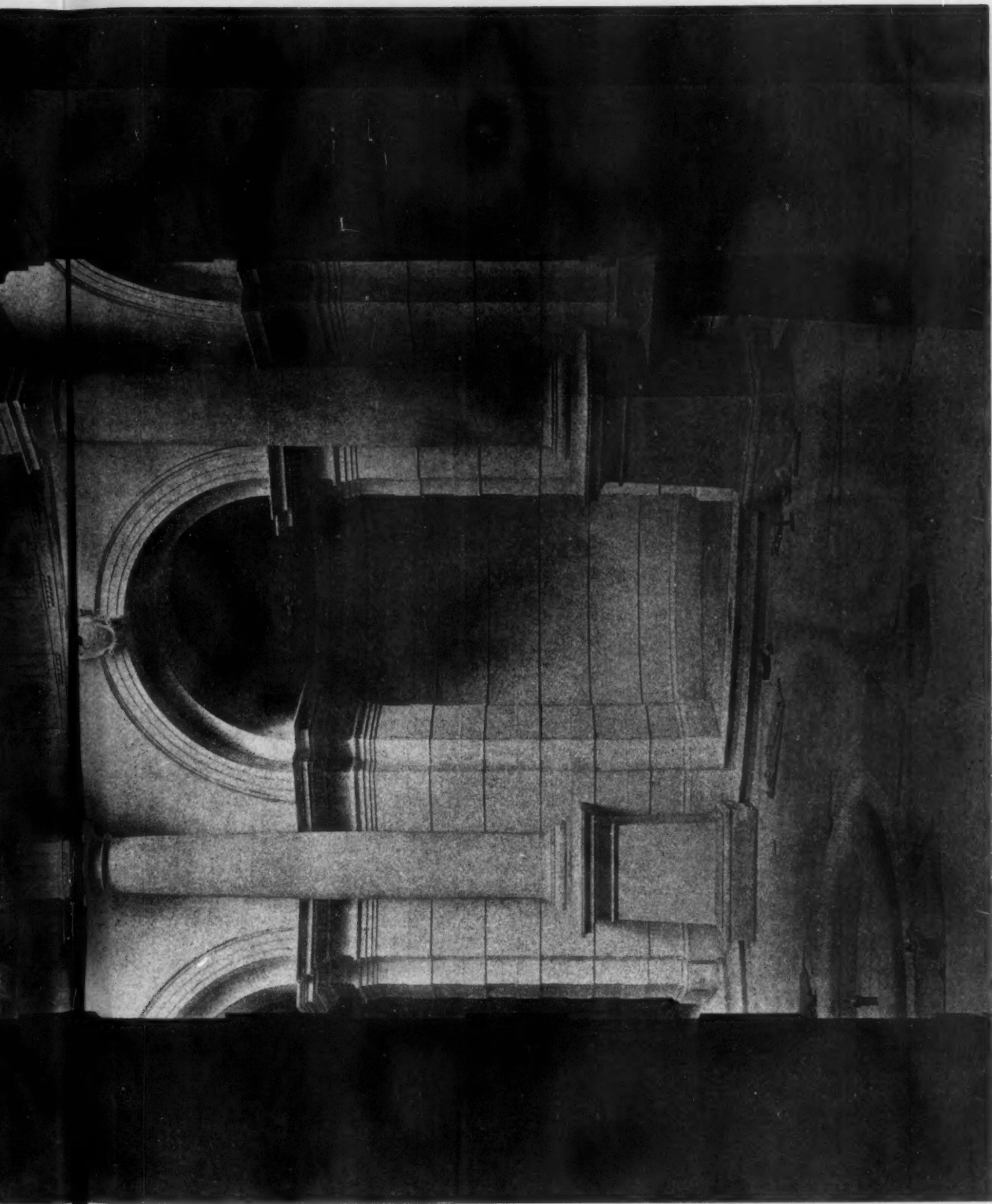


INK-PHOTO. SPRAGUE & CO. 48 & 5 EAST HARDING STREET FETTER LANE, E.C.

PHOTOGRAPHED BY S. B. BOLAS & CO.

THE NATIONAL GALLERY OF BRITISH ART, MILLBANK, S.W.: PART OF UPPER GALLERY.
(THE GIFT OF MR. HENRY TATE.)
SIDNEY R. J. SMITH, F.R.I.B.A., F.S.I., Architect.





PHOTOGRAPHED BY G. S. BOLAS & CO

184- PHOTO. SPRAGUE & CO 48 EAST HAWKING STREET, FETTER LANE, E.C.

THE NATIONAL GALLERY OF BRITISH ART, MILLBANK, S.W.: BAY OF SCULPTURE GALLERY.
(THE GIFT OF MR. HENRY TATE.)
SIDNEY R. J. SMITH, F.R.I.B.A., F.S.I., Architect.