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CONTENTS.

EDITORIAL SUMMARY.
THE CONGRESSIONAL LIBRARY BUILDING AT WASHINGTON.
THE SO-CALLED COLONIAL ARCHITECTURE OF THE UNITED STATES. — IV.
ELECTRICAL SCIENCE FOR ARCHITECTS. — XI.
VENTILATION OF HOSPITALS.
SOCIETIES.
EXHIBITIONS.
NOTES AND CLIPPINGS.

ILLUSTRATIONS.

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CONTENTS

SUMMARY: —

Proposed "Girdle Line" Railway and Driveway for New York City. — The Bearing of Foreign Precedent on the Matter. — Transcontinental Traffic and American Seaports. — Insuring the Stability of Buildings. — The Albany Capitol. — Effect of the Recent Earthquake at Florence. — The Ownership of Trade Secrets. — The Monument to commemorate the Capture of Louisburg. — The New York Aquarium. 93

THE CONGRESSIONAL LIBRARY BUILDING AT WASHINGTON. . . . 95

THE SO-CALLED COLONIAL ARCHITECTURE OF THE UNITED STATES. — IV. 97

ELECTRICAL SCIENCE FOR ARCHITECTS. — XI. 99

VENTILATION OF HOSPITALS. 102

SOCIETIES. 103

ILLUSTRATIONS: —

House of C. W. Henry, Esq., Wissahickon Heights, Philadelphia, Pa. — Progressive Views of the Congressional Library, Washington, D. C.: Two Sheets. — St. Clement's Memorial Church, St. Paul, Minn.

Additional: The Hall: Kellogg Terrace, Great Barrington, Mass. — The Entrance Hall. North Eastern Station Hotel, Newcastle, Eng. — Reading-room of the Same. — Spa Mansions, Bermondsey, Eng. 103

EXHIBITIONS. 104

NOTES AND CLIPPINGS. 104

MR. ALFRED H. THORP, a well-known New York architect, has presented to the Rapid-Transit Commissioners of that city a plan for securing greater accommodation for traffic which strikes us as extremely well-studied, sensible and practicable. In brief, Mr. Thorp's plan is to construct a "girdle line" of railway, encircling the lower portion of the city, and built on the present water-front. At present, the water-front of New York consists of a succession of old wooden wharves and docks, reached by a string of dirty streets, passing the heads of the wharves. These streets, — West Street, South Street, and so on — Mr. Thorp proposes to retain, giving them a uniform width of sixty feet. Beyond them, toward the water, he proposes that the present piers, most, if not all, of which belong to the city, shall be abandoned, and their site, to a width of one hundred and sixty-four feet, filled-in. One hundred feet in width of this space is to be sold, giving space for warehouses, which will have one front on West and South Streets, and the other on the new rapid-transit avenue, with which the remaining sixty-four feet is to be occupied. This avenue is to accommodate, at the level of the ground, a paved street, for heavy teaming. Above this is to be a six-track railway, furnishing two tracks for freight, two for express trains, and two for accommodation trains; and above this an asphalted driveway for light traffic. Beyond this "girdle" avenue new and substantial piers and docks are to be built.

THE asphalted "boulevard," or pleasure drive, on top of the railway structure seems to us unnecessary and expensive, and it would interfere very much with the transfer of freight between the warehouses, the freight tracks and vessels lying in the docks beyond, which is perhaps the most important part of the whole project. It is well known that the commercial growth of New York has been much hindered by the lack of proper facilities for the transfer of freight to and from ships. It is a common remark among the merchants of the city, that it costs less to bring goods from London or Paris to the steamship pier in New York than it does to transport them a mile or so from the pier to the store where they are to be sold; and a great deal of freight is sent to other ports, where the accommodations for transfer are slightly less miserable, to save a part of this exorbitant tax. So long as New York was rich and flourishing, and the millions of dollars annually wasted in this way could be recouped out of the pockets of retail purchasers, the merchants did not care very much for losing a part of their business, but the competition between cities, which has reached a high development in Europe, is beginning to manifest itself here, and it will not be long before New York will have to see that its merchants are on an equality with those of other cities in regard to the cost of carrying on business, if it wishes to retain its place in American commerce. Some twenty years ago, a struggle for business began among the countries of Continental Europe, which it is instructive for us to study. The first step in diverting business from its usual channels, to the profit of persons intelligent enough to devise means for accomplishing this result, seems to have been the construction of the Mont Cenis tunnel. To the ordinary observer, this was simply a hole through a mountain, by which people who wanted to do so could get from France to Italy without climbing over the top, and it would probably surprise people unfamiliar with the movement of commerce to be told that the digging of this hole through a rock resulted, within a few years, in the closing of great mercantile establishments in England and other parts of Europe, and in the abandonment of steamship lines in which millions of dollars' worth of property had found profitable employment; yet this is only a small part of the commercial revolution which followed the opening of a short route, by which the vast traffic between Northern Europe and Asia, instead of passing through Southampton or Marseilles, could be transferred by rail to Brindisi, and thence, by a short water transit, to Alexandria, Smyrna or Suez. Marseilles, seeing the mail-bags and fast freight fly past, on their way through the tunnel to the English steamers at Brindisi, solaced itself with successful attempts to attract local shipping business by remodelling its piers, and building splendid docks, and soon recovered a part of its traffic. Then Genoa began to wake out of its mediæval sleep, and, stimulated by a contribution of four million dollars from a patriotic citizen, pulled away its old wharves, and built a system of docks rivalling those of Marseilles, by the help of which it began to draw business away from the latter city. The Germans and Swiss, seeing trade diverted from the Rhine valley to the more roundabout, but quicker, route through France, determined to open a commercial sluice through the Alpine barrier on their own account, and spent many millions in the construction of the St. Gothard tunnel, which has already become so inadequate to the vast traffic which is poured through it, that contracts have been made for enlarging its capacity. These two tunnels left Austria, which had, by the way of Trieste, enjoyed a certain portion of the trade between North Europe and the Levant, rather in the lurch; and the Austrian Government was quick-witted enough to enter promptly the struggle for commercial advantage before its seaports should be entirely abandoned and forgotten, by constructing at its own expense the splendid Arlberg tunnel, connecting the Austrian and South German railway systems at Innsbrück with those of Western Europe at Zürich. Now the French, who have ascertained, by careful investigation, how much traffic is diverted from them by the other tunnels, have just signed contracts for a tunnel through the Simplon mountain, to connect Milan, by way of Domo d' Ossola, with the Rhone Valley, Geneva and the railways of Central and Western France.

MEANWHILE, the seaports of Northern Europe have been contending with each other for the traffic which has been poured through the Alpine tunnels. Antwerp, Amsterdam and Rotterdam have vied with each other in endeavoring to attract shipping business by improving facilities for transfer; and lately, Hamburg, although rather out of the direct route, has joined in the struggle, by providing a system for handling and transferring freight almost unrivalled in the world. The contrast between the shipping facilities provided in these seaports, and those of our own country, is, at present, absolutely ludicrous, but the American commercial world is slowly awaking to the fact that the exchange of sea-borne freight for native products involves business for the railroads, and employment for a great number of people; and certain cities are actually beginning to discuss the question whether it might not be desirable to attract shipping, by providing some means for delivering and transferring freight expeditiously and economically. In Boston, it is rumored that as much as two hundred thousand dollars is to be spent in completing a certain wharf, the foundations for which were laid thirty years ago; and the air in New York has for some time been thick with schemes for new systems of docks. Whether these will come to anything remains to be seen, but it certainly will not be many years before some one will find out that the quickest, safest and most comfortable route from Northern Europe to Japan, China, Australia, New Zealand, the west coast of South America, and Mexico, lies by the way of the seaport towns of the United States, between the thirty-ninth and forty-third parallels of latitude, and it will not be long, after that discovery is made, before these seaport towns, if there is any enterprise left in them, will be eagerly competing for the enormous traffic in teas, silks, wool, camphor, gold and silver, cottons and manufactured goods, which now passes between Northern Europe and Eastern Asia and Oceanica, a traffic which would keep every freight-car on every trans-continental railroad in the United States, with many thousands in addition, in constant employment, while it would support an army of people in the localities most directly concerned.

WHAT may become a very important movement has been started in New York. It is well known that several buildings in and about that city have recently fallen down. The owners have been unable to collect indemnity from the insurance companies for their loss, for the simple reason that all New York fire-insurance policies provide that the contract of insurance shall not apply to cases where the building, or any part of it, falls before taking fire; and some of them have been influential enough to procure the appointment of a committee of the Board of Trade, to confer with a similar committee of the fire-underwriters on the matter. The conference resulted in showing that, under the State laws, fire-insurance companies cannot insure against the fall of buildings, or pay losses caused by the fire after such a fall; and it seems probable that the demand for such insurance may cause the formation of new companies, organized expressly to furnish it. There is no doubt that the business would, at first, be profitable, for the contingency of the fall of a structure is an extremely remote one, and a small fraction of the rates charged for fire-insurance would be amply sufficient to cover it. If, however, the practice of insuring in this way should become general, the rates would fall, and the companies engaged in the business would naturally try to exert their united influence to improve the stability of ordinary construction. Such influence might, hereafter, become a powerful factor in the practice of building. Although the influence of the fire-insurance companies on the art of construction has not been, in all respects, favorable, no one can deny that it has been very great; and a similar, or rather, supplementary influence, exerted in favor of stable and rigid building ought to be useful. We presume that the day has gone by when an insurance company of the sort would favor bad construction, on the ground that an occasional collapse of a building was "good for the business"; and that stability insurance would be managed as rationally as fire-insurance now generally is. With that proviso, the new movement is certainly to be encouraged.

THE completion of the great Albany Capitol, which has cost already more than twenty-one million dollars, has been entrusted to a new Commission, with the provision that henceforth only the ornamental work shall be done by day labor, all the rest of the work being done by contract. Mr. Perry, the present Commissioner, estimates that it will cost nearly three million dollars more to complete the building. The new Commission is to be composed of the Lieutenant-Governor, the State Engineer, the Superintendent of Public Works, and two other persons, one of whom must be an architect of, at least, ten years' experience in the practice of his profession. The members of the Commission are to receive no pay for their services. Mr. Perry, the present Commissioner, is to remain in the employ of the new Commission, as architect and superintendent of the works. As the professional member of the Commission, it is understood that Mr. Archimedes Russell, of Syracuse, is to be selected.

EVERY lover of art will regret to hear that the recent earthquakes in Tuscany have done sensible injury to the Cathedral of Florence, one of the greatest pieces of architecture in the world. We have not yet any details of the damage to the building, but anything that may compromise the safety of the dome, at least, would be deplorable. A more serious consideration, perhaps, is to be found in the probability, which the earthquake indicates, that the shock may be repeated. The best modern explanation of these phenomena appears to be that they are simply sudden subsidences of the ground, by which a cavity, formed by the escape of pent-up gases, the action of water, or, perhaps, the mere shrinkage of the lower strata, is filled by the yielding of the mass above; and, as the cavity is apt not to be entirely filled by the first movement, subsequent shocks are likely to occur, which may be more severe than the early ones. Florence has been for many centuries comparatively free from such disturbances, and even the terrible earthquakes which ravaged the Mediterranean coast, between Nice and Genoa, a few years ago, made no impression upon it. What may be the movement which has now begun, and how much farther it will continue, it would be interesting to know.

A CURIOUS case was decided in Philadelphia the other day, where a certain Dempsey, lately a dyer, employed by the firm of John & James Dobson, carpet manufacturers, brought suit against the firm to recover fifty thousand dollars, the value of certain secret formulas and other private memoranda in relation to the art of mixing colors, recorded in certain books, belonging to him as his personal property, which, as he alleged, had been forcibly seized by the firm, and the formulas and secrets copied without his consent. The members of the firm, on their part, contended that the books in question belonged to the establishment, not to Dempsey, and alleged that they were compelled to take them from Dempsey, when he left their employ, because he had, before leaving, maliciously removed the numbers from the vessels containing the dyes, thus destroying the means of identifying them. After considering the subject for two hours, the jury brought in a verdict for Dempsey of ten thousand dollars.

IT will be remembered that the Massachusetts Historical Society has been taking steps to commemorate, by a suitable monument, the capture of Louisburg, Quebec, by the troops of the Colony of Massachusetts Bay, an exploit which was the pride of our forefathers, until the greater deeds of the Revolution eclipsed its glory. It seems that news of this intention of the Society must have reached the capital of the Dominion, for a few days ago, one of the distinguished Senators of the Dominion Parliament made a speech, denouncing the Society's action as "an unheard-of impertinence," and "offensive to a large number of loyal Canadians." Whether he wished the Imperial Government to declare war against the Historical Society, or only to demand indemnity, and send a garrison to occupy its library until the demand should be complied with, does not appear; but the Honorable Prime Minister explained that the Society had not asked the consent of the Canadian Government to its undertaking. He announced, however, that this consent had not been given, so that a *casus belli* is evidently available in future for any Canadian Government that may choose to claim that such consent is necessary.

THE students of natural history who, like certain of our acquaintance, have been anxiously awaiting the opening the great Aquarium which has long been in process of construction in Castle Garden, New York, may be interested to know that the opening has been delayed through certain mistakes in planning, which are described in the *Tribune*. In the first place, the glass for the fronts of the lower tanks appears not to have been thick enough to withstand the pressure of the water. As there is hardly anything easier to calculate than hydrostatic pressure, unless it be the resistance of plate-glass to such pressure, it is astonishing that such a mistake should be made, but the fact remains, according to the *Tribune*, that when the lower tanks, which are five feet deep, are filled with water, the glass fronts are apt to give way. Another trouble is said to be that the upper tanks are so near the glass roof that the water in them becomes very warm in hot weather, and the fish die in consequence; while the water which is pumped through the tanks is, at low tide, so mixed with the fresh water poured into the harbor by the Hudson River as to be unsuitable for sea fish, which suffer in health, and often die, as a result of this inattention to their wants. To make the changes in the building necessary to prevent the tanks from bursting, and to keep the fish in them alive and happy, will cost something like thirty-five thousand dollars, and it will be impossible to open the Aquarium to the public before October.

THE CONGRESSIONAL LIBRARY BUILDING AT WASHINGTON.

A PRODIGY is being performed at Washington. A public building is being constructed within the time fixed for its completion and within the limit of cost set by Congress! Nothing like this has been known in the history of the Supervising Architect's office. Nothing like it has occurred within the knowledge of any other Government Bureau having charge of the construction of a building for the Government.

"Estimates have been carefully made to see that the cost of construction should not overrun the limit fixed in the Act of March 2, 1889," says the report of Brig.-Gen. Thomas L. Casey, Chief of Engineers, U. S. A., in his report to Congress on the Building for the Library of Congress, "and there is now no reason to anticipate that either this limit of cost or the estimated time of completion in the original project will be exceeded. It is therefore confidently stated that, in the event of sufficient appropriations, the building will be finished early in 1897 and that the total cost will be within the limit fixed by law."

Any one who is at all familiar with the Government's way of doing business knows that "the limit fixed by law" is never considered more than a suggestion of the wishes of Congress for the limitation of the cost of a building or of any other public work. During the debate on the Library appropriation in the House of Representatives some years ago, a Member stated (and the statement was not challenged) that no Government work was ever completed within 33 per cent of the estimate or of the "limit fixed by law": and the excess of expenditure frequently ran up to 50 per cent and even 100 per cent of the original estimate. In spite of this record, the members of the Fiftieth Congress who voted for the amendment to the Sundry Civil Appropriation Bill, putting the Library Building in Gen. Casey's charge, expected him to keep within the limit he had fixed. The record Gen. Casey had made in completing the State, War and Navy Department Building at much less than the architect's estimate and within a much shorter time than was expected, gave the members of the Fiftieth Congress this confidence in his exactness. Present indications seem to show that confidence was not misplaced.

When I speak of original estimate of the cost of the Library Building I do not mean the estimates of the people who had the building in charge before Gen. Casey's time. They differed very widely. The original estimate of the cost of the building, such as competent authorities believed the Government should have, was seven or eight million dollars. The estimate on which the original appropriation was made was less than three million dollars. What became of the difference between these in the juggling of the calculations by a Congressional Committee nobody knows. It is only certain that the proposition to begin the construction of a building at an estimated cost of seven or eight millions was adopted by the Senate and rejected by the House of Representatives in one Congress after another: and that finally the House was persuaded to agree to an initial appropriation by the assurance that the work contemplated would be completed within three years and would cost not more than three million dollars. This proposition was made in a report presented to the House by Mr. Singleton, of Mississippi. The design recommended by Mr. Singleton and his committee was the one prepared by John L. Smithmeyer, of Washington, who had made a special study of library architecture abroad and who had devoted 14 years to perfecting a plan for the proposed Library of Congress. This plan had been considered in a number of architects' contests inaugurated by the Government: and though there were 41 competitors in one of these contests, the Smithmeyer plan was pronounced easily the best submitted. Mr. Smithmeyer received a prize of $1,500 in one of these contests.

As I have said, the proposition to appropriate money for a Library Building was urged in Congress for many years. It was presented in the Forty-sixth Congress, the Forty-seventh Congress, the Forty-eighth Congress without success. The chief promoter of the proposition was Senator Morrill, of Vermont. As Chairman of the Committee on Library during a number of years, he had interested himself in having Congress appropriate money for a Library Building to be erected on one of the large spaces opposite the east front of the Capitol, and for a building for the Supreme Court of the United States to be erected on the other. Mr. Voorhees, of Indiana, was also a consistent supporter of the Library Building for many years. In the House the project had some friends, but the economists who always oppose public improvement on the ground of expense defeated the bill again and again. The urgent need of new quarters for the Library was admitted. In fact, no one who entered the quarters occupied by it and saw the aisles packed with rotting books, and phamphlets going to pieces for lack of proper storage-room, could question the necessity. But the economists always favor renting an old building in place of putting up a new one. They had kept many of the bureaus of the Government in quarters the rental of which was double the possible interest on the investment in a new building. Most of those rented quarters are still occupied. Occasionally one of them, like the old Ford's Theatre building, falls down and kills or maims a few people. And so the professional economists are responsible for a great deal of misery.

The economists in the House wanted to have the Capitol extended so as to make room for the Library. They argued that it would cost less to do this than to put up a Library building. The fact that the Library was entirely out of place in the Capitol (for it is a National Library and not a Congressional Library) was of small importance to them. The fact that the extension of the Capitol would make space merely for the accumulations of the present and not for the possible accumulations of the future weighed with them hardly at all. They insisted on an extension of the Capitol toward the west. This was opposed by the friends of the Library on several grounds. One was the fact that the proposed extension would mar the architecture of the Capitol, which is considered, commonly, a remarkable symmetrical building. Another was the inadequacy of the proposed accommodation. These arguments had no influence with the opponents of the Library-Building appropriation. Then some one suggested that a part of the Library Building be constructed — enough to accommodate the present supply of books — and that the building be pushed to completion slowly as the needs of the Library demanded. It was on this proposition that Mr. Singleton, of Mississippi, made a report to the House of Representatives in 1886. The bill which he presented proposed an appropriation of $500,000 to be used in the construction of "a building of ample dimensions to hold ultimately three million books." This building was to be 450 by 300 feet, covering approximately 2.9 acres. It was to have a stone exterior and an iron and concrete interior and was to be fireproof throughout. It was to be "pleasing and sufficiently ornate without extravagance." The report directed attention to the fact that the British Museum Building covered 5 acres; the building of the National Library of France at Paris 4½ acres; and the Capitol at Washington 3½ acres. The appropriation of half a million was to be used for the building and not for the site, which was not considered in the building estimates. The committee said that a million dollars would be asked the second year and about $800,000 the third year: "which will complete the building for occupancy in all its parts sufficiently for shelving one million books and leaving space for the introduction of additional iron alcoves in the next 50 years," said the committee report. The "ultimate gross cost" of this additional shelving, the committee said, would be $700,000: and as only $14,000 would be expended each year, the receipts from copyrights (then $20,000 a year) would cover the cost and leave a balance for emergencies. The building was to be constructed "substantially according to the plan submitted . . . . by John L. Smithmeyer in the Italian Renaissance style of architecture with such modifications as may be found necessary or advisable without materially altering the cost of the building."

Bungalow at Burlingame, Cal. A. Page Brown, Architect.

This proposition looked reasonable to the members of Congress. A Library Building to be constructed under the Smithmeyer plan (which was attached to the report) was very cheap at three million dollars. Then the economists were hushed by the statement that the estimate of Mr. Walter, the former Architect of the Capitol, for the proposed extension of the Capitol building was $4,500,000 and that the estimate of Architect Clark for this extension was $4,200,000. The argument that it would be cheaper to put up a Library Building than to extend the Capitol for the accommodation of the Library was unanswerable. No one seems to have thought it necessary to consult authority about the estimate of less than three millions. Even the enemies of the proposed building were staggered by the figures presented and they mustered only 68 votes against the bill. The votes in favor of the bill were 159.

Of course there was no doubt of the Senate accepting the appropriation. The friends of the Library-Building project congratulated themselves and each other on this triumph after more than a dozen years of agitation. They would have compromised on much less than half a million as a first appropriation.

The bill, which was passed by House and Senate, was of the loosest description. It established a Commission, composed of the Secretary of the Interior, the Librarian of Congress and the Architect of the Capitol, to have charge of the erection of the building. But it fixed no limit of cost and it set no time for the completion of the building. All of the details which should have been considered by Congress and carefully stipulated in the bill were left to the judgment of the Commission. The leading member of this Commission was Secretary Lamar, a dreamy absent-minded man with no knowledge of building or architecture; the Librarian of Congress, a very practical and level-headed man with more work in the care of the books in his charge than one man should be expected to do; and the Architect of the Capitol, one of the old employés of the Government, accustomed for a quarter of a century to do things in his own way, regardless of the restraint of others, and whose architectural ideas were necessarily antagonistic in some particulars to those of the designer of the proposed building. The Commission appointed Mr. Smithmeyer to be Architect-in-charge. His pay as architect was the only direct reward he was to receive for his designs. But the preparatory work at the proposed site was left to the direction of Mr. Clark, the Architect of the Capitol. And here arose the first trouble. Mr. Smithmeyer did not approve certain work which Mr. Clark ordered. He protested against it and finally brought the matter before the full Commission. Then the preliminaries were put in the hands of Mr. Smithmeyer, and Mr. Clark protested against what Mr. Smithmeyer did. Both of these gentlemen afterward made charges and counter-charges before a Congressional committee which investigated the Commission's work. Neither was convicted of anything worse than bad judgment, and probably the judgment of neither would have been impugned if he had not come into conflict with the other and if one had not thought it necessary to undo what the other had done.

Mr. Smithmeyer denied afterwards that he was responsible for the preliminary work. Whoever was responsible for it remotely, the immediate responsibility rested of course with the Commission: and Congress never placed it anywhere else. The Commission had the ground which had been selected long years before by Senator Morrill condemned and transferred to the Government. Then the work of clearing the ground was begun. The buildings were removed and the excavation was begun as though the entire building proposed by the Smithmeyer plan was to be constructed at once. The appropriation of half a million had been left intact for the building; for Congress had made an appropriation of half a million and then of $85,000 additional to pay for the site. An office was opened, watchmen and messengers were employed (there were seven watchmen and five messengers) and a full office force was engaged. There was an assistant-architect and a disbursing officer and draughtsmen and a sculptor, besides others who need not be catalogued here. The salary-list amounted to about $28,000 a year. In the first year after the law was passed an additional appropriation was asked of Congress, though the first appropriation was by no means exhausted. The House Committee on Appropriations refused to recommend an appropriation. The following year an appropriation of $2,000,000 was asked. About this time, Mr. Smithmeyer got into a controversy with some contractors who had tried to make him accept some cement which he declared inferior. The watchmen and the messengers employed in such great numbers were political protegés of members of Congress. The contractors were people of political influence too. They tried to bring some of that influence to bear on the architect to force him to accept the cement. The architect refused to be coerced or persuaded. He was warmly supported in this position by the *American Architect*. During the controversy a great deal of bitter feeling was engendered. It resulted in an attack on the Library project in Congress. This attack was not confined to the Appropriations Committee, where the request of the Library Commission for an additional appropriation was on file. It came up in the Senate Chamber during a discussion of the question of making appropriations for public buildings, and Senator Plumb (whose tongue was only less bitter than that of his colleague, Mr. Ingalls) made an attack on Mr. Smithmeyer and the Library Commission. The text of Mr. Plumb's speech was the report of the Library Commission for the year 1887. It showed, said Mr. Plumb, that the Government had been getting a large amount of services of architects, washing of towels and hiring of coupés and very little building. He attacked with particular vehemence the purchase of a horse and coupé for the use of the architect. To this attack Mr. Voorhees replied later. He said that six months had been consumed by the Library Commission in the condemnation and purchase of the property. Nothing had been done during the winter months. In the following summer there had been grading and excavations, but toward the end of the summer months the controversy over the cement contract had arisen and this had caused all work to be suspended for the time.

As to the purchase of the coupé, Mr. Voorhees said, that it was an expense made necessary by the long distances the architect had to travel. The larger amounts expended had been used in the tearing down of 45 buildings, the levelling of grounds, the removal of pipes, trees, etc., the filling of cellars and wells and the digging out of the bed of an old creek.

This work that Senator Voorhees catalogued so carefully was made a subject for investigation later: for Mr. Smithmeyer placed on file with an investigating committee of Congress, correspondence showing that he had protested to the Commission against the excavations and other work done by Mr. Clark's orders and particularly against the employment of overseers and laborers at wages much higher than those which the contractors were paying: and Mr. Clark replied that Mr. Smithmeyer had thrown away much good material taken from the old buildings: and Mr. Smithmeyer retorted that the bricks and bats taken from the old buildings were not fit to use in a new building in which the strain was to be so great, and demonstrated that the cost of cleaning 1,875,000 bricks under Mr. Clark's direction had been $5,627 and that the Government had been able to sell only a part of these bricks later for $2,185, and had carted away the remainder as rubbish. All of this dirty linen was washed more or less publicly in September, 1888.

Meantime the House Committee on Appropriations had brought in the Sundry Civil Appropriation Bill with a paragraph giving half a million dollars to the building of the Library, providing that $5,000 should be paid to the architect, $3,000 to an assistant, $4,000 to a superintendent, $2,200 to a chief clerk and distributing agent, and that the remainder should be used by the Secretary of the Interior to employ such skilled workmen as he deemed necessary. The consideration of this paragraph brought up the whole question of the necessity of a Library Building and provoked a lively discussion of the misapprehension under which some members had voted for the original appropriation two years before. It was asserted by some that the committee which reported the bill had assured the House that $3,000,000 would cover the entire cost of the completed library building. Others asserted that they had never understood that the three millions was to make more than a start. Some one wanted to know where Mr. Singleton had got his estimate of three millions. The friends of Mr. Smithmeyer on the floor said that he had never made such an estimate. Mr. Singleton's speech in the House was quoted, and it seemed that he had asserted that his figures came from Mr. Smithmeyer. The architect then came in for a great deal of abuse and he was defended very warmly by his friend, Mr. Kelly, the honored "Father of the House." Mr. Kelly said in the course of a speech: "It has been asked, Why so many officers? I reply, Why so many commissioners to be bothered for appointments and contracts by politicians and personal friends? Again it is asked, Why has that vast excavation been made and the stone-work for the foundation contracted for? I reply, Why so many commissioners to be solicited by so many members of Congress and other politicians for contracts and appointments?" And in this little speech Mr. Kelly probably came nearer to the truth of the situation than any one else. Gossip was busy at that time with the names of a great many members of the House who had interested themselves for friends who wanted favors in connection with the building, and one of these members was investigated later by a special committee of the House on the charge of having attempted to force Mr. Smithmeyer to accept inferior material from contractors.

Whatever the cause of the existing state of affairs, the Library Commission was doomed from the begining of the debate. It had not a friend at court. Even the Commissioners themselves made no attempt to defend the plan. The Secretary of the Interior was quoted as having said to the House Committee on Appropriations, "Gentlemen, I will not permit you to be deceived any longer in regard to the cost of this building. It cannot cost less than ten millions and it may cost more." At that time $200,000 of the original $500,000 had been used. It was evident before the debate in the House had proceeded far that the expenditure of this money would have to stop. Mr. Ryan proposed that a committee of the House invite five eminent architects to submit designs and specifications for a building not to cost more than $3,000,000. Pending their report in the following December, work was to be suspended. This was adopted by the House. In the Senate an amendment was inserted, proposing the appropriation of $1,000,000 for the continuation of the work under the direction of the Chief of Engineers according to "Plan No. 1," which covered the west front of the proposed building and a central building for the library itself. The subject was debated at great length in both Houses during the conference on the bill and the following provision was agreed upon by the conferees as a substitute for both amendments: Half a million dollars to be appropriated for the building of the Library of Congress; all appropriations to be expended under the direction of the Chief of Engineers who should have control of the employment of all men and the making of all contracts; the law of 1886, so far as it accepted the plan of J. L. Smithmeyer and created the Library Commission, to be repealed; all contracts to be cancelled; the Secretary of the Interior to determine the value of the Smithmeyer plan and the damage done by the cancellation of contracts and to make good the amounts out of the general appropriation; plans to be prepared and submitted by the Chief of Engineers to the Secretary of the Interior and the Secretary of War; the total cost of the building not to exceed $4,000,000 exclusive of appropriations already made.

Under this clause in the Sundry Civil Bill Gen. Casey took charge of the Library building. Mr. Smithmeyer eventually carried his claim to the Court of Claims, which awarded him $58,000 for his plan. This plan was used by Gen. Casey as the basis of the plan which he submitted to the Secretary of the Interior and the Secretary of War — or rather of the plans which he submitted, for he prepared several. One of these plans provided for the accommodation of all the books likely to accumulate in the next 54 years and confined the cost to $4,000,000: another trebled the capacity of the library and increased the cost to $6,000,000. Mr. Reed, of Maine, in the interest of true economy made a fight in January, 1889, for the larger building and Congress increased the limit of cost to $5,500,000 March 2, 1889.

From the day when Congress placed the building in Gen. Casey's hands, it moved forward with a regularity and a precision worthy of all praise. Gen. Casey appointed Bernard R. Green superintendent of the building and Paul J. Pelz architect. Mr. Green had been superintendent for six months under the old regime. Everything was put on a business basis, though the political features of Government work were eliminated with difficulty. Even now, the superintendent is importuned constantly to find places for workmen because of their political standing. During the recent spell of hard times great was the pressure brought to bear on the superintendent. He was urged every day in the week to make places for needy constituents of Congressmen. I was in Mr. Green's office one day when two women came in to ask the appointment of the husband of one of them. They opened with the tale of the Senator who was willing to recommend him for appointment.

"Is he a good workman?" asked Mr. Green.

Oh, yes. He was a very good workman. He had worked for a great many people and they all thought he was a good workman: none better. And Senator Blank thought very well of him and —

"But for whom has he worked?" said Mr. Green.

Oh, for a great many people. And the Senator said —

"Why doesn't he come to see me himself?" said Mr. Green.

Well, he was out of town that day and they thought perhaps they could do him some good by coming and —

"Tell your husband to come to see me," said Mr. Green. "If he is a good workman, perhaps I can give him something to do. There is no vacancy now, but chances offer occasionally. I will be able to judge whether he will suit me when I have seen him. But no political influence will be of the least benefit to him. This work is being conducted like any private contract."

The same answer is given to all. No influence but a business consideration is of the slightest value. Good workmen alone have been employed and these only at times when they could be of the most value in the work. Economy has been considered in the letting of contracts and the result of this is that the work is nearing completion with the prospect of keeping it well within the estimate accepted by Congress in 1889. And General Casey has had some unexpected difficulties to meet. The eight-hour law was applied to all Government contracts by Congress after the estimate of cost had been given. The Supervising Architect of the Treasury said that this law would increase materially the cost of every public building. It has not increased the cost of the Library Building enough to eat up the margin which the estimate of the Chief Engineer left as insurance against the unforeseen when he made his estimates. There have been strikes, too, and one inquiry by Congress concerning the use of foreign marbles.

During the time between December 1, 1888, and March 2, 1889 (when the plan for the Library Building was adopted finally), the Chief Engineer had draughtsmen employed making general detail drawings for the several designs he had submitted to Congress. On the final selection of the design to be followed, it was possible to advertise almost immediately for some of the materials. The first advertisements were issued March 18, 1889. April 4, a small force of workmen began preparing the way for the excavations. April 10 stone-cutters were put to work. By May 15, the work of construction was fairly under way. The work continued throughout the summer with an increasing force of workmen, and by December 2, when the report of the Chief Engineer was made, the building had practically reached the level of the ground. During the winter of 1889-1890 the derricks were put in place and excavations for boiler and coal vaults were begun. Stone-setting and brickwork were resumed April 3. In 1890 all the basement story (the first story above the ground) was built and the iron girders, the arching, etc., constituting the first-story floor were put in place. The court walls of the first story were brought more than half-way up to the second-story level. The preparation of dressed granite went on through the winter; and in the summer of 1891 the front walls were carried to the height of the second-story floor, while most of the walls of the courts and book-stacks were finished to the height of the curtain and book-stack roofs. The iron-work of the book-stacks was put in place during the ensuing winter and the derricks were raised. All the court walls were completed in the summer of 1892 excepting the attics of the pavilions. The heating, steam-supply and pumping apparatus were almost completed, the main book-stacks were finished and the roofs put on. There was some delay in the work on the exterior walls during this season, because of a disagreement between workmen and their employers in the granite quarries, and later between the contractors and the stone-cutters in Washington. In 1893 the dome was erected and completed. The exterior walls were built up to include the lower members of the entablature all around, while the whole entablature was completed on the north and west curtains and west main pavillion. The marble finish of the reading-room and the main stair hallway was begun and considerably advanced. The last stone of the superstructure was laid July 7, 1894. The stonework of the porte-cochère, porch and main entrance steps was nearly finished that summer and the coping of the area walls was laid. All of the remaining roofs and skylights were put in place. The winding stairways of iron from basement to gallery were built in the eight wells of the main piers of the rotunda. The windows were glazed and the building was completely closed-in. Since that time the interior work has progressed rapidly and everything points to the completion of the building by the time specified by General Casey in his original estimate — early in 1897.

This result has been made possible by the wisdom of Congress in divorcing this work entirely from politics and in making the needed appropriations for it year after year. General Casey has had all the money he needed each year. He has carried on the work as though he were constructing a private residence and paying for it out of his private funds. The new Library when completed will be something to point out to the tourist as the one Government building which was completed on time and which cost no more than the original estimate. GEORGE GRANTHAM BAIN.

THE SO-CALLED COLONIAL ARCHITECTURE OF THE UNITED STATES.[1] — IV.

THE MIDDLE PROVINCES: DOMESTIC ARCHITECTURE.

Fig. 29. Dutch Manor, Long Island, N. Y.

WHEN Nieuw Amsterdam became New York, only about sixty years after its founding, the Dutch had already impressed many of their characteristics upon the architecture. Of these, some were soon outgrown, others persisted for a long time. It is quite natural that English elements at last prevailed. But there is, after all, only a slight resemblance between the architecture of New England and that of the Middle States. In some localities English influence hardly has been felt at all.

In New York City but little of the old work remains. One might expect that this city, with its 24,000 inhabitants in 1776, would have left us important structures. But fires and progress have made great havoc, or as Richard Grant White cleverly phrases it: "Old New York has been swept out of existence by the great tidal wave of its own material prosperity." But what remains is always interesting and valuable, often priceless.

The entire field is the one least investigated by writers upon architecture. An attempt to classify the few examples of which data are obtainable might prove futile. It is, however, certainly interesting to note peculiarities and points of similarity or dissimilarity between the Colonial work of this and of other sections.

New York was not only the most tolerant of all the colonies towards religious beliefs, but it was also the most eclectic and cosmopolitan in all matters, including building. Even before the peaceful English occupation eighteen languages were spoken in this city of New York, then having only 1,500 inhabitants. This little Babel welcomed every style of architecture and every kind of building material. In New England we found wood to be characteristic. In the Southern Colonies frame structures were, as we shall see, extremely rare. But in the Middle Colonies, as was eminently proper, wood and stone, brick and stucco were employed. The roofs were covered with every available material — slate, shingles or tile, tin, lead or copper.

It has been pointed out how despised the log-cabin was in New

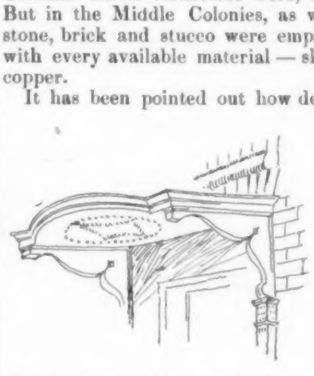

Fig. 30. Door-hood, Van Rensselaer House, Greenbush, N. Y.

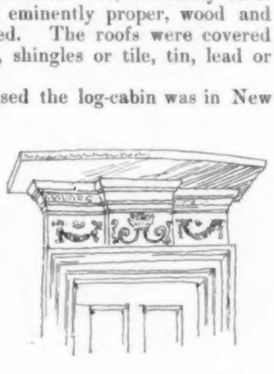

Fig. 31. From the House of New York's Third Mayor.

England. It was, if possible, still less thought of in this section. No Dutchman is known ever to have erected one for his dwelling.

[1] Post-Graduate thesis of Mr. O. Z. Cervin, School of Mines, Columbia College. Continued from No. 1014, page 88.

If he ever was forced to such a dire necessity, he must have succeeded, sooner than did his northern fellow colonist, in replacing it with something more acceptable.

Nor did the typical New England cottage, with its long sweep of roof, find much favor. Some do occur, but the Dutchman preferred to have a long slope to the front as well as to the rear. (Figs. 29, 38.)

Fig. 32. Typical New York Dormer.

Fig. 33. Old Doorway, 116th St., New York City.

Fig. 34. Van Rensselaer Manor, Greenbush, N. Y.

Splendid Classical fronts, such as that of Longfellow's home, are rare indeed. The few that belong to this type generally lack any attempt at strict correctness in detail and monumentality in treatment.

Much, too, is lost by the absence of roof-balustrades. For, though these are certainly without any practical value on a pitched roof, they seem almost indispensable for a good finish, at least for large houses. But there were few lofty houses. The phlegmatic Hollander looked upon long flights of stairs as a nuisance. His ceiling was high enough if it was eight or nine feet above the floor. There seemed to him to be no use for a second story, when an attic might do. His house tended rather to horizontal dimensions.

Fig. 35. Van Rensselaer Mansion, 1765, Albany, N. Y. Wings by R. Upjohn, 1840.

Very few absolutely new features are encountered. The stepped gable, which occurred only sporadically in New England, was here found at every turn from the Hudson to the Susquehanna. Very old prints show rows of these gables facing the streets. By degrees they disappear, and even as early as the Revolution they were not very common.

The gambrel roof, which was not used very often, was much modified. Sometimes it included two stories of windows, as in Figure 29. The upper slope was reduced in size so as to become, in many cases, quite insignificant. The long, lower slope was, as in very early New England examples, gracefully curved, so as to soften its angularity and hardness. Many of the ordinary gabled roofs, also, had a neat curve at the bottom of the slope, just at the overhang of the eaves. This overhang, too, is worthy of special notice. Farther north it occurred at every story-level, and gradually disappeared in later houses. But the Dutch retained it, though using it only at the eaves. Sometimes it was made so great as to become a stoop or porch, requiring supporting columns. Hackensack, especially, has many such overhanging eaves.

Fig. 36. Van Rensselaer Manor, 1790, Albany, N. Y.

The details, as before stated, are not very Classic, although generally derived from some Classic source. Many vagaries and oddities occur. It would be difficult to find a precedent for the hood over the rear door of the "ancient" Van Rensselaer manor, at Greenbush, N. Y. (Fig. 30), or for the interior door-trim of a New York house (Fig. 31). Both are charming in their originality and independence.

Typical New York dormers are based, as the Connecticut porches previously described, upon M. Angelo's window treatment (Fig. 32). They continued to be built for a long time, and may still be found on many old houses of this city and of its neighborhood. Another distinct type of dormer is given in Figure 48. The accompanying sketch shows an English precedent from New Castle.

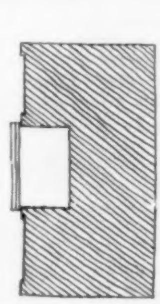

Fig. 37*a*. Block Plan, Apthorpe House, New York City.

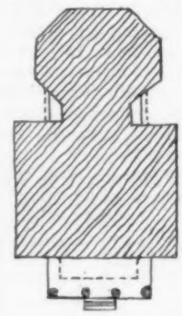

Fig. 37*b*. Block Plan, Jumel House, New York City.

Still another peculiarity was what might be termed "window tracery." In the large cities of Boston, New York and Philadelphia there was evolved a style of light cast-iron bar-tracery, of various combinations of circles, segments and straight lines, with a bit of foliage at some of the intersections (Fig. 33). This was much used for the side-lights and for the transoms of doorways, and is still the most striking feature of old city houses. It is often very delicate, pleasing, and richly varied in design. Sometimes this tracery served to hold the glass, but quite often it was independent of it. Its use continued far down into the Greek revival.

That, in spite of all Dutch influence, English, or rather New England, influences are quite observable, could not be better illustrated than by three Van Rensselaer manor-houses. Especially noticeable is the tendency to roof elimination. The oldest of these, the one called the "ancient," at Greenbush, N. Y. (Fig. 34), is very quaint and picturesque — Dutch throughout. The hood in Figure 30 belongs to this house. Classic influence is very slight.

But the fine old manor at Albany (Fig. 35), built in 1765, shows Classicism in the ascendency. The roof is a peculiar compromise between the gambrel and the mansard. For what should be the upper slope of the gambrel has become a flat deck, but without producing a mansard, for the end walls are carried up to the full height of the roof. The structure is now being torn down and rebuilt for a college fraternity at Williamstown, Mass. The old Dutch scenic

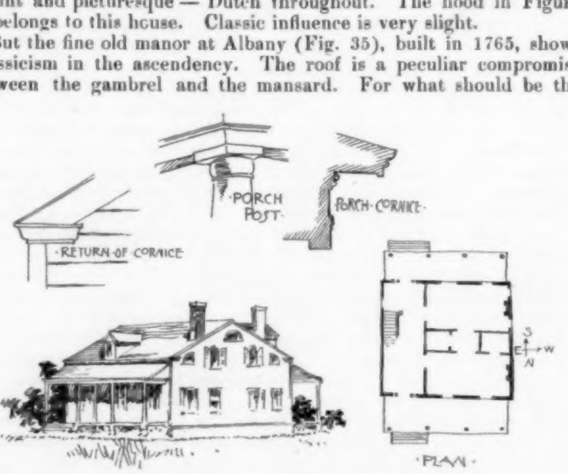

Fig. 38. Old Dutch Cottage, 116th St., New York City.

wall-paper, which ornamented the hall, has been carefully removed for future use.

In the third manor (Fig. 36), also at Albany, Classic conquest is complete. with strongly marked horizontal lines, a flat roof with a balustrade, an engaged Doric portico, and a Palladian window.

Fig. 39. Colonial House, Germantown, Pa.

This building and the preceding are raised up on high basements, a thing which was rarely done in New England.

Several old mansions are still standing in New York and in its immediate vicinity. Many of these depend for historic interest upon association with Washington. Among them is the fine old Jumel mansion at 165th Street and 9th Avenue, built about 1760 (Fig. 37*b*). It has a front porch with very slender two storied columns. The second-story balcony, under the porch, is carried on cantilevers and extends only half as far as does the main porch.

The home of Alexander Hamilton, on the Hamilton Grange, with the thirteen historic elms near by, is also interesting. Its Doric cornice has small inoffensive triglyphs. A balustrade surrounds the flat roof. Two porches only remain of the three which once almost enclosed it upon three sides. No engaged two-story columns or pilasters occur, in fact such features are rare throughout the Middle States, and entirely lacking in the Southern.

Figure 38 represents a little Dutch cottage on 116th Street near 7th Ave. It is now almost overgrown with additions and out-buildings — the result of making a "road-house" of it. At present it is used once more as a dwelling. Another and quite similar cottage is illustrated in Figure 29.

Yonker's City-hall might well be called "ancient," as antiquity goes in America. It was built in 1682 by Frederick Phillipse for his manor. In 1745, it was considerably enlarged. In 1779, its Tory owner having fled, it was confiscated and sold, only to be re-bought in 1868, since which time it has been in use for civic purposes. The structure is rather peculiar, and not very remarkable for beauty. It is long and narrow, two stories high, with a hipped roof relieved by dormers, and crowned by a balustrade running all around the flat deck on top. Upon the long front are two entrances, making it look much as though two houses had grown together.

The Apthorpe House, which until quite recently existed on the corner of 9th Avenue and 90th Street, was somewhat peculiar in plan (Fig. 37*a*). The plan and elevation were quite similar to that of the home of Washington's mother. Each had a deep two-story recess in the middle. On the front were four two-story pilasters.

The early settlers of Pennsylvania were remarkable in many ways. William Penn prepared upon his immense land-grant a refuge for all religious sects. Among these were Quakers, Moravians, Mennonites, Dunkards and Solitary Brethren. In view of such an assemblage of world-eschewing zealots, it is not surprising that Philadelphia is, today, the embodiment of Philistinism.

Many large and often imposing buildings remain, especially in Philadelphia and in Germantown. One of the best of these, a stuccoed brick structure, somewhat remodelled in later times, is given in Figure 39. Stucco seems to have been largely employed — perhaps owing to German influence — often with brick quoins and other brick trimmings. Stone was, however, the chief building-material.

The details generally are hard and crude, and often inappropriate. The home of the Colonial botanist, John Bartram, at Philadelphia, built in 1731, has two-story semi-detached columns with huge Ionic scrolls. The German, rococo mouldings of the window frames, too, are out of all scale with the humble dwelling.

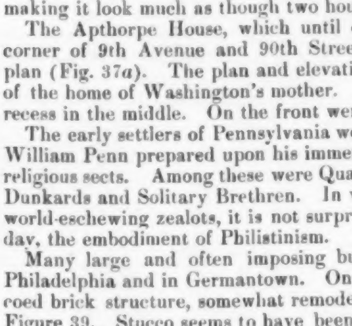

Fig. 40. Saal and Saron, Ephrata, Pa.

In Pennsylvania there were rarely any verandas, porches, or gardens. The fierce fight with the primeval forests had engendered a hatred of shade-trees: the settlers preferred to let the sun bake their unprotected walls.

The founders of New Sweden in Delaware were too few in numbers to exert any great influence. They, however, introduced an entirely new feature in the construction of frame houses. These they enclosed with upright split palisades, a common mode of building in their native country.

Exceptions are often as interesting as characteristics. If anything can be said to be unique, it surely must be a Protestant convent. Such a one was established by the so-called Solitary Brethren (and Sisters), in 1725, at Ephrata, near Lancaster, Pa. This establishment at first grew rapidly in numbers and erected several substantial buildings, some of which are still standing (Fig. 40). These are huge, simple structures, two stories high, with the usual large, steep, German gable. The very small doors and windows, irregularly spaced, produce a gloomy look. The sect, which long ago died out, has been superseded by Seventh-Day Baptists.

INTERIORS.

Hardly anything can be said of the interiors, so few are illustrated. Scenic wall-paper was used somewhat, though only in the best houses. Large wall-panelling of wood was much employed even in ordinary houses. The staircase halls were mostly simple affairs, as in the plan (Fig. 38). The hall of the second Van Rensselaer manor was exceptionally large, 23′ x 46′, and the stairs were in a separate enclosure off this hall. Some few staircase halls were very elaborate, as in the Wadsworth House at Genesee, N. Y., which very much resembled the best work of New England.

In few features was there more uniformity than in the mantels. Many of these from far distant colonies are strikingly similar. It can be said of the greater number of Colonial mantels that they are very pleasing and appropriate in design, and most carefully wrought out in detail. Perhaps they departed more from Classic motives and were less delicate in the Middle Colonies than in the other sections. It was quite characteristic of all the mantels to interrupt the frieze below the shelf with an ornamental panel. A similar device was sometimes resorted to in the entablature over the doors.

(To be continued.)

ELECTRICAL SCIENCE FOR ARCHITECTS.[1] — XI.

THE NATIONAL CODE OF RULES FOR ELECTRIC WIRING. — IV.

INTERIOR CONDUCTORS. — (HIGH-POTENTIAL SYSTEMS.)

12. ALL INTERIOR CONDUCTORS: —

a. Must be covered where they enter buildings from outside terminal insulators to and through the walls, with extra waterproof insulation, and must have drip-loops outside. The hole through which the conductor passes must be bushed with waterproof and non-combustible insulating tube, slanting upward toward the inside. The tube must be sealed with tape, thoroughly painted, and securing the tube to the wire.

b. Must be arranged to enter and leave the building through a double contact service-switch, which will effectually close the main circuit and disconnect the interior wires when it is turned "off." The switch must be so constructed that it shall be automatic in its action, not stopping between points when started, and prevent an arc between the points under all circumstances; it must indicate on inspection whether the current be "on" or "off," and be mounted in a non-combustible case, and kept free from moisture, and easy of access to police or firemen. So-called "snap-switches" shall not be used on high-potential circuits.

c. Must be always in plain sight, and never encased, except when *required* by the Inspector.

d. Must be covered in all cases with an *approved* non-combustible material that will adhere to the wire, not fray by friction, and bear a temperature of 150 degrees Fahr., without softening.

[Section *d.* Insulation that will be *approved* for interior conductors 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 degrees Fahr., and three days' submersion in lime-water, with a current of 550 volts, and after three minutes' electrification.]

[See List of Wires, under Rule 10 (*a*).]

e. Must be supported on glass or porcelain insulators, and kept rigidly at least eight inches from each other, except within the structure of lamps or on hanger-boards, cut-out boxes, or the like, where less distance is necessary.

f. Must be separated from contact with walls, floors, timbers or partitions through which they may pass, by non-combustible insulating tube.

g. Must be so spliced or joined as to be both mechanically and electrically secure without solder. They must then be soldered, to insure preservation, and covered with an insulation equal to that on the conductors.

The *terminal insulators* are the last insulators to which the wire is attached outside the building and from which the wire is lead through the walls. (Figs. 34 and 35.) The wire from these insulators and thence through the wall is to have extra waterproof insulation, because it is this part of the circuit that is most likely to be

[1] Continued from No. 1010, page 49.

near cornices, awnings, etc., and because in passing through holes exposed to moisture there is liability of leakage.

Drip-loops are loops in the wire just before it enters the building. (Figs. 34 and 35.) Water gathering on the wire will run to the lowest point and where there are drip-loops, this water will drip off instead of running into the holes in the wall, which would, of course, increase the danger of leakage.

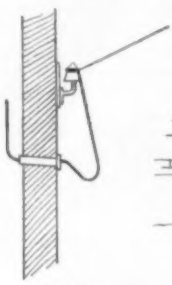

Fig. 34.

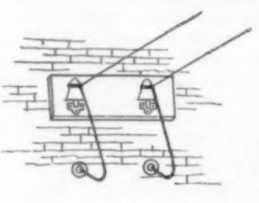

Fig. 35.

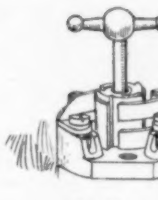

Fig. 36.

It is required that the holes, through which the wires pass, be bushed with non-combustible *insulating-tubes* made of glass, porcelain, or similar material (Fig. 14) because time and exposure do not cause their deterioration, and when, for any reason, leakage does occur over their surfaces, they will not char or burn or become better conductors. The tubes are slanted upward toward the inside of the building so that there will be no tendency for the water to enter.

Moisture is further provided against by winding about the wire and the end of the tube *tape* made of insulating material. This tape is adhesive and can be made effectually to seal the end of the tube, if it be afterward thoroughly painted with waterproof paint.

A *service-switch* is a switch in the service-wires [See remarks under Rule 10.] by which all connection between the main distributing wires in the street and the wiring in the building may be broken.

"*Snap switch*" is the name given to the small circular switches used ordinarily to turn incandescent lamps on and off. One form is shown in Figure 36. When the handle is moved slightly, a spring of considerable strength comes into play and snaps the switch into position, thus breaking or making the circuit quickly and preventing the longer arc that would form if the switch were thrown into position by the slow movement of the hand.

The *hanger-board* is the slab of insulating material fastened to the ceiling, from which arc-lamps are hung. (Figs. 43 and 44.) They usually have mounted on them connection-blocks for the wires, and a switch by which the current may be cut off from the lamp.

The term *cut-out* in Rule 12-*e* refers to the service-switch and the cut-out box is the box in which the working parts of the service-switch are placed.

The object of the service-switch is, as the rules state, to disconnect the interior wires from the main wires in the street. By this means, current can be excluded from the building at all times when it is not being used, and if, while current is being used, a defect in the insulation or in the operation of the apparatus develops, the current can immediately be cut off before it has time to do any damage. This safe-guard is particularly necessary with series circuits, for the dynamos in this case are so regulated that they tend to keep a constant current flowing, whatever resistance is brought into the circuit. Thus when a series circuit is broken, the pressure at the dynamo tends to increase so that the current may be maintained even through the air-space introduced by breaking the circuit. This, of course, causes a long and dangerous arc. Since in the series circuit the same current passes through all lamps and other devices, breaking the circuit shuts off the current from every device operated by the dynamo. Consequently, with the series circuit, a form of switch must be used that will first give a new path for the current and then cut the current off from the old path.

The principal of the switches used is illustrated in Figures 37 and 38. Suppose the lamps *A* and *B* to be in a building having a service-switch just outside the point of entrance. When the current is to be cut off from the lamps, it is necessary that the switch first make a connection directly across the two wires *C* and *D* as in Figure 37. The current now divides, part still going

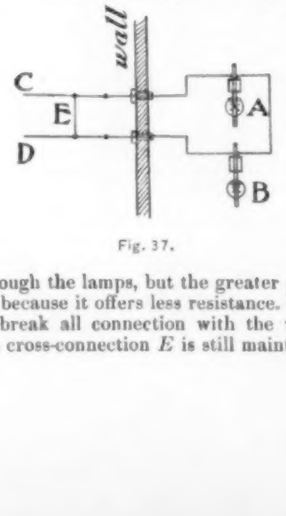

Fig. 37.

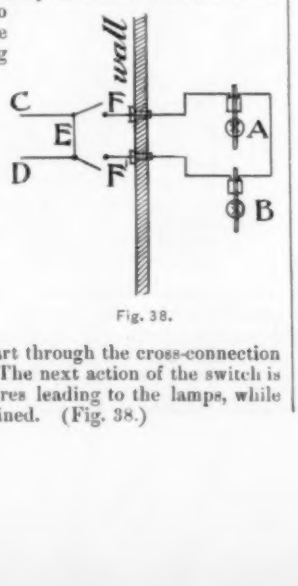

Fig. 38.

through the lamps, but the greater part through the cross-connection *E*, because it offers less resistance. The next action of the switch is to break all connection with the wires leading to the lamps, while the cross-connection *E* is still maintained. (Fig. 38.)

The circuit having been at no point interrupted, the other devices on the circuit are not interfered with, and there is no arc formed during the change. A switch that performs the two actions shown in Figures 37 and 38 is called a "double-contact" switch because there are simultaneously two contacts, one with the wires leading to the lamps and one forming the by-path. If these two contacts do not exist at the same time, that is, if when the lamps are to be turned off, the contacts at *F*, *F'*, are broken a little before the cross-connection *E* is made, or, if when the lamps are to be turned on, the cross-connection is broken a little before the connections *F*, *F'* are made, then there will, of course, be arcing, which will introduce a danger from fire. It is necessary that the switch be automatic in its action after it is started on or off, because if it were moved wholly by hand, it would sometimes be carelessly left half on and half off and would consequently not only fail to cut the current off completely from the building, but might bring the switch to a point where heating or arcing would be likely to occur, and by continuous action cause damage.

The switch should indicate whether it is "on" or "off," so that it will be known definitely without regard to anything else whether the current is turned on the wiring of the building or not. The marking also increases the probability of the switch being thrown in case of necessity, even by one unfamiliar with its working.

Freedom from moisture is required, so that there will not be leaks between different parts of the switch, or between the parts and the ground. The non-combustible case prevents damage that might be caused by overheating or arcing in a defective switch.

While the form of switch specifically mentioned in rule 12 (*b*) can be used only on series circuits, the rule applies generally to all circuits having a pressure of over 300 volts, whether series or multiple. In the case of a multiple circuit, such as a 500-volt motor-circuit, the switch must be of some such form as that shown in Figure 24, where the circuit is broken at once. In this case, it is the pressure that remains constant, and if a cross-connection were made, as in Figure 37, the dynamo would tend to maintain a constant pressure between the two sides of the circuit, and there would consequently be a tremendous flow of current through the connection of low resistance that would be stopped only by something being burned out.

Snap-switches are not allowed for use on high-potential circuits, because the air-spaces, that make the breaks in the circuit when the switch is off, are very short and the arc that forms upon breaking the circuit is likely to bridge over these spaces, destroy the switch and endanger property. Snap-switches are sometimes used to extinguish arc-lamps by closing a by-path, as if, for instance, one were introduced in *E* in Figure 37. A switch of this kind does not perform the functions of a service-switch, because, although it forms a by-path of low resistance and so causes the lamps to be extinguished, it does not break the connection to the lamps as in Figure 38.

It is required that wires forming a high-potential circuit shall always be in sight, because, with hidden wires, the conditions are always uncertain and the danger of leakage and the effects are much more serious with high potential than with low potential.

The makes of wire that are approved for interior conductors are the same as those given under Rule 10 (*a*).

The greater danger from leakage, with high-potential circuits, is the reason for the requirement that all insulating tubes, even in dry places, shall be of non-combustible material.

Soldered joints are, of course, quite as necessary for inside work as for that outside. [See Rule 10 (*f*).]

LAMPS AND OTHER DEVICES.

13. Arc Lamps — In every case: —

a. Must be carefully isolated from inflammable material.

b. Must be provided at all times with a glass globe surrounding the arc, securely fastened upon a closed base. No broken or cracked globes to be used.

c. Must 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.

[Section *c*. 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 Section *g* of Rule 13.]

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

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

f. Must be provided with a wire netting around the globe, and an *approved* spark arrester above to prevent escape of sparks, melted copper, or carbon, where readily inflammable material is in the vicinity of the lamps. It is recommended that plain carbons, not copper-plated, be used for lamps in such places.

[Section *f*. An *approved* spark arrester is one which will so close the upper orifice of the globe that it will be impossible for any sparks thrown off by the carbons to escape.]

g. 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 waterproof, non-combustible substance. All switches attached to the same must be so constructed that they shall be automatic in their action, not stopping between points when started, and preventing an arc between points under all circumstances.

h. Where hanger-boards are not used, lamps to be hung from insulated supports other than their conductors.

The *arc-lamp* makes practical use of the fact that when an air-space is introduced into a circuit, the current in passing through this space heats the ends of the conductors and the resulting gases to a very high degree of incandescence. Carbon is used as the most

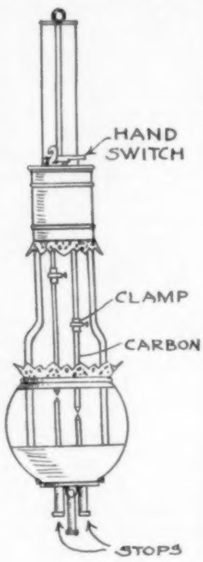

Fig. 39.

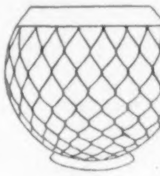
Fig. 40.

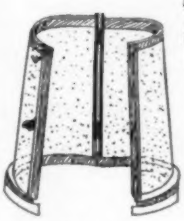
Fig. 41.

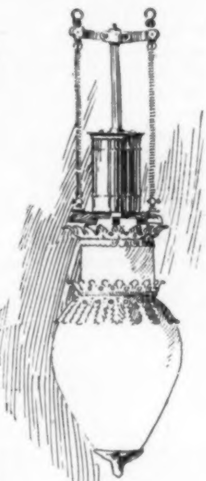
Fig. 42.

suitable material to form the conductors on each side of the air-space. The arc-lamp as used is made up principally of regulating apparatus that keeps the arc at the best length by feeding the carbons as they burn away, and maintains steadiness in the light. (Fig. 39.)

The *hand-switch*, mentioned in Rule 13 (*c*), is a small switch that will close a by-path round the lamp and thus give another path than the carbons for the passage of the current. The rules require it, so that the lamp will be cut out in case it does not work properly. (Fig. 39.) The *automatic switch* serves the same purpose, but is a part of the regulating apparatus of the lamp itself and cannot be moved by hand if it fails to operate.

The carbons are held in place by *clamps*. (Fig. 39.) Should the clamp holding the lower carbon become loose, the carbon, with its intensely hot end, will drop to the floor, if there be not a *stop* of some kind to hold it. (Fig. 39.)

The *wire netting* required around the globe when the lamp is near inflammable material, is a netting with a mesh about $1\frac{1}{4}$ inches on a side. In case the globe breaks, the netting will hold all parts in place until a new globe can be provided. (Fig. 40.)

Spark-arresters are made in many forms, but they are all designed, as the name indicates, to prevent the small pieces of incandescent material thrown off by the arc from escaping and perhaps setting fire to inflammable material near by. A common form is shown in Figure 41. It consists of a very fine wire screen which fits tight round the globe and encloses the space above. Another form is a flat disk that fits over the top of the globe and has holes for the carbons to pass through. It is now becoming common for indoor lamps to be made in the form shown in Figure 42. The arc is here entirely enclosed by an extension above the globe.

Carbons are usually *plated* because copper is a far better conductor than carbon, and a thin layer of copper on the carbon reduces the resistance and so saves trouble in getting good contact with the clamps, and lessens the waste that comes from driving a current through resistance. This thin layer of copper sometimes flies off in the shape of incandescent particles, hence the preference for plain carbons where inflammable material is near.

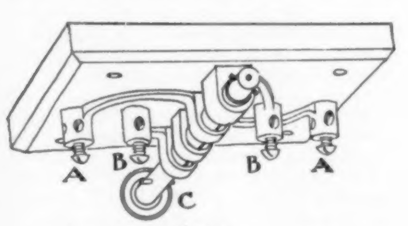

Fig. 43.

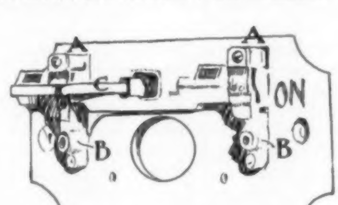

Fig. 44.

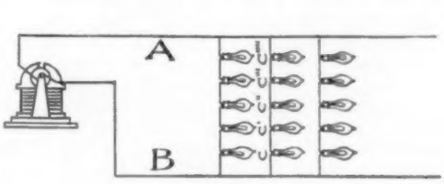

Fig. 45.

Hanger-boards are of many forms, but they all have virtually the same characteristics. (Figs. 43, 44.) They have conveniences for hanging the lamp, so that it may be simply unhooked or disconnected without disturbing the permanent wiring of the circuit. On the board is mounted a switch similar to the arc service-switch, by which the current may be cut off from the lamp and be made to pass only through the connections on the board. This makes it easy at any time to remove a lamp for repairs without shutting off the current from any other lamp. The switch must meet the requirements for the service-switch. Loose connections and imperfect switches cause heating and arcing, and it is necessary that the hanger-board be non-combustible so that nothing will be set on fire.

These troubles may be avoided by hanging the lamp direct from insulated supports and bringing the wires to the lamp without going first to a board, but in this case there is no switch to cut off the current from the lamp, and lamps cannot be taken down for repairs with the same facility.

The greatest danger from the arc-lamp is just such danger as would come from any centre of great heat, and it will be noted that the rules have for their object the complete isolation of the source of heat. Inflammable material hanging near will, of course, be in danger of catching fire, and the hot particles thrown off by the arc will be apt to burn material beneath if precautions are not taken. Tight globes, closed at the bottom, will catch most of the sparks, but many are carried up by the heated air and the spark-arresters are necessary to prevent any of these escaping. Broken globes are, of course, an approach to no globes at all, and the wire nettings thus help to keep the arc entirely enclosed.

14. Incandescent Lamps in Series Circuits having a Maximum Potential of 300 Volts or over: —

a. Must be governed by the same rules as for arc-lights, and each series lamp provided with an *approved* hand spring-switch and automatic cut-out.

b. Must have each lamp suspended from a hanger-board by means of a rigid tube.

c. No electro-magnetic device for switches and no system of multiple-series or series-multiple lighting will be approved.

d. Under no circumstances can series lamps be attached to gas-fixtures.

Incandescent lamps that are made to operate with a comparatively large current are sometimes connected in series circuits. Except that they do not throw off sparks as arc-lamps do, there are the same dangers as with other series circuits and the same precautions are to be taken.

The *hand spring-switch* is virtually the same thing as the arc service-switch, because it must act in the same way since it is used on a series circuit. That is, it must be made to first form a by-path round the lamp and then break the connection to the lamp.

The term *automatic cut-out*, when used in this connection, means a switch of some kind that will by itself shunt the current round through a by-path when the lamp becomes defective.

The *hanger-board* used with the series incandescent lamp is much the same as that used for arc-lamps, but it is required that the lamp be hung by means of a rigid tube, because incandescent lamps are likely to be moved about and the insulating covering on the conductors, therefore, apt to become abraded. This is a more serious matter with the high-potential series-circuits than it is with low-potential multiple-circuits, not only because of the higher potential, but because if the conductor were to break in a series-circuit, a long and destructive arc would be formed.

Electro-magnetic devices for switches are devices that depend for their action upon magnets that become stronger or weaker according to the amount of current that passes round the iron core. The magnetic force works a mechanism that operates the switch. They are objected to because a slight sticking of the movable parts prevents satisfactory action.

A *multiple-series system* is one in which lamps are in different series and these series connected in multiple. (Fig. 45.) There is a constant pressure between the wires A and B, so that if at C, for instance, a short circuit occurs, that is, if a by-path is formed across the terminals of the lamp, there is less resistance between A and B through this particular series and a larger current will flow. This is likely to burn out the other lamps, c', c'', etc., one after the other, with increasing speed and with liability of excessive heating and consequent danger.

A *series-multiple system* is one in which groups of lamps in multiple are connected in series. (Fig. 46.) The same current must go through each group since all groups are connected in series, and while all is in good order this current will divide properly between the different lamps. If, however, one lamp, say c, burns out and thus interrupts the current going through it, the other lamps, c'

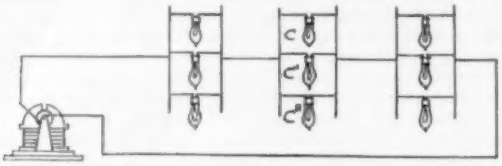

Fig. 46.

and c'' will have to take more than their share and are likely to burn out with the same attendant dangers as with the multiple-series system.

Gas-pipes are always connected with the ground and if series lamps are attached to the fixtures, with the high potential there is great danger of leakage to the pipes, however carefully the insulation is looked after.

The use of incandescent lamps on series circuits is becoming infrequent on account of the dangers and the inconvenience. The system is not suitable to the high degree of sub-division that is the great advantage of the incandescent lamp, for the greater precaution necessary to make the series circuit safe, makes the devices clumsy and rigid, and the portability that adds so much to the usefulness of the incandescent lamp on multiple systems is thus not possible. RUSSELL ROBB.

(To be continued.)

VENTILATION OF HOSPITALS.

"AN article on "The Ventilation of Hospitals and the Treatment of Infected Air" appears in our contemporary, the *Lancet*, in which are discussed in considerable detail the arrangements for ventilation which are being carried out at the new General Hospital, Birmingham, arrangements which have recently been the subject of vehement anonymous attack. The *Lancet* says:—"In no other buildings is it more essential or vital that ventilation should be efficient and conducive to comfort and to health than in those set apart for the tending and nursing of the sick. Most of our large hospitals were founded at a time when methods of ventilation and sanitation were crude; but even in hospitals of comparatively modern construction, in which the sanitary arrangements may be perfect so far as regards the removal of effete liquid and solid products, there will generally be found much that can be done to improve the satisfactory displacement of vitiated air and the means of providing a fresh and pure supply. The importance of such a provision is doubly emphasised when we consider, as experience has shown, how beneficially the free and open atmosphere ministers to the healing of wounds and to the elimination of morbid conditions. No apology is needed, therefore, if we lay before our readers the details of so important a departure in regard to the construction of one of our large provincial hospitals as the installation of a new method of ventilation which, we venture to think, is far in advance of any scheme which has hitherto come under our observation, and more particularly because not only does it provide for the efficient and salutary ventilation of hospitals, but also for the treatment, if need be by means of antiseptics, or purification of the vitiated air of the wards before it passes into the outer atmosphere. For the present, however, we will confine ourselves to the method from the point of view of ventilation only, and in a succeeding section we will describe how this system may, by the simplest, and, we think, most effective, manner be employed for the treatment of vitiated air with the important view of preventing the spread of infection from such buildings as smallpox and scarlet-fever hospitals.

"For this purpose we cannot do better than take as an illustration the new General Hospital, now in course of erection in Birmingham, which, by the courtesy of the architect, Mr. William Henman, we have recently had an opportunity of inspecting. Let it be understood that in doing so we are not dealing with a system that has merely been projected, but with one that has already been carried into practice in several infirmaries and other buildings, schools, police-courts, and the like, and which, as we have just said, has actually been provided for in the plans of one of our great hospitals. The building operations, indeed, at the new General Hospital, Birmingham, are so far advanced as to afford a clear idea and plan of the installation which is to effect the ventilation of the hospital." The article then briefly reviews the systems of ventilation which are available, and points out broadly the advantages of the propulsion system. The method of its application and the installation at the new General Hospital, Birmingham, are then described. The method of ventilation adopted is primarily due to Mr. William Key, an engineer of Glasgow. "In applying the Key scheme to a hospital a selection is first made of a position, uncontaminated by surroundings (or of more than one such position if the buildings are extensive), where air can be drawn in towards an extended screen, kept moistened with water and periodically flushed to free it from the large amount of dirt which it intercepts. The screen is formed of a series of cocoanut-fibre cords stretched vertically and interlaced with copper wire to keep them in position. On the outer side a coil of steam or hot-water pipes is placed to prevent freezing in the winter, and on the inside are other heating coils arranged so that by means of doors or louvres the air passing through or under them may be regulated. It is then forced onward by means of a rotary fan or air-propeller, set in motion by steam, water, gas, or other power — preferably an electric motor — and finds its way to the several rooms, wards or corridors by means of a wide and lofty horizontal duct and up-flues, all calculated to the required areas, at the base of which are more heating coils, together with a simple contrivance by which both the volume and temperature of the air-supply to any separate part of the buildings can be adjusted to a nicety. The air enters where required by means of trumpet-mouthed openings, at about two-thirds the height of the story, so as to disperse evenly throughout the apartment; and at the same time it expels an equal amount of air, principally through openings provided on the same side of the room as the inlets, up flues of the proper sectional area, into ducts in the roof, and thence to the open, through valved and louvred turrets or flaps, four-sided, so that outer movement of the atmosphere shall exert no adverse influence upon the outflow. These outlet air-valves are so constructed as to place the air within the building under a slight pressure of about four ounces per square foot in excess of the outside atmospheric pressure at the time. In the new General Hospital at Birmingham an installation has been provided for heating and ventilating the buildings, the cubical capacity of which equals about 2,000,000 feet; so that, as the air may be changed ten times per hour without opening any windows, 20,000,000 feet of air every hour has to be propelled, cleansed and warmed: for which purpose there will be eight 'fans,' from 6 to 8 feet diameter, to be turned by electric motors, 2,000 superficial feet of cleansing screen and about 35,000 feet of steam tubing."

After referring to some of the remarkable effects produced upon the air by the purifying screens above referred to, the article proceeds:—"It was the important purifying property of the screen just alluded to which led Mr. William Henman to suggest that the outgoing air, after being vitiated or infected by patients, might again be purified, so far as regards infection, by the use of similar screens at the outlets. This project is so important in connection with the construction and site of infectious-diseases hospitals as to merit very serious consideration and attention at the hands of the profession and others who are interested in the subject. Mr. Henman considers that in fever hospitals each block of buildings should be separately supplied with an air-intake, screen, heating-coils and fan, which in a building of only one story may be arranged in the roof space. Mr. Henman takes no credit for the method by which a suitable supply of air is cleansed, tempered, humidified and propelled into the buildings, but acknowledges his indebtedness to Mr. Key for the assistance he has rendered in working out his ideas in connection with the methods he adopts. It is simply proposed that air so cleansed, tempered and humidified should be propelled through narrow, wedge-shaped openings in the ceilings, and by means of a simple form of spreader evenly distributed throughout the wards and corridors. The feature which Mr. Henman claims to be a novelty is the placing of a screen (somewhat similar to those employed by Mr. Key at the air-intake) at the head of every bed, and keeping the same charged with a disinfecting fluid. An outlet flue will be provided at the back of each screen, so that as fresh air is constantly being propelled into the ward, an equal quantity will be forced through the screens, all other outlets being stopped; consequently, almost immediately the air becomes contaminated it will again be purified, even before it actually leaves the apartment, and thus purified will pass up the flues and into the open air. A very simple contrivance is employed for keeping the screens constantly charged with disinfecting fluid, so as to obviate disturbance to the patients in the wards and reduce personal attention to the least possible limits. The disinfecting fluid found to be perfectly effective in destroying disease germs is a weak solution of carbolic acid. Above and below each screen a shallow trough is placed, the upper and lower ones respectively being united by lead piping, carried to any convenient position outside the wards, each connected to a cistern of moderate dimensions to which a small pump is attached, so that as the fluid flows along the upper pipe and trickles down the screens, the surplus is caught in the lower troughs and returned through the other pipe to the lower cistern, whence it is pumped to the upper one. This may be made practically automatic by applying to the pump the same motive power used for turning the fan which propels fresh air into the building, and by having a third cistern or reservoir with regulated supply to make up for loss of fluid by evaporation from the screens. There can be little doubt of the efficacy of the screens in removing micro-organisms, in view of the indications afforded by a series of very searching and exhaustive experiments carried out under the direction of Dr. Sims Woodhead and Dr. Cartwright. The results of this investigation may be summed up as follows: (1) Micro-organisms are entrapped by passing air through moistened screens. (2) The apparatus employed in the experiments in which dust loaded with organisms was forced through an experimental screen into a wooden chamber, from which samples of the air were taken from time to time for bacteriological analysis, gave in all probability less perfect results than would occur in practice, because in these experiments the air, highly charged with micro-organisms, was both forced directly through the screens and also by force drawn through them, whereas in buildings the air would be propelled gently through the screens simply by the slight pressure of the incoming air, no suctional force whatever being employed. (3) The very marked diminution in the number of micro-organisms which passed through the screens when supported by means of perforated zinc, and the smaller number still which pass through a thin layer of cotton-wool, indicate varying powers of filtration, and point to the possibility of devising a screen which will practically free the air from germs and yet not unduly retard the expulsion of the air from the building. (4) In proportion to the closeness of texture of the screen material, the size of the screens must be increased so that the air may pass through them with the least possible force being required to expel it. (5) The moistened screens are all that is required to arrest the germs, but carbolic acid should be added for destroying them. (6) Disease germs, or fungi, likely to be conveyed by the atmosphere are usually found attached to comparatively large floating particles, as the scales of the epidermis, or fluffy shreds of material which would be entrapped by the screens in greater proportion than the germs experimented with. In accordance with the suggestion contained in paragraph 3, that better results might be expected by the use of finer screens, yet of ample size to permit of the passage of air, a building has been erected in which these suggestions can be adopted, and tests will shortly be made exactly on the same lines as when the screens are employed for the purification of air emitted from hospitals. It is probable, again, that the passage of large volumes of warm air through the screens would volatilize a considerable quantity of the disinfecting fluid with which the screens will be constantly charged, and that any germs which might not be entrapped by the screens would thereby be quickly deprived of vitality, and, moreover, that the mere reduction of the number of germs would be a considerable safeguard, because the attenuation of germs, as is well known, lessens the severity of their effects.

As regards the cost of the method proposed, the necessary apparatus is stated to be quite inexpensive and easily applied, and Mr. Henman is prepared to show that buildings can be erected and equipped at considerably less cost than is now expended upon hospitals relying only upon the ordinary means for ventilation, without any appliance for purifying the air emitted. More space for the patients has been the demand for some time, which, beyond a given area known to be necessary for nursing purposes, in reality means more air. It is very naturally asked, where, with such a constant change of air, is the necessity for more space within the hospital than is required for tending the patients? It is contended that with suitable appliances by which the air can be constantly and quickly changed, as in Mr. Key's method of ventilation, buildings might be less in cubical capacity by at least one-third; and not only would this reduction in size more than compensate for the cost of apparatus and its working, but the daily labor and charges for heating, lighting, cleaning, administration and maintenance would be proportionately less. Another point of importance is that those who tend the patients would be constantly in a pure atmosphere, for no sooner is the air vitiated by contact with the patients than it is at once purified and expelled.

The Key method of ventilation has met with very distinct success where it has already been installed, as, for instance, at the Victoria Infirmary, just mentioned, in several schools, and in other public buildings,[1] and the results of its adaptation to a large general hospital such as that in course of erection in Birmingham will be watched with very great interest, the completion of this admirably-designed building being expected in about two years' time. The practicability of the method, however, is obvious. The important proposal of the architect, Mr. Henman, to disinfect the outgoing air of infected wards where the Key method of ventilation is in force, has, of course, not yet been put to practical test; but there is good ground for believing, as we have already shown, that this important adjunct to Mr. Key's method of applying the propulsion system of ventilation may offer a really satisfactory solution of that difficult question of how to make infectious-diseases hospitals safe to the surrounding neighborhood. At any rate, the method, with its proposed augmentation, is of sufficient importance and scientific merit to demand the careful and serious consideration of all those interested in the vital questions of the ventilation and the purification of the air emitted from infected buildings. We congratulate the authorities at Birmingham on the trouble and care they are taking to provide and equip a hospital fully in accordance with the requirements of modern scientific research, and we trust that other communities which may be brought face to face with a similar problem will evince an equal share of anxiety to attain so admirable and worthy an end. — *The Architect.*

COLOSSAL STATUE OF THE VIRGIN. — The Duchesse d'Uzes is giving further evidence of her originality. She is at work on a colossal statue of the Virgin, with a design of placing it on a rocky mountain peak on her estate. The statue will be fifty-one feet high, and from its elevated pedestal will be visible for thirty miles. — *Philadelphia Press.*

[1] Mr. Key's method has been applied already to four hospitals or infirmaries, to some twenty-four large schools, and to several other large buildings, as cloth-factories, police-courts, public-libraries, and so on, while further installations are being provided for in fifteen similar buildings at the present time.

SOCIETIES

BUFFALO CHAPTER OF THE AMERICAN INSTITUTE OF ARCHITECTS.

AT a special meeting of the Buffalo Chapter of the American Institute of Architects, it was

Resolved, The members of the Buffalo Chapter of the American Institute of Architects desire to express their sense of the loss sustained by the Architectural profession and this Chapter in the death of their President, Mr. James Herbert Marling, and to extend their deepest sympathy to his family in their bereavement.

ULYSSES G. ORR, *Secretary.*

SKETCH-CLUB OF NEW YORK.

THE regular monthly meeting and dinner of the Sketch-Club of New York was held on Saturday evening, June 1st, at Delisle's Roof Garden, Central Building, Liberty Street.

About fifty members and guests were present. Mr. Wilson Eyre, Jr., of Philadelphia, was the guest of the evening and after the dinner he gave a delightful informal talk on the subject of his recent trip in England. Some of Mr. Eyre's sketches made during this trip were on exhibition and one of the most interesting of these he presented to the Club. Mr. Eyre was accorded three cheers for his very entertaining talk.

Music was furnished by the Tuxedo Banjo Club.

Mr. Field, the President, announced that next Saturday the Club would visit the American Surety Building under the personal guidance of Mr. Bruce Price.

ALFRED F. EVANS, *Recording Secretary.*

THE ILLUSTRATIONS

[*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 C. W. HENRY, ESQ., WISSIHICKON HEIGHTS, PHILADELPHIA, PA. MESSRS. MCKIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.

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

PROGRESSIVE VIEWS OF THE CONGRESSIONAL LIBRARY, WASHINGTON, D. C.: TWO SHEETS.

SEE article elsewhere in this issue.

ST. CLEMENT'S MEMORIAL CHURCH, ST. PAUL, MINN. MR. CASS GILBERT, ARCHITECT, ST. PAUL, MINN.

THE building is being erected by Mrs. Theodore A. Eaton of New York, as a memorial to her husband, the late rector of St. Clement's Church, New York, who for forty years was in charge of that parish.

The building is constructed of yellow limestone, the trimmings being of Danville sandstone of the same color. The roof is covered with a light bluish-green slate. The lower boards in the belfry are covered with tile. The furniture, rood-screen, etc., will be of very dark oak. The altar and font are of marble. The roof is construrted of open framing, the timbers being exposed to view and of Washington red fir. Memorial window at east end of chancel is being made by the Tiffany Glass Co. The chancel floor is to be tiled and chancel steps and base of marble. The cost of the church, not including guild house, is about $25,000.

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

THE HALL: KELLOGG TERRACE, GREAT BARRINGTON, MASS.

[Copper-plate Etching.]

THE ENTRANCE HALL: NORTH EASTERN STATION HOTEL, NEWCASTLE, ENG. MR. W. BELL, ARCHITECT.

READING-ROOM OF THE SAME.

SPA MANSIONS, BERMONDSEY, ENG. MR. JOHN JAMES DOWNES, ARCHITECT, LEWISHAM, ENG.

THE block of model dwellings shown in the illustration stands on a site at the corner of Spa Road and Grange Road, Bermondsey. The building, which has a frontage of 106 feet, consists of basement, ground-floor and four stories, surmounted by a flat roof. The entrance is by a staircase on the extreme right and left, terminating in towers on either side. There is also a spacious lift for the purpose of taking up furniture, etc. The front of the building is set back on the first, second, third and fourth floors to admit of wide balconies, by which access is gained to the several dwellings. The ground-floor is devoted to shops, of which there are five, and an archway in the centre leading to a court-yard in the rear to be used as a play-ground for children, etc. The staircases and balconies are of artificial stone. The floors are virtually fireproof, being of rolled-iron girders filled-in with coke breeze and cement.

The basement is devoted to cellars which are attached to the shops; also the lift, etc. On each of the upper floors are five suites of rooms, most of them unusually spacious, and each set is supplied with kitchen, containing a kitchener, sink, copper and dresser, with a water-closet, dust-shoot, and provision for coals. Every room is ventilated into a shaft, and there is abundance of light everywhere. Windows are placed at intervals up the staircases; in fact, there is not a dark corner in the whole building. The tenements are arranged as if they were a number of cottages placed in rows of five, each row stacked one above another. The balcony represents a footpath, and the front doors open on to it, so that there are no hidden entrances, as all the doors face the street. The front room is supplied with a bay-window, and each set of rooms resembles as nearly as possible an ordinary house. Every tenant, therefore, can sit at his window and either see the traffic in the street below or the extensive views obtainable over the neighboring houses. While the building is one as regards its structure, every set of rooms is isolated as much as if upon the ground. The roof is cemented and is to be used for drying-purposes. The building was erected with picked-stock bricks, with red brick arches and label over same. The cornices to towers at eaves are also in red moulded bricks.

EXHIBITIONS

Boston, Mass.— *Pictures loaned by Quincy A. Shaw; Gobelin Tapestries; Japanese Paintings; Line Engravings, Mezzotints, and Etchings by Rembrandt:* at the Museum of Fine Arts.

Chicago, Ill. — *Eighth Annual Spring Exhibition of Works of Architecture and the Allied Arts:* at the Art Institute, opened May 23.
Paintings by Manet: at the Art Institute.

Cincinnati, O. — *Spring Exhibition:* at the Art Museum, May 18 to June 30.

New York, N. Y. — *Twenty-eighth Semi-annual Exhibition:* at the Metropolitan Museum of Art.

NOTES AND CLIPPINGS

Human Magnets. — We do not vouch for the following story, which is taken from the *Tacoma News:* A remarkable story comes from the Upper Yakima. Two years ago Mr. Peter Stromstadt located on a piece of land near what is now known as Barox Springs, his family consisting of his wife and two children. A few days after his settlement Mr. Stromstadt discovered a spring close to the shack he had erected, the water of which was strongly impregnated with iron, but not unpalatable. Mr. Stromstadt dug out and deepened the spring, and since July, 1893, the family have used the water for all domestic purposes. On the night of April 2 a heavy electrical storm passed over the Cascades, accompanied by vivid displays of lightning. The following morning Mrs. Stromstadt, while kindling the fire in the stove, found it almost impossible to separate the stove lifter from her hand. Her husband, hearing her scream, ran to her assistance, when, to his surprise, he found that he too experienced difficulty in detaching any article of iron with which his hands came in contact. Breakfast was finally prepared and the family sat down to the meal. The children, two girls of five and seven years, drank their milk from tin cups, and upon raising the cups to their lips found themselves unable to detach the cups from their mouths. Mr. Stromstadt, who is an intelligent immigrant from Sweden, was nonplussed, and while unable to account for the wonderful occurrences, nevertheless laughed at his wife's excited declarations that the family were bewitched. Mr. Stromstadt has written a friend in town. He says that the small bed on which the children sleep is upon roller casters, and that in the morning the bed is invariably pointing north and south, the bed being a little to the east of north. The case is one of the most remarkable on record. A member of the Academy of Sciences, to whom the circumstances were related, states that the Stromstadt family have become saturated with iron, which was rendered magnetic by the passage of electricity from the clouds to the earth during the storm on the night of April 2; and they are actual human magnets.

Cost of the Great Tunnels. — In comparing the four great tunnels, it is interesting to note that time is an extraordinary element in the cost. The oldest tunnel — Hoosac — cost $379 a foot; Mont Cenis, next oldest, cost $353 a foot; St. Gothard, cost $229 a foot, and the most recent tunnel of the four — the Arlberg — cost only $154 a foot. All four were in old-settled countries, with abundant labor, and the very great difference in cost per foot plainly marks the progress of science, because it was the invention and improvement in tools that made it possible to reduce the time and thus the cost. To observe the difference between the work on the three great European tunnels, built by government aid in old-settled countries, it may be well to observe for a moment the work done on a comparatively small tunnel built far from civilization through the Cascade Mountains on the line of the Northern Pacific Railroad. The mountain through which the tunnel is cut is 3,790 feet above the sea, and the peak is 1,135 feet above the floor of the tunnel. To understand the magnitude and difficulty of this undertaking it must be observed that the site of the tunnel, at the time the contract for its construction was signed, was an unbroken wilderness. At the then existing terminus of rail connection, everything — men and tents, food, horses, machinery, lumber, hospitals, and, in fact, the material of the army — had to be transported over improvised roads 82 miles, through forests, through snow and mud, to the east portal of the tunnel, and 87 miles to the west portal. Six months passed before all the machinery was on the spot. Rivers had to be turned aside, bridges built, camps established and men and horses collected, fed, housed and cared for nearly one hundred miles from a locomotive. The tunnel is 16½ feet wide and 22 feet high, and the entire distance (8,950 feet) was bored through the mountain in twenty-two months, the rate of progress with the power-drills being 413 feet a month, and the cost of the completed tunnel was only $118 a foot, and the entire work was completed in twenty-eight months from the signing of the contract in New York City. — *Chautauquan.*

The Sphinx. — The commonplace book of Mr. Baldwin, once British Consul in Egypt, contains the following solution of the figure of the Sphinx: — "I have heard strange fables and strange conjectures concerning the Egyptian deity, but I have never met with its solution in the simple manner in which it has occurred to me. The Sphinx is represented by a figure having the body of a lion and the bust and head of a virgin, forming together a figure composed of the two signs of the zodiac, Leo and Virgo, through which signs the sun is coursing at the time of the inundations of the Nile, from which Egypt derives its fertility and the people their subsistence. It was very natural, therefore, for an enlightened people, leading the opinions of their credulous and superstitious brethren, wishing to dedicate their gratitude to a Supreme Being, to attribute the felicity they derived from this immediate cause to the apparent one in the heavens; and, consequently, to compose a deity of those signs in which the sun prevailed during the inundations of the Nile, from which all their abundance necessarily depended." — *The Architect.*

A Piazza is a Building. — A piazza is held by the full bench of the Supreme Court of Massachusetts to be a "building," within the terms of restriction that "no building erected on said premises shall be placed at a less distance than twenty feet from the line of a street." This proposition is finally decided for the first time in the case of John L. Reardon against Minnie J. Murphy. The plaintiff and defendant are owners of adjoining lots of land fronting on Parsons Street in Brighton. The defendant has her lot by grant from the plaintiff, her deed containing a restriction like the above. The front line of the main body of the defendant's house is twenty feet from the street, but the front piazza extends out eight feet nearer to the street. The plaintiff brought this bill in equity to enforce the restrictions in the deed. A single Justice held that the piazza was within the restrictions, and ordered it taken down. The defendant appealed, and now the full bench affirms the decree of the single Justice. — *Springfield (Mass.) Republican.*

The Temple of Jupiter Anxur. — In excavating the Temple of Jupiter Anxur on the Mount St. Angelo, at Terracina, some remarkable discoveries have been made. Jupiter Anxur, according to Virgil and his commentator, Servius, was Jupiter Puer or the boy god. The juvenility of the deity would account, then, for the number of children's toys which have been found. Leaden figures, such as once were made at Nuremberg, are of the remotest antiquity. Little dinner sets, precisely like those the children of to-day play with, have been found among the débris of this temple. This miniature service is complete. There are small plates (*patinæ*) with fishes cast in relief, dishes, a tray, a small candelabrum, a tiny table, and even small sandals. There are miniature cooking utensils, and among them a gridiron. — *N. Y. Times.*

Value of Mexican Onyx. — Mexican onyx has suffered a gradual decline in value for many years past. It is generally becoming known that the Mexican onyx is not true onyx, but a species of marble. It is really an aragonite, and is composed of calcium, oxide of iron, and magnesium. The presence of these last two elements gives it its beautiful color. It is said the use of African marble and other cheap stones is replacing it. Mexican onyx is easily worked, and has been used not only for building purposes, but for ornamental household articles, such as lamps, table-tops, mantels, etc. It was used by the ancient Mexicans for masks, idols, and similar small objects. The price of all such articles has of late considerably decreased. Mexican onyx now sells in the rough at from £1 to £5 a cubic foot. Very large pieces bring more than this proportional price. — *Illustrated Carpenter and Builder.*

Large Model of a Temple of Buddha. — A complete Buddhist temple and accessories, weighing six tons altogether were brought here by Professor Maxwell Somerville, of the University of Pennsylvania, who arrived on the *China*, from India, Siam and other countries of the Orient. It will be erected in Philadelphia, and will be the only temple of Buddha in the United States. — *N. Y. Tribune.*

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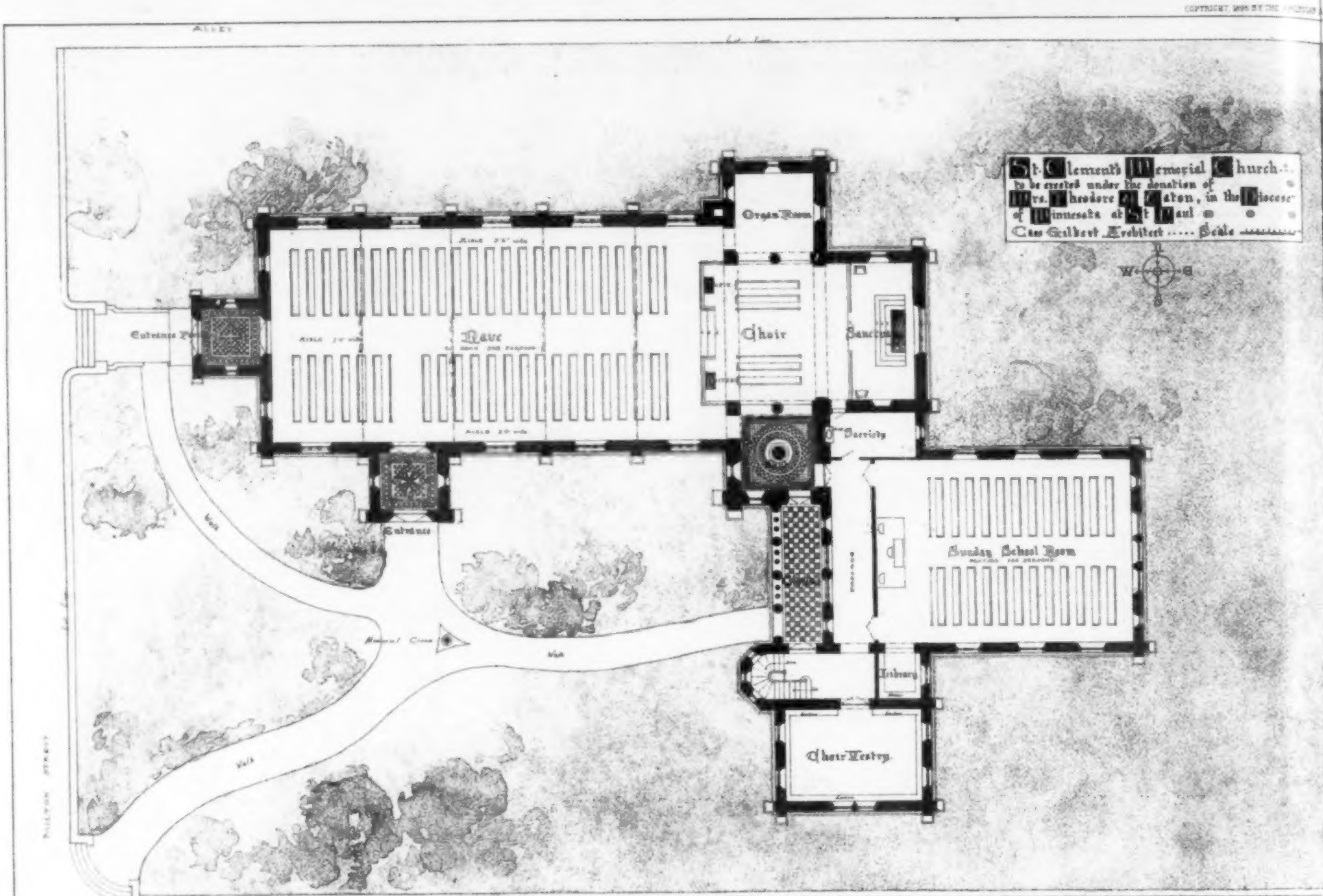
St. Clement's Memorial Church
to be erected under the donation of
Mrs. Theodore Eaton, in the Diocese
of Minnesota at St Paul
Cass Gilbert Architect ..... Scale
W
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Organ Room
Nave
Choir
Sanctuary
Sacristy
Sunday School Room
Library
Choir Vestry
Entrance Porch
Entrance
Walk
Portland Avenue
Alley

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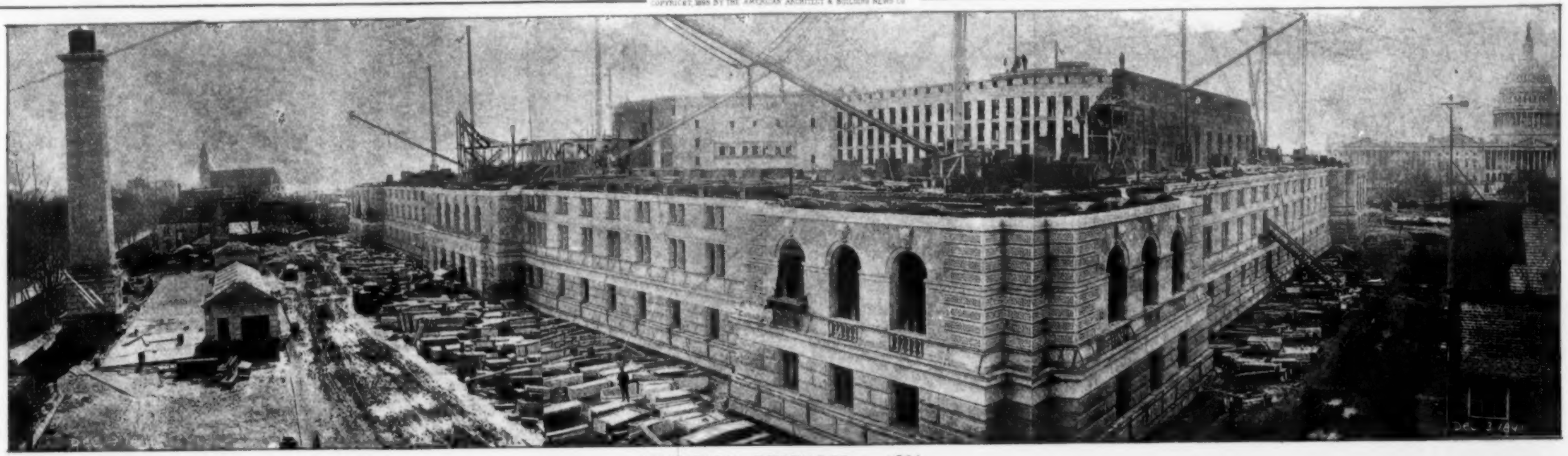

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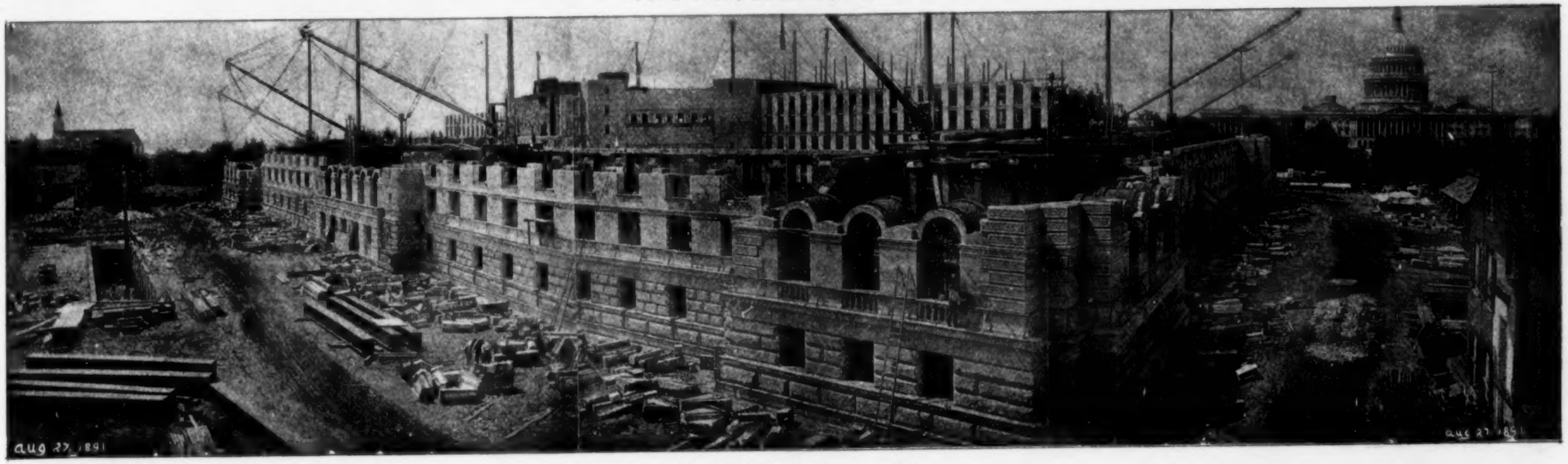

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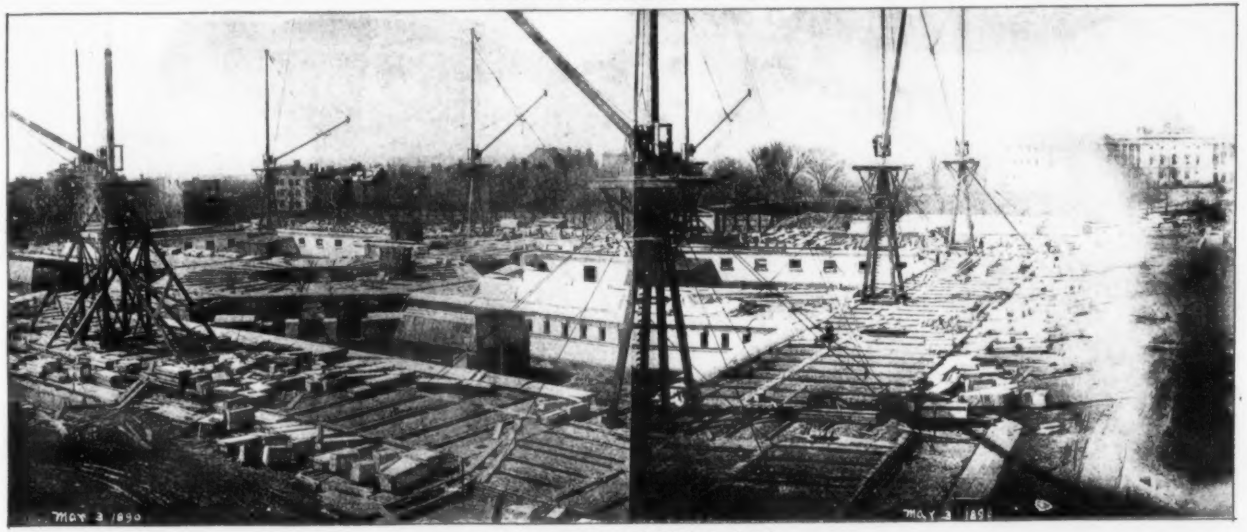
CONDITION, AUGUST 15, 1890.



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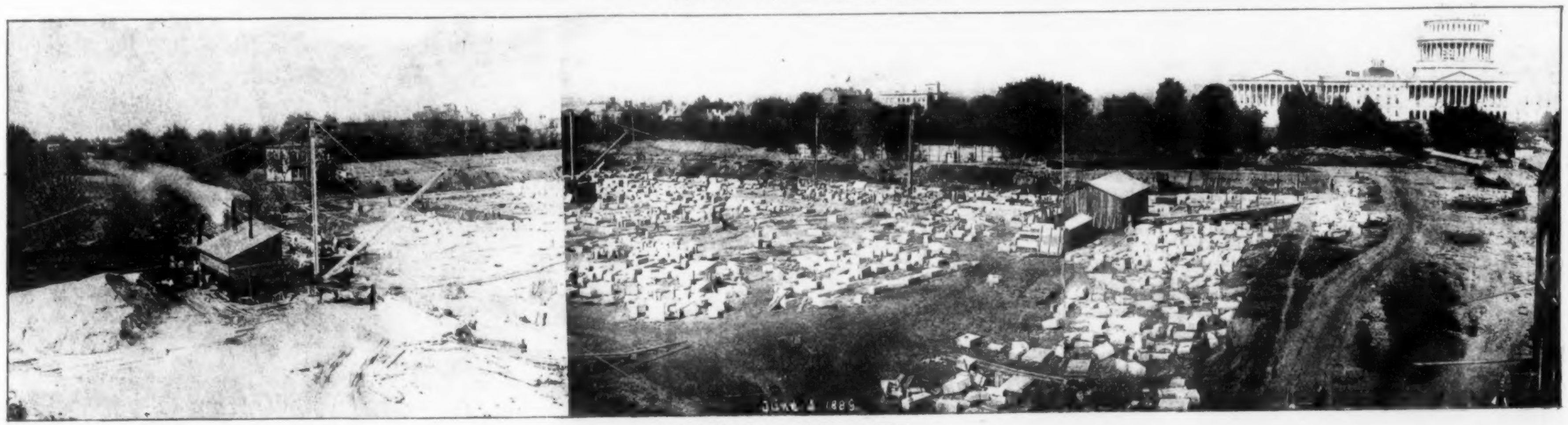

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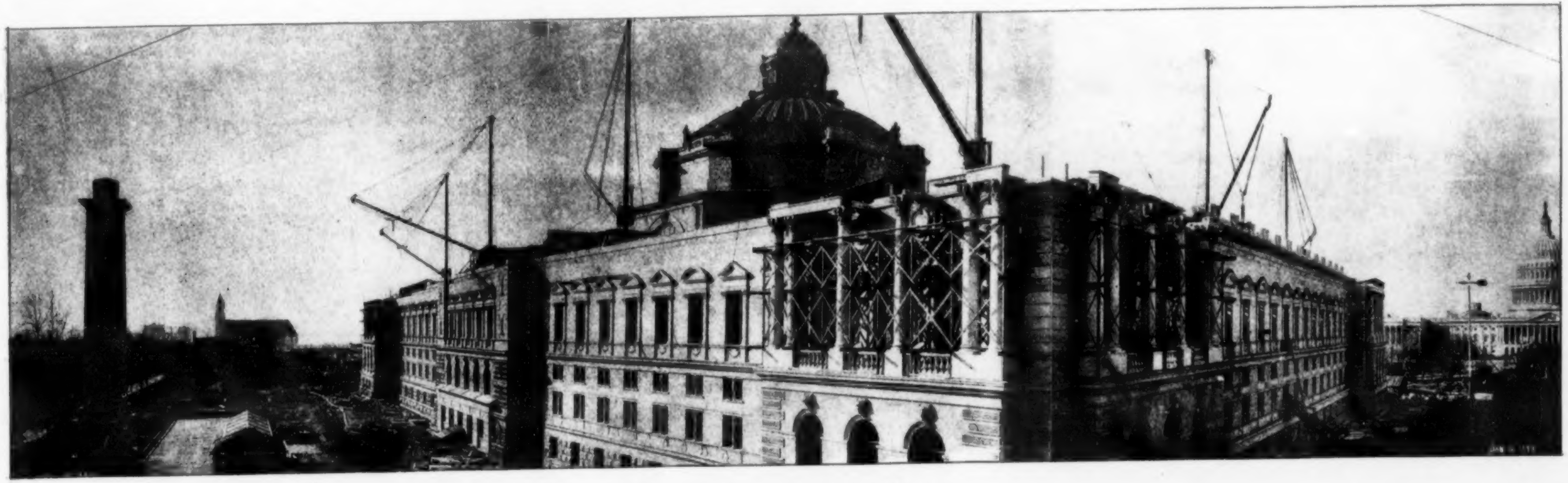

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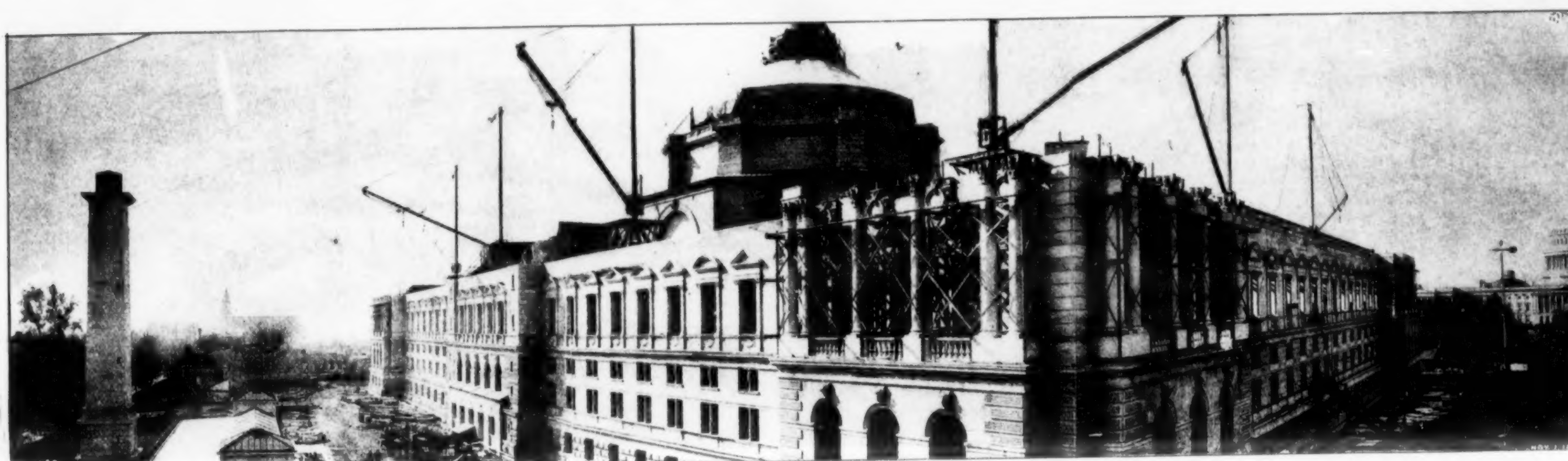

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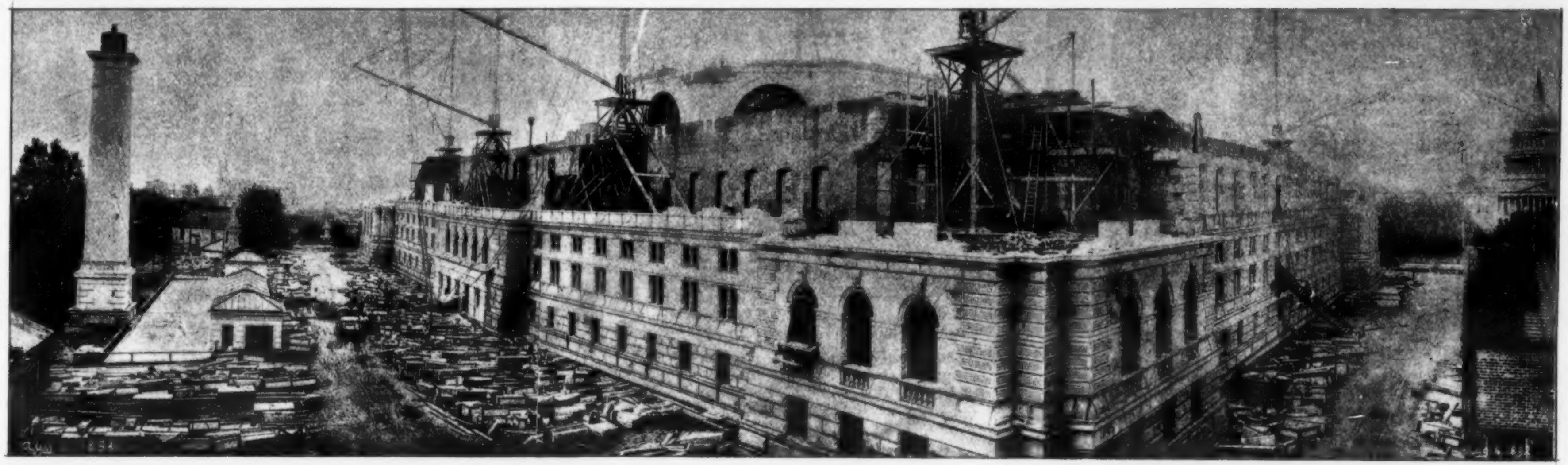

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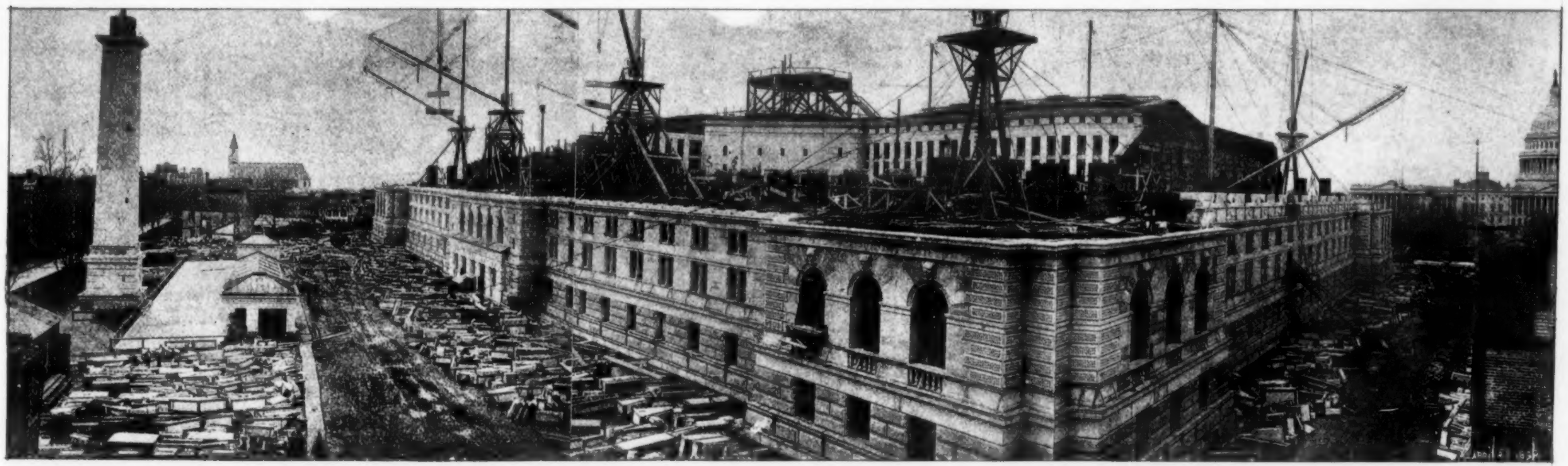

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