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ONE of the most extraordinary accidents of recent years is the fall of the Campanile in Venice. This famous structure, more than three hundred feet high, the foundations of which were laid more than eleven hundred years ago, and which was completed in its present form nearly five hundred years ago, collapsed, almost without warning, in the middle of the forenoon of July 14, falling in a heap of ruins, but fortunately, without seriously damaging the splendid and famous buildings which surround it. According to the newspapers, the first indication of any movement in the tower was observed on the day previous to the catastrophe, when a crack was seen near the corner of the north wall, and two of the windows were found broken. The Government officials, who keep a close watch upon ancient buildings in Venice, at once arranged for examination and repairs; and, as a measure of precaution, the usual Sunday afternoon concert in the Piazza of St. Mark, under the shadow of the tower, was abandoned. If it had not been for this prudent proceeding, the loss of life might have been appalling; but the fall, which might very probably have been hastened by the movement of a crowd around it, was delayed until a time in the morning when the Piazza is comparatively unfrequented; so that there is reason to hope that the loss of life was inconsiderable.

THE Trustees of the Massachusetts Institute of Technology have decided to establish a course, very much in accordance with the plan suggested by Mr. Edward Atkinson, for the instruction of young men "in the selection and constructive use of materials with a view to minimizing the risk of destruction by fire." Our valued contemporary *Insurance Engineering* thinks that architects are remarkable for "an ungraceful verbosity," and a "characteristic loquacity," so that we hesitate to make any comments on this subject, but it might be remarked that, with the very best wishes for the success of the new course, and the highest opinion of its value to the community, we hope that the underwriters will not forget that it is to them that the graduates in the new course must look for employment after their graduation. Although, as *Insurance Engineering* informs us, "underwriters cannot afford to waste valuable time on architects," the latter have been able to learn, partly from the officials of the factory mutual companies, for whose work they have the highest respect and admiration, and partly from their own observation, at least as much of the science of fire-resisting construction as they find to be called for by their clients, and, while the graduates in the new course can be of great use to the public as inspectors, either for insurance-companies or official departments, they are not likely, we fear, to find their services in demand elsewhere.

AT the risk of giving further evidence of the "excessive volubility" which, as *Insurance Engineering* informs us, is one of the more conspicuous failings of architects, we will venture to suggest, in reply to Mr. Edward Atkinson's observation that opportunities for studying the effect of atmospheric corrosion on iron cased with masonry are difficult to

obtain, that, in default of such opportunities, it is possible that valuable indications might be derived from investigating the action of hydrochloric-acid vapor upon cast-iron and steel protected by such a casing. The action of hydrochloric acid would be far more rapid than that of the carbonic or sulphurous acids of the atmosphere, but it would be affected, in something the same manner as the latter, by the action of the lime and cement in the masonry in intercepting and combining with the acid before it could reach the metal. In this way the advantage, or the reverse, of painting the iron, and the effect of leaving voids between the iron and the masonry, in place of grouting everything closely, could, at least, be studied by analogy, while waiting for a chance to make more decisive tests. We may say that, judging from our own observation, the theory that iron or steel embedded in masonry cannot rust needs to be accepted with reservations. It is well known that iron ties have been taken from buildings in Europe, after having been buried in masonry for seven hundred years, without a sign of corrosion, but there are also instances of the corrosion of iron similarly situated after the lapse of a few years. We have in mind a building, plastered outside with lime and cement on wire-lathing eight or ten years ago, the plaster on certain portions of which is already slightly, but uniformly, stained with the brown color of oxide of iron. The wire has never been exposed, on the front, to the direct influence of the weather, but it is possible that the back may not have been completely buried in the mortar; and it would be interesting to know whether the influence of the atmosphere, penetrating through the layer of mortar into the crevices behind it, has affected the wire, or whether there is something in or about the wire itself that has disposed it to rust, notwithstanding its alkaline covering, or whether the effect is due to some other cause.

A RATHER significant discussion took place not long ago at a meeting of a labor union connected with the Boston Navy Yard. There had been some talk of establishing a large number of holidays, about fifteen, for the special benefit of Government employes, and some of the speakers desired that the meeting should express its opinion in favor of the idea. To the astonishment and grief of the professional labor agitators, one of the union members rose to oppose any such action, on the ground that it was of no particular advantage to a workman to have fifteen additional days to spend in idleness; and that, if the Navy Yard employes worked fewer days in the year than the men in outside shipbuilding establishments, the labor cost of the work that they did would be correspondingly increased, and the difference would tend to throw the building of ships of war into the hands of outside contractors, thereby depriving the Government mechanics of the work. This view, which certainly seems reasonable, was supported by a large number of men, in spite of the sneers of the "friends of labor," who fiercely denounced any man who could be so false to "union principles" as to refuse a chance to get paid for a day's work without doing anything. On the whole, the advocates of honest and faithful industry, even among workmen, seem to have had the best of the argument, and their example should encourage other workmen in rebellion against the "union principles" which threaten, in time, to destroy our industries as they have already dragged down those of Great Britain. It is interesting to note, in connection with this discussion among the Navy Yard workmen in Boston, that the construction of a large naval vessel which it was intended to carry out in Boston, has been, since the meeting, definitely assigned to another Navy Yard, in consequence, it is said, of the smaller expense of construction at the latter. Whether the difference in cost of construction was a matter of actual calculation, or whether it was inferred as probable, from the disposition shown by the union leaders, does not appear; but it is certain that people who publicly advocate measures for enabling workmen to take the money of their employers without rendering any equivalent are, to say the least, very doubtful friends of labor.

PROFESSOR JOHN D. RUNKLE, long at the head of the department of mathematics in the Massachusetts Institute of Technology, and for some years President of the Institute, died a few days ago, at the age of seventy-eight.

Professor Runkle was a country boy, having been born and brought up in a village in New York State; but his capacity and energy made up for the disadvantages of distance from schools; and, although he was twenty-five years old when he finally secured his matriculation in the Lawrence Scientific School of Harvard University, he graduated three years later with both the Bachelor's and Master's degrees, and with a reputation as a mathematician which extended far beyond the University precincts. He was immediately engaged as one of the staff of the *Nautical Almanac*, and held this position for more than thirty years. While occupied in this work, he found time to edit the *Mathematical Monthly*, of which he was one of the originators, and his conduct of this brilliant scientific periodical added to his reputation. On the establishment of the Institute of Technology, in which he took an important part, he became a member of the faculty, and, with the exception of a few years absence abroad, his connection with the Institute was never afterwards interrupted. Personally, Professor Runkle was one of the most charming of men. He was universally beloved, by his pupils as well as by his associates, among whom he was conspicuous for his unwearying zeal in behalf of the Institute, and his wisdom and farsightedness in devising plans for making it more useful to the community.

THE improvements which are being made on the banks of the Charles River seem likely to effect, before many years, a great change in the distribution of the residence and business quarters of what is already virtually the central portion of the Boston metropolitan district. From what was locally known, in our college days, as the "ma'sh," a dismal bog, overflowed in high tides, which separated the river channel from the habitable portions of Cambridge, has been formed a beautiful park, extending along the shore, with varying width, for about ten miles. This parkway, or "Esplanade," as it is popularly called, facing south, and looking across the river to the city, closely resembles the "quais" of the new part of Geneva, and, like these *quais*, is sure, before long, to be lined with beautiful houses, hotels and club-houses, intimately connected by the West Boston, Harvard and Cottage Farm bridges with the business and residence sections of Boston, yet enjoying, like the palaces on the Geneva *quais*, the air and sunshine which are hardly to be had in the city. The Charles River Parkway has, however, the advantage over its Swiss prototype of being many times as long, so that it will afford, when complete, one of the most attractive of the magnificent drives characteristic of the park system of metropolitan Boston. At one point, the Esplanade parkway approaches very closely the main entrance to the grounds of Harvard University, and it is proposed by friends of the University to connect its enclosure with the Esplanade by a short, but wide, street, planted with trees, thus giving to the college grounds, what they have never had, an approach worthy of the beauty and interest centred in them. At present, the University precincts are reached mainly by Massachusetts Avenue, a street rather too narrow for the traffic through it, and encumbered with strings of electric-cars. Driving through Massachusetts Avenue is both disagreeable and dangerous; and the provision of a splendid parkway, short, and nearly straight, from the college enclosure, by way of the Esplanade and Cottage Farm bridge, to Commonwealth Avenue and the most fashionable residence quarter of Boston, would soon throw over the new route a large part of the traffic.

THE question of smoke-consumption has long agitated the city of Paris as well as cities in our own country; and although it is forbidden to discharge smoke into the Parisian atmosphere, just as it is into those of New York and Boston, the means for avoiding it is no better understood there than here. In 1894, a grand competition was held by the city of Paris for smoke-consuming apparatus. One hundred and ten devices were exhibited, of which not one was held by the judges to be satisfactory, and only six were awarded even a premium. Since then, very little progress has been made, and it seems to be an official, rather than a patentee, who has, so far, come nearest to success. This official, M. Sabourain, Inspector of the pneumatic-tube service of the Paris post-office, having several boilers under his charge, was led to study the possibility of diminishing, by some simple means, the discharge of smoke from their chimneys, a discharge which not only contravened the police-laws, but, to a certain extent, wasted coal. As every one knows, the principle of all smoke-consuming devices for boiler furnaces is to force the smoke from the fresh coal to pass through a mass of coal already brightly burning,

so that the carbon of the smoke may be caught and consumed. Although the principle is simple, the practice is by no means equally so, for the carbon-bearing smoke, as it passes through the second fire, must find there oxygen with which to combine, and the problem of supplying oxygen both to the second fire and the smoke has been found a difficult one.

TO meet the case as directly as possible, M. Sabourain, taking, for example, the fire-box of a water-tube boiler, of the Babcock and Wilcox or Worthington type, inserts a fire-brick arch over the front half of the grate, above the fire-door, but curving downwards at the back, toward the grate; and, at the same time, an iron plate is hung in the ashpit, below the middle of the grate. When the fire is lighted, a quantity of coal is placed on the front of the grate, and, when thoroughly incandescent, the mass is pushed to the rear. The next charge of coal is put on the front of the grate, and the smoke which at first rises from it is directed by the firebrick arch down to, and over, the brightly burning coal beyond. At the same time, the plate, hanging loosely in the ashpit, cuts off some of the air from the rear portion of the fire, while it increases the proportion of oxygen which passes through the front part, and which the smoke carries with it to the rear, where the heat is sufficient to determine combination. This simple arrangement seems to have proved very successful. Although the firebrick arch, of course, cuts off the front part of the water-tubes from the direct action of the fire, the loss in evaporating power due to this is said to be fully made up by the more perfect combustion of the fuel, while the arch, by protecting the front ends of the tubes, and their connections, from violent fluctuations of heat, and from the currents of cold air which enter when the fire-doors are opened, favors constancy of pressure, and preserves the tubes and joints. On the first installation of the apparatus in a battery of boilers in the Avenue Bréteuil, while the smoke was practically suppressed, it was found that more coal was used, by about five per cent, than was burned without it. This difference was, however, discovered to be due to the loss of small particles of coal through the grate in shifting the charges from the front to the back of the fire; and, as *Le Génie Civil* tells us, it was substantially overcome by changing the grates, and putting in those of the Wagner pattern, the bars of which are only one-quarter of an inch apart.

EXCAVATIONS made on the site of the ancient Larissa, on the slopes of Mount Hermus, in Æolis, have brought to light some curious remains of Greek antiquity. The name of Larissa is common to many places in Asia, the Grecian mainland and Italy, and is believed to have been simply a word signifying a walled city in some language spoken long before the Aryan immigration. However that may be, the various Larissas are places of great antiquity, and some of them promise discoveries, perhaps rivalling in interest those made in Argolis and Crete. The Æolian Larissa, being favorably situated for settlement, according to ancient ideas, has been continuously inhabited for many centuries, with the result that each generation has done its best to pull down and remodel what the previous one left to it, and the relics of distant antiquity must be sought in the rubbish heaps of a less remote civilization. Investigation has, however, shown that the town, in the Hellenic period, was surrounded by strong walls, very probably left, like those existing at Chiusi and other Etruscan cities in Italy, by a race of which almost nothing is now known. Within the walls were spacious houses, with courtyards, and a temple built of terra-cotta, richly painted, apparently after the manner of the Asiatics. At the time of the Hellenic ascendancy, the inhabitants of the town, whether Hellenic colonists or indigenous to the soil, seem to have been taken with a fever of reconstruction, and the terra-cotta temple was pulled down, and the fragments broken up into small lumps, which were used to level up the streets; and by digging up the ancient streets small pieces of the terra-cotta have been recovered. Either at this time or earlier, two cisterns, each about twenty feet deep, were excavated in the rock within the fortifications to afford a reserve of water in case of siege. In demolishing the old terra-cotta temple the capitals of two columns, which afforded two large and heavy blocks, were reserved, and put as covers over the mouths of the cisterns, and here they have remained for something like twenty-five hundred years, until dug out for the enlightenment of hyperborean savages. The form of these capitals is very curious, and the comparison of their details with those of other prehistoric sculpture should cast some light on the early history of the region.

NOTES ON IRON AND STEEL CONSTRUCTION.¹—IX.

NO other part of the structure of a modern building of the skeleton-construction type requires the exercise of so much care and study as the character and design of the foundations. The foundations cannot be designed or proportioned with that niceness that is requisite until the building has been partially designed, for upon the design of the building depend the dead loads which enter largely into the determination of the dimensions of the foundations and the footings. The foundations should be properly proportioned so that they will sustain with safety, and with a minimum, or at least uniform, settlement, the maximum load to which they are subjected. The loads upon the foundations consist of the dead and live loads, subject to exceptions and considerations as subsequently stated. The accumulated dead and live load should be considered, and the area of the footings or foundation-piers proportioned so that the greatest pressure per square foot of soil does not exceed the several values given for the various soils in the following table:—

Material.	Safe bearing-value in tons per square foot.
Compact bed-rock of granite.....	30
Compact bed-rock of limestone.....	25
Compact bed-rock of sandstone.....	18
Soft friable rock.....	5 to 10
Clay in thick beds absolutely dry.....	4
Clay in thick beds moderately dry.....	2
Soft clay.....	1
Dry, coarse gravel well packed and confined.....	6 to 8
Compact sand well cemented and confined.....	4
Clean dry sand in natural beds and confined.....	2 to 4
Good solid dry natural earth.....	4 to 6

Where there is liability of the foundation-soil being loosened by water, or by adjacent building-operations, due precautions must be taken to prevent serious results from attending such contingencies. Poor soils should, wherever practicable, be improved so that they are better adapted for the foundations. If the soil is wet, or saturated, an effort should be made to improve it by drainage; loose soils should be rammed or otherwise compacted, and piles driven at intervals to accomplish such results where required. All foundations should be protected against frost, which must be accomplished by excavating for the foundation at least 6 feet below the surface of the surrounding soil. Since foundations upon yielding material will settle, more or less, care must be exercised to see that this settlement be uniform, and in order to obtain uniform settlement the pressure on a unit of area must be the same in all foundations, footings and piers, providing the nature of the soil is the same throughout the area of the buildings. If the soil under different portions of the building is likely to have different values, it should be carefully tested and the several bearing-values ascertained at several points throughout the foundation-area, and the foundation-footings and pier-foundations so proportioned that the settlement be as uniform as possible. In testing foundation-soils it is usually necessary to make borings, in order to determine the different strata of earth that underlie the site, for only in this way can it be ascertained whether a seemingly secure foundation-soil is underlaid with quicksand; for if this is the case the designer usually endeavors to so arrange the footings that the stable strata will not be penetrated, and its bearing-value, consequently, partially, if not entirely, destroyed. One of the safest methods of testing is by building a test-pier, and loading it from time to time, ascertaining the settlement that takes place day by day. Instead of the test-pier sometimes a heavy square timber is used, which is provided at the top with a platform; this timber is set upon the soil on end, and, being properly guided, is loaded with some heavy material, such as pig-iron, the load being increased gradually, and the settlements that occur carefully observed. A square timber or a pier loaded in this manner does not give accurate results because it has four cutting-edges in a very small area, while the usual footing has but two cutting-edges, and a pier-footing, while having four cutting-edges, covers an area great in comparison. The results obtained, however, are on the side of safety.

Where the actual live load is variable, and seldom approaches the load originally assumed, as in office-buildings, equal settlement of the foundations must be obtained by proportioning the areas of the footings so that the dead loads produce equal

pressure. For example, the heaviest loaded foundation-pier in a building supports a dead load of 200 tons, and a live load also of 200 tons, while another foundation supports a dead load of 150 tons, and a live load of 100 tons. The first pier sustains a total load of 400 tons, and assuming the soil to safely sustain a load of 4 tons per square foot of pier-area, the area of footing required for the heaviest pier to carry both the dead and live load equals 400 divided by 4, or 100 square feet. This area gives, when estimating on the dead load alone, a bearing-pressure of 2 tons per square foot. Using this unit bearing-value of 2 tons for the second pier, the area of base required, figured on the dead load alone would be 75 square feet, while if both the dead and live loads were considered in proportioning the foundation, the required bearing-area would have been 62.5 square feet, and the dead load would cause a pressure upon the soil under the second pier of only 1.6 tons, which would have a tendency to cause unequal settlement.

All foundation-piers resting upon soils of good dry natural earth, and having a safe bearing-value of from 3 to 4 tons per square foot, should be designed as shown in detail in the Figure 65. In this typical foundation-pier the concrete base should be composed of 1 part cement, 2 parts sand and 5 parts broken stone, the stones being small enough to pass through a 2-inch diameter ring; this concrete base should have such an area that the pressure per square foot upon the soil does not exceed its safe unit bearing-value. The offset of the concrete, as at *a*, should not be more than one-half the thickness of the concrete, while the thickness of the concrete marked *b* in the figure should not be less than 12 inches, and is not usually more than 18 inches. The body of the pier is best built of good

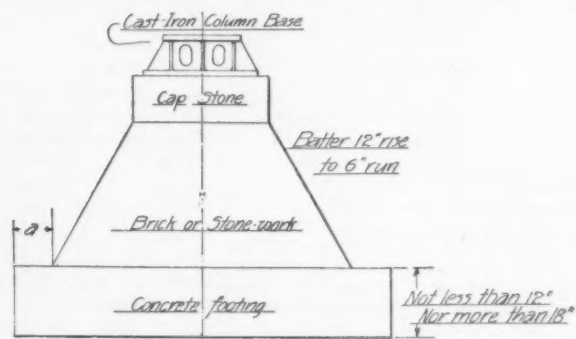


Fig. 65.

quality hard-burned, well-formed bricks, laid in Portland-cement mortar, and the area of the brick base should be so proportioned that the pressure upon each square inch of the concrete does not exceed 200 pounds; the batter upon which the sides of the brick pier is formed should not exceed a 6-inch offset to a 12-inch rise—that is, the rise should be in the ratio to the offset as 2 to 1, the sloping sides of the pier making approximately an angle of 60 degrees with the horizontal.

The area of the capstone upon the top of the brickwork should be such that the safe bearing-value of the brickwork is not exceeded, this value for brickwork in Portland-cement being usually assumed at 200 pounds per square inch. Should the load upon the stone cap be great, it is customary to use a heavy cast-iron pedestal, in order to distribute the pressure equally over the capstone. The area of the cast-iron base bearing upon the capstone should be such that the allowable crushing strength of the stone is not exceeded. The maximum working-pressure usually assumed for the materials employed in the construction of foundation-piers of the character just described and illustrated in Figure 65 is as follows:—

Granite.....	350 pounds per square inch.
Limestone.....	300 pounds per square inch.
Sandstone.....	250 pounds per square inch.
Brickwork in Portland-cement...	200 pounds per square inch.
Concrete.....	200 pounds per square inch.

The capstones upon the top of such piers are usually of granite, limestone, or sandstone, and their minimum thickness is 12 inches, though their thickness in any case should never be less than one-fifth the greatest dimension if rectangular, and one-fourth the length of its side if square. The cast-iron pedestal upon the top of the capstone should be designed as described in a previous article. The following is an example of the application of the foregoing:—

¹ Continued from No. 1383, page 103.

Example.—It is required to design a square foundation-pier of hard-burned bricks, with concrete footing of Portland-cement mortar. The capstone is of granite, and supports a cast-iron pedestal, which in turn sustains a structural-steel plate and angle column. The load upon the column is 600,000 pounds, and the safe bearing-value of the soil has been ascertained to equal 3½ tons per square foot.

Solution.—The size of the cast-iron pedestal is dependent upon the unit allowable bearing-value of the capstone, taken from the preceding table as 350 pounds per square inch; then 600,000 pounds ÷ 350 = 1,714 square inches required, and the dimensions of the base will equal √1,714, or, approximately, 42 inches on a side. The size of the granite capstone will be determined by limiting its pressure on the brickwork to 200 pounds per square inch, and the area required on the bed of the stone will equal 600,000 ÷ 200 = 3,000 square inches, the length of its sides being √3,000, or 55 inches; its thickness will be one-fourth of its base, or 14 inches. The area required for the concrete-footing is equal to 600,000 ÷ 7,000, or 86 square feet, and, consequently, it should be 9 feet 3 inches square, its thickness being 18 inches. Since the sides of the brickwork are battered 1 to 2, and the dimensions of its top and bottom are known, its height will be found as follows:—

One-half difference between top and bottom dimensions = $\frac{(111 - 18) - 55}{2} = 19$ inches; the 18 in the calculation is

twice the offset of the concrete beyond the brickwork, which,

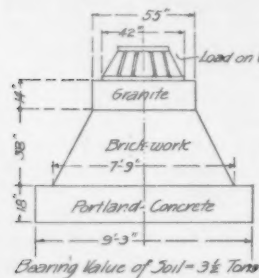


Fig. 66.

column can be designed as shown in Figure 66.

Where the weight of the building upon the foundations is great, and the soil offers insufficient bearing-capacity, pile foundations are usually resorted to; they are principally used, however, where the soil is of a clayey nature, underlaid with hard-pan or bed-rock. In such instances piles are driven to bed-rock, or to the hard-pan. Piles are of several kinds, and may be classed according to the material used, for they may be of timber, cast-iron or steel, and in some instances of steel castings filled with concrete. They may likewise be classed under two headings, determined by the processes by which they are placed. For instance, they may be driven by blows struck with a heavy weight falling some distance along vertical guides, or by a hammer worked by steam or gunpowder. Piles may be screwed into the ground, in which case they are provided usually with a cast-iron screw, having one turn, secured to the lower end, and the pile is made to penetrate the soil by turning. Piles are sometimes inserted in sand by the erosive action of a jet of water. In such instances a pipe is secured to their lower end, through which is forced a jet of water under pressure, which washes away the material beneath the end of the pile, the pile settling into the hole made in this manner, by its own weight. The piles used in building-construction are principally of timber, though where the new foundations are adjacent to others sustaining heavy loads, and where the soil is particularly susceptible to disturbance by jarring or vibration, screw piles are often resorted to.

Timber piles, if properly driven, and their location allows them to be submerged in water, are considered by conservative engineers as very satisfactory and permanent foundations. Foundation piles should not be spaced closer together than 2 feet from centre to centre, nor farther apart than 3 feet. Where their length is under 20 feet, they may be 10 inches in diameter at the large end, and 5 inches at the smaller, but where their length exceeds this dimension, they should be at least 15 inches in diameter at the large end, and not less than 10 inches at the smaller. All piles should be driven in a single foundation to an equal bearing, which should be determined by the distance the piles penetrate under the last blow of the hammer—that is,

where they are not driven to bed-rock. The bearing-load on piles driven to bed-rock through stiff soil, capable of providing lateral support, should not exceed the safe direct compressive-strength of the timber taken at the least cross-section.

If the surrounding soil is plastic and incapable of furnishing lateral support, then the pile must be considered as a timber column, having the same length as the pile; its safe strength per square inch of mean cross-section shall then be determined by the following formula:—

$$W = S - \left(\frac{SL}{8.33 D} \right)$$

in which formula W equals the safe load in pounds per square inch of section upon the pile; S , the allowable compressive-strength of the timber in pounds per square inch; L , the length of the pile in feet, and D , the mean diameter of the pile in inches. In this formula the allowable compressive values of the several kinds of timbers used as piles is as follows:—

White oak.....	800 pounds.
Southern long leaf, or Georgia yellow pine.....	700 pounds.
Cypress.....	800 pounds.
Chestnut.....	1,000 pounds.
Cedar.....	800 pounds.
Norway pine.....	800 pounds.
Oregon pine.....	1,200 pounds.

In locations where the bed-rock or hard-pan can not be reached, and the piles are driven through yielding material, their bearing-value may be ascertained by the following formula, which is known as the *Engineering News* formula, as it first appeared in that paper. In this formula the bearing-value, or

$$L = \frac{2WH}{p + 1}$$

wherein W is the weight of the hammer in tons; H the drop of the hammer in feet, while p is the distance in inches penetrated by the pile under the last blow of the hammer. The penetration of the pile under the last blow of the hammer should, in applying this formula, only be considered when the burred splinters caused by the crushing at the top of the pile by the hammer have been removed.

There are many formulas for ascertaining the bearing-value of piles. Their results vary greatly, and many of them are not substantiated in practice. The following table is a statement of several of the principal formulas, though the one given above agrees more nearly than most of them with actual tests made upon piles, except possibly the one evolved from experiments by Hertz:—

THE SEVERAL EMPIRICAL FORMULAS FOR DETERMINING THE BEARING-VALUE OF TIMBER PILES (DRIVEN BY HAMMER).

Authority.	Formulas.
Trautwine..	$W = \frac{52 P^2 \sqrt{H}}{1 + 12 p}$
Baker.....	$W = 100 (\sqrt{PH} + (50 p)^2 - 50 p)$
Sander.....	$W_1 = \frac{PH}{8 p}$
Hertz.....	$W = \sqrt{500 PH} + (250 p)^2 - 250 p$

In these formulas W_1 = the safe bearing-value of the pile; W = ultimate bearing-value of the pile (both in tons); P = the weight of the hammer in tons; H = the drop of the hammer in feet; p = the penetration of the pile in feet under the last blow.

In driving piles for the foundation of important buildings test-piles should always be driven, so that their bearing-value can be approximately ascertained, and the results obtained by the formula to some extent checked. No fixed factor-of-safety can be employed for pile foundations, but in practice the factor-of-safety for driven piles ranges from 2 to 10.

If a pile depends for its bearing upon fractional resistance, it is probable that its strength will increase after driving, while, if it depends for its bearing-strength upon the bearing at its end, it will usually support a greater statical load than the load implied from the impact of the hammer in driving. After the piles are driven they are sawed off to a level, and may be capped either with granite blocks, concrete or timber grillage. When the capping is of timber or stone, then care must be exercised that the tops of the piles will all be cut off squarely and at one level, though where the piles are capped with concrete,

this consideration is not of so much importance. When piles are capped with a wood grillage, the grillage consists of heavy timbers about one foot square, made in the form of a stout frame, which is drift-bolted or pinned to the tops of the piles, the timbers in the grillage being likewise held together by drift-bolts. Upon the top of the grillage is placed heavy planking, upon which the masonry is started. The drift-bolt used in this construction is usually about 1 inch in diameter, and is driven into a $\frac{3}{4}$ -inch auger hole; if the drift-bolt consists of a square bar 1 inch on a side, it is driven into a $\frac{3}{4}$ -inch hole. The timbers, in the top course, or layer, of the grillage, which support the planking upon which this masonry is started, are usually laid close together. Timber-grillage capping for piles should never be used unless it is entirely submerged. Concrete capping for pile foundations is, undoubtedly, the best construction for tall buildings. Where the masonry for the foundations is supported upon planking carried on timber grillage there is a danger of its slipping off, or sliding, and while this can be obviated by stepping the top of the grillage or by having drift-bolts project through the timbers and into the masonry, no such danger can possibly occur with a concrete capping, for the concrete is tamped in, around, and over the tops of the piles, as shown in Figure 67, and besides affording a durable footing which need not necessarily be under water, it has increased

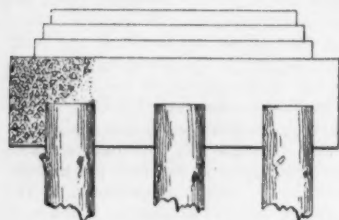


Fig. 67.

bearing-value, for to the resistance of the piles is added the bearing-value of the soil around them, upon which the concrete rests. In constructing pile foundations great care should be exercised to prevent disturbing adjacent buildings. If it is found necessary to drive them close to existing foundations, especially if such foundations support heavy buildings, and the surrounding earth is liable to considerable compression due to the superimposed load, such construction should be abandoned, and the foundations designed in such a manner as to prevent the danger attending the disturbance of adjacent footings.

The next article will treat upon spread footings, a type of foundation that is particularly adaptable to high-building construction.

M. M. SLOAN.

[To be continued.]

LIBRARIES IN THE UNITED STATES.¹—I.

ALTHOUGH the library movement in America is by no means of recent growth, yet its developments during the last ten years have been so enormous that few buildings erected previous to 1885 would be found to-day suitable for modern requirements. The librarians themselves have settled points in the policy of the working of libraries which previously were undetermined, and it is the very active interest of these men which has so greatly assisted the architects to produce the very fine plans.

The remarkable generosity of Mr. Carnegie has helped forward the movement wonderfully. Last year alone he gave more than £2,500,000 for new buildings. The activity of other generous men and women has also been very great, as well as the public-spiritedness shown by many of the great towns in voting large sums of money for similar purposes. The result is that the American architect has an opportunity quite unequalled, and he decidedly is showing the greatest interest in the work. At present some of the recent plans seem as perfect as possible, yet the interest in the subject is so great and ideas in regard to the working of libraries are being so rapidly evolved that new developments are always taking place.

An endeavor has been made in this paper to select representative libraries in each class: many good ones, no doubt, have been missed—but during a short stay in so large a country that was inevitable—and many could have been included if space had allowed.

The descriptions of the various libraries have been grouped under the following heads (town libraries have been subdivided into three, according to the size of the library): (1) Reference libraries; (2) University libraries; (3) Town libraries (in three divisions); (4) Branch libraries; (5) Small libraries.

REFERENCE LIBRARIES.

It is difficult to distinguish between the very large town libraries, such as those of New York and Boston, and what might be called reference libraries proper. It is, of course, the lending-department which makes the distinction. Yet both the New York and Boston libraries will in the future become, as their collections increase, great reference libraries. These valuable collections will be studied on

the spot, and it is from this point-of-view that the New York Public Library seems to have been planned. Its spacious reading-rooms, wonderful series of special libraries and exhibition galleries, are all designed for the student. Its description has therefore been included under this heading. The Congressional Library at Washington is decidedly the largest yet erected of this class. Its octagonal reading-room with the immense book-stacks projecting from three of its sides is the important feature, and it is interesting to compare it with the totally different method adopted at New York, where the main rectangular reading-room is placed over the seven floors of the stack-room. A similar plan to the latter has been suggested by the architects, Messrs. Shepley, Rutan and Coolidge, for the proposed John Crerar Reference Library at Chicago: here the reading-room, 240' x 50', is placed on the third floor, with four floors of stack below.

The Newbery Reference Library at Chicago can hardly be included as a recent one, yet it cannot be passed over without comment. It was the result of the ideas of the librarian, the late Dr. Poole. He held that a library should be really nothing more than a warehouse divided into rooms, in which the books were stored and read, and having no general reading-room or general stack-room, the books being shelved in the various rooms according to their subjects. The building has a frontage of 325 feet and a depth of 75 feet, and consists of basement and four floors. The plan is extremely economically arranged, and with the exception of the corridor at the back the whole of the floor-area is used for reading-rooms of various sizes, the end ones being each 50' x 66', the others between being smaller. Although Dr. Poole's plan was not wholly a success, yet its influence has been great, and the use of the special room with its special collection of books has become a law in library-planning.

Nearly all the States have reference libraries, but rarely have special buildings been erected. They are generally incorporated with, and form part of, the State House, as at Boston, Mass., and at Albany, N. Y. The recently erected one at Madison, Wis., is a distinct building, and is planned rather on the lines of a large town library. The main floor-plan is very well arranged.

THE CONGRESSIONAL LIBRARY, WASHINGTON.

The Library of Congress at Washington is by far the largest library-building² in the United States of America. It was in April, 1886, that Congress selected and acquired the site and proceeded to obtain plans. Finally, those prepared by Messrs. Smithmeyer and Pelz were adopted, but no limit of cost was fixed. By the summer of 1888 about one-half of the foundation-footings for the building were laid. During that year, however, Congress became dissatisfied with the progress that had been made, and lodged the entire control of the work, including the preparation of new plans, in the hands of General Casey, Chief of Engineers of the United States Army, with Mr. Bernard R. Green, C. E., as resident-engineer. In March, 1889, Congress enacted that the building should be erected at a total cost of £1,300,000, including previous expenditure, according to the plans prepared and submitted by General Casey, which were based on those adopted originally and provided a building of similar form, dimensions, and architecture. Under the new conditions operations were commenced in the spring of 1889 where they had been left off the year before, and the construction then proceeded without interruption until the building was finally completed in the spring of 1897.

The building is 470 feet in length by 340 feet in width, with four great inner courts. In height it consists of three floors above the ground; there is also a sub-basement. Each of the six pavilions contains an attic. The following is from Mr. Green's account of the building in the Smithsonian Report of 1898: "The first guiding principle of the design to accommodate a nation's library was that an ample general reading-room should be located within the mass of the books to ensure their easy reach and access. The next was ample light and air combined with security and latitude for future growth of the collections and their uses; then that all necessary accommodations should be provided for the constant work involved in the care, use, and increase of the library and its several departments. In endeavoring to meet all the utilitarian requirements of a national library in the present generation, it was found that library science was in a state of rapid evolution, and that the future of the subordinate departmental locations and needs was not sufficiently defined to enable special provisions to be made for them during the construction of the building. As a collection of books, however, to be housed in shelves and used by readers, the problem of shelving and reading-room was much more clearly presented, although book-shelving on a scale of millions of volumes had not hitherto approached a stage of perfection."

It was out of these conditions that the plan of the building was evolved. First, a reading-room of octagonal plan to accommodate 250 to 300 readers, amply lighted, is placed in the centre of the building. Adjoining this on three sides the great stacks of book-shelving are located, the main entrance to the room being on the fourth side. The four alternative octagonal sides face towards the large inner courts. The cross plan thus formed is enclosed by four fronts, the whole forming a rectangular plan and containing spaces for the subordinate departments of the library, for expansion of the stacks of book-shelving as future needs will require, and for the exhibition-halls, special reading-rooms, staff offices, etc. For the reason given the spaces in the front sections of the building were generally

¹ A paper by Sidney K. Greenslade [A.], Fugate student, Griesell Medallist, Godwin Bursar, read before the Royal Institute of British Architects, Monday, March 17, 1902, and printed in the *Journal of the Society*.

² See plan and interior views in the Paper on "Public Libraries," by the late Mr. J. M. Brydon, *Journal R. I. B. A.*, Vol. VI. (1898-99), pp. 214-15, 217.

not subdivided, but are so disposed as to admit of any desirable subdivision of a more or less permanent character that experience may dictate. At the same time the arrangements of windows, ventilation and communication, and the strength of the floors, are such that any part or the whole of any of the long halls may be conveniently occupied by shelved books, while the corner pavilion rooms are favorable for staff-work, reading-rooms, etc., and contain also lavatories and stairways.

The building has only two entrances—a two-storied one in front and a single one in the rear. The first is for the general use of the public and the other especially for the delivery and dispatch of freight. The front, or main, entrance opens into a great staircase-hall, 132 feet wide by 122 feet deep, extending the full height of the pavilion through the first and second stories. The great octagonal reading-room opens directly from the stair hall: it is 100 feet in diameter, 125 feet high to the crown of the dome, and is lighted by eight large semicircular clerestory windows, 32 feet wide, and the lantern above the dome. Small windows open into the alcoves in the four sides facing the courts. The seating capacity of the room is for 250. The space allowed each reader averages 4 feet of desk. The desks are arranged in concentric circles; there are three rows, the two outer rows have double desks, the readers facing each other. The double desks are 4 feet wide altogether, and are sloped 3 inches, the height being 2 feet 9 inches to the top; between them at the centre is a small screen 9 inches high. The space between the rows, centre to centre, is 11 feet 3 inches.

The card-catalogue and the superintendent's tribune and desks for his assistants are placed in an enclosed circular space, 29 feet in diameter, in the centre of the room. The floor of the superintendent's desk is raised 4 feet 8 inches above the floor of the reading-room and commands the greater portion of it. There is a small stairway of six steps up to it; balancing this stairway on the other side is one to the basement. At the back of the superintendent's desk is the cabinet containing the terminus of the system of book-carrying apparatus connecting the reading-room and stacks. The lift from the basement is also on this side of the enclosure. It is large enough to take the vertical book-trucks used in the room and stacks. This central desk is also in communication with the several stories of the book-stacks by means of pneumatic tubes for written messages and speaking. These are placed along the front of the superintendent's desk. There are twenty-four altogether—nine go to the north stack, nine to the south stack, and four to the east stack. Of the other two tubes, one goes to the librarian's room and the other connects with the Capitol. Each tube is numbered, and is worked by pressing a button, the action of which indicates also when the message is delivered at the other end. The height of the delivery-counter which surrounds this central enclosure is 4 feet 1 inch from the floor outside and 3 feet 4 inches from the raised floor inside. Its width is 2 feet 9 inches. The drawers for the card-catalogue for official use are placed on the inside towards the attendants. Outside the front is panelled only. The working-space for the attendants inside is 4 feet wide, and the space in front of the delivery-counter for the public is 7 feet wide. The card-catalogue for public use, book-shelves for dictionaries, encyclopedias, etc., with standing desks above as well as seats alongside, face towards this space.

The two tiers of alcoves on each of the eight sides of the rotunda call for special notice. Each bay, about 12 feet deep by 37 feet wide, is divided into three alcoves by book-stacks, and they are separated from the reading-room by bronze gates. These alcoves provide specially good places for quiet study. Above them is a gallery 35 feet above the floor of the reading-room, from which visitors not desiring to read may view without disturbing the readers.

The three great book-stacks project from three out of the eight sides of the reading-room and extend to the wings of the building. These are certainly most interesting and remarkable. All three are the same width, 45 feet, and the same height, 63 feet, but the lengths differ considerably—the north and south being 112 feet, against 30 feet for the east stack. They are absolutely fireproof, the only materials used being steel, iron, brick, glass and marble. The stacks are divided into nine floors, each floor being 7 feet high. The basement story is 14 feet below the level of the reading-room floor.

The fitting of the stack-rooms is quite independent of the walls. It consists of a slender rolled-steel framework of continuous columns and horizontal deck-members. These horizontal bars have proper anchorage in the surrounding walls—requisite for the lateral stability of the loaded stack. The decks are covered with white-marble slabs and contain narrow openings in front of the shelf-ranges for communication, admission of light, and the circulation of air. Between the stanchions a simple vertical cast-iron wing is attached, having the necessary teeth and lugs to receive the shelves and permit of their ready adjustment to any interval desired.

The shelf is of a gridiron form, being a set of parallel-bars of Ω section. Its length is 3 feet 8 inches, in all the stacks; they are therefore interchangeable, and may all be removed from any bay or series of bays on a floor to make a passage-way. They are constructed of bars of rolled steel treated by the Bower-Barff process with a coating of magnetic oxide, which renders them as smooth as glass, and they are so spaced as to afford ample ventilation for the books and prevent any accumulation of dust. The central marble gangway, running from end to end of each stack-room, is 6 feet wide. The stacks are placed at 5 feet 4 inches centres, the marble passage-ways between them being 2 feet 6 inches wide—the 5-inch air-spaces on either side making the total width 3 feet 4 inches.

Each of the two large stacks has a shelving capacity of 800,000 volumes. The ultimate shelving capacity of the whole building will admit of the storage of over four million volumes. An elevator, stairway, and the endless-chain book-carrier are located in the middle of the stack.

The book-carrier is a pair of parallel endless chains running in a vertical shaft in the middle of the stack, thence in a horizontal duct in the cellar to a point below the central desk of the reading-room, where it turns upwards and ascends vertically to the delivery-outlet at the desk. A series of equidistant book-trays, eighteen in number, are suspended between the chains. The machine runs continuously, and automatically takes on and delivers books of the size of a quarto or less at its reading-room terminal and at each of the stack-stories. The speed of the carrier is about 100 feet per minute.

At the ends of each of the passage-ways between the stacks are arranged the windows. They are placed at the intersections of the decks, so that each may diffuse direct light into two tiers at once. In this way both the upper and lower portions of the stacks are well lighted. The glass-line at the sill is 2 feet 7½ inches above the floor of the deck, and between each sill and head, and 1 foot 7½ inches above the floor is placed a seat to each window for the use of readers or the attendants. The windows are fixed and air-tight, all air for warming and ventilation being passed up through the stack from the sub-basement by natural draughts or fans and discharged at the roof. The fresh air is taken into the sub-basement through openings looking into the courtyards, first, however, passing through a filter of cotton cloth to exclude all dust; after being warmed it ascends. If necessary, electric fans are used in case of any sluggishness in the natural current of air. Besides windows in the side walls, there are skylights in the roofs to each of the stack-wings.

From a point in the basement just below the centre of the reading-room, books of any size are transported in a few minutes to the Capitol, and returned by means of an underground endless cable, driven by an electric motor. The distance between the Capitol and the library is a quarter of a mile. A brick tunnel, 6 feet high and 4 feet wide, connects the two, and through this the endless cable moves. The speed at which the cable runs is 600 feet per minute. The four outer wings with their corner pavilions surrounding the great reading-room and stacks are divided and allotted as follows:—

In the basement a corridor 10 feet wide is placed next the inner courts, with a staircase in each of the four corners to the upper floors and sub-basement, in addition to the two flights of stairs at the main entrance. The sub-basement contains the electric machinery, workshops, copyright storage, etc. The basement contains two large binderies, one 130' x 22' 10", printing-rooms, copyright department, library for the blind, staff lavatories under the alcoves of the reading-room, the superintendent's department, public lavatories, mail and packing rooms.

The first story is occupied on the right of the main entrance to the front by the Representative's reading-room, 105' x 22' 6", and the Senator's reading-room, 48' x 30'. The south wing contains the reading-room for current periodicals and newspapers: it is 217' x 35', with the delivery-counter and the attendant's desk placed at the entrance to the south stack. The order and catalogue rooms are in the east wing, each 130' x 35'. The north wing, as well as the north-west pavilion, is fitted for maps and charts: the former is 217' x 35', and is connected with the north stack. To the right of the main entrance are placed the administrative offices, including the rooms of the librarian. It is proposed at this first-story level to connect the north and south stacks with the catalogue and order rooms by bridges across the courts.

On the second floor the rooms are chiefly devoted to exhibition purposes—prints, books, manuscripts, special collections and music.

The height of the basement is 14 feet, floor to floor; the first story 21 feet, and the upper story is 29 feet in the clear. The boiler, battery, steam-pumps, coal-vaults, ash-house, etc., are located under the east approach outside the building. There are sixteen 60-horse-power boilers and a coal-storage capacity of 3,000 tons. The steam operates the hydraulic pumps for elevator power and water-supply, the air-compressor for the pneumatic-tube system, and the dynamo-engines for electric-lighting and power apparatus, the exhaust from which is passed through eight sets of tubular tanks for heating the water required for warming the building. By the circulation of this hot water through cast-iron coils of 3-inch pipe, enclosed in chambers of brick distributed throughout the cellar, to which it is carried and returned by pipes, fresh air from outside the building is warmed and passed by natural draught up wall-flues to the respective stories and apartments above. The air thus taken into the building and circulated through the rooms is discharged at the roof through other wall-flues.

The great reading-room, the fine stack-rooms, and the ample accommodation provided for the work of the library and its future needs make this one of the most important libraries in the world.

[To be continued.]

DALLIN'S "MEDICINE MAN."—Cyrus E. Dallin's "Medicine Man," the life-sized figure of an Indian in gala attire, which received prizes at the Paris Exposition of 1900 and at Buffalo last summer, has been bought by the Fairmount Park Association of Philadelphia, and will be cast in bronze. Austria also made an offer for the statue, and in recognition of the compliment Mr. Dallin has volunteered a bronze replica, if Vienna will pay the cost of the casting.—*N. Y. Evening Post*

ILLUSTRATIONS

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

THE BOARD OF TRADE BUILDING, STATE AND BROAD STS., BOSTON, MASS. MESSRS. WINSLOW & BIGELOW, ARCHITECTS, BOSTON, MASS.

A COMPETITIVE DESIGN FOR THE CARNEGIE LIBRARY, BURLINGTON, VT. MR. WILLIAM SANGER, ARCHITECT, NEW YORK, N. Y.

UNITED STATES POST-OFFICE, LOCKPORT, N. Y. MR. JAMES KNOX TAYLOR, SUPERVISING ARCHITECT, WASHINGTON, D. C.

INTERIOR DETAIL: MAJESTIC THEATRE, BOSTON, MASS. MR. J. M. WOOD AND MR. J. G. HOWARD, ASSOCIATE ARCHITECTS, NEW YORK, N. Y.

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

SOUTH PORCH: STA. MARIA MAGGIORE, BERGAMO, ITALY. DRAWN BY MR. W. CURTIS GREEN.

This plate is copied from the *Builder*.

[Additional illustrations in the International Edition.]

THE SMALL QUAD: UNIVERSITY OF PENNSYLVANIA DORMITORIES, PHILADELPHIA, PA. MESSRS. COPE & STEWARDSON, ARCHITECTS, PHILADELPHIA, PA.

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CHURCHES AT RÜTTINGEN AND THANNHAUSEN, WÜRTEMBERG.

This plate is copied from *Zeitschrift für Bauwesen*.

COMMUNICATIONS

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

THE COLT MEMORIAL BUILDINGS, HARTFORD.

NEW YORK, N. Y.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—Those of your readers who have had the pleasure of seeing, in Hartford, Conn., the church built by Mrs. Colt, in memory of her husband, and the adjoining parish-house, in memory of her son, have all doubtless carried away a general impression of artistic distinction. But, if asked for a specific characterization of that quality which to their apprehension dominates these works, or which, at all events, had most appealed to their sensitiveness, they would probably give quite different answers. What had most impressed myself, for instance, in the parish-house, was the notable result, perhaps unique in America, achieved by the architect's handling, in collocation with each other, of various species of stone, all contributing to an ensemble of color-harmony subdued in tint, as best befits most exterior building-surface, and highly effective and attractive to the artistic onlooker. One would, without surprise, find such an effect in some high-class textile fabric, but one would hardly expect it in a material so intractable as stone. Nor, at all events, in this country of recent architectural creations, though in ancient edifices of the Old World, one occasionally meets similar examples, due partly to the genius of the designer, and partly to the blending touch of time, sun and weather.

I discovered, however, in confiding my impressions of this church and parish-house to their architect, Mr. Edward Tuckerman Potter,

that, as regards the latter structure, he by no means acknowledged as its *piece de resistance* the color-scheme he had applied to its stone-work; with reference to both that and the church, his guiding principles, it seemed, had been based on quite another *motif*. As he proceeded to explain these, I found his remarks so interesting that it occurred to me they should not be confined to his listener of the moment, but would doubtless be equally appreciated by, and edifying for, a much wider audience. So, as our conversation on the subject approached its close, I asked him to give me, at his convenience, a memorandum of the chief points of what he had been telling me, which he did before long; and the more readily, perhaps, as the buildings in question had already been discussed in print in a manner meant to be, and which in fact is, largely appreciative, but to which their architect, at least on the point of "style," objected. Mr. Potter's observations, in treating of his methods, were, in substance, what appears in the earlier paragraphs and major portion of the following.

Yours truly,

A. J. BLOOR.

In a work describing the Colt Memorial Buildings in Hartford, Conn., its author, after treating of one of them, the Church of the Good Shepherd, adds "in the same general style of architecture, that variety known as 'Early English.'" To this characterization the architect of the buildings, in his own copy of the volume, makes marginal reference in this note: "No, this is not an archaic reproduction, but live art; not 'Early English,' but the very latest development of Gothic treatment, and not more English than Lombardic."

In this architect's works the design is studied as from afar. The result is something to be looked at from a distance as well as at hand. The intention is to make it look, like some mountains, beautiful when seen from afar. The attainment of this end depends on the outline, and mainly the skyline, which, again, depends on the construction, or what can be erected on the plan, and so primarily on the plan.

When the plan alike suits both possibilities for good outline to be erected on it, and satisfactory provision for the uses indicated is secured, the great primal work of the designer—the design—is virtually complete. Next, it is important that as one approaches the building, it should continue to interest and please, as mountains do when we approach them and perceive how they are divided into ridges, ravines, etc. Next, when we are yet nearer, we want continued beauty; the fine trees, their foliage, their blossoms, even their last details may be compared with the details of a building, the *oggetti*—the objects—many of them more of a literary than of a strictly architectural character—that add interest to them, because, like types or subjects of carving, of their appropriateness to that particular building. These last naturally take and absorb the attention of the mass of visitors to a building, to the neglect of appreciation of its plan, its construction, its outline, its design. They interfere with a due conception of what has been involved in the sense of the drawing or form of its various parts, its elevations, exterior and interior, of the divisions of each, of the mastery in choice and selection, and of the art, the knowledge, the taste, the sensitiveness to effect embodied in all of these.

These general forms and details constitute what makes the character of the building—the style of its architecture; and the natural seeking of some word which will at once express this style, without the circumlocution of further description, without the trouble of analysis and study of that style, leads to words that misrepresent it. Gothic is a generic term, but the same so-called Gothic building has been sometimes classified, by persons who claimed to be fitted to instruct others, as Early English, Italian, Lombardic, and Victorian, when none of these words are really applicable in any justly descriptive sense.¹ True, what is built during the reign of Victoria is in that sense Victorian, but this applies to buildings widely different in style. The use of a color-scheme to add to the architectural effect of a building is quite usual in pseudo-Italian-Gothic, but color, *per se*, scarcely constitutes a style. The form of voussours of arches in which the extrados and intrados are not concentric is a feature of much Lombardo-Gothic work, but one such feature does not constitute, though it may be one mark of, a style. Narrow lancet-windows are common in Early English, but are not confined to the Early English style.

If we analyze the style of this architect's buildings we shall find that they always arise out of, and are governed by, the construction. The general forms are plain. The angles of jambs are generally chamfered. Mouldings are rarely used. The style might be described as "chamfered" to distinguish it from styles described or differentiated by the forms of their mouldings.² Stones of more than one color are used, and chiefly in the arches; the extrados and intrados of arches are rarely concentric. What governs the line of these arches it is difficult to determine. The joints that separate their voussours do not all radiate from the same point. We are led to the conviction from a study of these arches and their voussours that this fact gives them a peculiar variety. "The arch never sleeps," it is said; and not only is it so in these arches—as in all arches in fact—but there is something unsleeping, and so possibly morally uplifting, in their lines, something that stimulates in the sensitive nature a sort of

¹ From the strict constructional point-of-view it can hardly be admitted that there is any such style as Italian Gothic.

² Chamfering is largely used in the most ordinary wooden houses for the finish of piazza-posts, door and window trim, and at arries generally. The word seems to have neither sufficient distinctiveness nor distinction to be fittingly applied, as descriptive of style, to structures of the rank of the Colt Memorial buildings.

emotion, a drawing in of the breath even.¹ A sensitive woman has testified that the sight of some of this architecture has each time moved her to tears. "I have that feeling that they call a frog in the throat," said another. "Many have said that they have that feeling here," was replied by one interested in the building. The treatment of even such a subordinate feature as a chimney may give such a sensation. Indeed it is common experience that all forms affect the sensitive nature through the eye, and not alone those finer ones appealing to us in pictures or in nature. We experience this in the reverse when we feel depressed by some low-browed or otherwise displeasing or prosaic or ugly buildings. In such a case we hear it said: "It oppresses me." "I could never live there." "I never want to see it again." "It is frightful to see." To analyze and find and select consciously what will produce such a semi-physical effect on the sensorium, and so give pleasure or pain by an architectural design, is art. To arrive at and effect such results without such analysis and conscious selection, but by merely unconscious feeling and choice, is genius.

Dismissing questions of *motif* and "style," Mr. Potter said further: "The burning in the great fire at Chicago of a church designed and built by myself led me to seek to make incombustible Gothic structures, when later called upon to design other churches. The first of these is the Church of the Holy Innocents, the Stevens Memorial Church, in Hoboken, N. J. Owing to the fact that no such building existed, I had to depend on the word of the constructor of the iron roof as to its qualities for the non-conducting of heat and cold; so I omitted making an air-chamber in the roof between the inside plastering and the outside slating; and the church has in consequence been very difficult to heat in winter and is, perhaps, very hot in summer. In the Colt Memorial Buildings this experience is profited by, and an air-chamber, of the thickness and depth of the rafters, being formed between the inside plastering and outside slating, no complaints of cold or heat have reached me."

Noticeable in the ironwork is the use of lattice-girders that have the effect of clerestories; and, by this means inside columns, to carry a wide and heavy roof, are avoided. The frankness of using the simple forms of these girders, and merely filling them with glass, is to be noted. It is by such expedients as these that the cost of the building is kept within bounds; a cost which would have been greatly surpassed by a Renaissance building of the same size and accommodations. The front elevation of the parish-house, with its staircases along the side, and the *ringhiera* in the centre, shows a novel combination, though a *ringhiera* on a public building is a not unusual Italian feature.

Had the piers of the balustrade crowning the arcade which is carried along above the staircase been finished with statues, as originally intended by the architect, the Italian character of the arcade would have been more marked.² The end elevations call for commendation as successful examples of rigorous symmetrical outline. This is best seen at some distance from them and exactly opposite their centres. The rear elevation, gaining a central feature from the tribune, which is such an important adjunct of the main room in the building, is in interesting contrast to the front elevation of the structure. The finish of the whole exterior mass, from ground-line to delicate spirelet and from wherever seen, is noticeable.

If now we give consideration to divisions of the design, the interior façade which frames the tribune is especially noticeable. There is a sense of grandeur in this special rendering of the architect's concept which is remarkable, when we consider its measurements, and how low is the height of the openings to the tribune. The details of this tribune, both without and within, well repay prolonged study. Another piece of design especially to be noted is the exquisite arcade that looks into the staircase. Not only its interesting carving but its elementary lines call for commendation. It is a beautiful work. The elevations of the interior ends, with their great arches, — arches made more interesting by the little doorways above them, that give access to the bridge which leads to the spirelet, — are carefully studied, and of noble proportions. The juxtaposition of grand leading forms with delicate details throughout the Colt Memorial Buildings is well worthy of attention, and is to be remarked in much of the architect's other work in various places; notably in St. John's Church, Yonkers, N. Y.

Design, in the sense of selection and judgment, as differentiated from ornament and unrelated details, is shown in the solidity of effect given to the parish-house by the exterior treatment of the

staircases at the angles of the building; the windows being mere narrow slits without decorative form, finish or color.

NOTES AND CLIPPINGS

FIRST STEPS IN THE PHILIPPINES. — When the Filipino sets out to build a house there is one thing that he never omits, that is, to erect the apparatus by means of which all his children will learn to walk. This is done by cutting a hole in the floor of his high and dry dwelling, through which he passes a long hardwood pole, sharpened at one end, which he drives in the ground below, until the part in the house stands about 19 or 20 inches above the floor. He then makes that part of the hardwood pole in the house firm and solid by driving wedges into the interstices formed by the passage of the stake through the split-bamboo floor, and, when all this is done, his next care is to secure a section of bamboo about half a foot longer than the length of the hardwood stake from its top to where it enters the floor and double the circumference of the latter. This section of bamboo is, of course, hollow, and fits over the hardwood stake like a glove. The apparatus is now about finished, and lacks only two things in order to be ready for business. This Mr. Filipino soon attends to. First he bores a hole through the two opposite walls of the bamboo sheath, at the top, where it extends upward about half a foot taller than the stake, and into these two holes he inserts a long hardwood handle which extends at right angles to the upright stake and bamboo case, thus completing the apparatus for teaching children to walk. The manner in which this curious arrangement is operated is very simple. When the mother of a family thinks that it is time for one of her youngsters to learn to walk she simply places the child on its feet, and with its hands grasping the bar, or handle, of wood extending out from the bamboo cylinder. Sometimes the child is tied by the waist to the handle, which the youngster grasps with that peculiar firmness characteristic of all children and especially those of savage tribes, and which, the evolutionists say, is a legacy from our simian forefathers, who lived in trees and who were obliged to hold fast and firm to the limbs or fall. And the minute that baby Tagalo does so the pressure of his body on the handle starts the bamboo cylinder to revolving around the hardwood core, so that baby, fearing lest he fall, clings to the rod with grim perseverance, squalling for his mother and trying hard to support himself by the handle, which continues slowly moving off and away from him. Thus, in an endeavor to keep from falling, and at the same time to keep pace with the slowly revolving cylinder, the child learns in a short time to walk. — *Washington Post*.

PERMEABLE WALLS. — Every one knows that air passes through the walls and ceilings of a closed room, and as long ago as 1878 it was proved that the rate of penetration depended mainly upon the excess of temperature of the inside air over that of the outside air. With walls of ordinary thickness it was observed that about one twenty-fifth of the atmospheric contents of a room would be changed for every degree Fahr. difference per hour. Thus, if the outer air were at 35° Fahr., and the air in the room at 60° Fahr., the latter would be completely changed in the space of one hour by transpiration through the walls. More recent inquiry seems to show that in the case of papered walls, it would not be safe to assume that much more than one-eighth of the air will be changed per degree Fahr. per hour. Further, it is the fact that walls covered with paper containing oil varnish or a coating of paint offer considerable resistance to the passage of air. As very little provision is designedly made for ventilation in ordinary dwelling-houses, and especially in those at low rentals, the subject to which we now allude may well be considered by architects. The employment of reasonably porous building materials is clearly calculated to exercise a beneficial influence upon the atmospheric conditions of a dwelling-house or other building. — *The Builder*.

BERLIN ELEVATED-RAILWAY STRUCTURES. — The *Paris Bulletin des Arts* praises the appearance of the new Berlin elevated electric road as an ornament to the city and a triumph for the architects. The ironwork is said to be really graceful in effect, while the stations are models of sightliness and convenience: all of which is, according to the *Bulletin*, in strong contrast with the Paris underground-road stations, which are condemned as insults to the public. The secret of the Berlin success is said to lie in the fact that first-class architects were invited by the Government to furnish designs for the work, and the best were chosen by a committee consisting of artists, architects and engineers. — *N. Y. Evening Post*.

PROPOSED MONUMENT TO PRISON-SHIP MARTYRS. — A joint resolution appropriating \$100,000 for a monument to prison-ship martyrs to be erected at Fort Greene, Brooklyn, N. Y., was passed by the Senate June 27. It provides that the appropriation of \$100,000 shall be made, on condition that an additional \$100,000 shall be raised, the work to be done under direction of the Secretary of War, the Governor of New York, and the Mayor of New York City. — *Exchange*.

ORIGINALITY. — The architects who have the alteration of the White House under way have been taking photographs by way of suggestion, in New York's City-hall, which architects are said to think is as nearly architecturally perfect as any building in the United States. But why not be original? — *Exchange*.

[If originality is the one thing to be sought, let the asker of the above question wear his shoes on his head in place of his hat. — Eds.]

¹ This saying that "the arch never sleeps" originated with the Arabs, doubtless owing to their experience with the Moorish Arch, which they have so much employed. It may be admissible, from the layman's merely sentimental point-of-view, to assign credit to the arch for its sleeplessness, but that the arch never ceases, more or less, to jeopardize its imposts, and, consequently, the whole wall in which it occurs, has always hitherto been considered its vice; and the architect takes a bold stand, and one apparently at issue with his professional obligations in his practice, who cites the fact as a virtue. For the first requisite demanded of the mass of a building is stability, and the upholders of that mass, the arch no less than the column with its architrave, should be inviolable by any coordinate stress or strain. Nearly all Europe's Gothic work of the medieval era, comparatively near as that epoch is to our own, is tied up with iron to reinforce its original construction, whereas the trabeated temples of Greece and Egypt, thousands of years older, stand to-day, when untouched by earthquake or the destroying hand of warfarer or stone-quarrying man, as intact as when erected.

² Statues of "Fortitude," "Truth," "Friendship," "Fidelity" and "Magnanimity."

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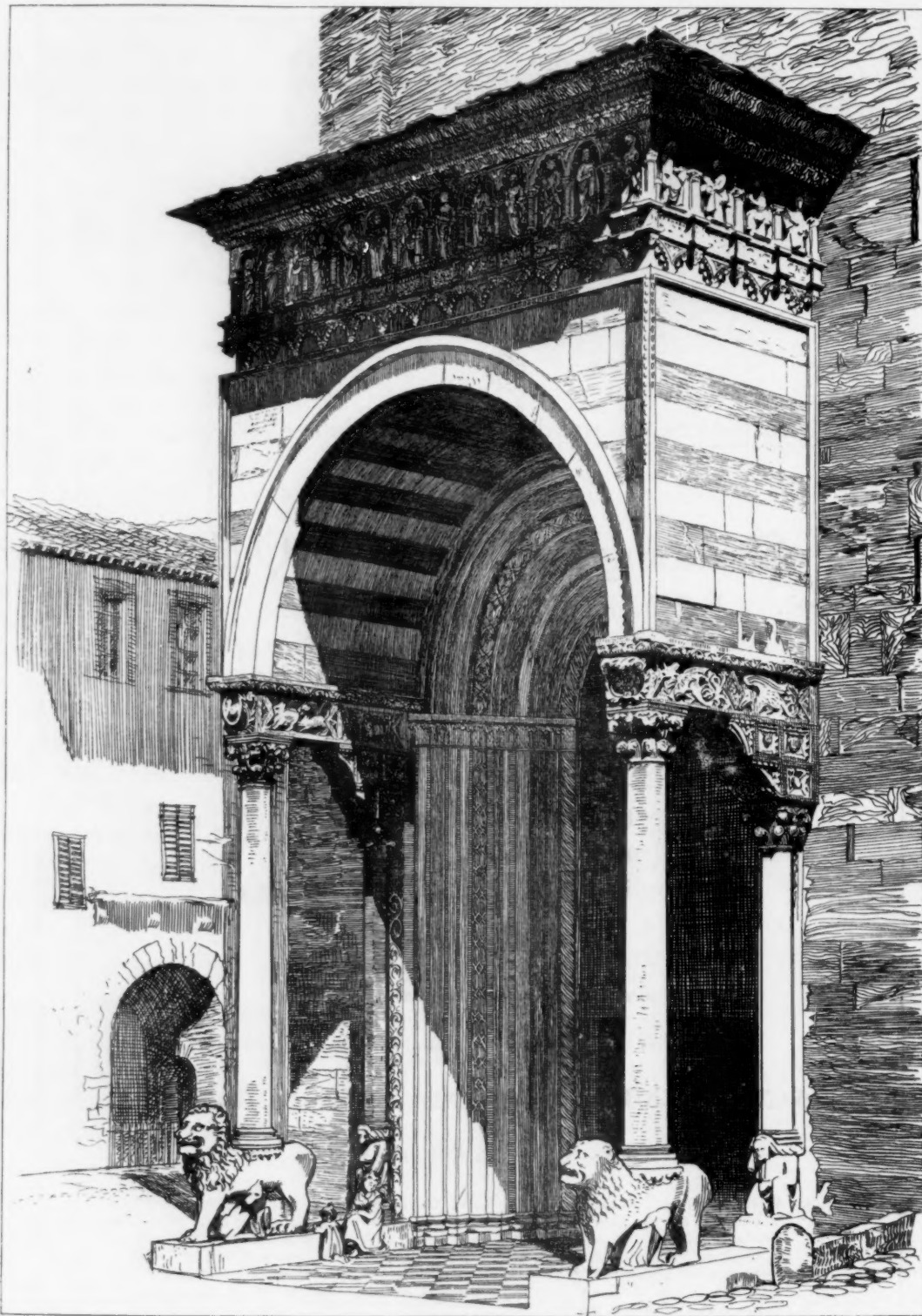
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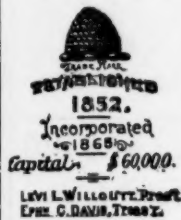
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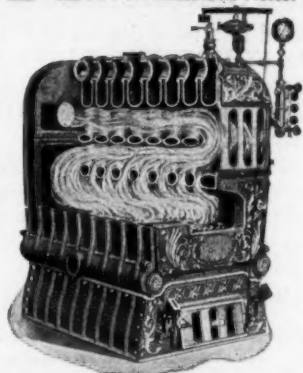
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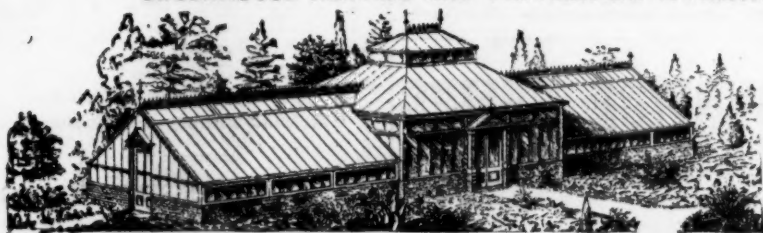
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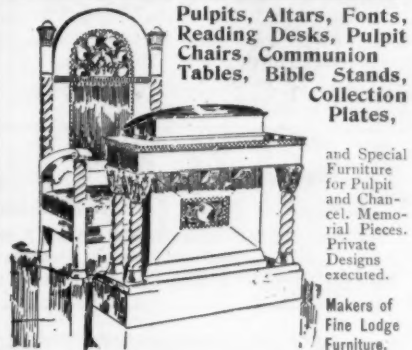
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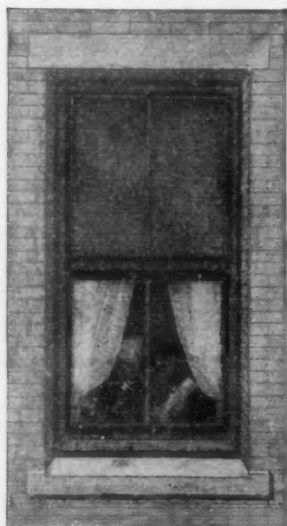
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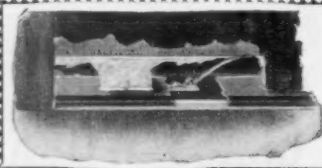
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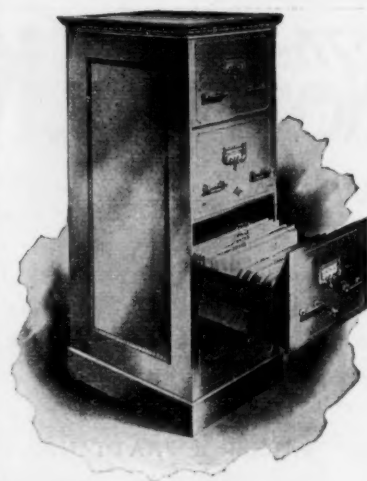
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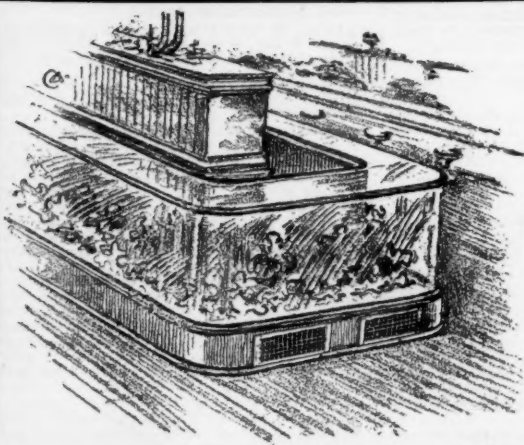
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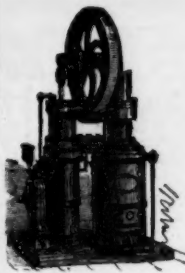
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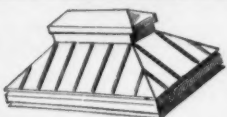
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BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

erected by the Union Ry. Co., at 175th St. and Southern Boulevard; cost, \$20,000. Architect, A. V. Porter, 621 Broadway.

Mayor Low is stated to have approved ordinances providing bond issues as follows: \$425,000 for the construction of new buildings under control of the Health Department; \$75,000 special revenue bonds for repairs for hospitals and Health Department buildings; \$200,000 for the construction of a borough hall in Richmond; \$250,000 for the erection of a court-house in the Bronx, and \$75,000 for the completion of the Criminal Courts Building in Manhattan.

It is reported that Henry Corn has bought No. 9 to 19 W. 19th St. and No. 8 to 16 W. 20th St., and will build on the premises what will be the largest loft-building ever erected in this city. The plot comprises ten city lots. The building will be ten stories high. Mr. Corn is one of the leading realty men of this city, and he has for some time mainly devoted himself to building big office and loft buildings on 5th Ave., between 14th and 23d Sts.

The plans for the house to be built by Charles M. Schwab, president of the United States Steel Corporation, in the block bounded by Riverside Drive, West End Ave., 73d and 74th Sts., are almost completed. The house will occupy a plot 100' x 15' in the center of the block, will be four stories high, and the estimated cost is said to be \$2,500,000.

John M. Burke, a wealthy retired merchant and railroad director of this city, has conveyed to a corporation real and personal property to the amount of \$4,000,000 for the purpose of founding a convalescent home in or near the Borough of Manhattan. The corporation is known as the Winifred Master-son Burke Relief. The provision is made that the income, less the current expenses of the administration, be reserved to Mr. Burke during his lifetime, after which it will be devoted to the purposes of the foundation.

Nicetown, Pa.—Plans and specifications will be sent out shortly by the Sanguet Silk Manufacturing Co., 5th and Columbia Aves., Philadelphia, for the new plant which it will have erected here. It will be a four-story brick and stone building of large dimensions.

Norristown, Pa.—Estimates have been filed for the construction of a manufacturing plant here for McMichael & Wildman, of that city. It will be a five-story building, 45' x 130'.

Oakland, Me.—A woollen-mill is in process of construction here.

Peoria, Ill.—The Peoria & Pekin Union R. R. Co. is stated to have decided to erect a \$100,000 round-house.

Philadelphia, Pa.—Cope & Stewardson, 320 Walnut St., are stated to have completed plans for a three-story engineering building, to be erected on the grounds of the University of Pennsylvania. It will be largely of steel and of slow-burning construction. A. Raymond Raff has the contract for the erection

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BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

of building for the Oakdale Baking Co., at 10th St. and Susquehanna Ave. The building will be of slow-burning construction, three stories and basement, with modern improvements. Contract price, \$40,000. Architects, Hale & Ballinger.

The Trustees of Cooper Hospital have decided to erect a \$20,000 building north of the hospital, to be used as a home for the nurses.

The City Council has passed an ordinance providing for the purchase of a site on Penrose Ferry Road and Eagle Creek, on which a municipal hospital will be erected.

H. C. E. Rahn, 410 Walnut St., has prepared plans for an edifice for the Bethlehem Evangelical Lutheran Church to be erected on 30th and Diamond Sts.; cost, \$30,000.

Pittsburgh, Pa.—The Trustees of the Jewish Hospital Association are stated to have adopted the plans of Simon B. Elendrath, 293 Michigan Ave., Chicago, Ill., for a hospital to be erected on Reed and Miller Sts., to cost \$50,000. Dr. A. Bloomberg, Chmn. Bldg. Com.

Local press reports state that the Baltimore & Ohio R. R. Co. will expend about \$1,100,000 on improvements in this district, including a \$500,000 depot.

The Shanahan Transfer Co. is to erect a six-story warehouse on Forbes St., to cost \$50,000.

Port Royal, Tenn.—It is stated that the construction of a bridge across Red River is being agitated.

Providence, R. I.—It is stated that the Mayor has offered a site as a gift of the City of Providence for the proposed new public building to be erected here by the government at a cost of \$1,000,000. Architects of high standing will soon be invited to prepare plans in competition.

Richmond, Va.—The Penitentiary Commission has adopted the plans of P. Thornton Mayre, of Newport News, for a new cell building to cost \$180,000. Working plans will be ready about August 1.

Rumford Falls, Me.—\$950,000 is being expended in houses and enterprises at this place.

San Francisco, Cal.—Cunningham & Politeo are stated to have prepared plans for a hotel, to be erected on Geary and Hyde Sts., for Harvey H. Dana, to cost \$70,000.

Plans have been completed by Newton J. Thorp for an eight-story building to be erected on Market and 7th Sts. by Douglas Grant, to cost about \$200,000.

San Jose, Cal.—The Board of Supervisors have ordered plans prepared for a county building to be located in the rear of the Hall of Records, to cost \$50,000.

Savannah, Ga.—G. L. Normer, Equitable Building, Atlanta, has made plans for the proposed branch of the Citizens Bank, to be erected on Liberty and Montgomery Sts. It will be five stories high.

Seranton, Pa.—The Board of Control is stated to have decided to erect a \$65,000 high school.

Somerville, Mass.—Architect George A. Moore, Mason Building, Boston, is to draw plans for the Somerville armory. They will not be ready to figure for some weeks. Architect will have charge.

South Manchester, Conn.—It is reported that Cheney Bros. will erect and present to this town a high school, to cost, with site, \$100,000.

Springfield, Mass.—A company is soon to be incorporated here at \$100,000, for the manufacture of thread, and the old Alden property on Mill St., recently occupied by the Standard Thread Co., is being remodelled for the purpose. About \$35,000 will be spent in enlarging and reconstructing the buildings, and \$40,000 in machinery.

Ex-Mayor D. O. Gilmore has had plans prepared by Lord, Burnham & Co., of New York City, for a new arboretum, 24 x 100', he is to erect at Forest Park and present to the city.

Wheaton, Ill.—The Board of Trustees of Wheaton College is stated to have voted to erect a central heat, light and water plant and a new industrial building, to cost about \$40,000.

BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

Wilmington, Del.—It is said that Alexis Felix Du Pont is about to build a \$20,000 brick and stone dwelling on Kennett Turnpike.

Perrot & Bissell, Bourse Building, Philadelphia, Pa., have prepared plans for alterations to the dwelling of Mrs. Eugene Du Pont, located on Pennsylvania Ave. and Clayton St.; cost, \$30,000.

Plans have been drawn by F. Watson, 1208 Chestnut St., Philadelphia, for a \$30,000 brick and stone dwelling, to be erected for Wm. W. Lobdell on Pennsylvania Ave. and Broome St.

Wind-or, Conn.—It is stated that B. F. Blood, of Waltham, Mass., will present to this city a brick and granite library, to cost from \$15,000 to \$20,000.

ALTERATIONS AND ADDITIONS.

Newton, Mass.—Park St., No. 269, alterations & addition to house, 20' x 36'; \$5,000; o., F. W. Stearns; a., Fehmer & Page; b., H. H. Hunt.

APARTMENT-HOUSES.

Cambridge, Mass.—Massachusetts Ave. and Lee St., 2 seven-sty' bk. & st. aparts., 72' x 96', steam; \$175,000; o., P. G. Rice & Co., 47 Main St., Watertown; a. & b., O. A. Heluck.

Dorchester, Mass.—Columbia Road and E. Cottage St., 6 three-sty' bk. store & apart. blocks, comp. roofs, steam; \$80,000; o., G. V. Wattendorff; a., K. A. Watson.

HOUSES.

Brainerd, Minn.—Two-sty' fr. dwell., 34' x 41', furnace; \$5,000; o., Dr. Walter Courtney; a., Reed & Stem.

Brooklyn, N. Y.—Avenue U, cor. E. 13th St., two-sty' & attic fr. dwell., 23' x 40', shingle roof, hot water; \$5,500; o., W. H. McKerr, on premises; a., C. W. Vanderkeek, on premises.

Seventy-fifth St., nr. 2d Ave., two-sty' & attic fr. dwell., 29' x 30', shingle roof; \$7,500; o., E. R. Seaver, 337 Seventy-fourth St.; a., Pohlman & Patrick, 322 Fifty-third St.

Dean St., nr. Carlton Ave., 3 four-sty' bk. dwells., 21' x 79', gravel roof, steam; \$36,000; o., Nels. Johnson & Son, 684 Bergen St.; a., A. S. Hedman, 371 Fulton St.

Avenue Q, cor. E. 18th St., two-sty' & attic fr. dwell., 27' x 49', shingle roof; \$7,500; o., A. H. Hattersley, 215 Montague St.; a., F. H. Quimby, 99 Nassau St.

Camb-idge, Mass.—Brown St., 2½-sty' fr. dwell., 33' x 42', furnace; \$6,000; o., Giles Taintor, 101 Milk St.; a., Chase & Ames.

Chicago, Ill.—Washington Boulevard and W. Forty-second Ave., two-sty' & base, fr. dwell., 22' x 52', steam; \$9,000; o., Mr. Marney; a., Nels Buck, 125 La Salle St.

Dorchester, Mass.—Charlotte St., nr. Blue Hill Ave., two-sty' fr. dwell., shingle roof, hot water; \$7,000; o., A. C. C. Hill, 145 Glenway St.; a., D. J. McKay, 45 Fowler St.

Glencoe, Ill.—Two-sty' base, & attic bk. dwell., 34' x 54'; \$20,000; o., Sylvan Newhall; a., J. J. Flanders, Masonic Temple, Chicago.

Jamaica Plain, Mass.—Tower and Washington Sts., two-sty' fr. dwell., 25' x 48', shingle roof, furnace; \$4,600; o., Annie Wiperman, 131 Longwood Ave.; a., J. Luippold.

Lawrence, Mass.—Two-sty' fr. dwell., 33' x 53', steam; \$7,000; o., Mrs. Clara Smith, 120 Haverhill St.; a., G. G. Adams, Adams Building.

Los Angeles, Cal.—Park View Ave., nr. 7th St., two-sty' fr. dwell., 69' x 74'; \$40,000; o., G. A. Leighton, Manchester, N. H.; a., A. S. Haley.

Maynard, Mass.—Thirty 1½-sty' fr. cottages; \$60,000; o., American Woollen Co., Ames Building, Boston; a., P. F. Gilbert, 53 Central St., Lowell.

Minneapolis, Minn.—Clifton Ave., No. 245, two-sty' bk. dwell., 66' x 96'; \$18,000; o., A. C. Andrews; a., W. C. Whitney; c., T. P. Healy.

New Britain, Conn.—Maple St., two-sty' fr. dwell., 37' x 45'; \$5,000; o., Chas. Scherp; a., W. H. Cadwell and W. F. Crabtree.

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(Houses Continued.)

Newton, Mass.—Tremont St., Ward 7, two-st'y fr. dwell., 34' x 52', furnace; \$4,500; o. Emma E. Munroe; b. A. S. MacLachlan, 40 Bigelow St., Brighton.

Otis St., Ward 3, two-st'y fr. dwell., 41' x 43', hot water; \$8,000; o. H. D. Talbot; a. W. W. Dinmore.

New York, N. Y.—Eleventh St., nr. White Plains Ave., two-st'y fr. dwell., 27' x 37'; \$5,000; o. Church Extension Society, 5th Ave. & 20th St.; a. John Davidson, Williamsbridge.

Clinton Ave., nr. Tremont Ave., two-st'y bk. dwell., 20' x 52'; \$5,500; o. Charlotte Kirschner, 1809 Crotona Ave.; a. Arthur Bohmer, 751 Tremont Ave.

Arthur Ave., nr. 18th St., two-st'y bk. dwell. & store, 25' x 70'; \$6,000; o. Giuseppe Baldo, Arthur Ave. & 18th St.; a. Wm. Kenn, 1336 Prospect Ave.

Caldwell Ave., nr. 15th St., 4 two-st'y bk. & st. dwells., 20' x 24' x 40'; \$20,000; o. & a. Rob't E. La Velle, 720 E. 164th St.

Seventy-fourth St., nr. Columbus Ave., 18 five-st'y bk. & m. dwells., 25' x 50' & 62' 6", gravel roofs; \$900,000; o. F. Ambrose Clark, Cooperstown; a. Percy Griffin, 244 Fifth Ave.

Randolph, Neb.—Two-st'y fr. dwell., 32' x 44'; \$8,000; o. S. O. Reese; a. F. D. Orr, 415 Lumber Exchange, Minneapolis, Minn.

South Boston, Mass.—Broadway, cor. F St., 2½-st'y fr. dwell., 50' x 50', shingle roof, hot air; \$15,000; o. J. F. Falvey; a. T. Edw. Sheehan, Tremont Building.

St. Louis, Mo.—Two-st'y bk. dwell., slate roof, hot water; \$8,000; o. E. W. Bentzen, 4217 Evans Ave.; a. O. J. Boehmer, 418½ Olive St.

Winnetka, Ill.—Hubbard's Woods, two-st'y bk., timber & plaster country dwell., 50' x 80'; \$25,000; o. J. L. Shortall; a. H. V. Shaw; 175 Dearborn St.

MERCANTILE BUILDINGS.

Cando, N. D.—Two-st'y bk. business block, 30' x 130', slate roof, steam; \$20,000; o. Canfield Co.; a. Boehme & Cordella, Kasota Block, Minneapolis, Minn.

New York, N. Y.—Pine St., Nos. 28-32, twelve-st'y marble front bank & office building, 57' 9" x 61', tile roof; \$200,000; o. Keane, Van Cortlandt Co., 26 Nassau St.; a. Warren & Wetmore, 3 E. 33d St.

OFFICE-BUILDINGS.

Boston, Mass.—Boylston St., Nos. 733-745, six-st'y steel-fr. office building, 97' x 113'; \$200,000; o. Boylston St. Trust; b. Commonwealth Const. Co., 7 Water St.

Bowdoin Sq., Nos. 6-7, three-st'y store & office building, comp. roof, steam; \$75,000; o. C. P. Bowditch et al., trustees; a. Peters & Rice.



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Brooklyn, N. Y.—Clinton Ave., nr. Atlantic Ave., six-st'y office building, 100' x 110' 2", tile roof, steam; \$250,000; o. N. Y. & N. J. Telephone Co., 81 Willoughby St.; a. W. B. Clafin, 81 Willoughby St.

STABLES.

Brooklyn, N. Y.—Dean St., nr. Carlton Ave., one-st'y bk. stable, 22' x 26', gravel roof; \$1,000; o. Estey Wire Works, 320 Manhattan Ave.; a. R. L. Daus, 26 Court St.

Cambridge, Mass.—Brookline St., No. 92, Ward 6, two-st'y fr. stable; \$1,000; o. John W. Kollen; a. George Richards.

New York, N. Y.—Thirty-sixth St., nr. 9th Ave., six-st'y bk. stable, 36' x 98' 9", felt & gravel roof; \$15,000; o. Park A. Geoghagan, 467 Eighth Ave.; a. Jas. W. Cole, 403 W. 51st St.

E. Seventy-third St., No. 178, three-st'y bk. stable, 25' x 97' 2"; \$25,000; o. John Connors, 1316 First Ave.; a. John H. Friend, 148 Alexander Ave.

TENEMENT-HOUSES.

New York, N. Y.—Charles St., Nos. 6-8, six-st'y bk. tenement, 40' x 82'; \$35,000; o. Friedman & Farber, 280 Broadway; a. Bernstein & Bernstein, 111 Broadway.

Second Ave., No. 107, six-st'y bk. & st. tenement & store, 24' x 87'; \$25,000; o. & b. Abraham Silverman, 236 E. 61st St.; a. G. F. Pe ham, 503 Fifth Ave.

E. Seventy-seventh St., No. 304, six-st'y bk. tenement, 21' 8' x 89' 2"; \$23,000; o. & b. Vincento Serritella, 115 Hamilton Pl.; a. Geo. F. Pelham, 503 Fifth Ave.

Sullivan St., cor. Spring St., six-st'y bk. tenement & store, 40' x 67' 6"; \$45,000; o. Chas. Friedman, 329 E. 116th St.; a. Bernstein & Bernstein, 111 Broadway.

Brook Ave., cor. 170th St., six st'y bk. tenement & stores, 24' 6" x 100' 6"; \$20,000; o. John Brady, 567 Seventh Ave.; a. Chas. H. McAfee, 335 Broadway.

THEATRES AND HALLS.

New Haven, Conn.—George St., two-st'y bk. theatre building, 90' x 240'; \$100,000; o. S. Z. Poli; a. E. W. Maynard, 226 Tremont St., Boston.

WAREHOUSES.

New York, N. Y.—Centre St., Nos. 193-197, six-st'y bk. loft building, 66' x 75'; \$50,000; o. Mrs. Barber, 90 Wall St.; a. Clinton & Russell, 32 Nassau St.

St. Louis, Mo.—Two-st'y bk. warehouse, 30' x 140', comp. roof, steam; \$12,000; o. Henry Walker, 1219 Spruce St.; a. G. Becker, 2804 Bailey Ave.

MISCELLANEOUS.

Des Moines, Ia.—Sixth Ave., three-st'y bk. sanitarium, slate roof, steam; \$16,000; o. Dr. Walston; a. Hallett & Rawson.

COMPETITIONS.

JAIL.

[At Louisville, Ky.] Plans will be received by John H. Cowles, Clerk Fiscal Court, until July 29 for a new county jail. It must have 300 cells and cost not over \$125,000. 1386

COMPETITIONS.

BUILDINGS.

[At Danville, Ky.] Competitive plans will be received by the Commissioners of the Kentucky Institute for Deaf, Danville, until July 31 for the erection of 2 additional buildings. B. O. RODES, Pres. Bd. of Comrs. 1386

ARTISTS' DESIGNS INVITED

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Terms of the competition may be had from PEERS DAVIDSON, Esq., London and Lancashire Building, Montreal, or at the Bank of Montreal, 22 Abchurch Lane, London, E. C. 1385

PROPOSALS.

SCHOOL.

[At Garden City, S. D.] Bids will be received at the office of Clerk J. R. Evans until July 26 for the erection of a school. 1386

BOILERS, PUMPS, ETC.

[At Chillicothe, Okla. Ter.] Bids are wanted July 28 for furnishing and delivering at the U. S. Indian School, Chillicothe, 2 200-H. P. boilers, 2 pumps for hot water, 2 steam traps, 1 elevator, 2 motors, 45 barrels cement, etc. S. M. McCOWAN, Supt. 1386

CHURCH.

[At Vincennes, Ind.] Bids are wanted July 31 for the erection of the First Christian Church; probable cost, \$25,000. 1386

CELLS.

[At Los Angeles, Cal.] Bids are wanted July 28 for furnishing a complete system of cells for the county jail. C. W. BELL, Co. Clk. 1386

HOSPITAL.

[At Fort Bayard, N. Mex.] Bids are wanted at office of Capt. H. M. Powell, Q. M., until July 31 for constructing an officers' 1386

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PROPOSALS.

hospital and installing necessary heating apparatus and plumbing. 1386

TOWN-HALL.

[At Southampton, Mass.] Bids are wanted until July 26 for the erection of a town-hall from plans of W. H. Cadwell, of New Britain, Conn. DR. A. C. COBB, Chairman Bldg. Com. 1386

GRADING.

[At Washington, D. C.] Office of the Commissioners, D. C., Washington. Sealed proposals will be received at this office until July 26, 1902, for grading certain streets and avenues, aggregating about 70,000 cubic yards of grading. Blank forms of proposal, specifications, and all necessary information will be furnished on application to the office of the Engineer Commissioner, D. C. H. B. F. MACFARLAND, JOHN W. ROSS, H. C. NEWCOMER (acting), Commissioners, D. C. 1386

GRADING AND REGULATING STREETS.

[At Washington, D. C.] Office of the Commissioners, D. C., Washington. Sealed proposals will be received at this office until July 26, 1902, for grading and regulating suburban streets and avenues. Blank forms of proposal, specifications, and all other necessary information will be furnished on application to the office of the Engineer Commissioner, D. C. H. B. F. MACFARLAND, JOHN W. ROSS, H. C. NEWCOMER (acting), Commissioners, D. C. 1386

PAVING.

[At Washington, D. C.] Office of the Commissioners, D. C., Washington. Sealed proposals will be received at this office until July 26, 1902, for laying asphalt block pavements. Blank forms of proposal, specifications and all necessary information may be obtained at the office of the Engineer Commissioner, D. C. H. B. F. MACFARLAND, JOHN W. ROSS, H. C. NEWCOMER (acting), Commissioners, D. C. 1386

LAYING WATER-PIPES.

[At Weston, Mass.] Sealed proposal will be received at the office of the Metropolitan Water and Sewerage Board, 1 Ashburton Pl., Boston, Mass., until July 25 for laying 2,600 linear feet of 60-inch cast-iron water pipe in Weston and Newton, including the construction of a coffer dam, the laying of three lines of pipes each about 350 feet in length under the Charles River, and the placing of about 800 cubic yards of concrete. Pamphlets containing further information for bidders, forms of proposal, contract and specifications will be mailed to contractors who apply to the Chief Engineer, or may be obtained at his office, 1 Ashburton Pl. Plans of the work may be seen at the office of the Chief Engineer. HENRY H. SPRAGUE, Chairman, HENRY

PROPOSALS.

P. WALCOTT, JAMES A. BAILEY, JR., Metropolitan Water and Sewerage Board. 1386

Treasury Department, Office of the Supervising Architect, Washington, D. C., July 11, 1902. Sealed proposals will be received at this office until 2 o'clock P. M. on the 19th day of August, 1902, and then opened, for the safety vaults, vault-doors and work incidental thereto in the U. S. Mint at Denver, Colorado, (new building) 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. 1387

Treasury Department, Office of the Supervising Architect, Washington, D. C., July 10, 1902. Sealed proposals will be received at this office until 2 o'clock P. M. on the 14th day of August, 1902, and then opened, for the installation of a conduit and wiring system for the U. S. Post-office Building at Hot Springs, Arkansas, 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 Hot Springs, Arkansas, at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1387

HOSPITAL.

[At Winthrop, Mass.] Bids are wanted August 7 for erecting a brick hospital at Fort Banks, Winthrop. A. W. CHASE, Q. M. 1387

STEAM HEATING PLANT.

[At Fort D. A. Russell, Wyo.] Bids will be received by Maj. J. W. Pope, Ch. Q. M., Denver, Col., until August 2 for installing a steam heating plant in commanding officer's quarters at Fort D. A. Russell. 1387

SEWERS.

[At Abilene, Kan.] Sealed proposals will be received by the City Clerk of Abilene, Kan., until the 6th day of August, 1902, for constructing a system of public and district sewers for said city in accordance with the plans and specifications on file. Separate bids will be received at the same time for furnishing pipe for said sewers. Specifications, instructions to bidders and blank proposals, and a complete set of detailed plans and profiles will be kept on file at the office of the city clerk of Abilene and at the office of the Consulting Engineers, Burns & McDonnell, Postal Telegraph Building, Kansas City, Mo. P. H. HALLECK, Mayor. C. C. WYANDS, City Clerk. 1387

Treasury Department, Office of the Supervising Architect, Washington, D. C., July 8, 1902. Sealed proposals will be received at this office until 2 o'clock P. M. on the 18th day of August, 1902, and then opened, for the construction (except heating apparatus, electric wiring and conduits) of the U. S. Court-house and

PROPOSALS.

Post-office at Fergus Falls, Minn., in accordance with drawings and specification, copies of which may be had at this office or at the office of the Postmaster at Fergus Falls, Minn., at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1386

BUILDINGS.

[At Columbus, O.] Bids will be received by E. G. Carpenter, M. D., Sec'y Bd. of Trus. of the Columbus State Hospital, until July 26 for furnishing material and erecting 2 buildings for the hospital. It is reported that the buildings will cost about \$40,000 each. 1386

Treasury Department, Office of the Supervising Architect, Washington, D. C., July 5, 1902. Sealed proposals will be received at this office until 2 o'clock P. M. on the 6th day of August, 1902, and then opened, for the installation of a conduit and electric wiring system for the U. S. Post-office at Freeport, Ill., 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 Freeport, Ill., at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1386

Treasury Department, Office of the Supervising Architect, Washington, D. C., June 19th, 1902. Sealed proposals will be received at this office until 2 o'clock P. M. on the 5th day of August, 1902, and then opened, for furnishing the steam-heating apparatus complete in place, for the U. S. Custom-house and Post-office at Brunswick, Ga., in accordance with drawings and specification, copies of which may be had at this office, or at the office of the Superintendent at Brunswick, Georgia, at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1386

HOSPITAL STEWARDS QUARTERS.

[At Plattsburgh Barracks, N. Y.] Quartermaster's Office, Plattsburgh Barracks, N. Y. Sealed proposals for constructing hospital stewards quarters here will be received until July 30, 1902. Information furnished on application. QUARTERMASTER, Plattsburgh Barracks, N. Y. 1386

PUBLIC BUILDING.

[At Dedham, Mass.] Sealed proposals for the construction at Dedham, in the County of Norfolk and the Commonwealth of Massachusetts, of a building for the Registries of Deeds and of Probate and for the Probate Court for said County, will be received by the County Commissioners of said County at the County Court-house in said Dedham, until the twenty-ninth day of July, 1902. Plans and specifications may be seen by prospective bidders at the office of the Architects, on any week day, except Saturday, between the hours of 9 A. M. and 5 P. M., and on any Saturday between the hours of 9 A. M. and 1 P. M. THOMAS BLANCHARD, JAMES HEWINS, MARSHALL P. WRIGHT,

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County Commissioners, of Norfolk County, Massachusetts. Peabody & Stearns, architects, 919 State Street Exchange, Boston. 1386	hall, in strict accordance with plans, specifications and instructions to bidders. For further information apply to this office or to Elwood Hadley, U. S. Indian agent, Sacaton, Ariz. W. A. JONES, commissioner. 1386	the Cherokee Indian School, N. C., in strict accordance with plans, specifications and instructions to bidders. For further information apply to Henry W. Spray, superintendent, Indian School, Cherokee, N. C. W. A. JONES, commissioner. 1386
H HEATING PLANT. [At Lisbon, N. D.] Bids for a steam-heating plant will be received until July 30. 1386	F FOUNDATIONS FOR BRIDGE, ETC. [At Chicago, Ill.] U. S. Engineer Office, 1637 Indiana Ave., Chicago, Ill. Sealed proposals for constructing foundations for five locks and one aqueduct bridge, the walls for eight locks, and the piers and abutments for five aqueduct bridges and one highway bridge will be received here until July 28, 1902. Information on application here or to Assistant Engineer L. L. Wheeler, Sterling, Ill. J. H. WILLARD, Maj. Engrs. 1386	A ADDITION TO GUARD-HOUSE. [At Fort Totten, Willets Point, N. Y.] Sealed proposals, in duplicate, for constructing addition to guard-house at this post, will be received here until August 1, 1902. Separate proposals may be made on construction, plumbing, heating apparatus and electric wiring. Information furnished on application. A. HASBROUCK, Q. M. 1387
R OADWAY. [At Anderson, Ind.] Bids will be received by the Directors of Maplewood Cemetery until July 27 for constructing about 1½ miles of macadamized drives and 50,000 square feet of cement work. JOHN P. SEARE, Sec'y. 1386	D ORMITORY. [At Cherokee, N. C.] Department of the Interior, Office of Indian Affairs, Washington, D. C. Sealed proposals will be received at the Indian office until July 28, 1902, for furnishing the necessary materials and labor required to construct and complete a frame dormitory, with plumbing, steam heat and acetylene gas piping, at	B UILDING. [At Mare Island, Cal.] Sealed proposals will be received at the bureau of yards and docks, Navy Department, Washington, D. C., until August 9, 1902, for constructing a one-story brick and steel building, 300' x 100', at the navy yard, Mare Island, Cal. Plans and specifications will be furnished by the commandant of the navy yard upon deposit of \$15 to secure their return. MOR-DECAI T. ENDICOTT, chief of bureau. 1387

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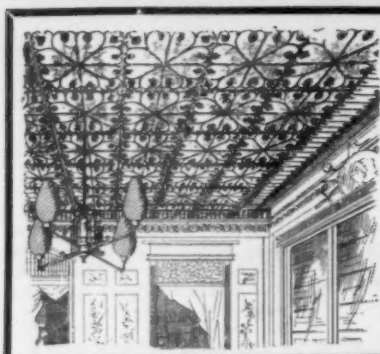
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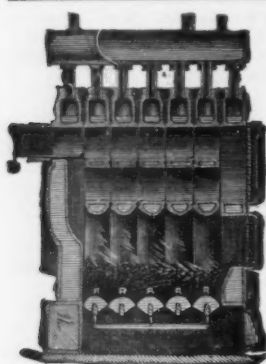
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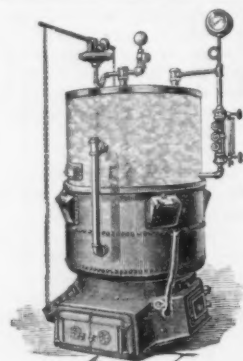
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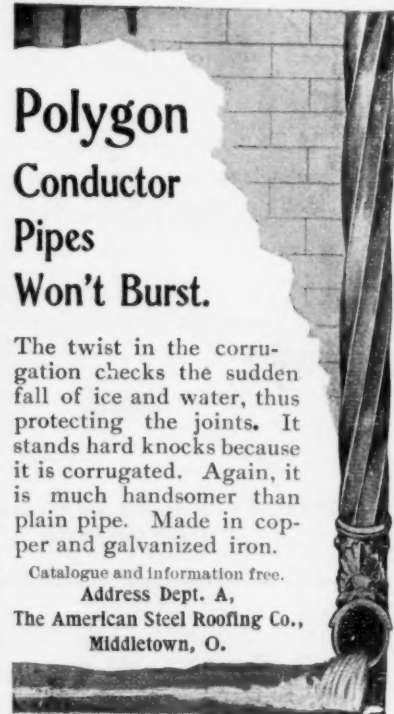
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ART GLASS WORK.

Chandler Specialty Mfg. Co., Boston.

ART METALWORK.

Art Metal Construction Co., James-

town, N. Y.

Ludlow Saylor Wire Co., St. Louis,

Mo. (mon)

ARCHITECT'L ORNAMENTATION.

Lombard & Co., A. P., Boston

ASPHALT.

Neuchatel Asphalt Co., New York

ASPHALT ROOFING.

Warren Chemical & Mfg. Co., N. Y.

BLUE PRINTS.

Moss, Chas. E., Boston

Spaulding Print Paper Co., Boston

(eow)

BOILER (Steam and Hot-Water).

Walker & Pratt Mfg. Co., Boston

BOILERS (Side-Feed).

Gorton & Lidgerwood Co., New York

BRICKS (Red Oxide).

Wisconsin Graphite Co., Pittsb'g, Pa.

BUILDER.

Smith & Brinckerhoff, New York

CAPITALS.

Lombard & Co., A. P., Boston

CAPITALS (Carved).

O. T. Nelson Co., The, Columbus, Ohio

CARVING.

Lombard & Co., A. P., Boston

Waddell Mfg. Co., Grand Rapids, Mich.

CEMENT.

Allen's Cement Works, N. Y. (eow)

Atlas Cement Co., New York

CLOTHES-DRYER.

Hill Dryer Co., Worcester, Mass.

COMPOSITION ORNAMENT.

Lombard & Co., A. P., Boston

CONDUCTORS.

American Steel Roofing Co., The,

Cincinnati, Ohio

CONSERVATORIES.

Lord & Burnham Co., Irvington-on-

Hudson, N. Y.

CONTRACTING.

Flynt Building & Construction Co.,

Palmer, Mass.

Rutan, William L., Boston

CONTRACTOR AND BUILDER.

Rutan, William L., Boston

CORDAGE.

Samson Cordage Works, Boston. (eow)

CREOSOTE STAINS.

S. Cabot, Boston

CUTLER PAT. MAILING SYSTEM.

Cutler Mfg. Co., Rochester, N. Y.

DEAFENING QUILT.

Samuel Cabot, Boston, Mass.

DOORS (Steel Rolling).

Kinnear Mfg. Co., The, Columbus, O.

DRAUGHTSMAN.

E. Eldon Deane, New York

ELECTRIC SIGNALS.

Elevator Supply & Repair Co., New

York

ELEVATORS, ETC.

Morse, Williams & Co., Philadelphia.

Whittier Machine Co., Boston

ELEVATOR SIGNALS.

Herzog Telesema Co., New York

ENGINES (Hot-Air).

Rider-Ericsson Engine Co., New York

EXPANDED METAL.

Associated Expanded Metal Co., New

York

EXPANDED METAL LOCKERS.

Merritt & Co., Philadelphia, Pa.

FAN SYSTEM.

Sturtevant Co., B. F., Boston, Mass.

FILING DEVICES.

Art Metal Construction Co., James-

town, N. Y.

FILTER.

Loomis-Manning Filter Co., Phila., Pa.

FIREPROOFING.

Johnson Co., E. V., Chicago, Ill.

National Fireproofing Co., Pittsburg,

Pa.

FIREPROOF LATHING.

Hayes, Geo., New York

FIREPROOF SHUTTERS.

Kinnear Mfg. Co., The, Columbus, O.

FLOOR POLISH.

Butcher Polish Co., Boston

GALVANIZED IRON.

American Sheet Steel Co., New York

GATES.

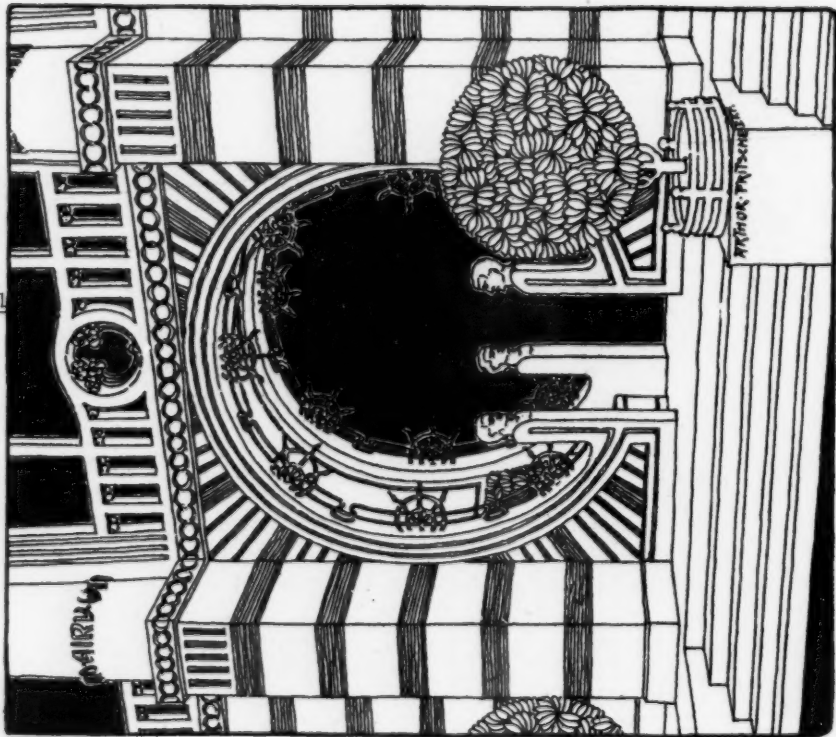
Wm. R. Pitt, New York (mon)

GRATES, ETC.

Wm. H. Jackson & Co., New York

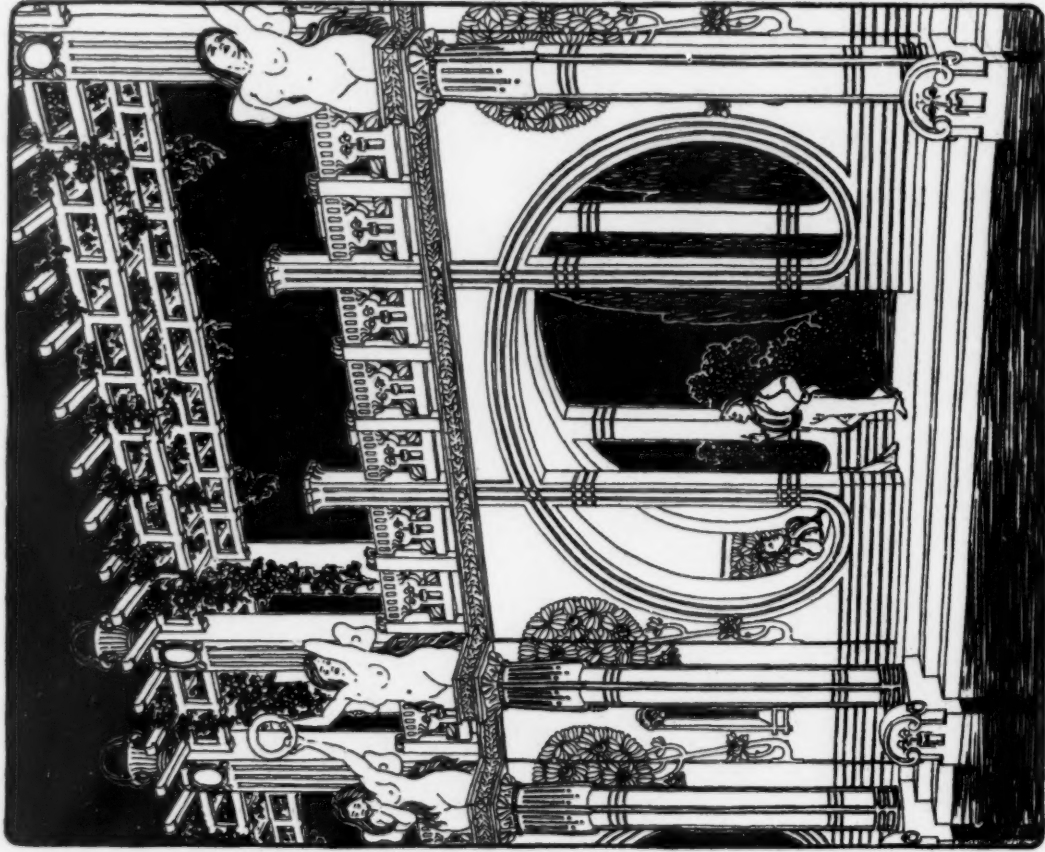
GREASE (Graphite).

Wisconsin Graphite Co., Pittsb'g, Pa.



PALASTPORTAL

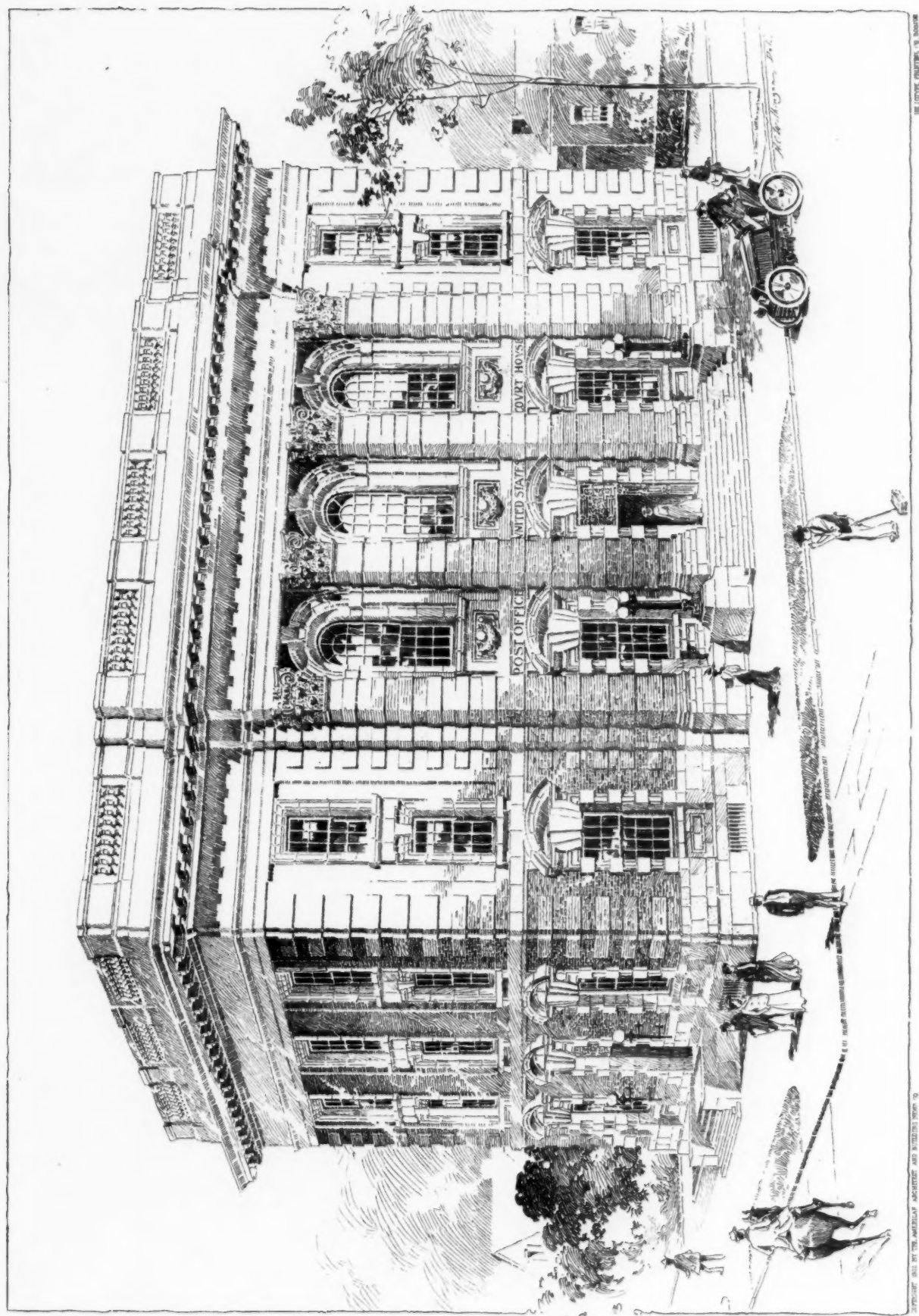
Architekturskizzen.



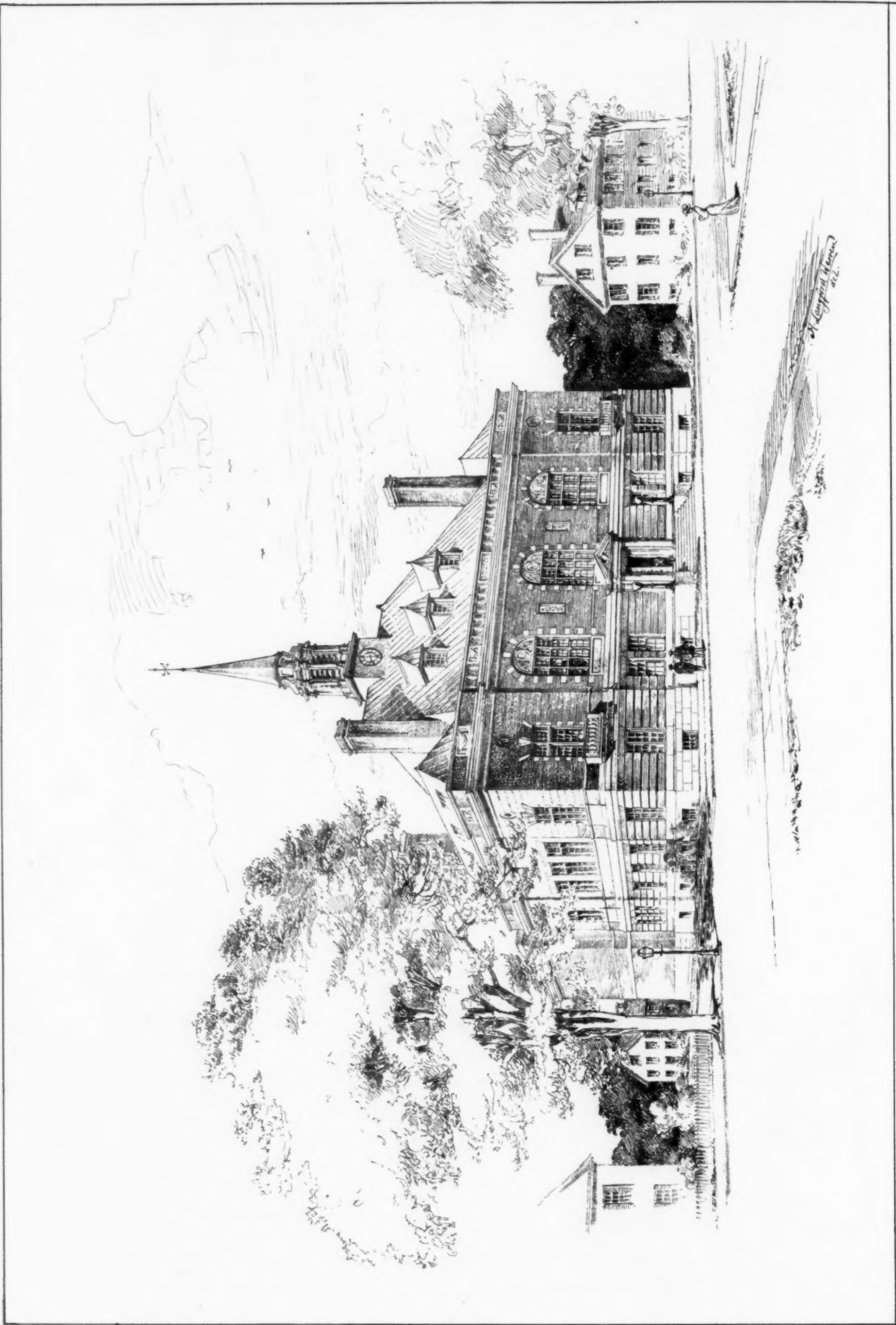
PROMENADENSTEG AM SEE

Architekt: Arthur Fritsche in Dresden.

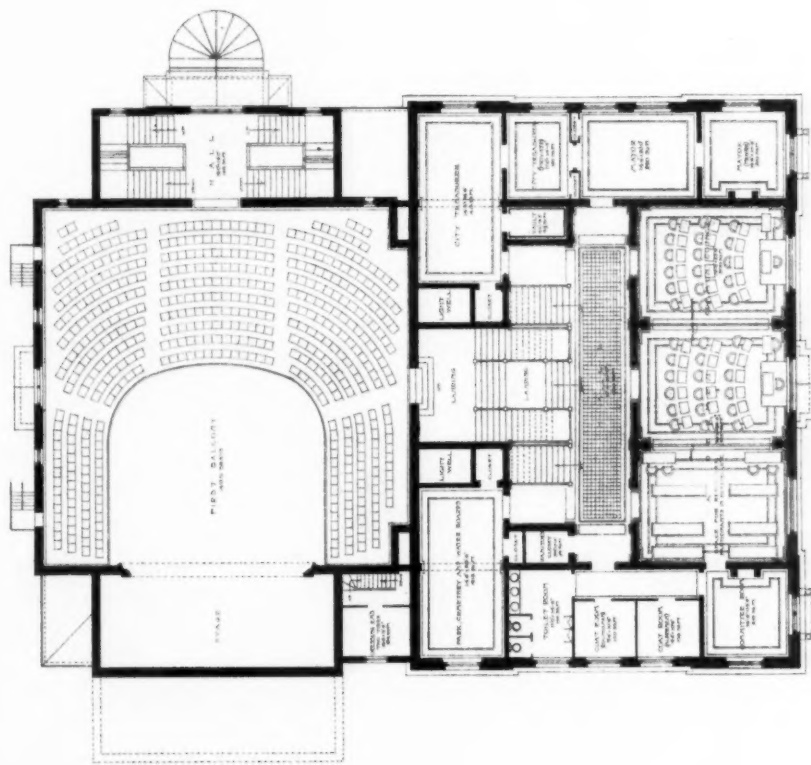
"LOOP-THE-LOOP" ARCHITECTURE.



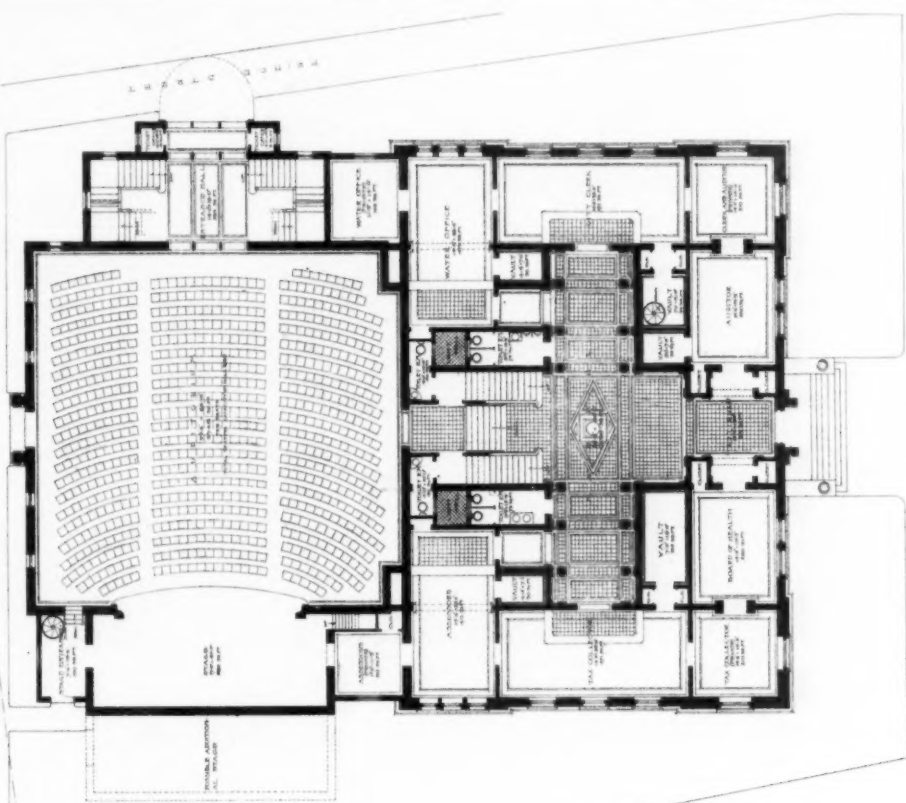
U. S. POST OFFICE, LOCKPORT, N. Y.
JAMES KNOX TAYLOR, SUPERVISING ARCHITECT



CITY HALL, CONCORD, N. H.
SECOND-FLOOR PLAN



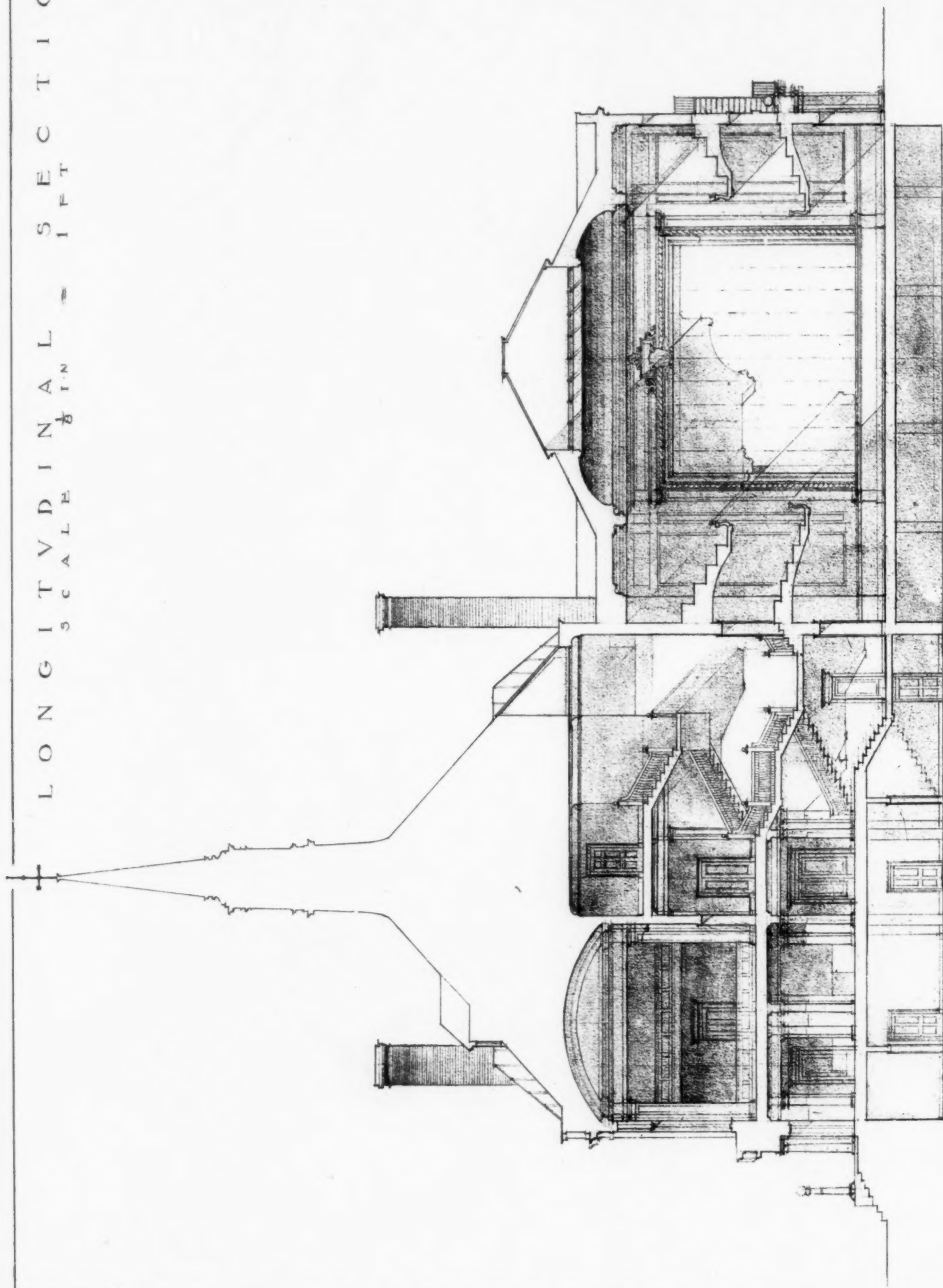
CITY HALL, CONCORD, N. H.
FIRST-FLOOR PLAN

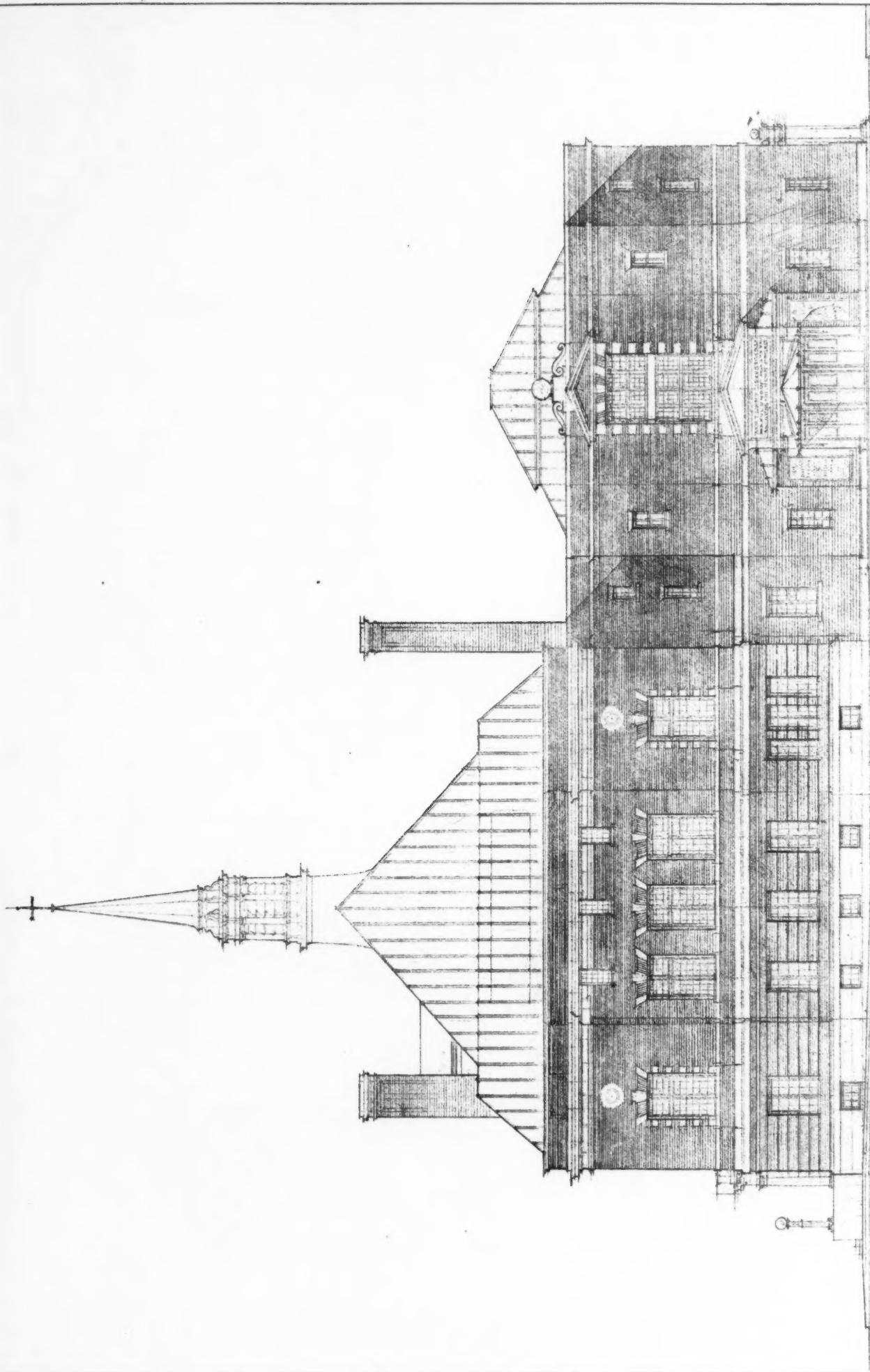


ACCEPTED DESIGN FOR THE CITY HALL, CONCORD, N. H.
WARREN, SMITH & BISCOE, ARCHITECTS.

The American Architect
July 26, 1902.
No. 1387.

LONGITUDINAL SECTION





S I D E E L E V A T I O N

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