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THE General Committee of the Philadelphia McKinley Memorial has issued its programme of competition for the monument to be erected to our lamented President in Fairmount Park. The Memorial, the cost of which is limited to thirty thousand dollars, is to include a portrait-statue of President McKinley, with a suitable architectural setting. Designs must be shown by models, at a scale of one and one-half inches to the foot, which must be delivered to the Secretary of the Committee, prepaid, before March 2, next. Five equal prizes are offered, of five hundred dollars each, and the author of one of the prize designs, if, in the opinion of the jury, any one is deserving of such distinction, will be recommended for employment to execute the work. The jury is an excellent one, consisting of Messrs. Wilson Eyre, Jr., Theophilus P. Chandler, Edward H. Coates, Charles E. Dana, J. Q. A. Ward, Paul Bartlett and Frank Miles Day. Competitors may be quite sure that no favoritism, carelessness or underhand dealing of any kind need be expected from such a jury. Further particulars of the competition, which is open to all artists, may be obtained from Mr. Charles J. Cohen, Secretary of the Committee on Design, 320 South Broad Street, Philadelphia, Pa.

A CASE of interest to architects and real-estate owners came up in the Appellate Court of Indiana a few days ago. The Western Union Telegraph Company, by its agents, injured certain trees in the public highway in front of the estate of Martin T. Krueger, who sued the Telegraph Company for damages. The question came before the Court whether the plaintiff would have a right of action for the destruction of trees in a public highway, even though he owned the fee in the portion of the highway in which the trees were situated. It is extremely common in this country for the fee in public streets and highways to be vested in abutting owners. This is the case, we believe, with many of the streets in New York, and any decisions which define the rights of the owners of the fee in such highways are of great importance. In the present instance, although no evidence had been submitted as to the character of Mr. Krueger's ownership, the Court said, as a general principle, that "An abutting owner, who owns the fee in land upon which a highway is located, is the owner of the soil, and of trees growing thereon, and of mines and quarries thereunder, so far as such ownership is not inconsistent with the public use. The municipality has the right to use these only in so far as they are necessary in the construction and maintenance of the way for the public use. Such an abutting proprietor, as to shade trees growing in front of his property, and upon land the fee of which he owns, has the rights and remedies of the owner of a freehold, subject only to the public easement." It will occur to architects of experience that this doctrine may be applied to other matters besides shade trees. In regard to vaults under sidewalks, for example, it would seem that, in highways of which the abutters own the fee, this ownership would carry with it the right to construct

and maintain vaults of any kind which did not interfere with free passage through the streets. It would, of course, be objected that the municipality might wish to construct subways in the streets, and that such vaults would interfere with them; but the implied contract between the property-owners and the municipality, at the time the streets in the business parts of New York and Boston were laid out, contemplated nothing of the nature of an underground railroad through the streets, and no considerations of public convenience can insert anything in a contract which was not contemplated by the parties when the contract was made.

A LARGE building of slow-burning construction was partly burned a few days ago in Pittsburgh. The floors, which were of heavy timbers, covered with three-inch pine plank, and this with one-inch maple flooring, resisted the flames very well, but the water thrown on the fire swelled the maple flooring so much as to push out the brick walls several inches. It seems that, in some of the floors, the maple flooring was simply lifted in ridges from the planking by the effect of the water; but, in certain stories, where a heavy load of boxes of glass prevented the boards from buckling upward, the whole movement was lateral. Architects will reason from this occurrence that maple upper floors in warehouses, if of large extent, ought not to be too dry before laying. In most cases kiln-drying is avoided under such circumstances, but it is important to keep the floors tight, and these boards, if not kiln-dried, seem to have been laid with very close joints. It may be observed that many architects who use the slow-burning construction pitch their floors slightly, and provide outlets, by which water thrown upon them to extinguish fire may escape without soaking the boards; and if, as is sometimes done, a little gutter is contrived in the flooring at the two sides of the building parallel with the floor-boards, the swelling of the latter will not affect the walls.

CERTAIN architects of the highest ability and distinction have, in the performance of what they conceived to be their duty to their employers, incurred the ill-will of an unimportant local union, affiliated with the International Building Trades Council, and the President of the offended union is now engaged in travelling about the country, endeavoring to secure from all unions connected with the Council a pledge to refuse to do any work on buildings designed by these architects. Under the system of mutual support in their attacks on other people which prevails among the unions, it is difficult to see how the organizations appealed to can refuse their coöperation in the contest, although, as the architects in question have a very extended connection throughout the country, the effect of refusing to work under them will simply be to throw a great deal of employment of the best kind into the hands of non-union men. In fact, it is not impossible that the bullying attitude which the building-trades unions have, of late, seen fit to assume toward architects in many localities may prove the most effective means ever devised for the humiliation of organized labor. A firm of architects like the one in question has, on an average, probably ten thousand men constantly working from its plans, and under its directions. It would be a simple matter, especially in these days of abundant capital, and easy organization, for these architects, or any others of equal capacity, to place themselves at the head of the designing department of a great construction company, employing only its own men, operating its own mills and workshops, and carrying on its operations without troubling itself about union rules or union men. A great deal of the best building work of the Middle Ages was done by coöperative associations of this kind, consisting of men accustomed to work together, under the guidance of architects whose designs they were skilled in interpreting; and, at the present day, the great building companies and firms employ very largely their own men, without concerning themselves about local unions. The latest of these building corporations has a capital of sixty-six million dollars. On such a capital, the corporation, presumably, expects to do a business of at least two hundred million dollars a year; or, to put it in the form favored by the political economists, to keep at least two hundred thousand men continuously employed, responsible only to it, and travelling from place to place as their services may be required. Against such an organization as this the unions

will be powerless. The corporations, with men trained to help each other, and to use the labor-saving machinery provided by the most skillful engineers, can compete at great advantage with contractors who have only the quarrelsome, unscrupulous and treacherous unions to depend upon for labor; and the day may not be far distant when in the building trades the only chance of employment will be found in the permanent force of building corporations. If anything could hasten this transformation of the great industry of building, it would be the attempt of the unions to discipline or injure architects, who, as the leaders of the building world, not only participate, from the first, in plans for the improvement of real-estate, but control, with almost absolute discretion, the manner in which such plans shall be carried out.

THE people who are, or who soon will be, toasting their food in front of wood fires, and shivering in unwarmed houses, may take from their troubles a lesson in regard to the methods of the union tyrants in this country. As every one knows, the dispute in the anthracite coal region is not over wages, but over the question of the "recognition of the union," that is, the submission of the coal-mine owners and the public to the dictation of irresponsible union magnates, who have their private ends to pursue, know perfectly well the pecuniary and political value of their influence, and are anxious to have frequent opportunities for exerting it. The example of the prosperous subsequent career of the most prominent figure in the great railway strike of ten years ago has, naturally, not been lost upon the professional agitators, and "labor troubles," intended to annoy and distress the public for the furtherance of their personal schemes, are likely to continue until the community is aroused to a better comprehension of the subject than it now possesses.

IN the present case, the owners of the coal-mines have been paying, and are ready to pay, wages far higher than the Hungarians and Lithuanian-Russians who form the majority of the miners could ever hope to earn in their own country, and many thousands of new men stand ready to take the place of the strikers as soon as they can be guaranteed security in doing so. Unfortunately, the Hungarian and Russian peasants, in addition to being grossly ignorant and degraded, possess the quality of being disposed to follow like sheep any one who gains authority over them. It is a saying among military men that Russian soldiers will march into the sea, or over a precipice, rather than question the propriety of an order given them, and this disposition has made the miners an easy prey to the agitators, whose more intelligent constituents have, of late, been getting rather unruly. In combination with their sheeplike docility, the Hungarians and Lithuanians have also a ferocious side to their character, which makes them the most dreaded and dangerous portion of the foreign community, and it is not surprising that the new men, who would gladly take employment in the mines, do not dare to face their hostility, which, as they know, is only feebly kept in check by the small show of military force on the part of the State authorities. While we have no sympathy for monopolies, which, by combination, seek to control, not only market prices, but the price of labor, it seems to us that, in this case, where the public must choose between a tyranny of bankers and railroad presidents on one side, and one of irresponsible and unscrupulous agitators on the other, it should, for the moment, favor the former, as being not only less dangerous to the community, but more amenable, later, to the control of law; and, whatever may be our private griefs against the "coal barons," it is better to avoid encouraging their opponents to further exertions, by talk of "forcing a compromise," than to run the risk of putting in the hands of the agitators weapons which will be used against us in the future, and of reducing to despair the anxious seekers for employment who are struggling with a monopoly more reckless and cruel than anything that we have to contend with.

AS to the question of the substitutes for anthracite which must, whatever may be the outcome of the strike, be very extensively used for the next six months, there is much that might be done to improve present circumstances. It is probable that the recent ordinances prohibiting the use of soft coal in cities, which are suspected of having been promoted, if not devised, by the anthracite trust, will be relaxed, the "coal barons" being now vitally interested in diminishing, rather than increasing, the demand for their product. Of coke, which has

already come into extensive use for stoves and ranges, the supply is limited, and, even in the cities, it will form a very feeble resource. The best substitute for anthracite, for household use, would probably be the compressed blocks, made of the dust, either of hard or soft coal, mixed with tar and other substances, possibly silicate of soda, and pressed in moulds, which form almost the staple fuel in France and Germany, both for railway locomotives and domestic use. The blocks used in Parisian households are of the size and shape of half a billiard-ball, and have the great advantage over soft coal of retaining their shape while burning, instead of crumbling. For such blocks, properly made, there would be now an enormous demand, and it is singular that some one should not already have placed on the market in this country a manufacture which should, under present circumstances, bring fortune rapidly to the producer. Blocks of this kind are, or have been, manufactured in a small way in Massachusetts, but no attempt has been made to place them on the market, and nothing seems to be publicly known of the results of the experiment.

AN International Fire Exhibition is to be held in London next summer, under the auspices of the British Fire Prevention Committee. The affair is to be undertaken and carried on by a corporation, known as the London Exhibitions, Limited, which owns extensive buildings and gardens at Earl's Court, within the limits of London; but the technical direction will be confided to the Fire Prevention Committee. Besides a comprehensive collection of appliances for extinguishing fires, saving life in conflagrations, and caring for injured persons, the Exhibition will contain examples of fire-resisting construction in wood, metal and other materials, including fireproof doors, shutters, screens, wire-glass and so on, besides protective coverings and impregnated materials of various kinds; and including also equipment, in the shape of protective signals, theatre curtains, sprinklers, pipe casings and similar devices. The Exhibition opens in May, and continues until October. Exhibitors are charged for floor-space, at the rate of four shillings per superficial foot, with a minimum charge of forty pounds; but there are no further expenses, beyond the cost of transporting goods and fitting up stands and show-cases. It is intended to hold "tournaments" and competitions of fire-brigades and ambulance-drivers, and the Exhibition Company provides music, illuminations and other attractions.

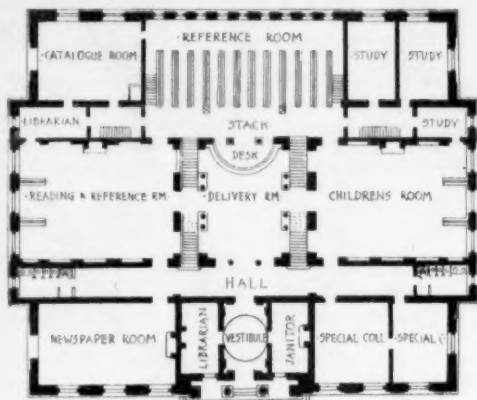
AN almost touching story of devotion to art is to be found in the account of the Dutuit bequest to the city of Paris. Many years ago, two brothers and a sister, the children of a rich contractor, were left orphans. One of the brothers wished to become an artist, and entered himself as a pupil of a distinguished painter. After several years of patient effort, he became convinced that nature had not endowed him with the talent necessary to make him eminent, and he modestly left the field to men more gifted, and devoted himself to collecting objects of art, with the avowed intention of presenting them to the community. More than this, he communicated his enthusiasm to his brother and sister, and they joined him, both with their money and their efforts, in his labor of love. Beginning with comparatively modest pecuniary resources, but with educated discrimination, and untiring zeal, the three orphans brought together, in the course of years, a collection valued at eight hundred thousand dollars, which has now come into possession of the municipality; and, with this, M. Dutuit has left a fund of six hundred thousand dollars, which will be employed in completing the Petit Palais des Beaux-Arts, in which the collection, consisting of ivories, carved furniture, porcelain, bronzes, pictures and other objects, will be deposited.

THE New York Fish, Game, and Forest Commission has under consideration a plan for propagating and raising young trees, to be given, when old enough to transplant, to towns and private citizens, to be set out on denuded lands. The professional nursery-men are, perhaps, not likely to view this scheme with favor, but, as neither towns nor private owners of barren lands are likely to have much money to spend on nursery stock, the intervention of the State, to furnish young trees for planting where none would otherwise be planted, cannot but be beneficial to the community. On a large scale, young pines and oaks, well rooted, and ready for development into vigorous trees, can be produced very cheaply, and the fact that they were available would induce many people to use them who would be discouraged by the expense, delay and disappointments incidental to raising seedlings for themselves.

LIBRARIES IN THE UNITED STATES.¹—V.

PUBLIC LIBRARY, UTICA, N. Y.

IN the very recent competition for the Public Library, Utica, N. Y., ten well-known firms of architects experienced in the construction of library buildings were asked to compete. The conditions of competition and suggested outline plans of the two floors were drawn up by the assessor, Professor W. R. Ware, of Columbia University, New York. It has been found necessary to cut down the size of the selected design considerably, but the general arrangement



Public Library, Utica, N. Y. Mr. A. C. Jackson, Architect.

exists. The plan illustrated is the competition one without these variations. In the suggested outline-plan certain points are distinctly good, particularly the relative positions of the stack-room, delivery hall and space, and the reference and children's reading-rooms, but to obtain this nearly all these rooms have to be top-lighted to assist the side-lights—perhaps a doubtful feature, certainly an extravagant one. The children's room occupies an important place. In the conditions, its area was desired to be as the main reading and reference room. The suggested position and form of the stack-room, with its reference-space extending its whole length on each floor, is also good, the only objection being that the inside portion of the stack might be dark, depending, as it does, on the borrowed light of the lantern over the delivery-hall. Still, the advantage of having all the books within such easy reach is great.

The basement, which is about 8 feet 6 inches in the clear, is entered from the outside by an entrance from an area in the rear. The area is reached by a very wide flight of 14 steps, 18 feet wide. On either side of the vestibule are placed the public lavatories and check-rooms, and beyond are 2 flights of stairs to the delivery-hall on the main floor. All the other rooms belong to the administrative side of the building, and include a very large general work-room, machinery, heating and ventilating plant, old-newspaper files, receiving and binding stores, and janitor's quarters. There are two service-staircases and a staff-entrance. The stack does not start on this floor.

On the first floor, or main floor after passing through the vestibule, which has the librarian's public-room, 12' 6" x 22', and the janitor's room of the same size, on either side, the hall corridor is reached; it is 10 feet wide, and extends from end to end, toilet-rooms being placed at the extreme ends—rooms which are hardly required at this point and necessitating waste space in the form of corridor to get to them. In the front of the building to the left is placed the newspaper-room, 26' x 46', and in a similar position on the right 2 special-collection rooms, one 25' x 26' and the other 19' 6" x 26'; both these are reached from the corridor. Directly opposite the vestibule is the delivery-room, 29' x 36', with the delivery-counter projecting into it from the stack-room. On the right is placed the children's room, 36' x 51', and on the left the reading and reference room of similar size; the stairs to the second floor and basement are arranged on either side between. These stairs interfere very little with the scheme desired of having these rooms practically under the control of the delivery-counter; on the other hand, whenever the lecture-room on the second floor is used, the current of people using them must become a very disturbing element to the readers. Both these main reading-rooms are lighted from the top, as well as by 3 windows at the ends. From the floor to the flat ceiling-light is 30 feet, the remaining portion of the room being 22 feet 6 inches in height. The space in each room adjacent to the windows is divided into 3 alcoves by bookcases 6 feet high. Similar cases are fitted into recessed bays on the other three sides of the room to the same height.

The librarian's private room, 10' x 23', is placed between the reading-room and catalogue-room, 26' x 34', which is placed in the far left-hand corner of the building at the end of the stack-room. In a similar position to the right are placed 2 study-rooms, both 26' x 17', and balancing the librarian's room is a small study-room opening out of the children's room.

The stack-room is 65' x 38'. The stacks are each 18 feet long and are arranged in one row. There are altogether 12 of them, containing space for 21,600 volumes on each floor, a total on the 5 floors of 108,000. The spaces in front of the stacks towards the delivery-room and at the back towards the windows are both 10 feet wide, the latter being used as a reference-room. As this is arranged so on each floor, a great number of readers can therefore be accommodated quite close to the books. This is very like the plan adopted for the seminar rooms at Columbia University, New York. Both lifts and stairs at each end of the stack are conveniently arranged. In the mezzanine floor, over a small portion at either end of the stack-room, are provided coat and lunch rooms for the staff, and study-rooms.

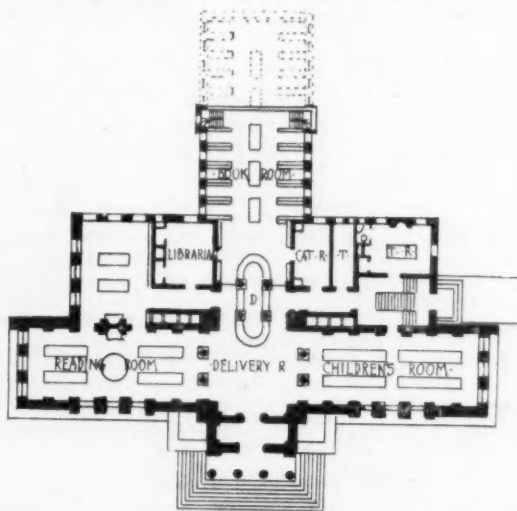
The second floor, which is level with the fourth floor of the stack, contains a large hall 30' x 96', a map-room 19' x 26', a lecture-room 19' x 26', two study-rooms 9' x 36' each, two special-collection rooms 19' x 26', a staff-room, with elevator, 14' x 26', trustees' room 19' x 26', and 2 toilet-rooms. The cost was limited to £30,000, and the architect is Mr. A. C. Jackson, of New York.

PAWTUCKET LIBRARY.

In the Library Building at Pawtucket, R. I., the planning is simple and straightforward. The approach is through a portico into a vestibule, and then directly into a square delivery-hall, with 2 large columns in each of the four openings leading to the main divisions of the library. Exactly opposite is the delivery-counter, enclosing a space, 25' x 6', having two semicircular ends, one towards the delivery-hall and the other towards the stack-room. From the attendant's desk practically all these main rooms are controlled—the children's room to the right, the reading-room to the left, and the stack-room in the rear. Originally the stack-room was arranged on the alcove system, but now it is fitted with stacks running in 4 rows lengthwise, with half-stacks at walls. They are 3 feet apart, and have 3-foot gangways across. The lighting will hardly be so successful as in the original scheme. Each floor of the stack is capable of shelving 21,000 volumes.

The general reading-room is 24' x 55'. It is fitted with 2 rows of tables—12 altogether—each 3' x 5', and seating 4. An open fireplace is placed on the inner wall, and on either side is an opening to the reference-room, 32' x 23', fitted with 4 round tables for 4 readers each. This room is also reached by a corridor from the delivery-hall. The children's room has also 2 rows of 12 tables, 3' x 5', 2 feet 2 inches high. Shelves are fitted between the pilasters along the wall of room, and the toilet-room is reached from the half-landing of the side staircase. Both these rooms are top-lighted, in addition to having windows at the front and sides. The ceiling over the delivery-hall is 36 feet from the floor, going up to a greater height than the adjoining rooms, which are 20 feet in height. The librarian's room, 20' x 15', and the cataloguing-room, 20' x 12', are placed adjacent to the delivery-desk, one on the right and the other on the left. A trustees' room and side-entrance hall and staircase balance the reference-room on the left. There is no second floor.

In the basement the newspaper and periodical room is placed under the stack-room, two circular staircases at the sides connecting



First Floor: Public Library, Pawtucket, R. I. Messrs. Cram, Goodhue & Ferguson, Architects.

them. The large rooms under the main reading-rooms are used, one as an art room and the other for special exhibits. They are fitted with special cases, swinging frames, etc.

The cost of the building was £45,000, and the architects were Messrs. Cram, Goodhue & Ferguson, of Boston.

FALL RIVER PUBLIC LIBRARY, MASS.

Although in one or two details the plan of the Public Library, Fall River, Mass., has been slightly altered, it is nearly the same as that illustrated, which was the one selected in the competition, but some of the rooms have been re-allotted.

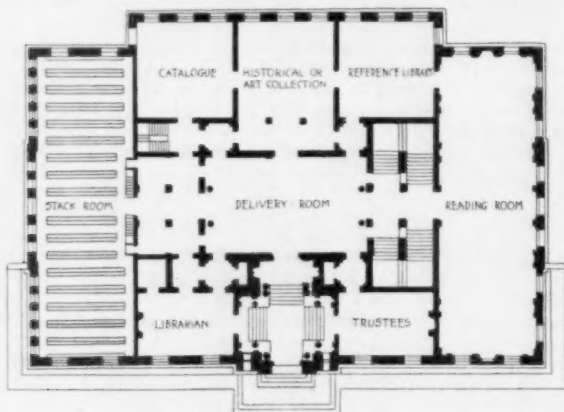
¹A paper by Sidney K. Greenslade [A.], Pugin student, Grissell Medallist, Godwin Bursar, read before the Royal Institute of British Architects, Monday, March 17, 1902, and printed in the *Journal of the Society*. Continued from No. 1389, page 44.

The arrangement of plan is very simple. On the main floor is a large top-lighted delivery-hall, occupying the centre of the building. It has an arcaded gallery 8 feet wide on the second floor, surrounding it. To the right of it is the main staircase, very well arranged, and beyond is the periodical reading-room. To the left is placed the large stack-room, eventually to be fitted with 7 floors, and then capable of taking 325,000 volumes. Opposite the main entrance is the reference-room, occupying the position originally assigned the "Historical Collection," but one bay on either side wider. To the left of this room, adjoining the stack-room, is the librarian's room, and to the right, adjoining the periodical-room, is the card-catalogue room, with 2 stands for the card-catalogue, and 2 tables, 8' x 4', 31 inches high, with 4 seats either side.

There are three openings from the delivery-hall into the working space between it and the stack-room. The large central one is fitted with the delivery-counter, segmental in plan and projecting into the hall; and the two sides have straight counters (for registration and information), of similar height, 3 feet 7 inches. The stacks are 18 feet in length, in one row—16 altogether, without the wall ones. They are 2 feet 6 inches apart. The staircase is placed centrally, and projects into the working-space, which is top-lighted. The delivery-floor level is the same as the third floor of the stack.

The periodical reading-room is well lighted on three sides. It goes up through the whole height of the building, and has a barrel ceiling, at present undecorated. The 6 tables are placed the short way of the room, and are 13 feet 9 inches long by 3 feet 6 inches wide, seating 6 either side. In the reference-room are 2 tables, 12' x 3' 11" and 2 feet 7 inches high, each seating 10 readers. Oak bookcases are placed around the room, 6 feet high. The attendant's desk is at the stack-room end, next the librarian.

In the basement, under the far end of the periodical-room and the whole of the card-catalogue room, is the children's room. Beyond, under the reference-room, is a large reading-room, which eventually will be added to the children's department. The basement can be



Public Library, Fall River, Mass. Messrs. Cram, Wentworth & Goodhue, Architects.

reached by stairs from the delivery-hall, but there is also a side entrance, with a prettily vaulted vestibule on 4 gray-granite columns. Art-galleries occupy the second floor.

The public toilet-rooms are all placed in the basement.

The architects were Messrs. Cram, Wentworth & Goodhue, of Boston.

TOWN LIBRARIES. — DIVISION III.

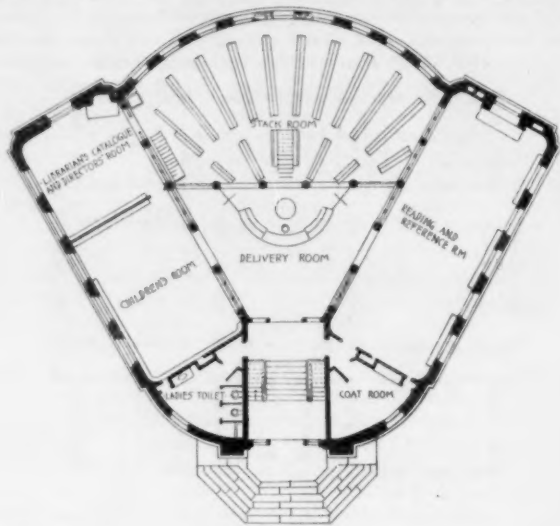
The effect of the "free access" policy, now so often adopted, is well illustrated in the plans of the 3 libraries selected under this heading. The tendency to do away with walls and substitute columns with glazed-screens between is a feature in all of them. In the East Orange and the Tacoma libraries the use of the radiating-stack, particularly in the latter, is new for such large buildings. The advantages obtained are enlarged upon in the descriptions of the libraries. The plan adopted for the Duluth Library is an unusual one, and there seem great possibilities of a development on similar lines in the future. It is not quite so well matured as the Tacoma plan, which is excellent.

CARNEGIE LIBRARY, EAST ORANGE.

The somewhat curious plan of the Carnegie Library, East Orange, N. J., is caused by the triangular shape of the site, and the result of such restriction of site has not been detrimental. In fact, it has allowed of the fitting-in of the rooms in a remarkably happy manner, and the relative positions of the two reading-rooms, the stack-room, and the delivery-room are very good. It is worthy of note that beyond the doors of the vestibule there are practically no internal walls on the first floor, but columns with glazed-screens which separate room from room. The advantage of this is very great from the control point-of-view. In the vestibule are placed the stairs to the basement, either side of a flight of 8 steps leading up to the main floor. In the basement under the whole of the stack-room is the auditorium; it is 12 feet high. The other rooms are 9 feet, and consist of store-room, repair room, janitor's room, men's toilet, boiler-room, and lunch-room for the staff.

On the first floor the delivery-room is a curiously-shaped four-sided space, right in the centre of the building. The short side, at the entrance, is 13 feet, the long one, opposite the next stack-room, is 40 feet, and the depth of the space between is 23 feet, with a varying width of from 13 feet to 40 feet.

The delivery-counter is placed in this space on the long side next



Carnegie Library, East Orange, N. J. Messrs. Jardine, Kent & Jardine, Architects.

the stack-room. The card-catalogue is arranged either side of the attendant on the counter, and beyond are turnstiles for the public to enter the stack-room. The whole of the stack-room is seen from the delivery-room. The height to the top of the columns surrounding the delivery-hall is 12 feet 6 inches, and to the flat circular skylight-lighting, some 20 feet. To the right the reading and reference room is placed; it is 20' x 49' 6"; and on the left is a similarly proportioned wing, in which the children's room, 20' x 29', and the librarian's and catalogue room, 20' x 20', are placed, the latter connected directly with the stack-room. The stack-room's extreme depth is 29 feet and width 58 feet, the outer wall being segmental. The stacks radiate from a centre at the attendant's desk. Against the outer wall is a gangway 3 feet wide; 5 feet separate each of the 11 stacks at this outer end, and they are about 14 feet long, and 2 feet 6 inches separate them at the inner end. There is also an inner row of small stacks, radiating from the same centre but of shorter lengths. There is room for two floors of stacks, and the height to the ceiling is 14 feet 8 inches. At present only one floor is fitted up. Each floor will contain about 23,000 volumes, a total of 46,000 in the two floors.

This is a decidedly interesting little library, and the general openness of the whole of the interior, making the control of every part from the attendant's desk easy, is a very important feature.

The cost was about £9,000, and the architects were Messrs. Jardine, Kent & Jardine, of New York.

DULUTH LIBRARY, MINN.

The Library at Duluth, Minn., is remarkably compact in its plan, and should well serve its purpose as an open-shelf library. It is in outline in the form of a Greek cross. The side-arms project very slightly. The extreme dimensions of the building are about 110 feet each way. It is practically of 2 floors, the ground floor, 11 feet in the clear, consisting of a newspaper-room (32' 6" x 39') on the left of the entrance-hall, which is 19 feet 6 inches wide, and the juvenile-room (32' 6" x 39') on the right. Provision is made for 2 future stack-rooms in addition to the main stack-room, which starts on this floor, one behind the children's and the other under the fiction-room. The lavatory accommodation is placed right in the centre of the building, apparently with only borrowed lights, men on one side, women on the other; this arrangement and position seem hardly successful. A packing-room below the work-room, with lift and stairs adjacent, and a store-room, boiler-room, engineer's room, etc., complete the accommodation provided on the lower floor.

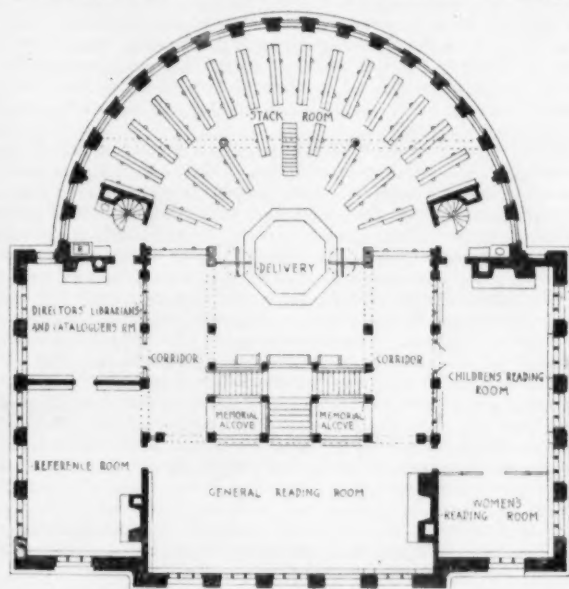
The first floor contains the principal rooms. These are all grouped around an octagonal space, 32 feet across, placed in the centre of the building. This public space is reached by the main staircase directly from the entrance vestibule, and on the side facing the entrance is the delivery-counter, with working-space behind, the whole width of the octagon, and 12 feet deep. This central octagonal delivery-hall is domed and top-lighted, and has four short sides, 8 feet wide, at the corners, and four main sides, 21 feet wide, having openings with columns between. The opening behind the delivery-space enters the stack-room, the opening on the right into the children's reading-room, and on the left into the fiction-room; both rooms are fitted with stacks. Between the children's room and the stack-room the librarian's room is placed, practically controlling the library. There is also a private room behind. At the back of the children's reading-room and opening out of it is their stack-room. The large reference-room and the general reading-room are placed to the front. A

ladies' reading-room, with lavatory accommodation, is placed just over the main entrance (which is the only entrance), and over it a board-room is placed, the only room on the second floor. At a height of 7 feet 9 inches, the glazed floor for the third tier of stacks is placed and forms a gallery finished with an iron railing just behind the columns forming the octagon. This floor occurs on the sides of the octagon opening into the fiction-room and stack-room only. The main stack-room is 32' 6" x 32'. The stacks are placed at 4-foot centres and two 12-foot lengths, with 2-foot 9-inch gangways, and contain 75,000 volumes. There are 3 tiers with glass floors. Tier No. 2 is at the same level as the first floor. In the fiction-room they are arranged similarly, as well as in the small room adjoining the children's reading-room. The children's room is 33' 6" x 26' 6", and is shown with 6 large tables, 11' 6" x 3'.

The general reading-room is 32' 6" x 39', and well lighted on two sides; it is shown with 8 large tables, 3' x 11' 6", and shelving around the room to window-sill height. The reference-room is 32' 6" x 39', balancing the general reading-room. The general openness of this plan is very good from the control point-of-view; with the exception of the columns and small piers at the corners of the octagonal hall there is practically nothing to obstruct the view of the whole of the rooms from the delivery-desk. The architect was Mr. A. F. Rudolf.

TACOMA PUBLIC LIBRARY, WASH.

The Public Library, Tacoma, Wash., is one of the largest of the recent libraries where the radiating stack-scheme has been adopted,



Second Story: Public Library, Tacoma, Wash. Messrs. Jardine, Kent & Jardine, Architects.

and where the maximum of supervision from the central delivery-desk is possible over every portion of the main floor of the library. The main building has a frontage of 95 feet 8 inches and depth at sides of 53 feet 8 inches; in addition, in the rear, is the semicircular stack-room. The whole consists of 2 floors.

On the first floor is placed, to the left, the newspaper-room, about 20' x 50'; on the opposite side of the building are the boiler-room, engineer's room, and coal-room, and between them, in the front, is the large entrance vestibule, with men's and women's lavatories and a foyer on each side of the stairs to the main floor. The auditorium, which occupies the whole space under the stack-room, is approached from these foyers.

The main library floor is reached by a staircase placed centrally up from this entrance vestibule, 8 feet wide; the stairs branch (5 feet wide), half way up, right and left, reaching a wide open corridor on each side, forming wings to the central space in front of the delivery-desk. This central delivery-space is 25 feet wide, and is provided with seats.

The octagonal delivery-desk is practically in the centre of the building, having an internal diameter of 12 feet (over this space is a domed top-light), and on each side are turnstiles at the entrance to the stack-room.

The stack-room has a radius from the centre of the delivery-desk of 38 feet. There are 2 rows of stacks; in the outer row are 16 and in the inner row 8, both 10 feet long, with a 2-foot 6-inch gangway between. There are 2 tiers of them, both floors having a total capacity for shelving 44,000 books.

The general reading-room is placed to the front centrally, and is approached from the corridors on either side by large openings 7 feet 6 inches wide. It is 22 feet wide and 50 feet long, very well lighted, and having glazed openings overlooking the main stairs and delivery-space. The right wing is divided into the children's and the women's reading-rooms. The former is 20 feet wide by 34 feet 6 inches long, and the latter 14' x 20', a low railing 3 feet high, with gate, separating the two.

In the left wing are placed the reference-room, 20' x 28' 6", and the directors', librarians', and cataloguer's room behind it, 20' x 19' 6".

The amount of floor-space lost by the radiating stack-scheme is somewhat great; at the outer gangway the distance between the stacks is 4 feet, narrowing to 2 feet 3 inches; at the inner one 4 feet 6 inches, narrowing to 2 feet 9 inches. On the other hand, the ample space next the windows would allow plenty of room for a seat and small desk to be used comfortably, and where free access is given to the stack room a good space between the stacks becomes essential. A window between each row of stacks is provided, 3 feet 6 inches wide, so they are well lighted, the inner ones being also helped with the dome over the delivery-space and two additional skylights. The approaches to all the rooms are direct and well under control, and all the rooms are exceedingly well lighted. Ample book-shelving is provided along the walls under the windows in each room for reference. The absence of walls between the various rooms and the use of columns with glazed screens instead, and the radiating arrangement of stacks, make the control of the whole floor an easy matter from the delivery-desk. The architects were Messrs. Jardine, Kent & Jardine, of New York.

[To be continued.]

PROBABLE CAUSE OF THE VENETIAN ACCIDENT.

IN the *Edinburgh Scotsman* Mr. A. Robertson gives the most plausible explanation we have seen of the lamentable collapse of the tower of St. Mark. He gives the following summary of previous disasters, slight or grave:—

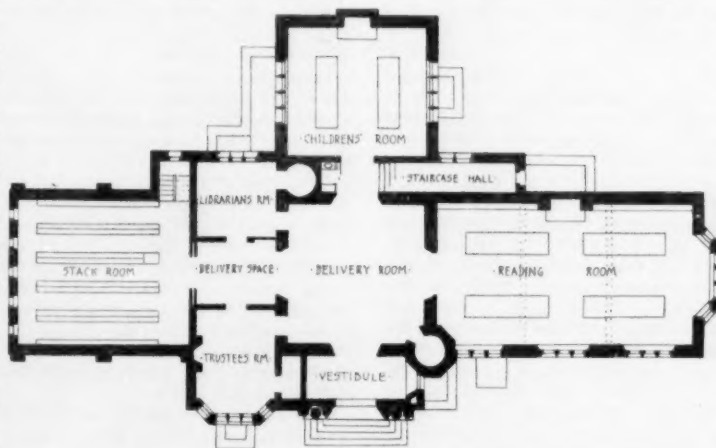
"It had been damaged by lightning, by fire, and by earthquake several times. On June 7, 1398, it was struck by lightning. In 1401, on the occasion of festivities for the Doge Michael Steno, fires were lighted on the platform and the top was burned. On October 24, 1403, the same thing happened. In 1405 the same thing happened. In 1417 it was struck by lightning and the new top of wood again burned. On June 21, 1436, all the shops around the Campanile built against it were burned. On March 26, 1511, an earthquake split its four corners. In June, 1548, it was struck by lightning. In 1565 it was struck by lightning. On July 10, 1591, an earthquake caused it to shake from top to bottom. In 1653 again struck by lightning. On August 23, 1657, again struck by lightning. On April 23, 1745, again struck by lightning, which damaged its east side severely, killing many people in the Campanile and near it. This was its last and most serious damage, although it was not till June 18, 1776, that the Republic employed the scientist Giuseppe Toaldo to put up a lightning-conductor."

Then as to the proximate cause of the irreparable disaster, he says:—

"And now comes the critical point. The Loggetta, a little marble

hall, built by Sansovino, rests against the eastern wall of the Campanile. It had almost a flat roof. To prevent the rain beating against the Campanile and, running down its side, from entering this marble hall a row of slabs of stone sloping downward was inserted in the Campanile where the roof met it.

"Only last week, that is, but ten days ago, these stones were begun to be removed, as the rain was somehow getting into the Loggetta, and a lead sheeting was to have been substituted. Instead of carefully removing one stone at a time they removed half of them—that is, 25 feet of them. Not only so, but they dug through the new wall of



Public Library, Nashua, N. H. Messrs. Cram, Goodhue & Ferguson, Architects.

the Campanile, that of 1745, and struck the old original wall, which they found separate from the new, and full of holes and cracks. Whilst working the old wall slipped down an inch or two. Instantly, the cut made was built up, but it was too late. On Wednesday, the 9th, it was observed that the new wall was cracked at the northeast corner, above the Loggetta, where the work was begun. On Thursday it was enlarged. On Friday it was struck across the north side

of the Campanile, sloping upward to the second window from the ground, then up to the third. On Saturday it passed behind the fourth and through the fifth. On Sunday the situation was, to use the word of an engineer, "desperate," and the Campanile was doomed. On Monday the crack visibly opened whilst we watched it, and the end came in a moment, when the whole structure sank into itself.

"Now for the responsibility. Who was responsible?"

"First, the engineer of the Campanile is Signor Saccardo, who is the engineer of St. Mark's Church. But Signor Saccardo is not the engineer in charge of the "marble hall," the "Loggetta" of Sansovino. That is under the charge of the authorities who take care of other national monuments in Venice. Secondly, these authorities in repairing the Loggetta roof, for which they were responsible, cut into the Campanile, as we have seen, as one might cut into a tree they intended to fell, and this they did without consulting Signor Saccardo, who bears the care of the Campanile.

"The cutting they did, had the Campanile been in good condition, would have had no effect upon it, but as things were, it was the last straw that broke the camel's back.

"To-day the Minister of Public Works, Signor Nasi, accompanied by Signor Calderini and Signor Boito, has arrived from Rome, and an inquest will be held.

"Meantime, I have but two observations to make. First, knowing the perilous condition of the Campanile, was it right to allow travellers to ascend it as recently as Saturday night? Many, many climbed its gradient steep on Saturday, the last ever to do it. Was it right to allow thousands of Venetians and strangers to promenade under its shadows on Sunday? It was only on Sunday night the band was ordered to stop playing. On Monday morning, ten minutes before its fall, we ourselves were around and around examining and touching it. Secondly, there are too many masters in Italy. The idea of two monuments built against each other, like the Campanile and Loggetta, being under different authorities, who work independently of each other! In Venice, indeed, there are five different sources of authority in regard to such monuments — namely, the authorities of St. Mark's, the authorities for the care of monuments, the Belle Arti authorities, those who have charge of public works, and the Committee of Vigilance. Then, there is a seventh, the Artists, who often make their voices heard in favor of not disturbing the old, worn, time-eaten face of things, and who sometimes hinder external renovation.

"The Campanile weighed, it is calculated, 22,000 tons. That is the mass of debris, the pyramid of material, to be sorted and cleared before rebuilding can be begun. Subscriptions are being taken up for that purpose, and half a million francs has been already received, as promised (\$100,000), but of this another time."

THE CRETAN PHÆSTOS.

LIKE other Cretan traditions, the claim of the island to have had a hundred cities is proving not altogether vain. Remains of primitive settlements, too considerable to have been villages, are coming to light at far more points of the Cretan coast than bear a name in classical atlases. There are half a dozen such in a part only of the eastern half isle, and the recent exploration of two among these supplies a key to the rest. One now suspects a "Mycenæan" site in every larger plain of the periphery. So far as searched at present, these towns show little or no sign of having continued into the historic period. Their civilization was blotted out with the "Mycenæan" domination. The succeeding class of remains is found for the most part higher up inland, on difficult heights or in remote gorges. The coastal plains were secure no longer. An age of seafaring and communication between ancient seats of luxurious life had given way to one of local and jejune development. But why and how we may only guess.

The crown of the great Cretan civilization was in Mindan Knossos. No other site in the island had furnished, or is likely to furnish, evidences of so high artistic achievement. But there is at least one notable site better preserved. Knossos, owing to its revival in later epochs and the proximity of its site to the mediæval capital of Crete, has suffered wreck and plunder beyond other sites. Much knowledge and more imagination are required to invest with full significance its "shorn and parcelled ruin," which, lying low in a featureless valley, conveys no immediate impression of magnificence. One must study its cracked and faded fragments of fresco, and look narrowly into the work of its reliefs and stone vases, to realize why it claims to rival Mycenæ in interest. The house must be reconstructed from its furniture, rather than the furniture from the house.

The ordinary visitor, not a specialist, will, therefore, prefer the ruin at Phæstos, on the south of the island, the full revelation of which has certainly been the sensation of the past spring. When Professor Halbherr announced in 1900 that he had begun upon a lesser Knossos no one expected that he and his Italian colleagues were to find, in the event, a palace more uniform, complete and imposing. What they have now laid bare stands alone in Crete as a spectacle. Even those fresh from the Mycenæ walls and the treasury of Atreus, or even from Egypt and Syria, must admire the broad staircases and majestic courts of Phæstos, all on so intelligible a plan and preserved to a point which excites without overtaxing imagination. The ruin covers a promontory of rock. Far below, the greatest of Cretan plains stretches to Mt. Dicte in the blue distance. Ida hangs right over the site and through a gap in the screen to the

west show the snows of Sphakia, all three high masses of the Cretan relief being visible from this one point. In so superb a setting it is the more pity Phæstos should be so difficult of attainment. It may, indeed, be reached in an hour from the sea, but it is from the stormy, harborless Libyan Sea. A steamer that had landed its passengers in the sunrise calm at Dybaki would often be unable to reëmbark them at noon. One must ride, therefore, from Candia, making a three-day expedition, which will include also Gortyna; but the days are long and the paths are rough.

The palace of Phæstos is contained in a vast rectangle, obvious at first sight. There had been an earlier structure, but the building now revealed is of the character and period — that of the acme of the Mycenæan age in Crete. The visitor, approaching from the north, sees from a terrace the ruin below distinguished into three main quarters. On his left a broad stairway descends to a spacious paved court, containing an altar and tiers of stone seats, built up against the rock, evidently to hold an assembly. Flanking this on the east and raised high above it is the main building, entered by a truly majestic flight of steps, extending the full width of the fine pillared hall at their head. But the entrance from without is from the opposite side, where a second and larger paved court stretches to the brink of the precipice. Thence is admittance not only to the pillared vestibule and the main hall, but to a doubled rank of galleries, and a maze of small chambers to southward, which form the third quarter. This great court, round which the walls and doors are admirably preserved, vies with the region on the west, where the two main stairways meet, as the best point-of-view on the site. To one standing in it, the uses of the various blocks about it are manifest. Here were the living and sleeping rooms of men, there of women. Their common hall of assembly occupies half another side; the store galleries for the produce of the plain fill the other half. In the chambers to the south they bathed, worshipped and lodged their retainers and their beasts.

All this is constructed of an excellent limestone, which has retained its sharp and square outlines, while the Knossian gypsums have crumbled and collapsed. The general impression, therefore, is the more convincing. But in details, the inferiority of Phæstos is unquestionable. The elaborate frescos, the sculptured friezes and the delicate plaster-relief of Knossos were never here. Phæstos was provincial. It could command good stone and good masons, but not the materials or the men for the more subtle crafts. The noble shell was decorated only in the rudest manner, and its ruin is not comparable to that of Knossos as a museum of art. On its plastered walls appear none but conventional patterns of a primitive sort; the only sculptured thing of any note yet found is a fragment of shell; the clay vases are interesting, but of common ware, and the fine stone vases have not come to light at all; trinkets in the precious metals or stones have not been found, and two small tablets make a poor show beside the immense clay library of Knossos. Indeed, all the smaller finds are conspicuously wanting. For example, clay impressions of lost signet-intaglios, a most valuable class of which Knossos has yielded to Mr. Evans scores of admirable examples, and Zakro some hundreds to me, remain unrepresented among the Italian discoveries. — D. C. Hogarth, in the *London Times*.

LONDON DOCKS.¹

AT London the rise and fall of the tide is very great, the mean rise and fall being 17½ feet at London Bridge. At various points along the river piers are built out, at the ends of which the coastwise steamers lie to receive and discharge their cargoes. These piers are too narrow to permit of mooring the whole length of the vessel directly to the ends of the piers, so mooring-buoys are placed in the river above and below the piers, and to these buoys the mooring-lines are made fast. All along the river below the Victoria Embankment, and also on the Surrey side, the warehouses are built at the water's edge and steamers and barges are brought alongside and lie there on the bottom while their cargo is discharged into the warehouses by long-armed cranes which are attached to the faces of the buildings.

In some places the bed of the river is prepared and levelled above the level of low-water mark, so that the flat-bottom barges can lie there when the tide recedes without dropping too great a distance below the level of the wharf. At various points in the river are placed mooring-buoys, to which steamers are made fast, stem and stern, to prevent their swinging while their cargo is discharged over the side into lighters, which are then floated up and down the river to the various warehouses. These lighters, or scows, are also taken into the various docks and loaded from steamers or vessels lying there, and then are taken out again into the river to the warehouses, railroad-stations and canals.

Docks similar to those at Liverpool are built on both sides of the river at various places. Some of the oldest, as the London and St. Catherine's Docks, are just below the Tower and are very massive, having heavy stone and brick warehouses built right on the quay-line. Below these, on the same side of the river, are the East and West India Docks, which are located on the inside of a bend in the river and have openings into the river at both ends. Below these again are the Victoria and Albert Docks, and at the mouth of the river are the new Tilbury Docks, which are the only ones into which

¹ Extract from a paper by F. W. Hodgdon, read before the Boston Society of Civil Engineers and published in the *Journal of the Association of Engineering Societies*.

the largest steamers can enter, the tidal basin having a depth of 23½ feet at low-water spring-tides and 42½ feet at high-water spring-tides. The depth on the outer sill of the lock leading to the closed dock is 1½ feet less. The Victoria and Albert Docks accommodate the larger part of the Peninsular and Oriental steamship lines, as well as many others. There are large cold-storage warehouses for receiving and storing frozen meat, and there have just been installed at the Victoria Dock small grain-elevators for transferring grain from barges to cars.

Some of the dock-walls in the Victoria Dock are constructed of vertical cast-iron I-beams, with webs and flanges over 2 inches thick, the spaces between the I-beams being filled-in with brick arches. There are also a few pile-piers built of square timber.

The walls of the Albert Dock are constructed wholly of concrete except at the entrances, where they are faced with brick. Very little is now being done in the London docks in the way of improvement, and I was told by the engineer at the Victoria and Albert Docks that it was almost impossible to get the authority to make the really needed improvements.

At the West India Docks one of the large entrance-locks was being reconstructed, the arch of the invert being taken out and replaced with one having a greater radius in order to allow modern vessels with flat bottoms to enter, the depth of water at the sides being increased about 4 feet; at the same time the lock is being lengthened and an additional pair of gates placed at the inner end. In order to carry out this work a coffer-dam of timber was built on the apron outside the entrance-gates, and at the inner end, in the dock itself, a circular coffer-dam was being constructed of Southern-pine timber, each pile constructed of two sticks 12 inches square bolted together. The piles thus made, being driven close together in the dock, form a semicircular wall 2 feet thick around the inner end of the lock. These piles were driven as close together as possible in sections of ten piles each. When one section was driven a space of about 10 inches was left and then another section of ten piles was driven. This was continued until the whole distance had been covered. Then, by the aid of divers, the exact space between each two sections was measured and a pile, cut slightly larger than the space to be filled, was driven into it, thereby wedging all the others together.

To strengthen the top of the coffer-dam, a horizontal timber arch 8 to 10 feet thick and 12 inches wide, made of planks 3 inches by 12 inches, was built against its inner face. Between this and the bottom it was proposed to put in additional bracing by the aid of divers. Just before my visit, the dam had been completed with the exception of some of the under-water bracing, and an attempt was made to pump it out. When the water had been lowered about 12 feet, the dam gave way near the middle, and at the time of my visit it was being reconstructed with the intention of putting in additional under-water bracing. In placing the new invert in the lock, sections 5 to 6 feet wide are first cut out of the old invert and a new invert of concrete built in place; then the intermediate sections are cut out and sections are built-in between the sections previously constructed. The entrance at which this work is being done is 55 feet wide.

On the opposite side of the river is another large system of docks used largely by sailing-vessels.

There is a large passenger-traffic on the river in small paddle-wheel steamers which run up and down the river from Westminster Bridge and Greenwich every half-hour and other steamers which run much oftener to intermediate points.

Along the banks of the Thames are many dry-docks opening directly from the river. They are large enough to accommodate the ordinary sailing-vessel, and some are of considerable size. The sills are above the plane of low water, and after vessels are placed in them and the gates are closed, the docks are emptied by allowing the water to flow out as the tide falls, the sluice being closed at low water, and after the vessels have been cleaned or repaired the water is allowed to enter at high tide and the vessels are floated out. This makes very cheap dockage, no pumping-plant being required.

At Liverpool some of the older dry-docks, opening from the wet-docks, are equipped in a similar manner by having sluices built through the walls of the main dock out into the river; but all the larger and more recent docks are built with pumping-plants, the Canada Dock, the largest now in operation, being equipped with pumps which will empty the entire dock in 1½ hours. This method of operating dry-docks, of course, can be used only where there is a considerable range of tide, as there is in Great Britain.

THE PORT OF LONDON.

IN connection with the foregoing extracts the following, from a paper on the Port of London by the Right Honorable Earl Egerston of Tatton in the *Nineteenth Century* for July, will be found of interest:—

London is not the only port affected by the recent growth of the enlarged ports of Hamburg and Antwerp. The French are alarmed at the decadence of their ports, and an article appeared in the *Petit Marseillais* commenting on a report from the Antwerp Chamber of Commerce, from which I glean some important facts. Since the abolition of the Scheldt dues threw open the Port of Antwerp it has been constantly progressing: from a port-tonnage of 3,063,825 tons in 1880 it had increased to 4,506,277 tons in 1890, to 5,322,262 tons in 1895, and to 6,872,848 tons in 1899; it is at this time the

third port of Western Europe. This is a result of which the Belgians have reason to be proud. But the principal cause is that Antwerp has become more and more a, so to speak, supplementary port of the German Empire; the carrying of emigrants to America is very important, and it is especially from the American coast that the commercial and maritime increase comes. Napoleon wished to make Antwerp a pistol pointed at London, the heart of England; and does not the great Belgian port somewhat play this part to-day?

"But the progress of Hamburg is still more significant. In 1880 Hamburg was only the fifth port of Western Europe, and came after Marseilles, with a port-tonnage of 2,766,806 tons; in 1899 Hamburg had risen to the second rank, and closely presses London, with a port-tonnage of 7,765,950 tons.

This remarkable progress is due to three causes—the general development of Germany since the war of 1870-1871; the marvellous network of communications—railroads for light and costly goods, canals for heavy goods—which border upon Hamburg; and, lastly, the initiative spirit and the activity of the Hamburgers.

Another port whose progress is still more marked, and which although situated on Dutch territory may perhaps be considered as a sort of annex to the German ports, is that of Rotterdam; the seventh in 1890, it is to-day the fourth, and has considerably distanced Marseilles, going from 1,681,650 tons to 6,323,072.

The Port of Marseilles from the fourth rank in 1880 has fallen to the sixth rank in 1890, though the amount of its tonnage has always slowly increased: 2,769,047 in 1880 to 3,458,914 in 1890 and 4,699,168 in 1899.

The foreign trade of London and Liverpool is compared with that of other foreign ports in the following table. The figures of London and Liverpool are taken from the Board of Trade Returns for 1900 for vessels with cargoes and in ballast, and those for foreign ports from the *Petit Marseilles*:—

	1880.	1899.	Increase.	Position as a port.	
				1880.	1899.
London	5,970,341	9,437,950	3,467,609	1	1
Liverpool	4,913,324	6,152,187	1,238,863	2	5
Antwerp	3,063,825	6,872,848	3,809,023	3	3
Marseilles	2,769,047	4,699,168	1,930,121	4	6
Hamburg	2,766,806	7,765,950	4,999,144	5	2
Havre	1,969,000	2,175,000	206,000	6	8 ¹
Rotterdam	1,681,650	6,323,072	4,641,422	7	4

¹ Now below Bremen.

One of the great drawbacks to the Port of London is the want of despatch in the unloading of cargo and the consequent loss to the shipowner.

Sir Alfred Jones states that while London costs about the same as Liverpool and Avonmouth, the despatch is about five times as bad in the case of a large vessel in London.

The usage of the Port of London is, that if required by the consignee the goods have to be delivered not merely on the quay but to the consignee's barge. There is great difficulty in doing this with the mixed cargoes that large steamers now convey, and it is cheaper for the shipowner to pay 1s. 6d. or 2s. per ton to get the sorting done on the delivery made on the quay than to suffer delay and loss consequent on the ship discharging overside to craft.

Sir Thomas Sutherland considers that shipowners ought to be able to discharge their ships in dock, on to the dock-quay entirely, as they do in all great ports, and that the subsequent handling of goods, if they are to be taken away by barges for the convenience of consignees, should be at the cost of these consignees; but in the present state of the dock-plant and of their warehouses, which are simply ground-floor sheds, it would be impossible to discharge *in toto* the large cargoes which are now brought into the docks.

It is difficult to realize how great is the capacity of these large ships. Mr. Douglas Owen points out that the cargo of a vessel, not by any means of the largest size—viz, of 8,000 tons—would require 1,000 truckloads or 50 trainloads to transport it; how can it be sorted, whether bags, cases, or packages, except there is a shed into which it can be lifted by hydraulic power, with five or seven stories to hold different classes of goods such as were recently erected in the Port of Manchester. It is in these provisions, which are supplied in the newest Port of Manchester, that London is deficient, and in which the modern ports of Antwerp or Hamburg have the advantage over London. In Manchester a line of railway and road for wagons run into the sheds so as to save as much as possible the cost of handling the goods. Alongside timber ships a floating platform is placed on which the timber is stacked and moved to any part of the port, and the vessel is discharged on both sides at once, on to the platform and quay.

EARL GREY AND THE BRITISH LION.—Writing to the Honorable Secretary of the Rhodesia Memorial (1896) Fund, at Bulawayo, Earl Grey suggests some modifications in the design of the proposed monument. One alteration his Lordship desires to see is the removal of the assegai from the lion's breast, as he "does not approve of the British lion submitting to this indignity." It would, he maintains, be more in keeping with the history of the country if the lion stood upon a broken assegai, thus symbolizing the establishment of the Pax Britannica in Rhodesia.—*St. James's Gazette*.

¹ The 21st of April, 1901.



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

BIRD'S-EYE VIEW: SWEETBRIER INSTITUTE, VIRGINIA. MESSRS. CRAM, GOODHUE & FERGUSON, ARCHITECTS, BOSTON, MASS.

A PORTION of this very interesting group of buildings, which is to shelter one of the largest schools for young ladies in the South, is now under contract.

PLAN OF THE SAME GROUP.

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

NEW MEMORIAL CHURCH, WEST DERBY, ENG. MR. J. OLDRID SCOTT, ARCHITECT.

This plate is copied from *Building News*.

[Additional illustrations in the International Edition.]

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BUILDING-LABORERS SCARCE IN CHICAGO.—Chicago building-contractors are hampered in their business at present by a shortage in the supply of laborers, according to the Hod-Carriers' and Building Laborers' Union, which acts also in the capacity of an employment-bureau. The minimum wage paid for this class of work now is \$2.80 a day, and contractors in need of men have run the price above the union scale. Union hod-carriers in many cases are getting 37½ cents an hour, while the union scale is but 35 cents. — *N. Y. Times*.

RESTORATION OF CLIFFORD'S TOWER.—The grant of £3,500 which the Treasury has just promised towards the cost of restoring the historic Clifford's Tower of York Castle is but a reasonable recognition of the national character of the work. Standing high upon the great Castle Mound, Clifford's Tower looks the part of beetling donjon to a nicety. The tradition attaches to it of having been the scene of the massacre of 1190, when some hundreds of Jews and their families shut themselves up either within its walls, or in other portions of the castle, in the vain hope of escaping the fury of the citizens. At present it is little more than a shell. For some reason or other the garrison which the son of the vanquished of Marston Moor maintained in the massive old keep was unpopular with the citizens, and one fine day the magazine blew up, and Clifford's Tower was an empty shell. — *London Standard*.

ELECTROLYSIS AND PIPE-SYSTEMS.—The question of electrolysis in pipe-systems and the proposed prevention of the action by means of insulating-joints, recently printed in the *Evening Post*, has brought forth a number of objections from those interested in the piping-systems. In response to these, George T. Hanchett has written to the *Electrical Review* to refute the arguments used. He declares that there are plainly two ways of stopping the electrolysis, one being to prevent the electric current from leaving the pipe which it has sought as the path of least resistance on its return to the power-house, and the other to keep it out of the pipe altogether. The proposed plan, he says, to make the pipe-return a poor conductor, is not to make the metal immune to electrolysis, but to keep the current out of it. The first plan, to prevent the current from leaving the pipes, which would also prevent electrolysis, could be carried out by making the pipe-line an absolutely continuous metallic structure, and connecting it solidly to the return feeders at all points where current tends to leave it. This, the writer claims, is rarely satisfactory, as the current distribution is continually changing with the position of the cars. The other plan, that of breaking up the piping-system so thoroughly that currents would not enter it, is believed by Mr. Hanchett to be a complete protection, and of much more worth than the first proposition. He says in conclusion: "Let us for a

moment revert to the facts in the case. Electrolytic action is a simple and quiet chemical decomposition, taking place very much like the dissolving of metal in an acid, and without pyrotechnics of any kind. It is proportionate to the volume of current and to the time that it flows. It will attack any conductor, either poor or good, at the point of leaving if the conditions are such as to invite electrolytic action. It can be effectively checked by making *nil* the volume of current flowing. This can be done by thoroughly breaking up the electrical continuity of the piping-system. A partial attempt to do this will be worse than to leave the metallic continuity intact, and the experience and judgment of most of the newspaper communicants seem to be drawn from such cases, which are frequent in practice. If the conductivity of wet grounds were nearly that of cast-iron, it is probable there would be little choice between the iron pipe and the ground, which would make the construction of insulating-joints difficult. Unfortunately, the most conducting loam saturated with salt water measures about 20 ohms to the cubic yard, while a cubic yard of cast-iron, especially alloyed for high resistance, has a resistance of about .0000011, making the conductivity of cast-iron almost twenty million times as great as that of moist conducting earth."

A USE FOR THE PEAT-BOGS OF NEW YORK.—As the anthracite-coal miners' strike continues and the price of coal advances the people begin to look about for a substitute fuel. Dr. Wilson S. Pettit, of Lockport, who has investigated the fuel question to a considerable extent, says that \$10, or even \$8, per ton of anthracite coal this winter will mean that many people will not be able to buy a sufficient amount to keep warm and for domestic purposes. Unless a cheaper substitute fuel can be found, he thinks there will be great suffering, provided the strike is not settled very soon. Dr. Pettit has suggested that peat be substituted, to a certain extent at least, for anthracite or bituminous coal. It is not generally known that peat abounds in Western New York. On the bog-lands of Orleans, Erie, Monroe, Niagara, and Genesee counties there are immense deposits of peat as rich as any found in Ireland, Scotland, or Germany. The fuel is quite good, but because of the manner of combustion is not equal to either kinds of the most commonly used coal. It is suggested, however, that peat, treated with petroleum by an inexpensive process, would furnish a fuel equal in heat-producing powers to anthracite, and in many respects superior to hard coal. — *N. Y. Times*.

TO INCREASE INCANDESCENT-LAMP EFFICIENCY.—An ingenious system of increasing the general efficiency of incandescent lighting was recently described before the French Academy of Sciences by G. Weisman and André Blondel. The authors state the well-known fact that incandescent-lamps with carbon filaments cannot be made below 5-candle-power for pressures of about 100 volts, since the filament required is smaller than can be commercially manufactured and handled. They point out that the efficiency of a carbon filament also depends to a large degree upon the size and candle-power of the lamp. For example, speaking of commercial efficiencies and 110-volt lamps, the 32-candle-power lamp will show 3 watts, the 50-candle-power lamp 2.5 watts, and the 100-candle-power lamp 2 to 1.8 watts efficiency. It appears, therefore, that large filaments show higher efficiency in luminous output than the smaller ones, and also possess greater steadiness in burning on account of what may be called their heat inertia. The economizer system suggested consists in putting a very small transformer in the circuit of each group of lamps, so arranged that its primary is cut in or out by the lighting-switch. For example, in place of using 10-candle-power 110 volt lamps with fine filaments which consume 4 watts per candle-power, lamps of 22 volts and 10-candle-power may be installed, consuming only 2.5 watts per candle-power. At 22 volts lamps of 1-candle-power may be made very satisfactorily. The small transformer may be made of very high efficiency, going up to 97 per cent for sizes up to 300 watts. They are always worked naturally at full load, and as their primaries are cut out when the lamps are extinguished, cannot produce phase displacement or all-day core losses. It is stated that several thousand lamps have already been installed in Paris on this system, and during the 8 months they have been in operation have given generally excellent results. — *N. Y. Evening Post*.

WARNINGS FOR USERS OF ELECTRICITY.—In the Report of the National Board of Fire Underwriters are recounted these two very instructive stories: The destruction of one house nearly resulted from the overheating of an electric flatiron. The appliance was hung upon the wall when not in use. While in that position a child turned the switch so that the current was turned into the iron. After a time the heat became so intense that it communicated through the plastering to the lath and studding, which were finally ignited. The smoke was discovered by a servant on the third floor in time to avert serious loss. A \$35,000 loss occurred during a thunder-storm when lightning temporarily disabled service-wires furnishing current to a supply-store. One of the employes going to the second floor to show some merchandise, turned the key of a lamp attached to an extension cord. As it did not work he carelessly dropped the lamp on top of some clothing. When the current was turned on a fire was started in the stock with very disastrous results. — *Exchange*.

THE TOWER OF ST. MARK AND PROFANE PRIESTS.—Some centuries ago, but discontinued in 1518, there was a curious iron cage, quite exposed to the elements, hung to the side of the tower about half-way up, into which swearing priests were locked for longer or shorter periods, their food being let down by ropes. The bells were 5, now buried in the debris at the bottom, and each had its own name, their music being as familiar to the Venetians as Bow Bells to London. Their ceasing to ring makes the silence of this silent city all the more marked. — *Pall-Mall Gazette*.

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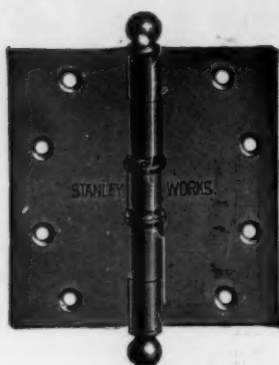
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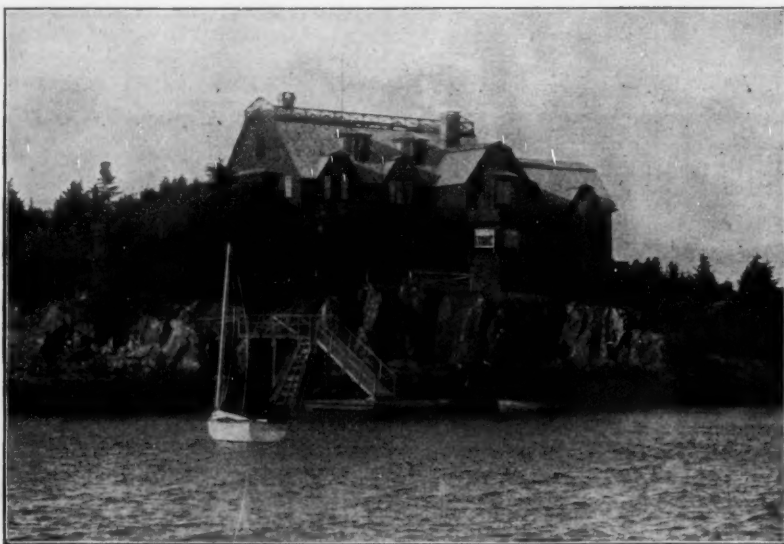
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Staircases	21	"
Mantelpieces	81	"
Pulpits	6	"
Fanlights	60	"

In addition to the subjects enumerated above there is a large quantity of measured and detailed drawings of Cornices, Ironwork, Gateposts, Windows, Interior Finish, Ceiling Decoration, Capitals, etc., together with elevational and sectional views of entire buildings.

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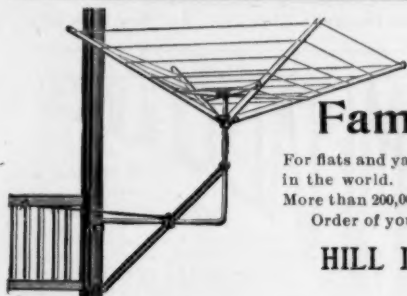
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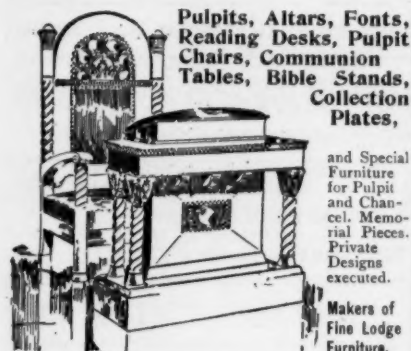


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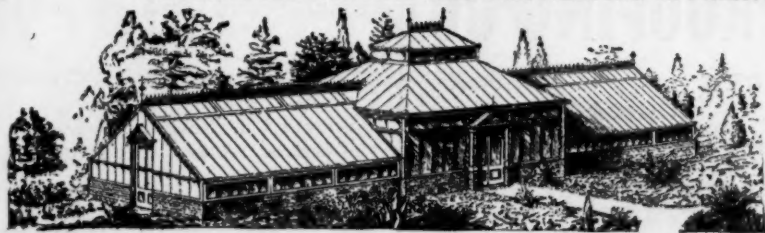
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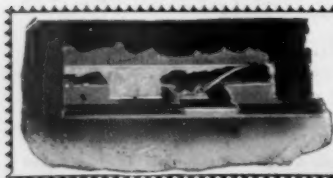
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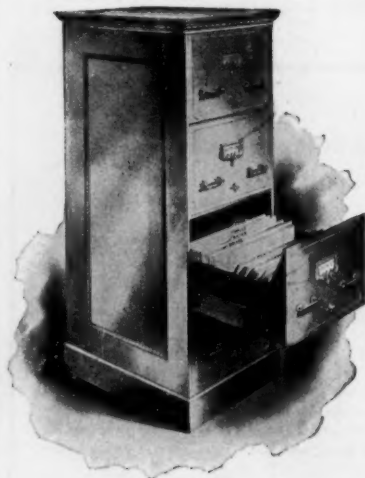
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Important Litigation Relating to Magnesia Covering Patents

THE KEASBEY & MATTISON CO., the owners of the patents for magnesia covering, have commenced a suit in the United States Circuit Court for the Southern District of New York against the Philip Carey Mfg. Co., George D. Crabbs, J. E. Breese, Schoellkopf, Hartford & Hanna Co., J. F. Schoellkopf, Jr., James Hartford, W. W. Hanna, C. P. Hugo Schoellkopf and Jesse W. Starr, to restrain the defendants from making and selling magnesia covering for boilers and steam pipes containing more than 50 per cent of magnesia, and especially coverings containing 85 per cent magnesia.

The Bill prays for a preliminary writ of injunction, to be continued during the pendency of the suit, and upon the final determination thereof to be made perpetual, and also demands an accounting and damages.

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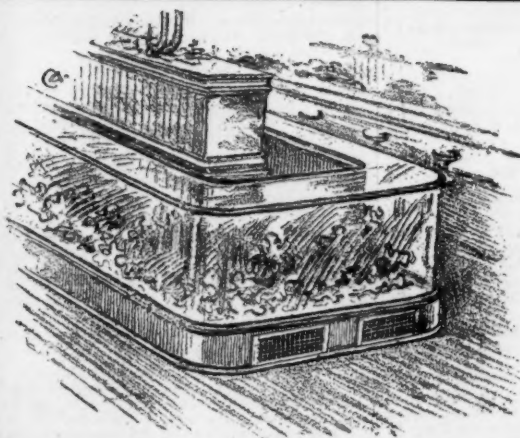
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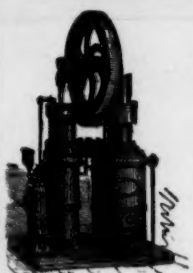
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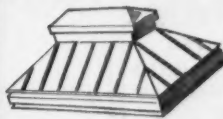
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Brooklyn, N. Y.—Marcy Ave., w. s. 80 s Macon St., four-sty bk. flat, 45' x 61', steam; \$25,000; o. A. Crawford, 186 Remsen St.; a. A. K. Koch, 26 Court St.

Cornelia St., s. w. cor. Knickerbocker Ave., three-sty bk. tenement, 25' x 80'; \$90,000; o. S. H. Coombs, 85 Bainbridge St.; a. L. Berger & Co., 300 St. Nicholas Ave.

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Fayette, Mo.—Bk. st. & fr. opera-house, 60' x 120', with seating capacity of 1,300; \$33,000; o. Lee Holloway; a. George O. Garney, 185 Dearborn St., Chicago, Ill.

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COMPETITIONS.

MARKET, ETC.

[At Houston, Tex.] Plans, specifications and detailed drawings will be received by D. D. Bryan, City Secretary, until October 6 for a combined market-house and city-hall. Cost not to exceed \$100,000. 1391

PROPOSALS.

NURSES' HOME.

[At Monson, Mass.] Proposals will be received by trustees Massachusetts Hospitals for Epileptics, at office of Architects Kendall, Taylor & Stevens, 93 Federal St., Boston, until 12 M. August 29 for construction (exclusive of heating, lighting and plumbing) of nurses' home, at State Hospital for Epileptics at Monson, Mass. Will be brick, two and one-half stories, 34' x 84', and cost about \$20,000. Certified check for \$50 and bond for 30 per cent of bid required. WM. N. BULLARD, chmn. trustees. 1391

HOSPITAL BUILDINGS.

[At Boston, Mass.] Proposals will be received by trustees, Austin Farm, until 12 M. August 30 for erection of three-story brick reception ward, 40' x 160'; two-story operating ward and two-story excited ward building at Austin Farm, Dorchester. Certified check for \$2,500 and bond for \$50,000 required. Proposals at office of Architects Wheelwright & Haven, 100 Boylston St. French & Hubbard, Albany Building, steam and electric engs. DR. P. C. KNAPP, 33 Marlboro St., chmn. trustees. 1391

BUILDING.

[At Columbus, Ga.] Bids are wanted September 3 for the construction of a Y. M. C. A. Building at Columbus, in accordance with plans and specifications on file in the office of T. W. Smith and T. F. Lockwood, of Columbus. L. H. CHAPPELL, Chmn. Bd. of Trus. 1391

SEWERS.

[At Athol, Mass.] Sealed proposals will be received until September 3, 1902, for the construction of about five miles of sewers in the town of Athol, Mass. Plans, profiles and specifications may be seen at the Selectmen's Rooms, Engine-house Building, Exchange St., Athol. HERBERT L. HAPGOOD, HENRIE C. FAY, GARRETT B. B. LARKEQUE, Sewer Commissioners. 1391

BUILDINGS.

[At Rapid City, S. D.] Proposals for five brick buildings, Department of the Interior, Office of Indian Affairs, Washington, D. C. Sealed proposals will be received at the Indian Office until September 2, 1902, for furnishing and delivering the necessary materials and labor required to construct and complete one brick employees' quarters and one brick laundry, both with plumbing and acetylene gas piping; also one brick dormitory, one addition to brick dormitory and one brick school-house, all with plumbing, acetylene gas piping and steam heat at the Rapid City Indian School, South Dakota. For further information apply to Sam B. Davis, Supt. Indian School, Rapid City, S. D. A. C. TONNER, acting commissioner. 1391

SCHOOL.

[At Ordway, S. D.] Bids will be received until September 5 for the

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PROPOSALS.
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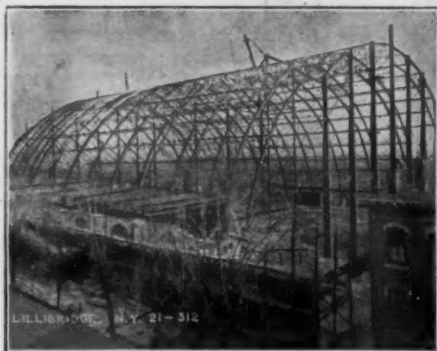
HOSPITAL. [At Cleveland, O.] Bids are wanted September 6 for erecting an Acute Hospital building on site designated at Cleveland State Hospital. Frank L. Packard, architect, Columbus, O. A. B. HOWARD, M. D., Sec'y Bd. of Trus. 1392

LIBRARY. [At Sheboygan, Wis.] Bids are wanted September 10 for the erection of a public library. FRANCIS WILLIAMS, Sec'y Library Bd. Approximate cost of building, \$35,000. 1392

SEWER AND WATER MAINS. [At Lakewood, O.] Bids are wanted September 6 for laying the necessary sewer and water mains on Lake Ave. Bids will also be received by the Bd. of Hamlet Trus. in September for laying necessary sewers on Clifton Boulevard. Plans may be obtained at the office of the Wm. H. Evers Engineering Co., Williamson Building, Cleveland. JOHN FRENCH, Hamlet Clk. 1392

STEEL. [At Brooklyn, N. Y.] Proposals for steel for use in building battle-ship "Connecticut," at the navy yard, Brooklyn, N. Y. will be received at the Navy Department until September 10, 1902. Specifications and all information may be obtained on application to the bureau of construction and repair, Navy Department. CHAS. H. DARLING, acting secretary of the navy. 1392

PIPE. [At Washington, D. C.] Sealed proposals will be received at the office of the commissioners until September 6, 1902, for furnishing 30 inch, 36-inch and 48-inch cast-iron water-pipe and specials. Specifications and blank forms of proposal may be obtained at this office. HENRY B. F. MACFARLAND, et al., commissioners, D. C. 1392



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VALVES. [At Washington, D. C.] Sealed proposals will be received at the office of the commissioners, D. C., until September 6, 1902, for furnishing gate and check valves for water department. Specifications and blank forms of proposal may be obtained at this office. HENRY B. F. MACFARLAND et al., commissioners, D. C. 1392

BUILDING. [At Green River, Ky.] U. S. Engineer Office, Louisville, Ky. Sealed proposals for office and warehouse buildings at locks 2 and 3, Green River, Ky., will be received here until September 6, 1902. Information furnished on application. E. H. RUFFNER, maj., engrs. 1392

Treasury Department, Office of the Supervising Architect, Washington, D. C., August 13th, 1902. Sealed proposals will be received at this office until 2 o'clock P. M. on the 3d day of September, 1902, and then opened, for furnishing the plumbing and gas-piping complete in place for the Hygienic Laboratory of the U. S. Marine Hospital Service at Washington, D. C., in accordance with the drawings and specification, copies of which may be had at this office, at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1392

Treasury Department, Office of the Supervising Architect, Washington, D. C., August 13th, 1902. Sealed proposals will be received at this office until 2 o'clock P. M. on the 3d day of September, 1902, and then opened, for the installation of a conduit and electric wiring system for the Hygienic Laboratory, U. S. Marine Hospital Service, Washington, D. C., in accordance with the drawings and specification, copies of which may be obtained at this office at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1392

Treasury Department, Office of the Supervising Architect, Washington, D. C., August 16th, 1902. Sealed proposals will be received at this office until 2 o'clock P. M. on the 8th day of September, 1902, and then opened, for furnishing the low pressure steam heating apparatus, etc., complete in place for the Hygienic Laboratory of the Marine Hospital Service at Washington, D. C., in accordance with drawings and specification, copies of which may be had at this office at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1392

Treasury Department, Office of the Supervising Architect, Washington, D. C., August 19, 1902. Sealed proposals will be received at this office until 2 o'clock P. M. on the 30th day of September, 1902, and then opened, for the mechanical and electrical equipment for the U. S. Court-house and Post-office at Indianapolis, Indiana, in accordance with the drawings and

PROPOSALS.

specifications, copies of which may be had at the discretion of the Supervising Architect on application at this office or the office of the architects, Rankin & Kellogg, 1012 Walnut Street, Philadelphia, Pa. Applications must be accompanied by a certified check for \$100 payable to the Treasurer of the United States, which will be held at this office until the return of the drawings and specifications. JAMES KNOX TAYLOR, Supervising Architect. 1392

SCHOOL. [At Cincinnati, O.] Sealed proposals will be received up to and including September 15th, 1902, for the erection of a brick school-house in Cincinnati, Appanoose County, Ia., according to plans and specifications of J. C. & W. Woodward, Council Bluffs, Ia. For plans and specifications address the architects or the undersigned secretary. L. H. ATHERTON, secretary. J. M. STURDIVANT, president. 1393

INTERIOR FINISH, ETC. [At Chicago, Ill.] Treasury Department, Office of the Chicago Building, Washington, D. C. Sealed proposals will be received at this office until September 24, 1902, for the interior finish and completion of the post-office, court-house, etc., Chicago, Ill., in accordance with the drawings and specifications, copies of which may be had on application at this office. Henry Ives Cobb, architect, U. S. Government Building at Chicago, Treasury Department, Washington, D. C. 1393

LIBRARY. [At Boulder, Col.] It is reported that bids are wanted August 30 for erecting a library in this city, to cost about \$75,000. G. W. ROE, architect, Pueblo, Col. 1391

CAPITOL. [At Harrisburg, Pa.] Sealed proposals for the construction of a Capitol building for the Commonwealth of Pennsylvania, at Harrisburg, Pa., will be received by the Capitol Building Commission, at Harrisburg, Pa., until twelve o'clock, noon, on the 6th day of September, 1902, and then publicly opened. Plans and specifications and blank forms of proposal may be had on application to J. M. Huston, architect, Witherspoon Building, Philadelphia, Pa. EDGAR G. HELWIG, Secretary. M. L. AYRE, Superintendent. 1391

PRINTING OFFICE BUILDING. [At Washington, D. C.] U. S. Engineer Office, 735 N. Capitol St., Washington, D. C., July 28, 1902. Sealed proposals will be

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STEPHEN SEWELL, Capt., Engrs. 1391

Treasury Department, Office of the Supervising Archi-
tect, Washington, D. C., August 8, 1902. Sealed
proposals will be received at this office until 2 o'clock
P. M. on the 9th day of September, 1902, and then
opened, for furnishing the steam heating and venti-
lating apparatus complete in place for the U. S.
Post-office and Court-house at Elmira, New York, in
accordance with drawings and specification, copies of
which may be had at this office, or at the office of the

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the Supervising Architect. JAMES KNOX TAYLOR,
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QUARANTINE STATION.

[At Galveston, Tex.]

Sealed proposals will be received by George R.
Tabor, M. D., State health officer, at his office, in
Austin, Tex., until Tuesday, the 26th day of
August, 1902, for building the iron frame screw
piling quarantine station at Galveston, Tex. Bids
will be received for the erection of the building, in-
cluding iron and all other materials complete. Bids
will also be received for the iron work, complete, and
also bids for all other branches of work, complete,
separately. Plans and specifications can be seen at

PROPOSALS.

quarantine department, Austin, Tex., and at quaran-
tine station, Galveston, Tex., and at the office of
Dodson & Scott, in Waco, Tex. GEORGE R. TABOR,
M. D., State Health Officer. 1391

QUAY WALL.

[At Bremerton, Wash.]

Sealed proposals, endorsed "Proposals for Concrete
Quay Wall," will be received at the Bureau of Yards
and Docks, Navy Department, Washington, until 1
o'clock, September 6, 1902, and then and there
publicly opened, for constructing 600 feet, more or
less, of concrete quay wall, at the Navy Yard, Brem-
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BUILDING. [At Fort Strong.] Depot Quartermaster's Office, U. S. Army, 170 Summer St., Boston, Mass. Sealed proposals, in triplicate, will be received at this office until 11 A. M. August 28, 1902, and then opened, for constructing a fire apparatus building at Fort Strong, Boston Harbor, Mass. Blank proposals and full information furnished on application. Envelopes containing proposals to be endorsed "Proposal for Constructing Building at Fort Strong, Mass.," and addressed to A. M. PALMER, depot quartermaster. 1391	Treasury Department, Office of the Supervising Architect, Washington, D. C., August 6, 1902. Sealed proposals will be received at this office until 2 o'clock P. M. on the 18th day of September, 1902, and then opened, for the installation of a conduit and electric wiring system for the U. S. Post-office at Oakland, California, in accordance with the drawings and specification, copies of which may be obtained at this office or at the office of the Superintendent of Construction at Oakland, Cal., at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1391	connections from the power-house to these buildings and others now under construction at the Mountain Branch of the National Home for D. V. S., near Johnson City, Tenn. Also for a complete system of water distribution and sewerage for this Branch Home. Plans and specifications can be seen at this office, at the office of the architect, J. H. Freedlander, 244 Fifth Ave., New York City, or at the office of the Superintendent of Construction, at the site of the work. Necessary information can also be obtained and blank forms for proposals procured on application at either of the above-named places. The Home reserves the right to reject any or all bids and to waive defects. MOSES HARRIS, General Treasurer, N. H. D. V. S. Approved: M. T. McMAHON, President Board of Managers, N. H. D. V. S. 1392
DRY DOCK. [At Norfolk, Va.] Sealed proposals, endorsed "Proposals for Dry Dock," will be received at the Bureau of yards and docks, Navy Department, Washington, until 1 o'clock, September 13, 1902, for constructing a concrete and granite dry dock, exclusive of pumping plant and caisson, at the navy yard, Norfolk, Va. Authorized cost of entire work, \$1,200,000. Plans and specifications will be furnished by the bureau on deposit of \$100 to secure their return. MORDECAI T. ENDICOTT, Chief of Bureau. 1391	MESS-HALL AND KITCHEN, LAUNDRY, STOREHOUSE, ETC. [For the Mountain Branch, N. H. D. V. S.] OFFICE OF THE NATIONAL HOME FOR DISABLED VOLUNTEER SOLDIERS, Rooms 932-4 New York Life Building, 346 Broadway, New York City, August 1st, 1902. Sealed proposals will be received at this office until 12 M. Tuesday, the 2d day of September, 1902, for furnishing materials, labor, etc., for the construction of mess-hall and kitchen, laundry, storehouse, hospital morgue, and for steam and electric lighting	WATER-PIPE, ETC. [At Washington, D. C.] Office of the Commissioners, D. C., Washington, D. C., July 30, 1902. Sealed proposals will be received at this office until twelve o'clock, noon, September 6, 1902, for furnishing thirty-inch, thirty-six-inch and forty-eight-inch cast-iron water-pipe and specials. HENRY B. F. MACFARLAND, JOHN BIDDLE, Commissioners, D. C. 1391

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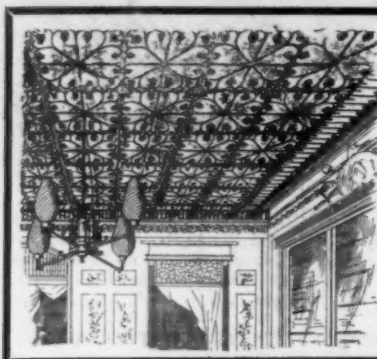
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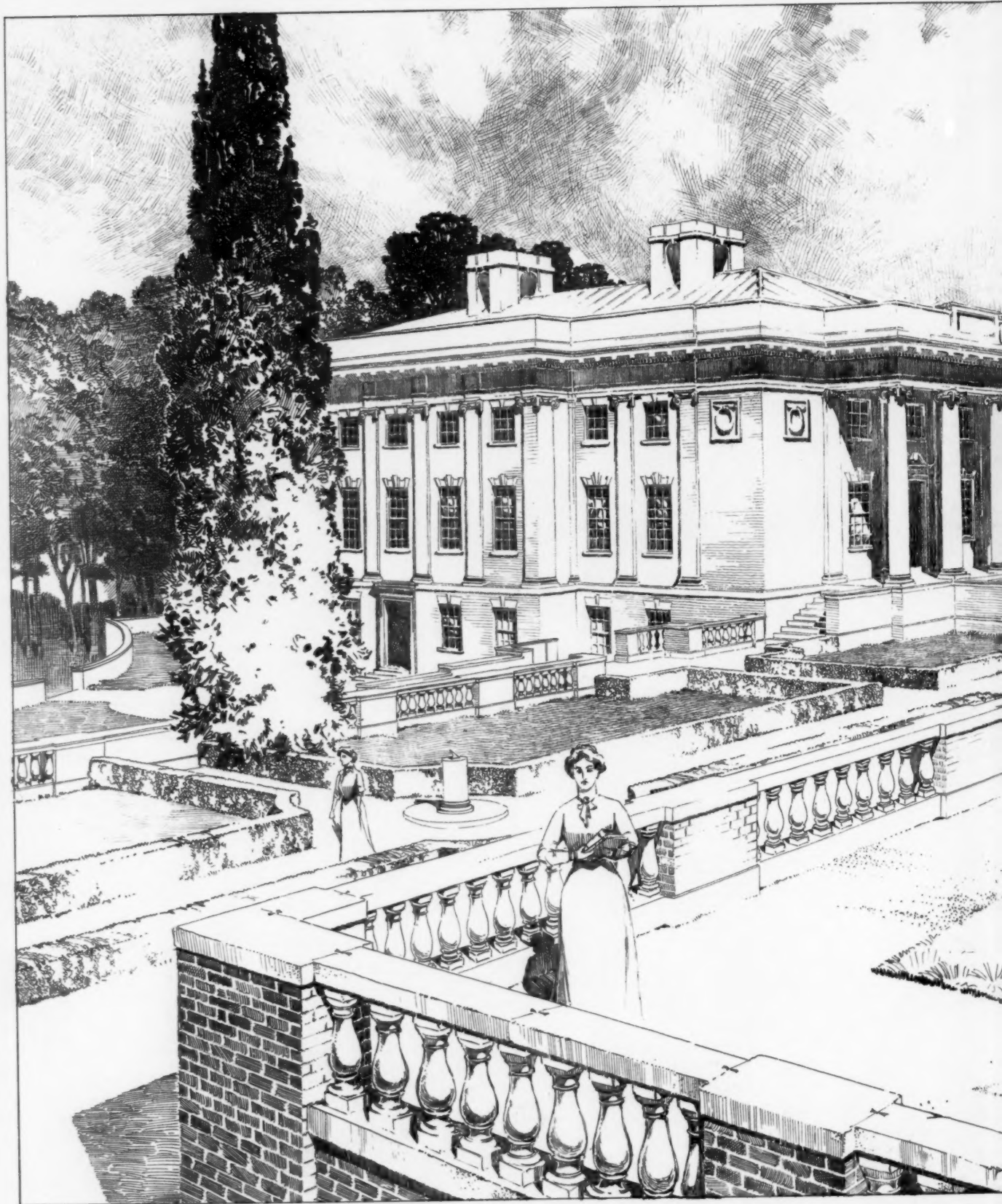
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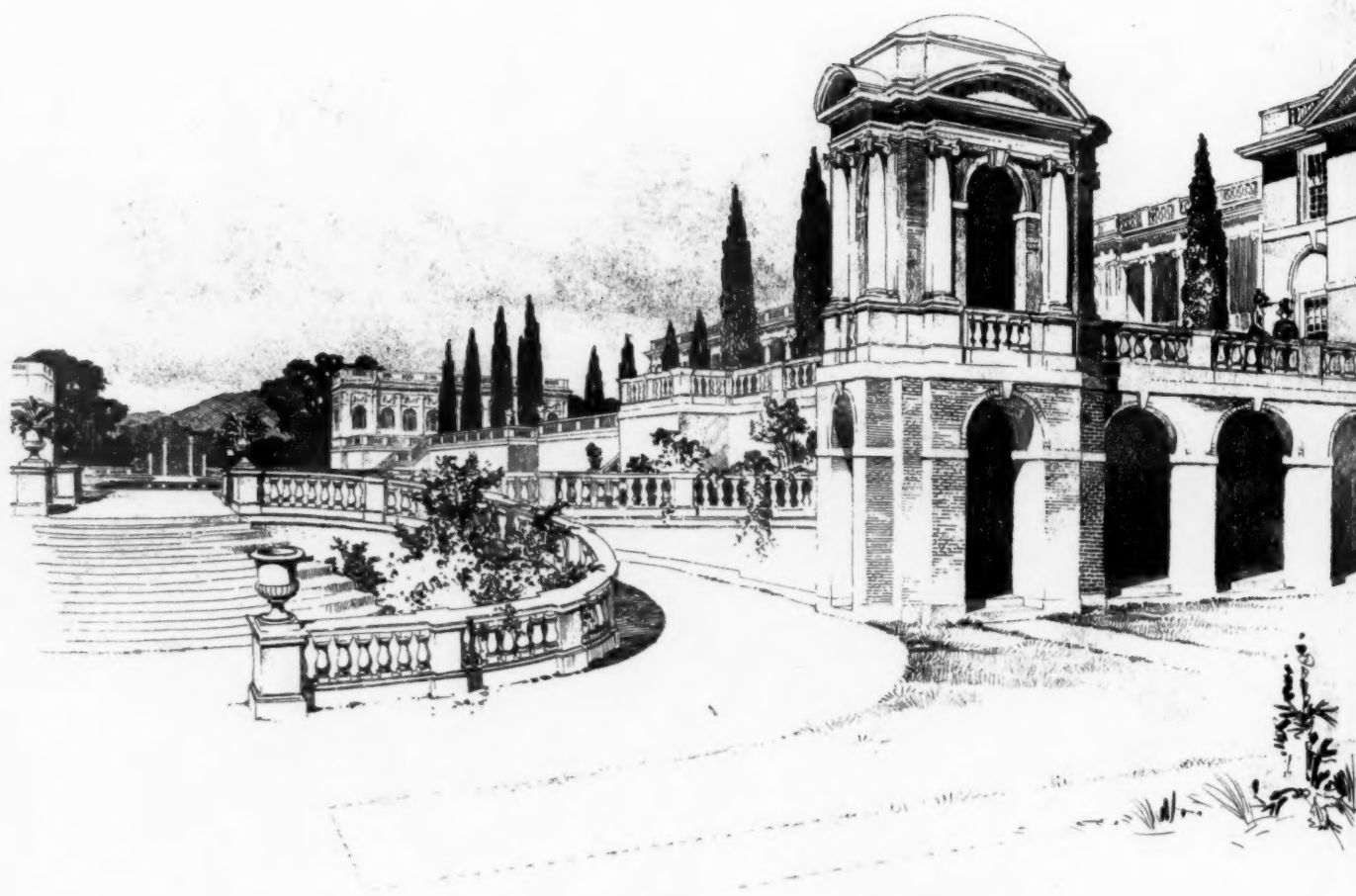
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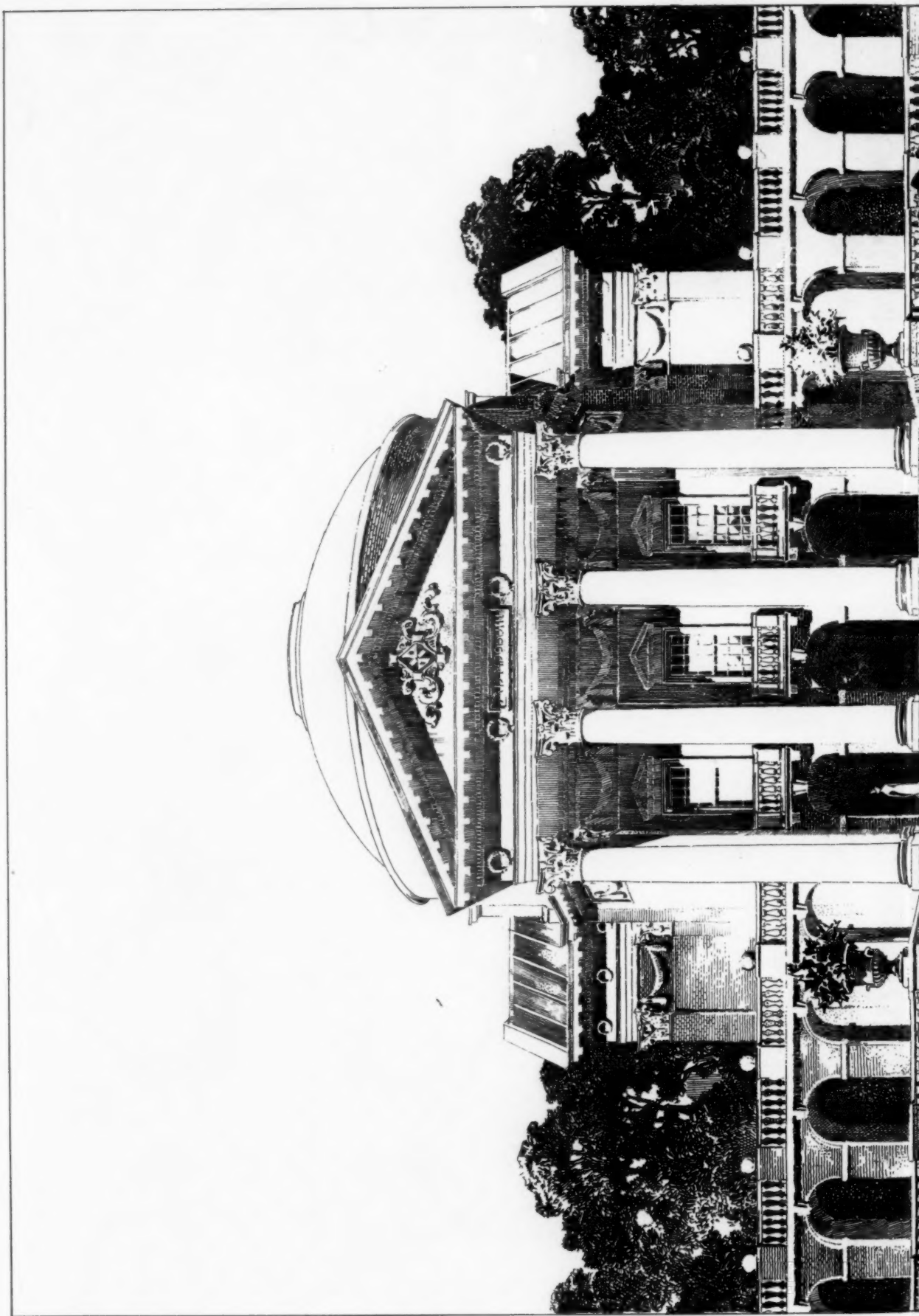
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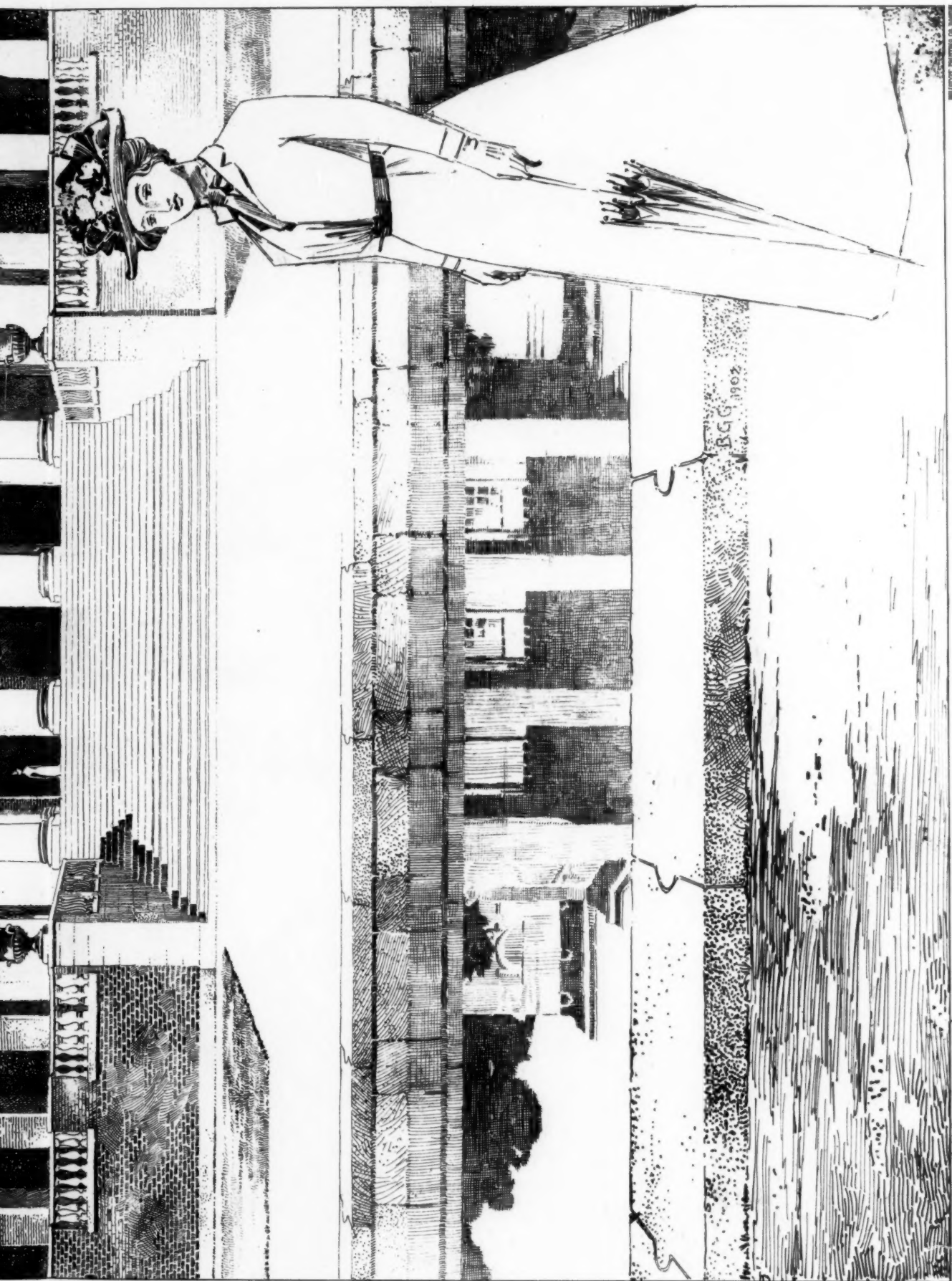


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