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THE bequest by Mr. Jacob S. Rogers of an estate estimated at six million dollars to the Metropolitan Museum of Fine-Arts in New York has aroused a great deal of interest. There may be a question how far it is advantageous to a community to have rich men set the example of passing over their relatives, in favor of public institutions; but family affection cannot be cultivated by force, and if a millionaire does not like his nieces and nephews, he cannot very well be compelled to leave his money to them. If, therefore, the will is sustained, the Metropolitan Museum will come into possession of a vast sum, the income of which, presumably, will be used for adding to its collections. It is hard to realize that the sum available for that purpose is, at present, only four thousand dollars a year, nearly all its collections, valued now at twelve million dollars, having been given to it by individuals. With an invested fund of six millions, it will have an income available for purchases of three or four hundred thousand dollars a year. What it will buy with this remains to be seen, but the judgment which has managed its acquisitions so far may be depended upon for the future.

WE mentioned some time ago that the European iron-workers, whom it has been fashionable to represent as paralyzed by despair at the competition of the Americans, were actively engaged in preparations to meet this competition by new economies in production, one of the most important of which was to be brought about by utilizing the gases from the blast-furnaces for driving engines in and about their works; and *Le Génie Civil* gives an interesting view of the present development of this modification in the ancient processes. Naturally enough, Germany, which is usually first in the application of science to industry, leads in the new improvement, gas-engines, to the amount of nearly forty-five thousand horse-power, being already installed, or in process of construction, to be operated by blast-furnace gases. The little province of Luxembourg, with only two hundred and thirty thousand inhabitants, who seem to make up for the smallness of their number by their inventive enterprise, comes next to Germany, with ninety-eight hundred horse-power; France is third, with ninety-seven hundred, and Belgium fourth, with seventy-six hundred. England, once supreme in all branches of iron-manufacture, is sixth on the list of countries adopting the new system, with only twenty-six hundred horse-power. The United States has no place on the list, although one of our great Pittsburgh establishments is experimenting on an extensive scale with gas-utilization.

THE New York *Evening Post*, speaking of the gift of more than five million dollars, made to the city of New York by Mr. Andrew Carnegie, for the purpose of building public libraries, expresses a wish that the designs for the new buildings, which will cost about eighty thousand dollars each,

might be selected in open competition. As it says, the design for a building of such comparatively small importance, if intrusted to a great and famous office, is likely to be turned over to some draughtsman, while there are plenty of skilful and talented architects, particularly among the younger ones, who would be glad to do their best work in connection with such a structure. We are by no means sure that, even in the most famous offices, small buildings of such interest would be given over to the draughtsmen, but it may at least be said that open competition would be likely to lead to a much greater variety among the designs, at the same time that all the designs would probably be good.

AN interesting insurance case was recently decided by a referee. The Cummer Lumber Company owned a large plant at Jacksonville, Fla., the buildings of which were equipped with automatic sprinklers. The buildings and stock were insured in the Associated Manufacturers' Mutual Fire Insurance Corporation of Brooklyn. In the great frost of February, 1899, the sprinkler-pipes in the Lumber Company's buildings froze and burst, of course making the sprinkler-system useless. The Lumber Company immediately took steps to repair it; but, owing to the great demand for sprinkler workmen, the repairs could not be completed before a fire occurred, destroying the whole plant, and causing a loss of two hundred and fifty thousand dollars. The insurance was only one hundred and fifty thousand, divided among twenty-five companies, all of which paid their part of the damage except the Brooklyn company, and the suit was to enforce its liability. The Company claimed that, owing to the freezing of the sprinklers, the hazard was "increased by means within the knowledge of the insured," which, under the standard policy, makes the contract of insurance void. The Lumber Company held, on the contrary, that the increase of hazard meant by the contract was one voluntarily made or suffered, and not one resulting from unforeseen and unavoidable natural contingencies. The referee agreed with this view, and ordered judgment in favor of the Lumber Company.

IT is not many months since the English *Builder* was grieved, not to say offended, because, in mentioning the fact that German brands of Portland cement had, to a great extent, supplanted the English Portland in the American market, we accounted for it by saying that our engineers and architects found the German Portland cements, of the Dyckerhoff, Star, Alsen and other brands popular here, more uniform and reliable than the English cements, which once had almost a monopoly of this market. The *Builder* endeavored to account for the gradual disuse of English cement here on the theory that the American architects and engineers demanded something in the way of cement cheaper and more worthless than the English brands, and, therefore, went to Germany to find something to suit their taste; but the professional press in this country confirmed our view, with, however, the observation, in which we willingly coincided, that the better class of English cement-manufacturers had begun to make improvements in their processes, and in their product.

NOW, although American Portland cements are so rapidly superseding both the English and the German brands here that the question has no longer much practical importance, some editorial remarks of the *Builder* on the present condition of the cement manufacture in England are not without interest. Summing up a long article, it says, "What is intended to be advocated is that the old principle of trusting to a cement-maker to send good cement is played out, and that, although at times it may be necessary to send cement to some professional testers to confirm a test, as a rule, it is absolutely necessary for any engineer who puts in work with cement, or any user who has to depend on the quality of the cement being right, to keep clear of damages and trouble, and, in fact, every one who is interested in the using and buying of cement, to test it systematically for themselves before they use it." The tests advised are those for fineness of grinding, over or under burning, and improper proportions of lime; and we are told that, unless these are applied, the engineer or contractor is liable to "trouble and cost"; "the loss of money on one such job often having been large enough to pay the entire cost of testing for

a lifetime, even leaving out the fact that the engineer's or contractor's name must necessarily be damaged to a certain extent by his being associated with work that has failed or given trouble through the material not having been of good quality." This is excellent advice, and we commend it to the attention of our readers, only remarking that when we formerly gave the same advice, warning our readers that the only safe course with English Portland cement was to test every barrel, the *Builder* could hardly restrain its indignation, while our observation that the best German cements, when imported in quantity, generally ran so uniform in quality that the testing of every barrel could be dispensed with in ordinary architects' work, was attributed to the American passion for cheapness, irrespective of quality.

IT is rather singular that just now, only about two years after the announcement that the known deposits of mineral oil were nearly exhausted, discoveries are being made on all sides, of new deposits, not only of oil, but of bituminous substances of various kinds, including asphalt, which is now found, not only in Germany, France and Switzerland, but in Sicily and the Danube provinces, as well as in California. The *Deutsche Bauzeitung* gives an interesting description of the asphalt-mines now worked in Europe, the older of which have, in some cases, a curious historical interest. So long ago as the middle of the eighteenth century, asphalt, or stone saturated with mineral pitch, which would melt and burn when put into the fire, was known to exist at Limmer, near the city of Hanover, in Germany. Similar deposits were discovered, not long afterwards, at Vorwohle, near Limmer, and at Lobsann, in Alsace. No use seems to have been made of the material from any of these places, but, at Lobsann, the asphalt-rock contained fragments of lignite, which was found available for evaporating brine at some salt-works in the neighborhood. The salt-works belonged to a certain Baron von Bode, who, desiring, like a prudent man, to control his supply of fuel, bought the land containing the asphalt-rock and the lignite, and began extensive mining-operations. This was in 1788. Five years later, the French Revolution broke out; all men were declared free and equal, and aristocratic privileges were abolished, including the unfortunate Baron von Bode's interest in the Lobsann asphalt-mines, which were confiscated, and leased by Napoleon to private parties. In this case, as in that of the Limmer and Vorwohle mines, the industry soon came into the hands of corporations, but it was not until long after Napoleon's time that the asphalt became an important article of commerce.

ABOUT 1840, the city of Paris, and some other large towns in France, made a trial of melted asphalt-rock, from the French mines of Seyssel, as a material for covering street-pavements. The experiment attracted attention, and very soon afterwards, the officers of the municipality of Hanover gave directions to the professors of the city technical school to examine the material from the mines of Limmer, which had been abandoned, and almost forgotten, to see whether it could be used for street-pavements, in the manner in which the Seyssel asphalt had been tried in Paris. This leisurely investigation was interrupted by the political tumults of 1848, in which barricades of paving-stones were used as fortifications by the discontented mob of nearly all the large cities of the Continent. Napoleon III, a practical man, like his uncle, bethought himself that if the streets of Paris were paved with asphalt, in the manner which had just been tried on a small scale, there would be no paving-stones to make barricades of, and, by his influence, although not with that avowed object, many miles of asphalt-paving were laid throughout Paris. London, Berlin, Marseilles, and other cities followed the example of Paris, and a great demand sprang up for asphalt-rock. Although London and Paris have now substituted wood-blocks for asphalt in the roadways of their principal streets, the demand for the material continues unabated, and fresh deposits are eagerly sought for.

AT present, although the Limmer-Vorwohle mines are extensively worked, those of Pyrimont-Seyssel, on the banks of the Rhone, in the French Department of the Ain, hold the first place in regard to the quality of their product. The rock is a carbonate of lime, containing from six to eight per cent of bitumen, so intimately combined that it cannot be removed, even by long heating. The stone is very uniform, and has a certain toughness, which peculiarly adapts it for

pavements. The Val de Travers, a few miles distant from Neuchâtel, in Switzerland, furnishes a very similar material. Every architect knows the octagonal and circular blocks in which the Seyssel and Val-de-Travers asphalts are sent all over the world. For some purposes, both these asphalts are mixed with mineral pitch, from a mine near Ragusa, in Sicily, owned by the same company as the Pyrimont-Seyssel mines. Lately, other asphalt-mines have been opened in Southern France, at Marvejols, near Grenoble; at Lovagny, and at Mons, in the Department of the Gard; but none of these asphalts are known here.

MR. JOHN DOWNEY, the builder of the Waldorf-Astoria Hotel, the Park Row Syndicate Building, the Home Life Insurance Building, the American Tract Society's Building, and many other of the most important structures of modern New York, died in that city of apoplexy a few days ago, at the age of seventy. Mr. Downey was a native of Ireland, but came to New York many years ago. In the busy times following the close of the Civil War, his capacity and integrity as a mechanic attracted the notice of the Astor family, and he was invited to take charge of the building-operations of the estate. In this responsible position he gained experience and reputation, and others besides the Astors applied to him for his services. The path of the large contractor in New York is not lined with roses, and Mr. Downey, like others, had his troubles with the unions, but his friends and employers, the Astors, stood by him in case of need, and he is reported to have left a large fortune, the fruit of life-long patience, integrity and industry.

THE Paris School of Fine-Arts has a way, which might with advantage be followed here, of holding occasional competitions in which students of architecture, sculpture and painting participate together. Naturally, the architects do not often win medals in these competitions, which have purely artistic subjects, but they frequently obtain mentions or other honors, and, in consequence, are inspired with a feeling of sympathy with artists of a different kind, and with art in general, which is of great use to them. Among us, although we have no such thing as a school of fine-art with a department of architecture, many students of architecture in our technical schools possess great talent for painting or sculpture. It has occasionally happened that such students, after completing their studies in architecture, have become successful painters, and, while the study of thermodynamics and the calculus of probabilities is not essential to the development of the artistic instinct, it does not, at least, prevent it, if other circumstances are favorable to its cultivation. These other favorable circumstances are to be sought for principally in association with other artists, and, perhaps, in a revival of that cultivation of the sympathies which has almost disappeared from our system of education, but among the minor influences which might be of great value would be an occasional joint exhibition or competition among students of architectural schools and schools of pure art. Nearly all our large cities now possess schools of both kinds. In some cases a sort of hazy relation is maintained between them, but it would not be difficult to strengthen this relation, with great advantage on both sides.

A NEW industry seems to have been created, in the shipment of American granite to Scotland and England. The Scotch granite, as every one knows, is of excellent quality, but sells in Glasgow, Aberdeen and Liverpool at what our granite-dealers would call an exorbitant price; and the owners of certain large quarries in Connecticut and Maine have undertaken to ship to Liverpool their material, which is quite equal to that from Scotland, and can, it is said, be sold in Liverpool for less than half the price asked for Scotch blocks of the same size. Considering that nearly the whole of New England is a mass of granite, which is found in a great variety of colors, and, in general, of excellent quality, it seems as if a considerable trade might be built up in it. According to the newspapers, blocks of Scotch granite, measuring over forty cubic feet, bring, in Liverpool, two dollars and a quarter per cubic foot. Sound blocks of equal dimensions, in any color, from the milk-white Randolph to the red or black Maine varieties, could probably be placed on board a steamer in Boston at an actual cost of fifty cents a cubic foot. Transportation and insurance would cost, perhaps, five cents more, and the difference between the total, of fifty-five cents, and what the stone could be sold for in competition with the Scotch product would represent the profit of the operation.

VENTILATION BY ASPIRATION. — I.

IT is certain that there is no systematic and accepted method of ventilating buildings by means of the aspirating-chimney. Much as this well-known motive-power is resorted to in systems of heating and ventilation, especially in school-houses, it has, through what it would seem is an imperfect understanding of the source of its power and mode of action, become obscured in function until it appears to be a sort of rudimentary or merely formal element rather than the main basis of the system to which it gives its name. Nowhere except in mining has the aspirating-chimney been fully studied and its employment made thoroughly practical and satisfactory. Twenty years ago the same statement might have been made regarding the fan. The few rare and satisfactory examples of either, while sufficing to prevent the art from being lost altogether and forming exceptions to the prevailing rule, were yet not of such a character as to have established a principle and compelled its recognition in practice. Fans have been employed in ventilation from the very beginning of the art, yet it must be admitted that previous to about 1878 the employment of the fan in ventilation was merely tentative and sporadic. There have always been engineers and architects who in the selection of an appropriate instrument are influenced more by the mechanical instinct than by a blind devotion to barren precedent, and the fan has been kept alive by their interest in it, although their knowledge was too limited to make it always preëminently successful. Moreover, it is to students of the laws of nature, to engineers and occasionally to an architect, that the art of ventilation owes its position to-day rather than to the heating-men, who, being in trade, have always been handicapped by obsolete methods and by stocks of antiquated materials which had to be sold before room could be found for improvements. The art has perhaps naturally and properly fallen into the hands of the heating-men, but, at the time of which I am speaking, no heating-man could be found who believed in the utility of the fan. The late Robert Briggs, who had the clearest ideas on this subject, and designed some important works involving the fan as the sole motive-power of the ventilation, was yet unable to convert architects and builders generally to his views. He could not, and probably did not care to, combat both classes, and abandoned this important field, soured and disappointed, having lived to see his fans neglected in some cases and in others actually permanently disconnected or removed.

It is easy to understand how a proud nature such as his, conscious of a power based upon the possession of truth and knowledge, must have been chagrined to see his labors scorned, and even his work undone by incompetents and experimenting amateurs. It is a fact that notwithstanding Briggs's remarkably successful efforts the fan was not established during his time as a reliable and valuable instrument in the hands of the heating-trade. It was not until some years later that its acceptance was forced upon them despite the most unreasoning and benighted antagonism; and the extended and general use of the engine-driven fan in America to-day is due, not to the trade, but to the struggles of outsiders going into the business and compelling the heating men to abandon their bigoted opposition and adopt the fan themselves as the legitimate and best instrument for ventilation. On the continent of Europe they have begun to accomplish something also, mainly by imitating American example, but little will be done there for a long time. The situation offers no encouragement. As regards ventilation, the public there may be divided into three classes: those who are uninstructed, those who are indifferent, and those who are both uninstructed and indifferent. In Great Britain there is no sign of progress; all is Egyptian darkness, where people grope about led by any one who pretends to know the way. Especially there the public turns to tinkers who combine religion and philanthropy with their tinkering (see the Robert Boyle publications for proof of the utility of true Christian heroism in promoting business in their line), as was formerly practised here by white-chokered, Quaker-garbed benefactors of the human family, whose memory still lingers with some of us elders. Many of the older architects can, I fancy, conjure up the ghosts of these worthies. In this country this sort of thing has influence now only in the rural districts; the more instructed now expect that those who aspire to be bunco-steerers in their set shall have advanced with them and stand on a relatively higher plane. But it is no use complaining; so long as there are geese there will be foxes to catch them; "Jenkinson" always will outwit his victim, because it is the victim's nature and his expectation to be outwitted. I wish I knew of a remedy for this state of things, but there will be none found, I fear, so long as there is no inducement for men of talent to take up the work, and it is evident enough there is no inducement. The whole matter rests in the hands of the architects; have they ever given, and will they ever give, encouragement to professional specialists? Let every architect answer for himself and consider to what extent his own personal efforts have been given in this direction, or what sacrifices he has personally made to help along this meritorious branch of knowledge. Briggs's career is a good example of a talent full of promise of the greatest good to the community allowed to go to waste, and I think it must be confessed that the architects of America are entirely responsible for the loss.

It is my opinion that the practical adaptation of the aspirating-chimney to schemes of ventilation is as imperfectly understood to-day as was that of the fan twenty years ago. By only a few firms who offer aspirating systems in competition with mechanical systems is the chimney regularly employed, and in many cases these firms win

because the cost of the chimney and its enormous airways is saddled upon the unwitting owner as a part of the general construction, and does not appear as part of the cost of the ventilating-scheme. I think many engineers will agree with me that the employment of the chimney, for example in school-houses, is due more to its cost being concealed in this way than to any merit of its own or any skill shown in its application.

In 1896 the Mayor of the city of Boston, the Hon. Josiah Quincy, appointed a committee to report upon the sanitation of the school-houses and to suggest methods of improvement. While acting as a member of this committee I had occasion to design a system of ventilation for a new four-room school-house where it seemed that the appropriate motive-power would be the aspirating-shaft. Although I had been a practising engineer with extensive experience in heating and ventilating (since 1875, in fact), it happened that I had never yet made use of the aspirating-chimney as the chief active force of a scheme of ventilation, except for temporary service in the Moody and Sankey Tabernacle in Boston in 1878. My early studies had made me an advocate of the fan as a motive-power, while I was the first to show its value as a heating adjunct, and it is certain that no one has done more to establish the fan on a firm basis and to discredit the chimney as a motive-power in ventilation than myself.

During the first ten years of my experience as an engineer, the larger part of my energy was expended in overcoming the then firmly rooted prejudice against fans. None of the younger engineers can have any idea of the amount of work that had to be done to break the influence of this prejudice, and it is but the truth to say that the only thing that did effectively break it was the entire success of fan-installations, economically as well as practically, which were designed by me at this period. Not a single manufacturer of blowers had yet entered the field of heating or ventilating as a specialty, while all the heating-engineers with whom I was acquainted were opposed to fans. In Boston, where the art of heating by low-pressure steam and gravity-return had reached a perfect state of development, the process of heating and ventilating by means of fans had lost all standing, so much so that buildings which, through the influence of Robert Briggs, had been equipped with fans were refitted without them or deprived of them altogether. Thus, the Boston City Hospital had a 12-foot fan which stood idle for twenty years; the fan in the Custom-house was removed; while if an architect was so rash as to call for a fan, pointing to Briggs as authority, he was dissuaded by the heating-engineers, whose want of practical knowledge of the properties of fans made them hesitate to assume any responsibility for results of which its unknown force was to be a factor. Consequently, not one of the well-known houses of Boston engaged in heating and ventilating during the period named was other than an unremitting opponent of the fan, and the same remark applies to New York and all the large centres of the country.

In the Boston Custom-house a fan-system of heating and ventilation had been installed by Robert Briggs, mechanical-engineer. It was entirely successful, but before my time had been removed by Supervising-architect Mullett, under the guidance of Charles W. Newton, heating-engineer. The Massachusetts State-house was provided with a fan by Shedd & Edson, civil engineers, but the system never won approval because there was a lack of harmony in the design; the heating had not been properly combined with the ventilation. The same defect prevented success at the British Museum, at the Danvers Hospital in Massachusetts, the Court-house in Providence, the New York Hospital and the Fifth Avenue Presbyterian Church. None of these examples became types, except of errors to be avoided. The advantages of the fan had been obscured by defects in relatively unimportant details, and the system as a whole condemned through failure of a part.

The Vienna Opera-house alone was entirely successful, and here success was due to the most elaborate provision for the control of temperature. The methods, however, were too crude and at the same time too expensive for general adoption, and they have never been repeated except in the Hofburg Theatre, where Dr. Boehm, the designer of the Opera-house system, had full control. In mechanical execution this apparatus is incomparably superior to anything of its kind in the world, in the presence of which fact one hardly likes to speak of defects, and in truth, these are rather of the nature of an *embarras de richesses* than actual faults. Its defects are diffuseness and elaborateness and a poor arrangement of the heating-surfaces, necessitating the supervision of a graduate engineer with a force of twenty attendants. But, at any rate, the apparatus accomplishes all it was designed to do, and for general excellence of results has never been surpassed. Despite one or two successes like this, the heating-men were able to prove the fact of the failure of the fan in so many cases where it had been ignorantly applied that it had come to be generally mistrusted by architects. It was about 1876, after Briggs had become discouraged and retired from the field, when I entered it with three very great advantages not possessed by him and others who had promoted the fan before me. One of these advantages was my scheme to utilize the exhaust-steam of the fan and pumping-engines under a back-pressure, with a return of the condense-water to the boiler; made possible by the increasing introduction of elevators and their great consumption of steam, along with the discovery of mineral lubricants and their non-corrosive action on boilers; the second was my discovery of the three-fold efficiency of heating-surfaces when exposed to a high velocity of the air; while the third consisted in my proposal to limit the temperature of the fresh air to the standard of comfort, 72 degrees to 75

degrees, by means of a primary or tempering coil, so that no registers in any part of the system need be meddled with in attempts to reduce the heat, the heat-loss through walls and windows being made up by supplementary heaters, direct or indirect, locally controlled.

By the first I was able to show that the power cost nothing; by the second I was able to economize in apparatus, in heating superficies, in size of ducts, etc., and even compete against systems not employing the fan nor offering anything assured in the form of ventilation; by the third, the control of temperature was centralized and the management simplified and made positive. This feature has contributed more than any other element to the success of the fan in ventilation, more, I believe, than the power which the engineer possesses of putting by its aid the air exactly where he wants it, discounting wind, temperature and all other adventitious obstacles common to aspirating systems.

These three important features were new to architects and the heating-trade, and have revolutionized the art of heating and ventilation as applied to large and important buildings. Yet this revolution was far from instantaneous. The inertia of the heating-men and their inability to adapt themselves to changed conditions are well shown in the influence they successfully exerted to prevent the adoption of any of these improvements in recent buildings of such importance as the English High and Latin Schools, the Suffolk County Court-house, in Boston, the Johns Hopkins Hospital, in Baltimore, and the National Library, in Washington, except partially in the latter, where exhaust-steam was utilized.

As Tomlinson says, such "historical details are curious and interesting, as marking the slow growth of real improvement, and the difficulty men have in grasping a new idea if a change of habit is involved in its acceptance."

FREDERICK TUDOR.

(To be continued.)

CLOCKS, CARILLONS, AND BELLS.¹—II.

AUTOMATIC RINGING MACHINES.

IN addition to our regular carillon machinery we have lately made several automatic ringing machines for playing changes on bells, by mechanical means, similar to a band of ringers. I will show you one of these on the screen, and also illustrate its action by means of the working model. It is a convenient form of calling to service where any difficulty exists about ringers, although it has not the same sonorous effect that eight pairs of lusty arms, tugging at the ropes, would produce. It will ring for about twenty minutes with once winding.

BELLS.

There would appear to be a halo of romance surrounding bells and their origin which would render almost anything one might say on the subject interesting. The industry of bell-founding is, without doubt, a very ancient one. I venture to suggest that the cymbals of old were, in reality, bells cast in a flat form, instead of the one we are accustomed to. Even at the present time there exist, in this country, bells cast in the year 1300. A bell, it seems to me, gives wonderful value for money. I do not know of any other article that is as good as new after 600 years' wear, and even if a bell becomes cracked it is still worth two-thirds its original value, since it can be broken up and recast, the metal itself being the chief cost. The value of a clock lies in the labor of making it, the value of a bell is principally in its material. All bells are, or should be, made of the same alloy. This is about four parts of copper to one of tin. No other metal than this is used. If you attempt to vary that rule or depart from it you will be unsuccessful. For the purposes of demonstration in connection with this paper, I had a bell cast of four parts of tin to one of copper, but it cracked in the cooling. I have had another one cast, however, and you will be able to judge it by the side of the small peal before you, which has been cast for this occasion. This peal is a counterpart of an ordinary ring of bells in a church-tower, and is made of the same metals, and in the same relative proportions as regards shape and thickness.

My object in exhibiting them is to demonstrate that bells, in order to be musical and tuneful, need not necessarily be large and costly. These eight bells only weigh 10 cwt. altogether. They are not suitable for public buildings or towers of any size, but I should have no hesitation in putting them up at private residences, where the punctuation of time is all that is desired, or in public parks.

In this connection I may say, however, that ridiculously small bells have been put up from time to time by foreign firms in this country, notably at Aberdeen and Boston, and in both instances have been attended by failure. At Aberdeen, the smallest bell weighs only 37 pounds, and this in a lofty tower with thick walls, and surrounded by busy traffic! Out of a peal of 36 bells, 24 are absolutely useless, and have been the cause of much heart-burnings and controversy during the past decade; £3,000 worth of bells lying idle (or were, when I was last there) is a source of real trouble in the Granite City, which has been turned into a city of woe, so far as its campanology is concerned, and one very wroth with those who led it into such an unfortunate outlay. After this I do not think we shall see many more foreign peals erected in this country, especially as the makers charge twice as much as English founders. This small bell formed one of a Belgian peal of 36 bells, which hung for 20 years silent in

Boston tower, until we took them down lately, broke them up, and re-cast them into three respectable bells, to be incorporated as semi-tones with the original English peal in the tower below, with which they are now used.

Next to the alloy of the bell, its diameter, shape and mould require close attention. We show you here a mould of a bell about to be cast. First of all, we start with the theory confirmed by practice, that a bell of a given weight must also be of a given diameter and thickness. For example—a ton bell should be 4 feet diameter at the mouth, and 3½ inches thick at the sound-bow, whilst a 1 cwt. bell should be 18 inches diameter and 1½ inches thick. There is no getting away from this rule, if you wish your casting to turn out a success. The same principle applies to all bells of various sizes. The heavier the bell, the larger and thicker it becomes, the lighter, the smaller and thinner. You see before you a full-size tracing of the great hour-bell we have lately cast and erected at Toronto. This bell weighs 5 tons 7 cwt., is 6 feet 8 inches in diameter, 5 feet 9 inches high, and 6½ inches thick at the sound-bow. You will notice that it is not of uniform thickness. No bell can be of a pleasant sound, unless its thickness varies. A bell is thickest at the sound-bow where it is struck, then it tapers upwards to one-third of this thickness. If a bell were of a uniform thickness right through, it would sound dull and dead, and be bereft of that timbre and resonance which is desirable.

Here is a tracing of a Chinese bell which came into our possession some years ago. Its only virtue lay in its outer adornments—its tone was execrable, because the principles of mould, shape, varying thickness, etc., had not been followed, although the metal was the same as we use.

Another point to be guarded against in the casting of bells is "sponginess." This arises from two causes, viz, the mould not being dry, or the metal not being hot enough. Sponginess (that is, small holes in the bell), is an element of weakness, as when a bell becomes cracked, it is often found when broken up that this has been the cause.

When a bell becomes cracked through the wear and tear of centuries, it can be recast into a new one at a comparatively small expense, as it is the metal which is the principal factor in its original cost.

When old bells are recast, it is usual to take a rubbing of any inscription on them and reproduce it on the new bell. There is a general belief that old bells contain a quantity of silver. If they do, I am sorry to say none of them ever came our way. In breaking up old bells we have invariably found what we ourselves use at the present day, copper and tin, and in much the same proportions.

I will now explain briefly the method of bell-casting. We take the mould, which has previously been built up on an iron plate, and lower it into a pit already dug in the ground, of a sufficient height to envelop the bell. This mould is called the "core," and has been built up of bricks and loam and dried hard in an oven. The "core" being now placed below the level of the base of the furnace, the case, which has been built-up and baked in a similar manner, is then placed over it like a glove, but leaving a vacuum space between the two, of the prescribed thickness of the bell.

Any inscription to be cast on has already been impressed on the loam of the case so as to form part of the metal when run. The alloy having previously been mixed in the proportions already referred to, and being now reduced to liquefaction as the result of being in the furnace some hours, the furnace is tapped, the molten metal, finding an outlet, rushes down an inclined conduit into the crown of the mould, and in a very few minutes the vacuum is filled and the whole—core, case, and bell—are allowed to remain in the ground for a day or two to cool. A 5-cwt. bell could be dug out the next day. A ton bell would remain too hot to touch for two or three days. The process of casting is but the consummation of days and weeks of preparation. It takes five minutes to run about £1,000 worth of bell-metal.

The tuning of a peal of bells is a delicate business. So long as bells are used singly it does not matter much what note they turn out, but where bells are required to act in concert with each other then the question of tuning them to harmonize has to be taken into account. I will show you on the screen a bell in the act of being tuned. The bell is fixed mouth upwards and held firmly in the grip of powerful vices. Having taken a plumb of the centre we adjust our steel-cutter to the sound-bow of the bell, and proceed to pare off the metal at its thickest part. This is how a sharp bell is flattened in tone and it can be done without detriment to the bell up to half or even three-quarters of a note. If you keep on turning it out the bell would become thin and "panny" in sound.

To sharpen a flat bell is not so easy; indeed we seldom attempt it, preferring rather to take the bell into stock, or even to recast it, than to waste time over what generally results in failure. There is a theory extant that a flat bell can be sharpened by reducing its diameter. I believe the note of a flat bell can be slightly sharpened in this way, but we have also found that the application of this principle prejudicially affects the tone of the bell—hence we generally contrive to cast our bells sharp, so that they can be easily flattened, if necessary, to the required note. Sometimes they come out exactly right, and that is the best form of "tuning."

The same bells may be used in a variety of ways. They may be (1) rung in peal by a band of ringers; and also (2) chimed upon externally by a clock; and (3) chimed upon by a carillon machine; and lastly (4) struck by a hammer pulled by hand. Each bell may

¹A paper by A. A. Johnston, read at a meeting of the Society of Arts, and published in the *Journal of the Society*. Continued from No. 1334, page 21.

thus be requisitioned in four distinct ways, neither method interfering with the others. It is not, of course, possible to put these various practices into use simultaneously.

When a bell gets worn in one place through the tongue striking there for generations, it becomes weak in that particular spot and runs the risk of cracking in consequence. What should then be done is to quarter turn it round in its pit so that a fresh substance is presented to the clapper as the bell swings. In determining the weight of bells to be erected in a given building, attention should be paid to internal measurement of tower, thickness of walls, elevation of belfry, and conditions of traffic. Bells should be proportionate to the tower; large bells for large towers, small ones for small towers. Another not unimportant factor in deciding as to the calibre of bells is the question of funds at disposal. We are sometimes requested to provide a 1-cwt. bell of a rich, mellow tone. Unfortunately it cannot be done; there is not enough financial inducement to make it rich, although there is no reason why it should not be a clear, full tone and pleasant to the ear.

The last specimen I have to present to you to-night is a hemispherical bell. Some call them cup bells. It is of the same composition as the others, but different in shape, and of an almost uniform thickness. It is not a species of bell we recommend, and you will probably confirm this when you hear it. The only point in favor of hemispherical bells is their deeper tone, as they are so much thinner, but they have no clear, defined note, the same as an ordinary bell, and for this reason we do not advise their adoption.

I would like to have touched upon such interesting matters as the mechanical clock of Strasburg Cathedral, and that mammoth bell at Moscow, weighing 220 tons, which has been the wonder of the age for two centuries. Time does not permit me, however, to refer to works which have not come under our own knowledge, and I have, therefore, only endeavored to carry out what I foreshadowed at the beginning, namely, an application of the questions raised to the age in which we live.

DISCUSSION.

THE CHAIRMAN said: The only really modern development of Mr. Johnston's business was in the construction of carillons, but he frankly confessed that the mechanical-carillon did not appeal to him at all. There was a remarkable difference in the sounds obtained from the bells played by hand and those played by the ingenious piece of mechanism exhibited by Mr. Johnston; the hand-played bells being much more musical. He believed he was right in saying that the reason Big Ben cracked was because its talented designer, Sir Edmund Beckett, now Lord Grimthorpe, wanted to obtain so fine a tone that he put an inordinate amount of tin into the bell, practically making it of speculum metal, an extremely brittle alloy, the result being that Big Ben was not struck by its clapper many times before it cracked. Sir Frederick Bramwell had told him how he located the crack. Eight men were placed round the bell and carefully watched its circumference; the sound-bow was wetted all round, and then the rim of the bell was struck. A minute row of tiny bubbles came out, and at once indicated the location of the crack. That was an ingenious method, not very unlike the way in which bicyclists localized punctures in pneumatic tyres. Sir Frederick Bramwell had told him that the idea suggested itself to him by the way in which cracks in locomotive crank-axes were found out. The crank when working was well lubricated with oil, any cracks and interstices being full of oil. In localizing the crack, the crank was hit on its end with a monkey, the outline of the crack then being indicated by a tiny outflow of dirty oil. He thought it was probable that there was a good deal of silver in old bells because silver was generally found in company with tin and copper, and in old days the more recent processes for taking out the silver were not employed. It was a little curious that one should be able to tell the time on a clock-face without figures. When Lord Grimthorpe, who erected the first clock of that kind in Lincoln's Inn, suggested that the numbers should be abolished, and dots or lines inserted in their place, people said it was utterly impossible. The fact was that out of every hundred people who took the time from Lincoln's Inn clock not 1 per cent knew that the figures were not there.

MR. S. B. GOSLIN said that the louvers in church-towers were sometimes put so close together that the sound of the bells could not get out of the tower. In designing towers, architects, unfortunately, very often forgot such details. He doubted very much whether the present Big Ben was broken in consequence of the metal being too "high"; he rather thought it was broken, as the first one was broken, by the force of the blow being too great for the bell. The first bell, which was something like 16 feet in diameter, was never raised up the tower, an opening of only 13 feet having been allowed. He hoped the paper would be the means of bringing the subject before the minds of architects, who so often forgot to provide for raising the bell in the tower. When one compared the old-fashioned machinery used in the clock in Cripplegate or Antwerp with that now made by Mr. Johnston's firm, he thought it must be admitted that England was far in advance of other nations in that particular respect, English machines being excellent. However, no beating of bells hanging dead could ever compare with the ringing of bells when they were turned mouth upwards by a band of ringers. The ringing-machine would be useful, particularly in the Colonies, where men could not be obtained to chime the bells. It was not surprising that Mr. Johnston could not break the tin bell he had shown them, be-

cause it was full of soft metal. It was impossible to get the sound out of a tin bell which could be obtained from one made of copper and a little tin. Mr. Johnston had shown an improved shape of bell, founded upon the researches of Lord Grimthorpe, who had thoroughly inquired into the subject of the best form and thickness of bells, and had improved the sound and form of English bells by the rules he laid down. American bells were a little different in form, being narrower at the head, but such bells did not give so good a sound as those with a properly-proportioned English head. The casting of some of the bells made abroad was far better than the English in finish and ornamentation. In connection with tuning, Mr. Johnston had said it was not wise to sharpen a bell, but he did not think anything could be said against sharpening a bell to a small extent. It was far easier to tune large bells than small ones, the difficulty being that immediately the bell was cut and made thinner at the sound-bow the proportions of the upper part of the bell were thrown out. The stipulation should be made in buying bells that they were to be cast in tune and not cut afterwards. The large bells at Westminster and St. Paul's were very porous. Mr. Johnston had said that porosity was due to the mould being damp or the metal being poured in too cold. He agreed with the first statement, but not with the second. The metal became rotten if it was exposed in the furnace too long. Tin was of a lighter specific gravity than copper, and floated to the top of the furnace or pot, thus being liable to evaporate, with the result that the proper proportion of metal was not obtained, and the bell became porous. He would not advocate the use of tubes in place of bells. He thought that anybody hearing the "hooters" and "sirens" in Manchester would be inclined to put their fingers in their ears and run away.

MR. R. A. DANIEL thought the difficulties experienced with louvers were due to the towers being designed by people who knew absolutely nothing about bells. They were very often so constructed that the sound, instead of being diffused, was showered on the heads of people immediately below the tower. There was no doubt that silver was a component of the metal of many bells, but it did not affect the sound. It would be interesting to know the age of the St. Clement Danes chiming-machine, which, he believed, took a quarter of an hour to wind up. The clock also struck the hour twice, first on the tenor and then on the treble. He believed a similar arrangement existed at Trinity College, Cambridge. The old bells were as good as the new, but at the same time, while many of the old bells could not be improved upon, modern makers were now supplying very homogeneous peals.

MR. A. A. JOHNSTON, in reply, said he did not think bells could be dispensed with in favor of the hooter in villages where people had to walk for miles to church on a Sunday. He was too prejudiced to give an opinion as to whether the hooter or siren would take the place of bells, his prejudice not being in favor of the hooter. The drawback to an electric-motor controlling the time was that one was never safe with electricity or electric-motors. He quite agreed with Mr. Goslin's remarks on the subject of louvers. He knew of a building in a provincial city which was completed before a thought was given to the erection of a clock and bells, £200 having eventually to be spent in alterations. He had always understood that Big Ben was broken by the heaviness of the clock-hammer, and that rather than go to the expense of lowering the bell, recasting it, and hoisting it again, the crack was sawn out. A hammer only weighing half the original weight was now being used. If a bell was cracked in only one part the defect could be sawn out without, of course, restoring the strength of the bell and its resistance to the blow of the hammer. The ringing-machine was a substitute for ringers, and was principally intended for service in villages where men were scarce or there was a difficulty in obtaining an efficient band of men to apply themselves to the ringing of the bells. There was very great difficulty in tuning small bells, much more so than in bells ten times their size, on account of their sensitiveness. The two small peals of bells mentioned by Colonel Cunningham were made of exactly the same alloys and from the same patterns. If one set sounded better than the other it was because he had manipulated the bells in order to catch the ear. Ornamentation and inscriptions on a bell did not affect its tone in the slightest. Unless louvers were made at a certain angle and overlapped wet got in. He should recommend architects to have no louvers at all, because the more bells were washed the better they liked it, wet doing them no harm. If good full-toned bells were required no louvers should be put in. Bells peeping out of a turret were certainly an adornment. If louvers were put in they must be made at a certain angle in order to throw the sound down in the direction required. The only silver bells he had seen had simply been dipped in silver. He could not say whether sound would be improved by the addition of silver. The chiming-machine of St. Clement Danes' clock was about two hundred years old. The clock first of all struck on the tenor bell, and then repeated the hour, not on the treble bell, but on a small bell in the very top of the tower, about 20 feet above the peal. If old bells were not so good in tone as modern bells the fault lay not in the alloy but in the make and shape of the bell.

CARNEGIE'S GIFTS TO LIBRARIES.—At a session of the American Library Association, the report of gifts and bequests was made, a notable fact mentioned being that Andrew Carnegie had given in the last year \$11,219,500 to libraries and library work.—*Exchange*.

PERSPECTIVE PROBLEMS.¹—II.

II.—THE PERSPECTIVE OF CONCENTRIC CIRCLES.

CONCENTRIC circles so frequently occur, both in decoration and in architectural construction, that it is worth while to consider what happens when they are put into perspective. They obviously must all have the same *Pole*, which is the perspective of their common centre, and the same *Polar Line*, which is the horizon of the plane in which they lie. But each ellipse will have its own centre and axes. These, however, must have some geometrical relations with each other, and it is well to inquire what these are and whether they may not be serviceable ones.

Let us, as before, take the case of circles lying in a horizontal plane and lying directly in front of the spectator so that the ellipses are circumscribed by symmetrical trapezoids. Figure 11 shows six such circles in plan, and Figure 12 shows how three of them look in perspective.

These figures illustrate the following geometrical relations:—

It appears from Figure 11 that visual rays drawn through the station-point *S*, tangent to the concentric circles, determine the length of the chords $d^1 d^1$, $d^2 d^2$, $d^3 d^3$, etc., which appear in perspective as the major axes of the successive ellipses. As these rays make right angles with the radii of the circles at the points of tangency, the locus of these points is necessarily an auxiliary circle, whose diameter is the distance *S* *c*, the distance from the station-point to their common centre. The lines *R*^o and *L*^o drawn from the station-point at an angle of 45°, right and left, cut this circle at the extremities of the longest of these chords. This chord, $d^4 d^4$, is a diameter

of the ends of these major axes. If the parabola is constructed the length of all these major axes is thereby determined.

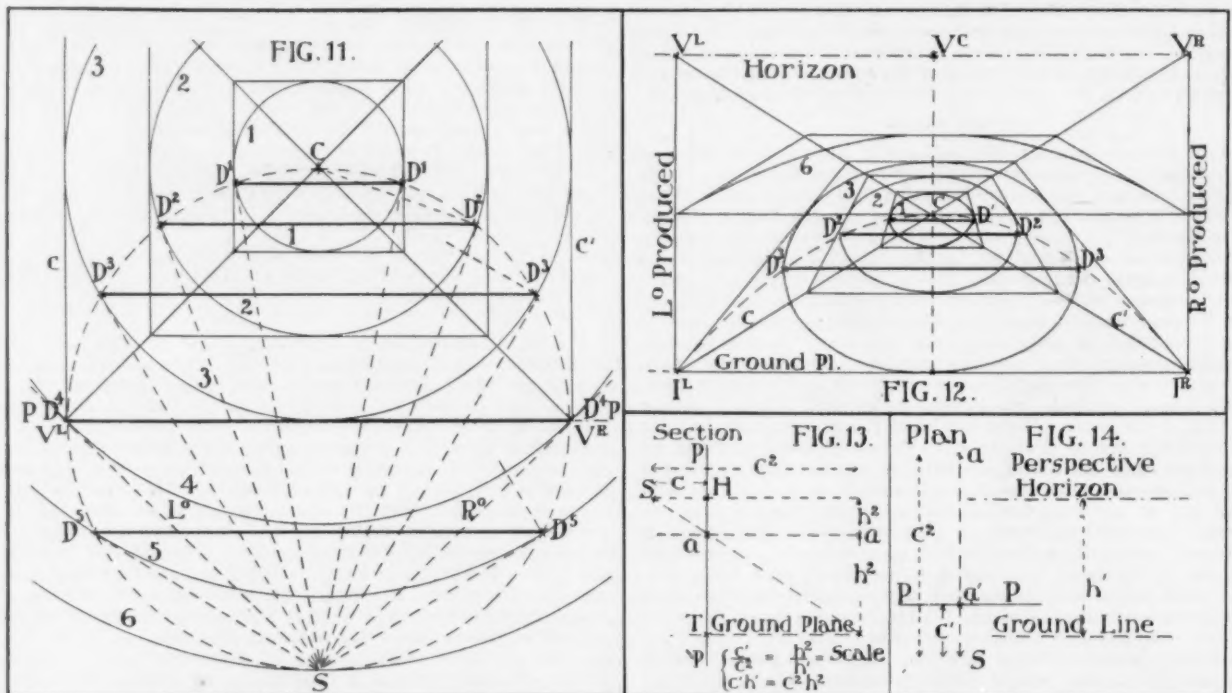
This parabola has its vertex at the *Pole* *c*, which is the perspective of the centre of the concentric circles, and is the point where the diagonals common to the circumscribing trapezoids meet. This point, as has been seen, comes half-way between the horizon and the ground-line.

The vertex being thus given, and also a point on the parabola and the tangent at that point, the parabola is easily constructed, since the distance from the vertex to the directrix on one side, and to the focus on the other, is twice the length of the Sub-normal.

If the successive ellipses are circumscribed by oblique trapezoids or by trapeziums, the problem they present can be solved by means of symmetrical trapezoids, as is done in Figures 6 and 7.

It is interesting to notice that circle No. 6, which, like the auxiliary circle, comes forward as far as the station-point, also has a parabola for its perspective. As this circle is twice as large as the other, its farthest point is twice as far from the station-point as is the centre *c*, or four times as far away as is the plane of the picture. Its perspective, then, which is the vertex of this parabola, is a quarter of the way down from the horizon to the ground-line, or half-way to the point *c*.

Note 1, Position.—² Figures 13 and 14 illustrate the proposition that the perspective of a point lying in a plane divides the normal distance between the horizon and the trace (or ground-line) of the plane, in the same ratio that the plane of the picture divides the normal distance between the station-point and the given point;



of the auxiliary circle and lies half-way between the station-point and the centre of the concentric circles.

If, for convenience, the plane of the picture *PP* is taken at this point, this chord or diameter, $d^4 d^4$, will lie in the plane of the picture and will coincide with the ground-line, or trace, of the horizontal plane, as appears in Figure 12. The squares that enclose the concentric circles will all have the same diagonals, whose initial points *I*^L and *I*^R in the plane of the picture will be the extremities of this diameter. In the perspective, Figure 12, this diameter is seen to lie in the ground-line, while the vanishing points of the diagonals *R* and *L* are at *V*^R and *V*^L, where the lines *R*^o and *L*^o, Figure 11, drawn parallel to them through *S* pierce the plane of the picture. These lines if produced beyond the plane of the picture appear as vertical lines in the perspective (as lines radiating from a point just above or below the station-point always do) and join *I*^L to *V*^L, *I*^R to *V*^R. The normal lines *C* and *C'*, tangent to the auxiliary circle at these same points, are the sides of one of the circumscribing squares, and, like the sides of the other squares, have their perspectives directed towards *V*^C, the centre of the picture and vanishing-point of lines normal to it. The point *c*, the perspective of the common centre of the concentric circles, is half-way between the ground-line and the horizon, since the plane of the picture is half-way between the station-point and the centre (see Fig. 13, note).

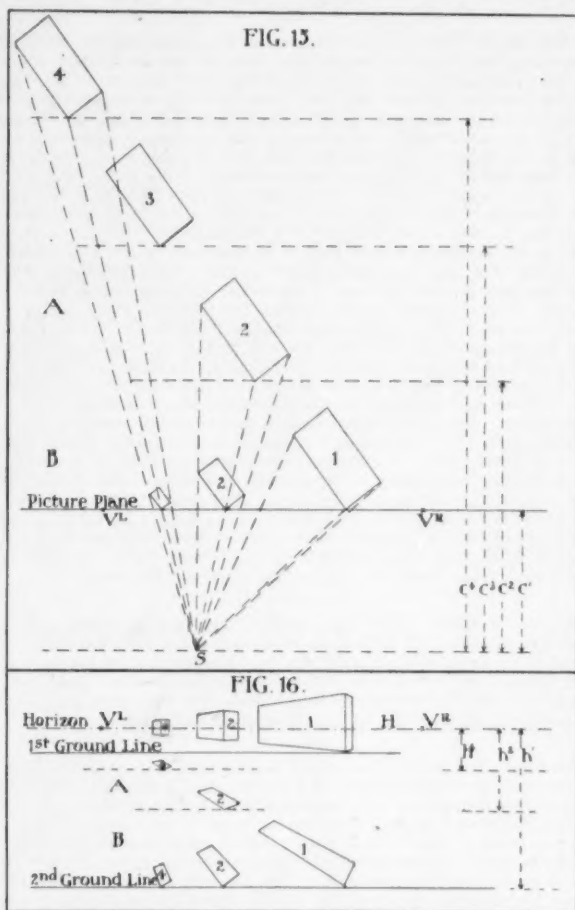
The auxiliary circle, since it extends to the station-point, appears in perspective as a parabola, the plane of the picture cutting the cone of visual rays parallel to one side of the cone. Since the circle itself is the locus of the ends of the chords which in perspective are the major axes of the successive ellipses, the parabola is the locus

that is to say $c^1 : c^2 = h^1 : h^2$ as shown in the figures, in which the distances c^1 and h^1 are determined by the positions of the station-point, the plane of the picture and the plane in which the given point lies, and c^2 and h^2 by the position of the point in that plane. It makes no difference, as may easily be proved, whether the given plane is horizontal or inclined. The second equation $c^1 h^1 = c^2 h^2$ shows that these rectangles are equal, and that c^1 and h^1 being given, c^2 and h^2 are reciprocally proportional. This is merely saying that the farther an object is removed the nearer is its perspective to the horizon of the plane in which it lies. So, also, the nearer the plane of the picture is to the station-point, the nearer the perspective will be to the horizon. Hence, if a given point is twice as far away as is the plane of the picture (i. e., if the picture is half-way to the point) its perspective will come half-way between the horizon and the ground-line, as does the point *c* in Figure 12. If it is three or four times as far away, the perspective will cover a third or a fourth of the distance from the horizon to the ground-line. It is to be noted that the nearer dimension in the plan and section is proportional to the more remote dimension in the perspective, and vice versa. This makes it practicable to locate a point on a normal line, if the distance of the spectator from the picture is known, without the aid of points of distance. This may be of practical convenience when the point in question is many times as far away as is the picture.

Note 2, Scale.—The ratio between the distance of the picture from the spectator and the distance of the object represented expresses also the scale at which its perspective is drawn. By this is meant the scale at which some given line in the object, parallel to the plane of the picture, is represented in that plane. The line taken is generally the nearest vertical line; if such a line is two, three or

¹ Continued from No. 1333, page 12.

four times as far away as the picture, it is drawn at a half, a third, or a quarter, of its real size. If it is ninety-six times as far away it is drawn to the scale of an eighth of an inch to the foot, and if it is one hundred and ninety-two times as far away as the picture, at the scale of one-sixteenth. The perspective of a building or other large object situated a great way off is made, however, not, of course, from



a full-sized drawing set at that distance, but from a drawing made at a reduced scale, representing a model of the object, set near or in contact with the plane of the picture. In that case the ratio between the distance of the picture and the distance of the object determines the scale at which the model, or the drawing, is to be constructed. An object, or a model, thus in contact with the plane of the picture, will be drawn at its real size. If there are several objects to be shown, situated at different distances, they may be shown in plan by models, or drawings, all made to the same scale and placed at corresponding distances. But it is generally more convenient to make the perspectives from models of these models, drawn to a correspondingly smaller scale and set in contact with the plane of the picture. Both procedures are illustrated in Figures 15 and 16. Paralleloiped No. 2 is twice as far away as No. 1, No. 3 three times, and No. 4 four times. These are shown in plan at A, Figure 15, and their perspective plans at B, Figure 16. The distances h^1 , h^2 and h^4 , by which these perspectives are separated from the horizon, are inversely proportional to the distances c^1 , c^2 and c^4 , between the objects and the spectator, as shown in Figure 15. The models of No. 2 and No. 4, shown at B, in contact with the picture are half and quarter as large as that of No. 1, but their perspective plans shown at Figure 16 B are of the same size as the perspective plans at A, and serve equally well to determine the size of the perspectives.

W. R. WARE.



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

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

HOUSE FOR W. BRUCE CLARKE, ESQ., NO. 51 HARLEY ST., LONDON, W., ENG.

This plate is copied from the *Architect*.

[Additional illustrations in the International Edition.]

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STAIRCASE-HALL IN SAME HOUSE.

POWER-HOUSE ON THE FARM OF HOWARD WILLETS, ESQ., WHITE PLAINS, N. Y.



[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.]

FREEDOM TO WORK.

ST. LOUIS, Mo., July 17, 1901.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—In your editorial (July 13) on the strike of the steel-workers you apply the word "free" to the non-union mills, and the impression conveyed is that the strikers seek to compel the employment of union labor only.

The demand of the strikers, as set forth in late dispatches, is that the non-union mills shall abrogate the present rule, which forbids their men to join the union. It would, therefore, appear that the non-union mills have been the reverse of free. At least it is not the brand of freedom for which we New Englanders have always contended.

Yours truly,

OBSERVER.

A COLONIAL FIREPROOFING DEVICE.

PHILADELPHIA, Pa., July 17, 1901.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—A short time since, while surveying an old farmhouse in Delaware County, Pa., it was discovered that the upper [attic] floor was laid with rough boards upon which was about an inch of good, strong mortar. Inquiry elicited the fact that this was a common practice in former times in this locality, for protection against fire, and that, in one instance that my informant cited, this "protection" actually did save the house when the roof burned off.

The walls of the house above noted are of stone, and extend 18 inches above the upper floor. The building is about a century old, and, aside from being somewhat dilapidated, has been little changed.

The writer cannot recall having seen, under like conditions, any similar protection against the results of a burning roof, and thought that, possibly, it might be novel to many of your readers.

Very truly yours,

CHARLES L. HILLMAN.

ST. PETERSBURG BRIDGE COMPETITIONS.

ST. PETERSBURG, RUSSIA, June 22 (July 5), 1901.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—There is something of interest to the readers of your valuable periodical in the competition to be opened up by the Municipal Board of St. Petersburg, for the construction of two bridges on the main river, the Great Neva. At their meeting of June 20 (July 3, new style), the Municipal Board of this city have arrived at the decision, as we learn from the local newspaper, *Novoe Wremia*, June 21 (July 4), No. 9085, to have a competition opened up for the construction of two new bridges, the one being the Palace

Bridge; the other, the Ochta Bridge. Both should be competed for by the intending designers within a year's run—from September 1 (14), 1901, till September 1 (14), 1902—both to be of stone and iron, and the Palace Bridge, which is to be in front of the Winter Palace of H. I. M. the Emperor, is expected to be a piece of art and taste (hence the appropriation of 3,500,000 rubles, viz, \$1,750,000 for its construction). It must be an arch-system bridge of three spans, the length being 121 sagan (847 feet); the width, 13 sagan (91 feet). There will be three prizes delivered for the best designs, i. e., 12,000 rubles (\$6,000); 8,000 rubles (\$4,000); and 5,000 rubles (\$2,500), an appropriation of 6,000 rubles having been made for the advertisements of the forthcoming competition. There will, likewise, be prizes given for the best designs of the projected Ochta Bridge. It goes without saying that all the projects rewarded will entitle their respective authors to no further claim whatever, the Municipal Board preserving the right of giving the contract away to whoever will prove the cheapest bidder, and foreign competitors being admitted on equal terms.

American parties should do well in availing themselves of the opportunity to display their designing and building facilities. It is a good job, worth while taking, in spite of the long distance. Particulars, comprising technical details, facts relative to local conditions, etc., may be had on application to the Technical Department of the Municipal Board, City Hall.

Very truly, ALFRED F. BENDER, C. E.



A GERMAN ART EXPERIMENT.—According to a correspondent of the *Standard*, the Grand Duke Ernst Ludwig of Hesse has achieved a unique position among German sovereigns as a promoter of art. Unlike some of his contemporaries, who appear to regard art mainly as a means for the glorification of their dynasty, this young ruler is employing his patronage and wealth, without any thought of self, in the effort to crystallize some of the leading tendencies of the period into a distinctively German style. It is in the so-called Secessionist School that he finds the promise of his faith, and in the departments of applied art that he seeks its realization. Penetrated by the conviction that a favorable environment free from worldly care, is essential to the full development of the artistic nature, the Grand Duke determined two years ago to found in the city of Darmstadt a colony of artists who should be at liberty, under his aegis, to create untroubled by the demands of the market. He accordingly selected, chiefly from Munich and Vienna, five young artists distinguished by their performances in the industrial arts. For their use he reserved the "Mathildenhöhe," near the Grecian chapel erected for the use of the Russian Emperor and Empress. From this hill, which is situated on the northern periphery of the city magnificent prospects may be commanded of the Odenwald; and there in the course of the past two years the artists have been busily engaged, at the expense of their royal patron, in the delightful task of carrying into actual fulfilment their individual ideals in the way of ateliers and dwelling-houses. The results of the experiment have now been thrown open to the inspection of the public, in the hope that people may be inspired to construct their own homes on similar German lines. The exhibition bears the title "A Document of German Art." The claim contained in this title is justified by the fact that none of the houses contain a single article of foreign origin. Down to the smallest details, such as cups and saucers, spoons and door-handles, these homes have been constructed in accordance with the personal directions of their artist-owners.

ELEVATORS NOT COMMON CARRIERS.—According to a ruling of the Massachusetts Supreme Court, one who maintains a passenger-elevator in an office-building is not a common carrier. The decision is erudite as well as interesting. "The modern liability of common carriers of goods," said the Court, "is a resultant of the two long-accepted doctrines that bailies were answerable for the loss of goods in their charge, although happening without their fault, unless it was due to the public enemy, and that those exercising a common calling were bound to exercise it on demand, and to show skill in their calling. Both doctrines have disappeared, although they have left this hybrid descendant. The law of common carriers of passengers, so far as peculiar to them, is a brother of the half-blood. It also goes back to the old principles concerning common callings. Carriers not exercising a common calling as such are not common carriers, whatever their liabilities may be. But the defendant did not exercise the common calling of a carrier, as sufficiently appears from the fact that he might have shut the elevator-door in the plaintiff's face, and arbitrarily have refused to carry him without incurring any liability to him."—*Exchange*.

SAN FRANCISCO'S OIL-SPRINKLED DRIVEWAYS.—There are advantages and disadvantages in oil-sprinkled roads, according to the experience of the Park Commissioners in San Francisco. The dust is certainly laid, and driving in the parks where the roadways have been thus treated is freed from the discomfort of dirt in the eyes and lungs of drivers and horses, while the foliage and grass along the highways is as green as if daily rain-washed. Complaints of the horse-owners are confined to the injury done their clothing and their vehicles by the flying bits of oil-soaked sand. This last the Commissioners promise to remedy. When the roads have become sufficiently packed they will be

covered with a thin layer of white sand. There is a hint in this last for road-makers elsewhere, as sprinkling with oil instead of water has become widespread this summer, particularly in the South, where the good-roads movement is enjoying a belated popularity. Another hint to be borrowed from the Californians is in using the oil hot, whereby the materials of the roadbed are practically cemented.—*N. Y. Evening Post*.

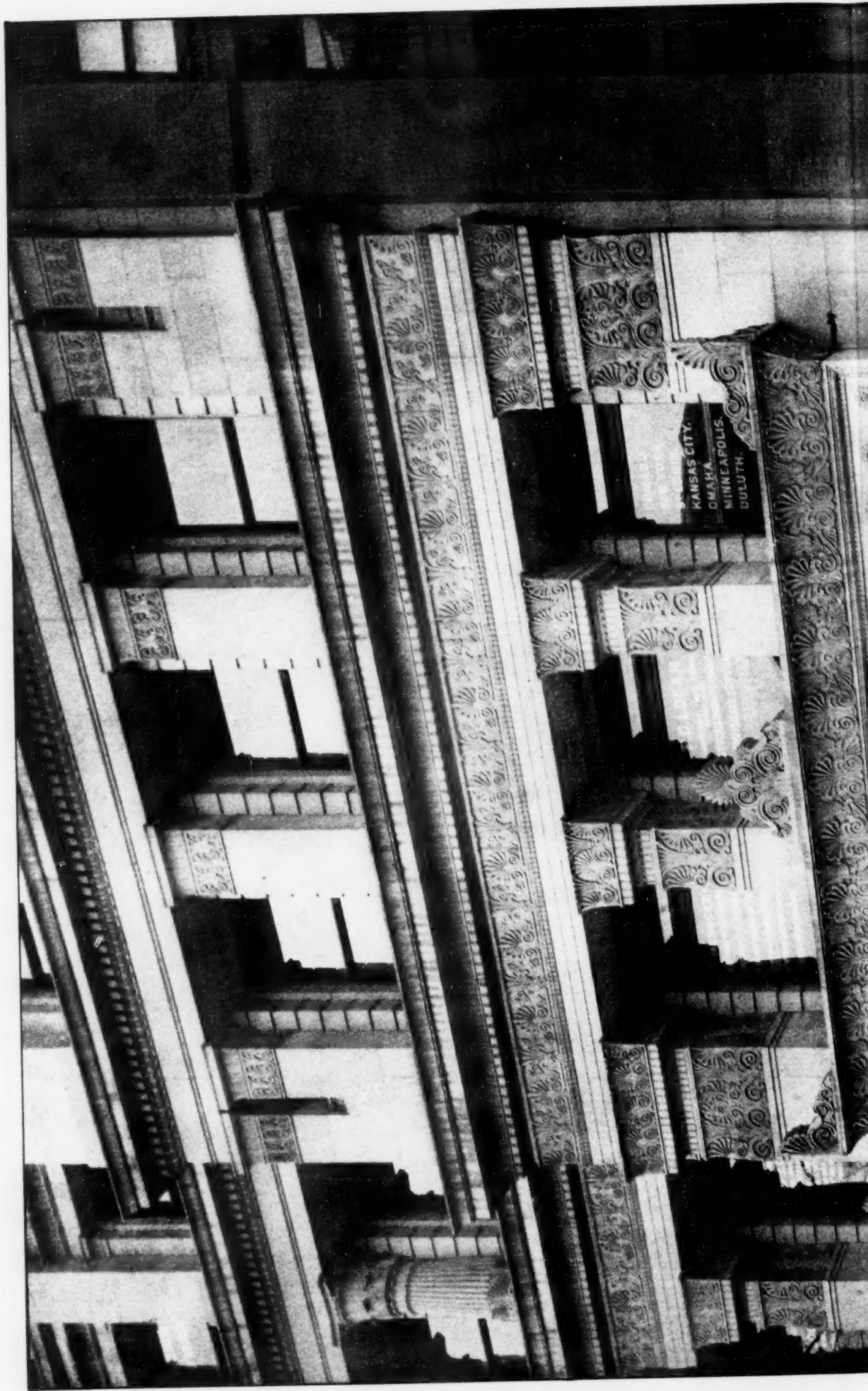
"BIG BEN'S" RIVAL.—It will come as a surprise to many to be told that the great clock erected on the tower of the works of a sewing-machine company at Kilbowie rivals "Big Ben" in point of size, says *London Tit-Bits*. When "Big Ben" took up his present position in the clock-tower fifty years ago it was rightly regarded as one of the wonders of the clock-world, for it was by far the largest timepiece ever seen in this country. It must now take second place in regard to size. A comparison of the two giants is interesting. "Big Ben's" dial is 180 feet above the ground, over 60 feet higher up than its rival at Kilbowie. The diameter of the dial over all of the latter clock is 26 feet, whereas "Big Ben" comes a good second with a dial-diameter of 22½ feet. At the same time, Londoners will be pleased to hear that in the dimensions of the hands "Big Ben" can easily afford to smile. Its minute-hand, which is of fine steel, is twice as long as the one at Kilbowie, being 15 feet in length. When it comes to the figures, the Kilbowie clock scores, for its figures are 2 feet 6 inches high, against "Big Ben's" 2-foot figures. The pendulum of the Kilbowie giant is 12 feet in length and weighs 840 pounds, being much heavier than that of the famous Westminster clock. Although the pendulum is of such a huge weight, it is as delicately fixed and balanced as the pendulum of an ordinary drawing-room clock. The great bob swings 2 feet 6 inches thirty times per minute, or 150 miles per week; in the course of a year it swings a distance of 7,800 miles. The minute-hand moves one third of an inch at every swing of the pendulum, or 1½ miles in a week. The distance between the minute divisions is 10 inches. The total weight of the dial is 22 tons. The driving-force is obtained from a weight of 1,000 pounds, wound up through a height of 45 feet once a week by three men. The winding-up of such large clocks is decidedly hard work. It takes two men several hours three times a week to wind up "Big Ben."

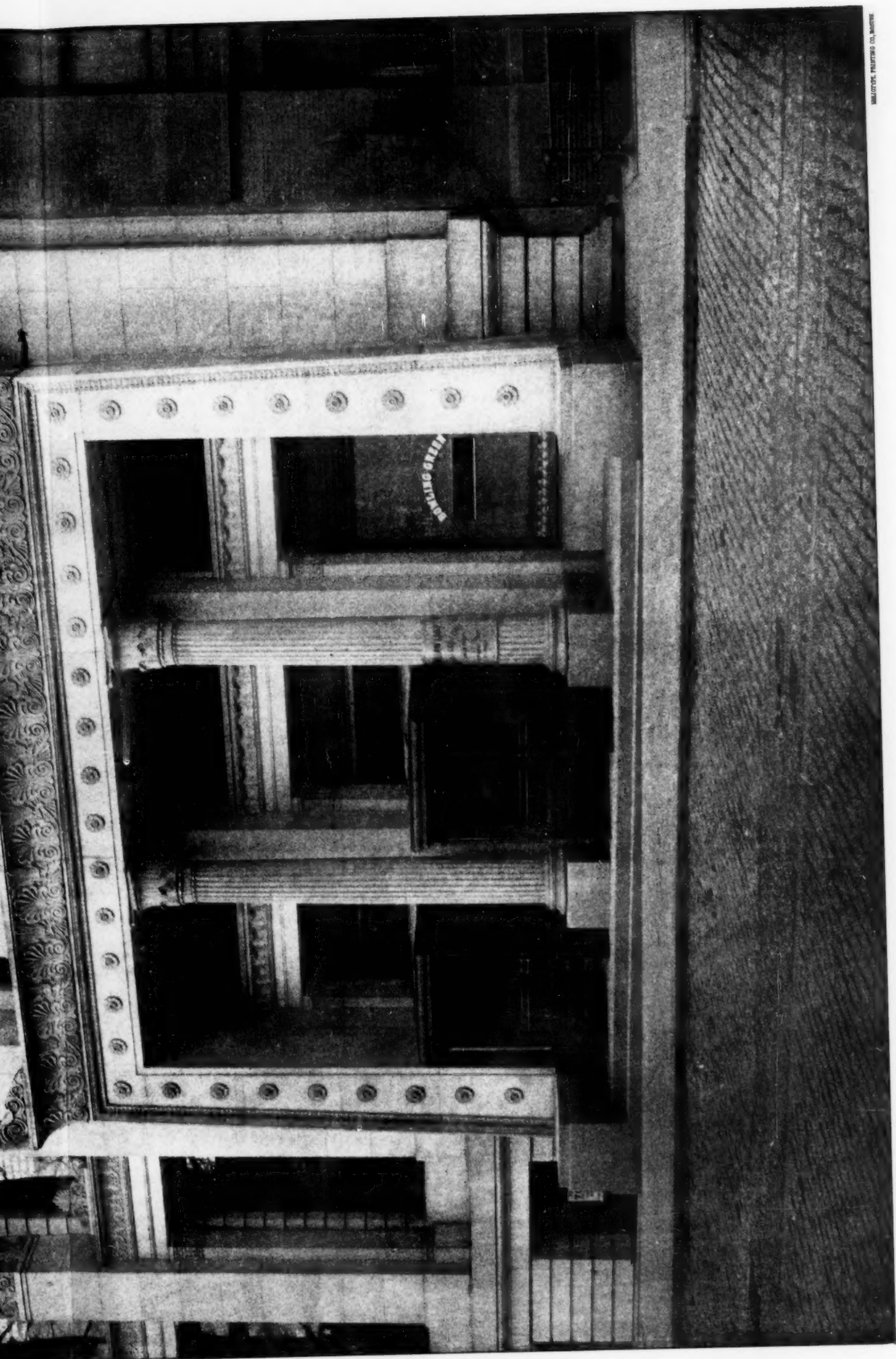
A BIG FIR-TREE.—The big fir-tree, 44 feet in circumference, which grew one mile west of Arlington, Washington, has been cut down, and 9 feet of the base, with a cut for the floor and another for the roof, has been shipped to Everett to be converted into an office for Commissioner Johnston at the Pan-American Exposition. The floor part is 15 feet in diameter and the roof 10½ feet in diameter.—*Exchange*.

AN ANECDOTE ABOUT DAGUERRE.—It seems that Daguerre was a painter as well as the "Father of Photography." He was accustomed to spend his summers in the pleasant village of Bry-sur-Marne, and the recent official visit of the Prefect of the Seine to the hamlet brings out a pretty story of him. One day the priest of one of the village parishes, known as Saint-Gervais-et-Saint-Protais, was complaining of the dilapidated condition of the interior of his church; whereupon Daguerre seized his paint-box and brushes and shut himself up in the church of a Monday, and when, on the following Sunday, the Bry folk went to Mass, they found themselves in what seemed an immense cathedral. Daguerre had painted the chancel-walls with such a skilful effect of perspective that the little church seemed to have stretched itself out into majestic depths! The work can be seen still, and is shown to visitors as a curious reminiscence of the "Father of Photography."—*Boston Transcript*.

RENAISSANCE OF OLD NORSE TAPESTRY.—From a small seed of genuine antique tapestry hidden in the home of an old peasant-woman, a great-art-industry has sprung up and won the admiration of the whole world. Quite unexpectedly one finds a transition from the present into the great past of the heroes of the Sagas. In the Edda we find that women were weaving pictures of great deeds of their men and decorating their walls at festivals. Brynhild Budle's daughter, who was said to be an expert at this, wove a golden drapery, which Olaf the Saint bade his poet, Torfin Skald, to celebrate in song. Harold the Fair-haired honored his dead wife by laying her in "Gudvav," of very fine woven cloth. When in the year 1028 Olaf's mother heard of her son's coming, she at once ordered the servant-girls to adorn the walls with "Tjeld" wall-draperies. The oldest tapestry in Norway is from the eleventh century, and was found between two floors in a church. The production of tapestry continued up to the seventeenth century, but about that time the art began to degenerate until it seems altogether to have died out. But as a lost art it had found refuge in the home of an old peasant-woman and her daughter. They were weaving, as they explained, partly according to patterns drawn by an architect in the nearest town, partly from memory, according to pictures seen in an old vacated church.—*Chicago Record-Herald*.

DO LOCUST-TREES ATTRACT LIGHTNING?—Is a locust-tree more likely to be struck by lightning than other trees? Farmers in western Pennsylvania and Ohio will answer "yes," and will cite any number of instances in their neighborhood where such trees have been splintered by lightning when other varieties have escaped. So strong is this belief in the rural regions that people are warned not to take shelter under a locust during a thunder-shower. The tree is planted, too, in groves, 100 feet or more from houses and farm-buildings, under the impression that it draws the lightning, and thus protects the buildings. In the rural mind, the locust is better than a lightning-rod. This extensive planting of the locust probably explains why it is so often hit by lightning. The tree has many good qualities, aside from its fancied one as a lightning-arrester, and it has become so frequent in Ohio and western Pennsylvania that the lightning cannot well help striking it.—*N. Y. Evening Post*.



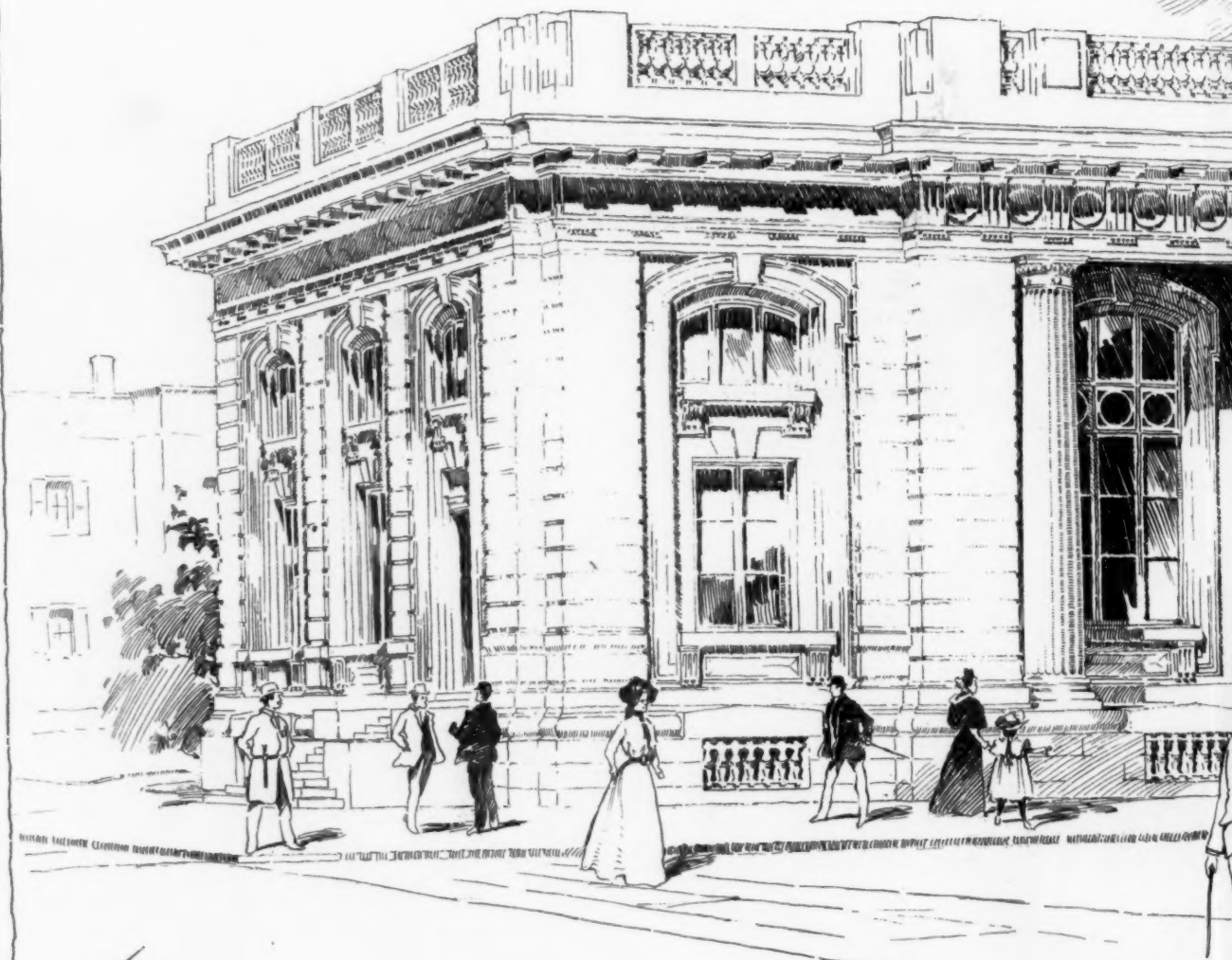


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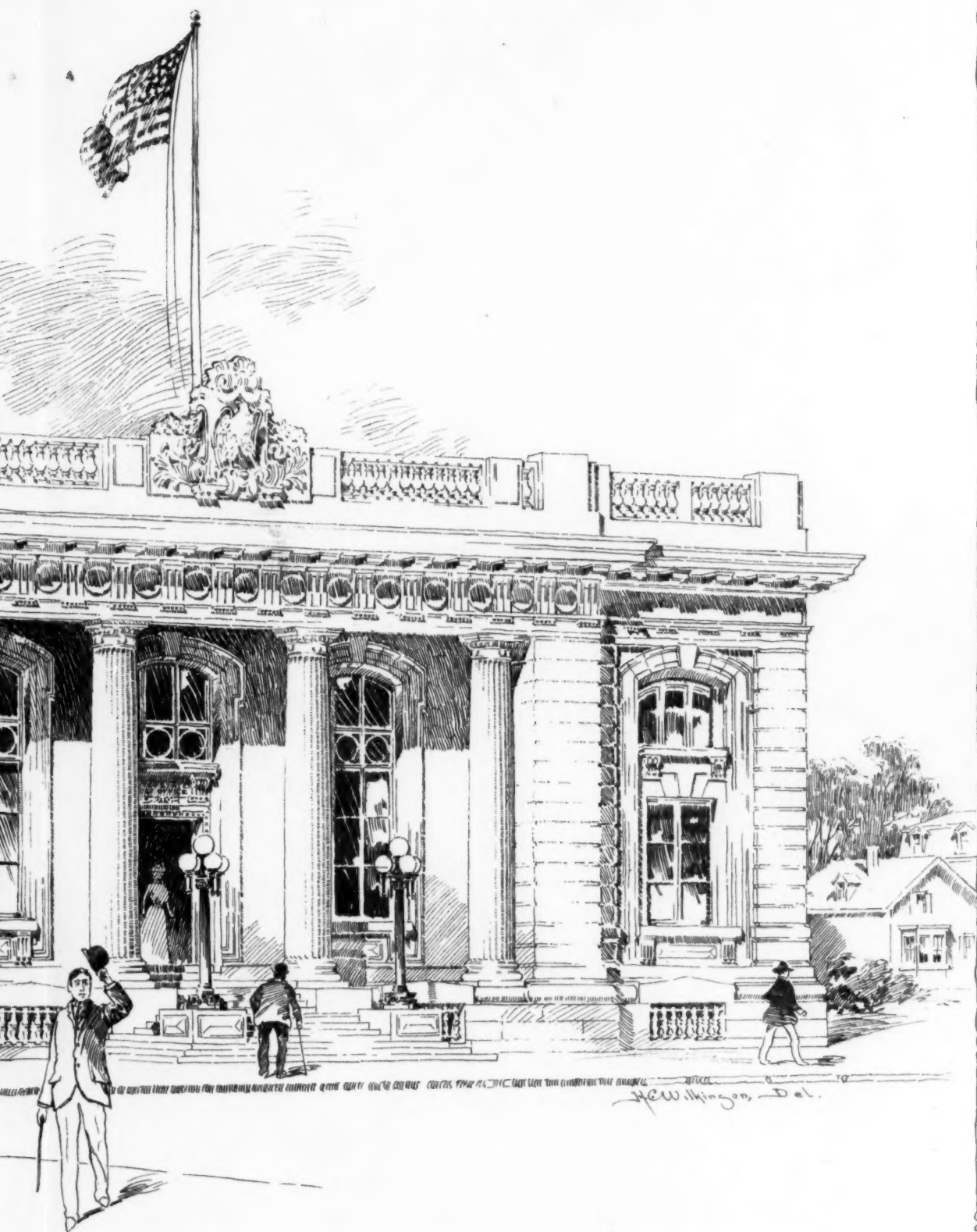
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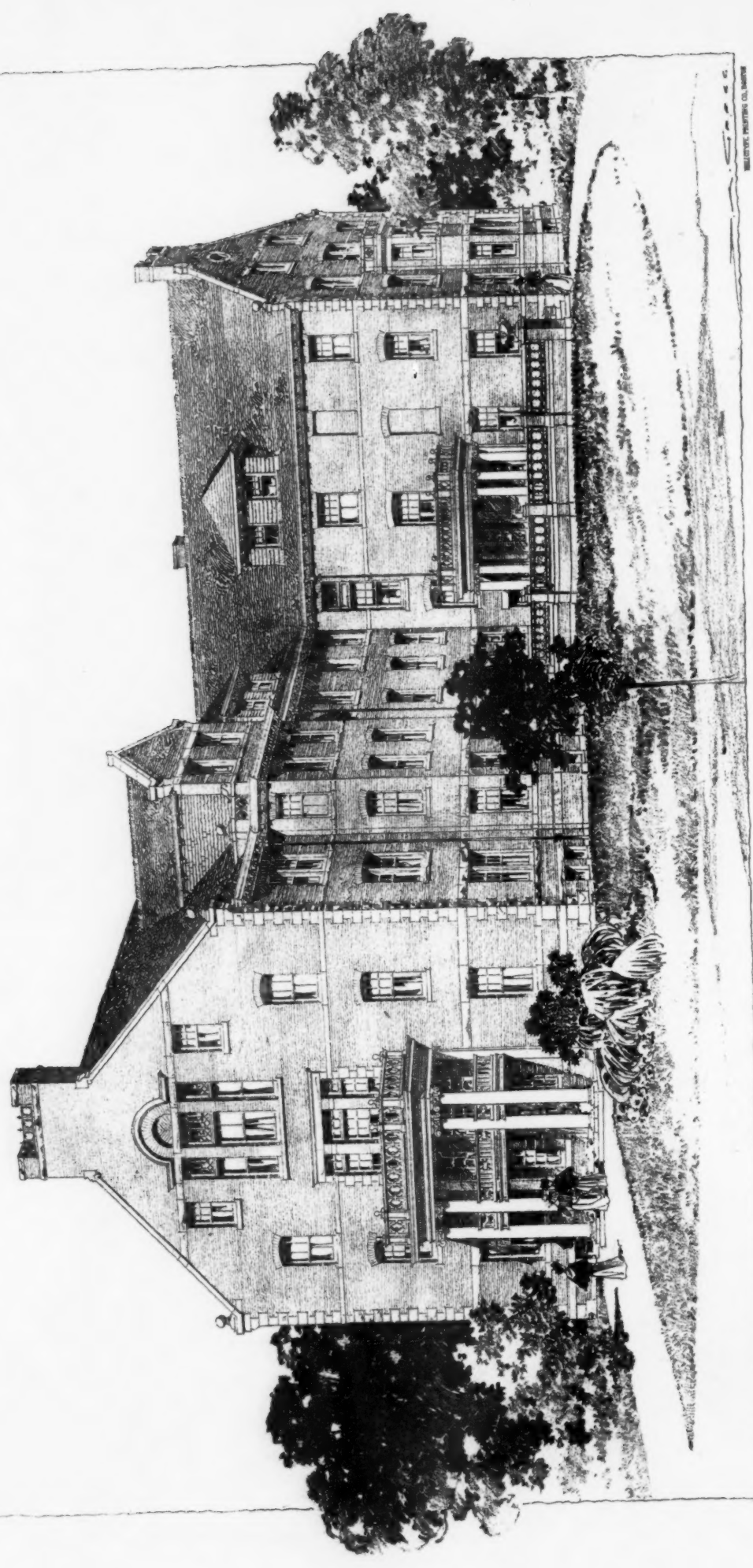
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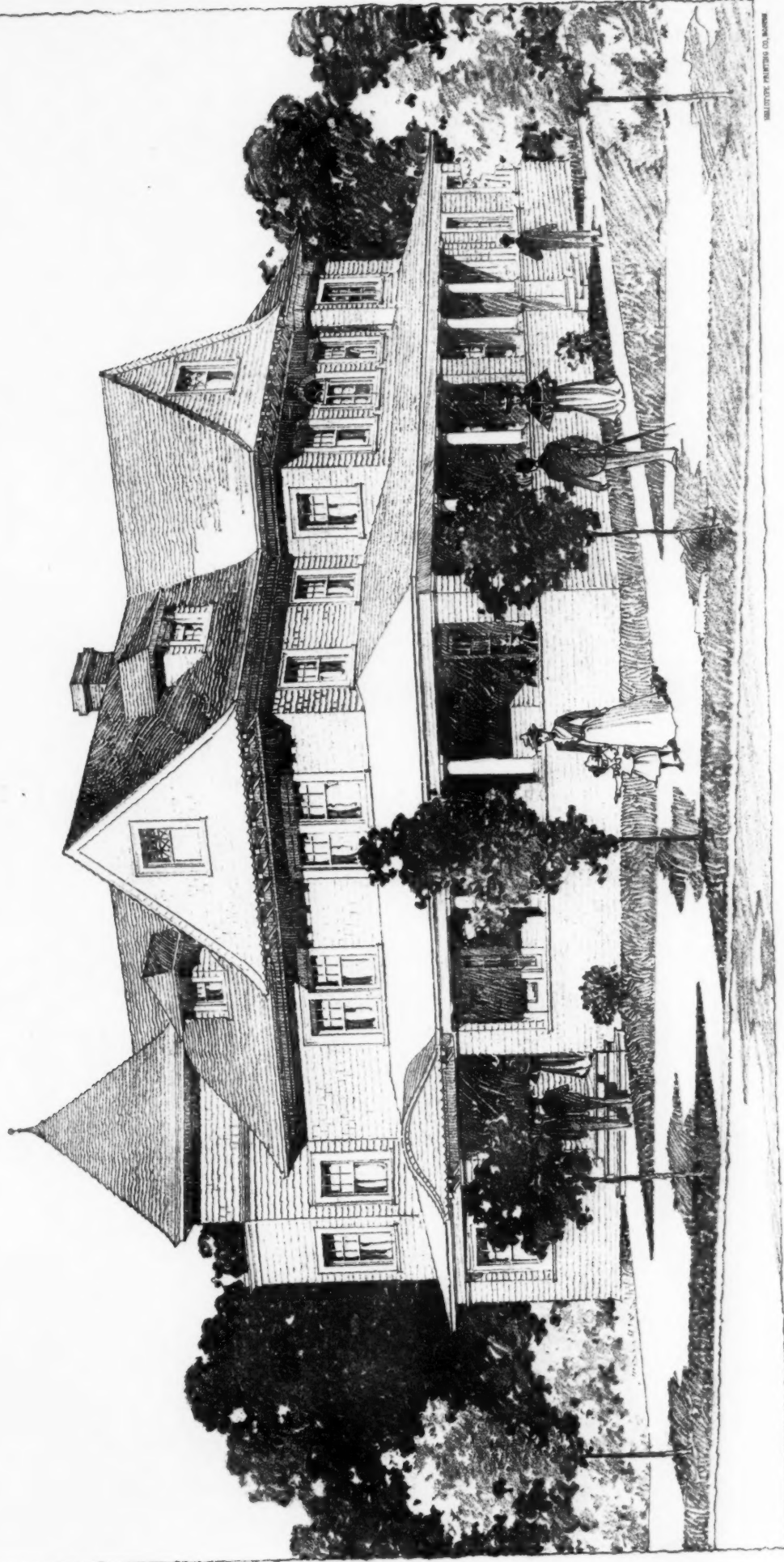


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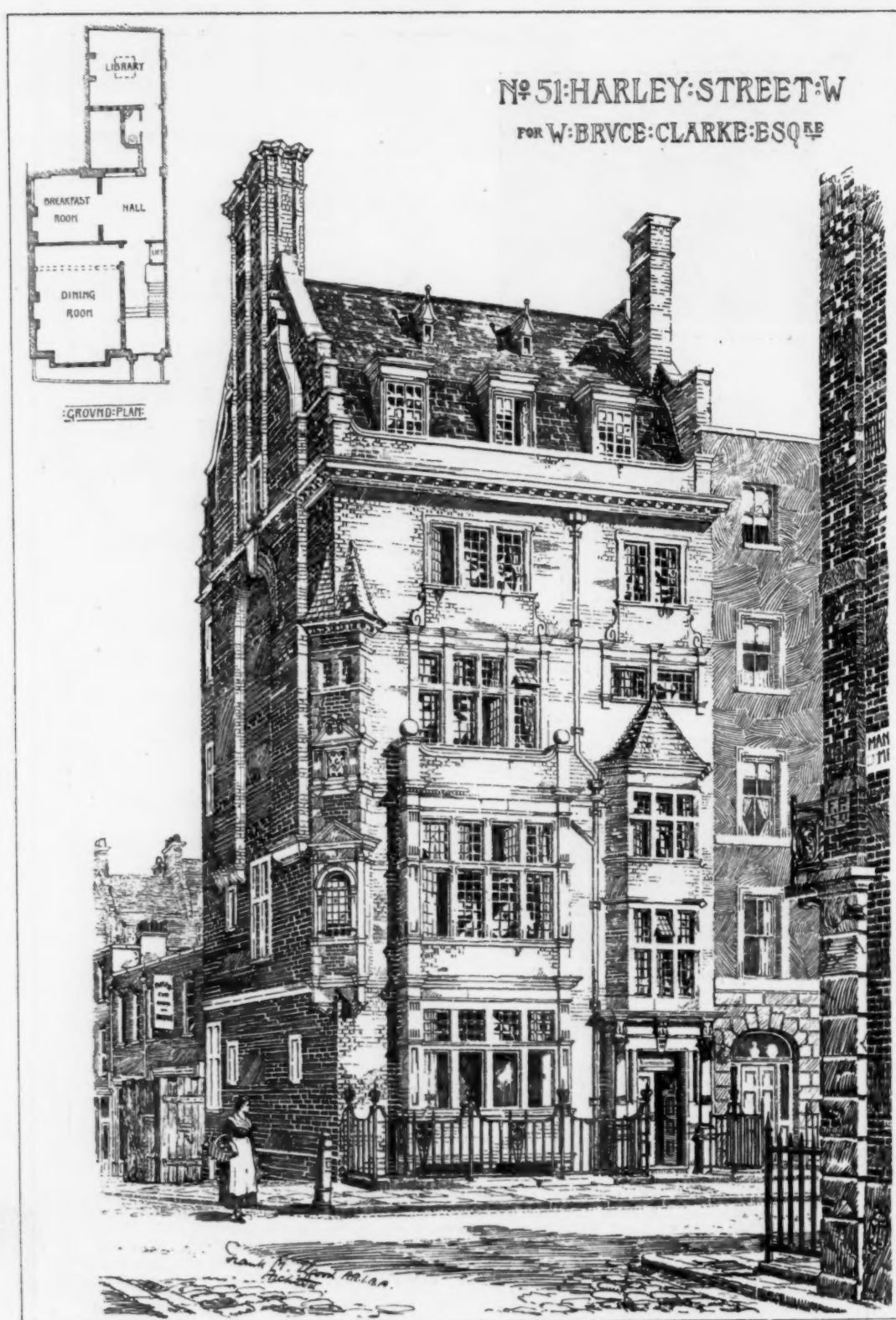
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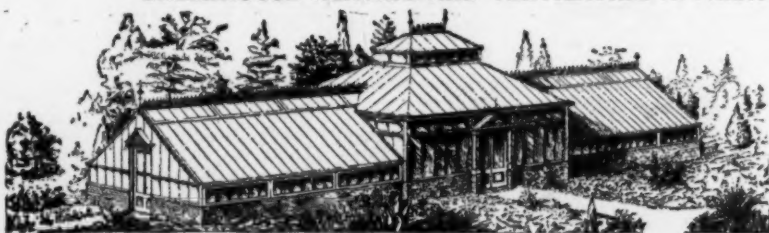
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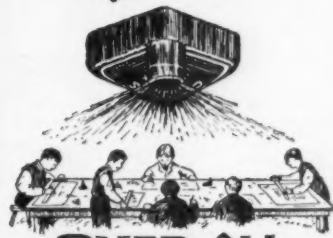
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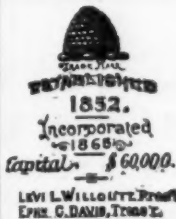
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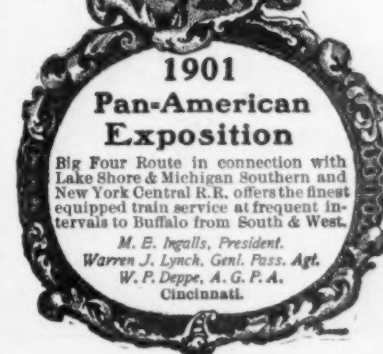
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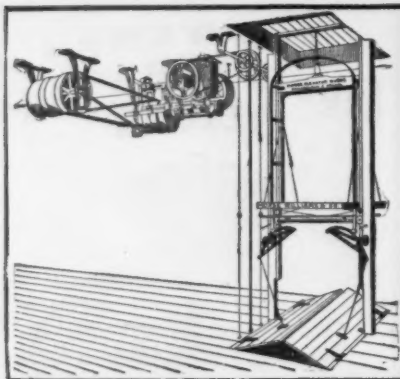
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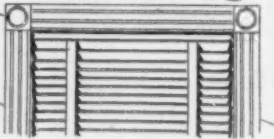
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Important Litigation Relating to Magnesia Covering Patents

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

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

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BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

Danvers, Conn.—Plans have been prepared by Cudworth & Woodworth, architects, of Norwich, for the proposed new church edifice of stone and wood to be erected for the Methodist Society at a cost of about \$10,000.

Denton, Tex.—The J. Riely Gordon Co., architects, Dallas, are preparing plans for a new \$100,000, four-story brick hotel for a stock company of which Messrs. Lingo, Foster & Platter are the directors. It will be provided with all modern improvements.

Denton, Tex.—The School Board has accepted the plans of the J. Riely Gordon Co., architects, of Dallas, for the remodeling and addition of the Denton School-house. Two-story brick, A.A. Class, steam heat, plumbing, etc.; cost, \$20,500.

Des Moines, Ia.—Plans have been completed by Proudfoot & Bird, Crocker Building, for the West Des Moines High-school building; cost, \$75,000.

The Bank Building Co. will erect a building for the Capital City State Bank. Hallet & Rawson, architects, have prepared plans for a seven-story building, 90' x 100', to be erected at E. 5th and Locust Sts. The building will cost about \$75,000.

Ellensburg, Wash.—Proctor & Farrell, architects, of Tacoma, have plans for a brick opera-house to be erected here at a cost of \$12,000 to \$15,000.

Elmira, N. Y.—Swan & Murray, 613 Baldwin St., have received the contract for erecting a two-story brick annex to school No. 4 at \$16,637.

Frankfort, Mich.—It is reported that the Ann Arbor R. R. Co. will expend about \$100,000 in the erection of a hotel and cottages. W. R. Burt, pres., Saginaw.

Galveston, Tex.—Plans are being prepared by Chas. W. Bulger for a \$20,000 church for the First Baptist Society.

Great Falls, Mont.—Andrew Carnegie has offered \$50,000 for a library building under the usual conditions.

A site for the erection of a \$50,000 school has been purchased by the Catholic Society. The Ursuline Sisters contemplate erecting a \$50,000 school-house.

Green Bay, Wis.—The Council have authorized an issue of \$35,000 bonds for the erection of a city-hall.

Guthrie, Okla. Ter.—Report states that Arthur J. Williams, of Oklahoma City, has been selected to prepare plans for a new building for the University, to cost about \$90,000.

Hot Springs, Va.—The Homestead Hotel, which was destroyed by fire recently, will be rebuilt at once from the original plans. Warner Moore, of Richmond, director. The new structure will cost \$200,000.

Houston, Tex.—The plans of the J. Riely Gordon Co., architects of Dallas, have been accepted in the competition for the new Carnegie Library to cost \$50,000, to be fireproof, slate roof, to have book-lift, book-stacks, steam heat, marble floors and wainscoting.

Iron Mountain, Mich.—Architect Clancy has been selected by the Board of Education to make plans for the Carnegie Library building, to be erected at this place; estimated cost, \$20,000.

Jacksonville, Fla.—West Bros. will erect a \$60,000 office-building at the corner of Bay and Laura Sts. It will be a five-story structure. G. L. Norman, of Atlanta, Ga., is the architect.

The Board of Trustees of the Florida Agricultural College have examined and approved the plans of Architects Snelling & Potter, for the construction of a new college building. G. W. Wilson, president board.

Jacksonville, Ill.—Architects Patton & Miller, of Chicago, are planning the \$40,000 library to be built from Andrew Carnegie's gift. The building is to be in Classic style, of Bedford stone with red tile roof.

Jennings, La.—The directors of the Citizen's Bank

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BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

have decided to erect a new building, to cost about \$25,000.

Lake Charles, La.—The J. Riely Gordon Co., architects, of Dallas, Tex., have secured in competition the adoption of their plans for the court-house. To be of brick and stone, fireproof, with steam heat; cost, \$50,000.

Leadville, Col.—Andrew Carnegie is stated to have offered this city \$100,000 for a public library.

Madison, Wis.—Herman Esser, architect, Milwaukee, is preparing plans for reconstructing and enlarging the Park Hotel; cost, about \$100,000.

Madrid, Ia.—The Catholics contemplate erecting a \$30,000 church.

Manchester, Va.—Mrs. W. M. Ramsey, of California, will spend \$75,000 in improving "Westover Mansion" on the James River. She has recently purchased the mansion. "The Chimborazo Hospital Co." will build a hospital here to cost \$25,000.

Marion, O.—Wilbur T. Mills, Columbus, has been selected to prepare plans for a \$40,000 Masonic Temple.

Mattoon, Ill.—S. R. Badgley, Cleveland, O., is preparing plans for a \$25,000 stone church for the First M. E. Society.

Menominee, Mich.—The Masonic Association will erect a temple to cost \$20,000.

Meridian, Miss.—A new jail building is to be erected in Lauderdale County to cost \$35,000.

Milwaukee, Wis.—H. G. Lotter, 427 Milwaukee St., is preparing plans for a school to be erected on 28th and Clark Sts. It will be three stories high and have slate roof, steam heat, tile floors; cost, \$55,000.

Montevideo, Minn.—Fremont D. Orff, architect, Minneapolis, has plans for a building to be erected by the Independent Order of Odd Fellows. It will be 58' x 100', three stories and basement, of brick and stone, gravel roof, iron columns, steam heating; cost, \$20,000.

Mosquito, Tex.—The Board of Trustees have accepted the plans of the J. Riely Gordon Co., architects, Dallas, for a two-story brick school-building, to cost \$20,000.

Newark, N. J.—The congregation of St. Michael's Church has decided to erect a \$25,000 edifice at Main and Franklin Sts.

Omaha, Neb.—The Omaha R. C. Diocese is about to build a cathedral to cost from \$150,000 to \$200,000.

Paris, Ill.—The plans by Charles Henry & Sons, Akron, O., for a new M. E. Church, have been accepted, and bids will soon be advertised for. The cost of the church will be \$32,000.

Paris, Tex.—The J. Riely Gordon Co., architects, Dallas, are preparing the plans for residence of R. F. Scott, to be two-story and basement, of buff brick, with slate roof, hot-water heating and tile floors; cost, \$40,000.

Passaic, N. J.—Passaic will have a new post-office building. The site of the *Daily Herald* building, in Prospect St., has been selected, and a new building will be erected. It is expected that it will be completed by December 15.

Pine Bluff, Ark.—Architect F. W. Gibb, Little Rock, has completed plans for the Catholic Annunciation Academy. The building is to be two-story brick, 100' x 115', and will cost about \$20,000. There will be about 40 rooms, including six school-rooms and twelve music-rooms.

Pittsburgh, Pa.—The School Board has decided to erect a new high-school building at a cost of \$28,000.

Sidney T. Heckert is at work on plans for a five-story fireproof addition, 56' x 100', to be built to the Mercy Hospital; also for a wing, 100' x 140'. The cost of the improvement will be \$300,000.

Schickel & Dittmars, 115 Fifth Ave., New York, are preparing plans for new buildings for the East End Charity Hospital, conducted by Mother Josephine at 420 Collins Ave. The hospital has purchased a new site at the corner of Frankstown Ave. and Beechwood Boulevard in this city. The principal building will be five stories high, 150' x 320', and will be fireproof. It will cost \$500,000. The directors of the hospital are: Charles M. Schwab, C. A. Fagan, George S. MacFarlane, W. H. Hoe-veller, William Heil, Hugh Murphy, Titus Berger and George Matthews.

The Knights of Columbus contemplate erecting a temple, to cost \$50,000, in Bellefield.

Rutan & Russell will design the alterations and addition to be made to the Duquesne Club-house on 6th Ave.

Theophilus P. Chandler, 328 Chestnut St., Philadelphia, has prepared plans for the new church-building which the congregation of the Third Presbyterian Church proposes to erect at 5th and S. Negley Aves., East End. The cost will be \$65,000.

Local press reports state that a new building, a hotel four stories high and a new stock exchange,

BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

will be erected at the new Union stock yards on Herts Island, at a cost of from \$80,000 to \$100,000. Sam'l W. Allerton and Simon O'Donnell are pres. and gen'l mgr., respectively, of the new yards.

Portsmouth, Va.—The contract for the building of Court Street Baptist Church has been awarded to S. B. Hutchins at \$34,000.

Princeton, Minn.—A. L. Flegel & Co., architects, of Racine, Wis., have plans for a three-story and basement building, 66' x 80', for the Odd Fellows. Pressed brick front, buff Bedford trimmings, steel beams, iron columns, steam heat; cost, \$20,000.

Princeton, N. J.—Cope & Stewardson, 320 Walnut St., Philadelphia, Pa., are preparing plans for a new dormitory for Princeton University, to cost about \$100,000.

Providence, R. I.—Hartwell, Williams & Kingston have received the contract for erecting the Ralph St. School, at \$23,750.

Reedsburg, Wis.—Report states that it has been voted to erect a \$30,000 school. J. H. Hasler, clerk school bd.

Richmond, Va.—Local press reports state that a R. C. Cathedral will be erected on Laurel St. and Floyd Ave. at a cost of about \$250,000 to be the gift of Thos. F. Ryan, of New York.

Mr. W. N. Bowman has been awarded the contract for the erection of the Norfolk city jail at \$100,000.

Roanoke, Va.—James Haggart will build a \$30,000 residence at the corner of 36th St. and Madison Ave. To be a three-story stone structure.

San Antonio, Tex.—Plans are being prepared for a \$60,000 building for the Alamo National Bank. Chas. Hugo, pres.

The Southern Pacific will build a \$100,000 depot here.

The J. Riely Gordon Co., of Dallas, are the architects of the Carnegie Library, and the contract has been let to P. T. Shields, at \$45,000.

San Francisco, Cal.—Andrew Carnegie has offered this city \$750,000 for a public library, reports state.

Saybrook, Ill.—A gymnasium building costing \$76,000 will be erected at the University of Illinois.

Shamokin, Pa.—It is reported that the Knights of Columbus will erect a building here to cost \$30,000.

Sherman, Tex.—The J. Riely Gordon Co., architects, Dallas, are preparing the plans for residence of Thos. Randolph. Two-story and basement, buff brick, slate roof, hot-water heating, tile floors and laundry fixtures; cost, \$40,000.

Shreveport, La.—The J. Riely Gordon Co., architects, Dallas, Tex., have let the contract for the Caddo Parish jail to Sonnenfeld & Abright and the Stewart Iron Works Co., of Cincinnati, O., for \$78,000.

Sioux City, Ia.—The Deering Harvester Co. will erect a four-story brick warehouse, 50' x 200', this fall at a cost of \$75,000.

Southbridge, Mass.—A four-room brick school-house, to cost \$12,000, will be erected on the corner of Charlton and Mechanics Sts. H. S. Cheney, Esq., chairman of the building committee.

South St. Joseph, Mo.—E. J. Eckel, of St. Joseph, has been selected to draw the plans of the Carnegie Library. It will cost \$25,000.

Spokane, Wash.—The Northwest Theatrical Association will erect a theatre here at a cost of \$80,000.

Springfield, Mass.—E. J. Parlett is preparing plans for extensive alterations to the block of the Homer Foot heirs at the corner of Main and State Sts.; cost, \$20,000.

Stillwater, Minn.—Andrew Carnegie has offered this city \$25,000 for a public library.

St. John's, N. F.—Under his usual conditions, Andrew Carnegie has offered \$50,000 to build a public library in this city.

Toledo, O.—The \$75,000 needed to build the super-structure of the Y. M. C. A. Building has been raised, and plans for same are being prepared by E. O. Fallis, The Nasby.

Plans are being prepared by J. W. Matz, 35 Hartford Block, for the new church to be built by the Grace Reformed congregation. It will cost \$16,000.

Vincennes, Ind.—The Knox County Commissioners have adopted the plans of John W. Gaddis for a sheriff's residence and jail, to cost \$30,000.

Watertown, S. D.—A. R. Saunders, architect, of Brookings, has plans for a two-story brick and stone building, 50' x 111', for the Citizens' National Bank; cost, \$20,000.

Waterville, Me.—The contract for erecting the city-hall has been awarded to Horace Furinton & Co., of this city, at \$24,834.

Wauwatosa, Wis.—H. G. Lotter, Milwaukee, is preparing plans for remodelling a hospital for Milwaukee County; cost, \$50,000.

Waynesboro, Pa.—The School Board has decided to erect a \$20,000 school on Snyder Ave.

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L. L. BRIDGE, N. Y., 21-215.

BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

Wills Point, Tex.—The School Board of the city has accepted the plans for a new brick high school as submitted by the J. Riley Gordon Co., architects, Dallas, and H. A. Overbeck, associate, school-seats and opera-chairs, furnace heat; cost, about \$35,000.

Winchester, Va.—Charles B. Rouse, of New York, has announced his intention of giving \$5,000 to the proposed Winchester Memorial Hospital. This donation, coupled with \$9,000 already raised, will assure the erection of the hospital.

York, Pa.—The City School Board has accepted the plans of J. A. Dempwolf for a 16-room brick school and authorized the architect to receive bids for the erection of same.

Ypsilanti, Mich.—Plans are being made for the new science building. It will cost \$50,000.

Under the direction of J. W. Stevens, superintendent of buildings and grounds, \$23,000 will be spent for repairs and improvements on the Normal School.

The Marquette Normal will spend \$48,000 this summer on repairs and improvements.

APARTMENT-HOUSES.

Chicago, Ill.—*Sacramento and Fulton Sts.*, 2 two-sty' bk. & st. flats, 50' x 55'; \$30,000; o., Mrs. Minnie G. McIntosh; a., Huehl & Schmid, Metropolitan Block.

Indiana Ave., nr. 46th St., three-sty' bk. & st. flats, 74' x 100'; \$45,000; o., Sherman T. Cooper; a., L. M. Mitchell, 145 La Salle St.

Calumet Ave. and Forty-first St., three-sty' bk. & st. flats; \$30,000; o., Sherman T. Cooper; a., L. M. Mitchell.

Prairie Ave. and Forty-fifth St., three-sty' bk. & st. flats, 50' x 130'; \$50,000; o., George S. Weebes; a., Henry L. Newhouse.

CHURCHES.

Boston, Mass.—*Shawmut Ave.*, cor. Corning St., Ward 7, three-sty' bk. & st. church, 92' x 104', flat roof, steam; \$35,000; o., Benevolent Fraternity of Churches; b., D. F. Burns, 36 Bromfield St.; a., C. Howard Walker.

EDUCATIONAL.

Wars, Mass.—*Three-sty' bk. & st. school*, 80' x 122', 12 rooms; \$24,000; o., Town; b., A. D. McCormick; a., Ellsworth & Kirkpatrick.

FACTORIES.

Boston, Mass.—*Edinboro St.*, Nos. 21-23, five-sty' bk. building, 44' x 57', flat roof, steam; \$30,000; o., Geo. C. Conant; b., Boston Construction Co., 16 State St.

HOTELS.

Cambridge, Mass.—*Harvard St.*, No. 211, three-sty' fr. & bk. hotel, 51' x 59'; \$12,000; o., Union Real Estate Trust; b., J. A. McIsaac; a., Chas. H. Bartlett.

HOUSES.

Attleboro, Mass.—*Three-sty' fr. dwell.*, 48' x 56', pitch roof, steam; \$20,000; o., G. H. Tappan; a., Wright & Isham, Banigan Building, Providence, R. I.

Boston, Mass.—*Washington St.*, Nos. 2656-58, 2 three-sty' fr. dwells., 23' x 53', flat roofs, stoves; \$10,000; o., Workmen's Realty & Ins. Assn.; b., J. F. Maherty, 51 Mt. Vernon St., Dorchester; a., P. A. Tracy.

Georgia St., No. 8, Ward 21, three-sty' fr. dwell., 27' x 55', flat roof, hot water; \$7,000; o., Emma J. Moreau; b., J. L. McLearn, Bowdoin Sq., Dorchester.

Richview St., Ward 24, two-sty' fr. dwell., 24' x 50', pitch roof, hot water; \$8,000; o., Mary E. Tillman; b., J. A. Cruikshank, 1 Carlos St.

Sacia Hill Ave., nr. Gramplan Way, Ward 20, 2 two-sty' fr. dwells., 26' x 46', pitch roofs, furnaces; \$8,000; o., Joseph P. Whalen; b., C. D. Rankin; a., E. N. Boyden.

Claybourne St., No. 9, Ward 20, two-sty' fr. dwell., 28' x 47', pitch roof, furnace; \$5,000; o. & b., D. J. McKay, 10 Harvard St., Dorchester.

Florida St., nr. King St., Ward 24, 3 three-sty' bk. dwells., 22' x 48', flat roofs, stoves; \$30,000; o. & b., Isaac Schurman, Florida St.

Wait St., nr. Hillside St., Ward 19, 15 three-sty' bk. dwells., 23' x 43', flat roofs, stoves; \$75,000; o. & b., Thos. F. Maguire, Wait St.

Bay State Road, nr. Ashley St., Ward 11, 3 four-sty' bk. dwells., 24' x 60', flat roofs, furnaces; \$60,000; o. & b., Warren D. Vinal.

Draper St., No. 94, Ward 20, two-sty' fr. dwell., 23' x 50', pitch roof, furnace; \$6,000; o. & b., John B. McKenna, 36 Barry St., Dorchester.

Fisher Ave., nr. Buchanan St., Ward 19, three-sty' fr. dwell., 25' x 48', flat roof, stoves; \$5,500; o. & b., John F. Costello, 1394 Columbus Ave.

BUILDING INTELLIGENCE.

(Houses Continued.)

Hancock St., nr. Downer Ct., Ward 20, 3 three-sty' fr. dwells., 26' x 56', flat roofs, stoves; \$10,000; o. & b., L. E. H. Jones, 30 Sawyer Ave., Dorchester.

Hendry St., Nos. 11-13, Ward 20, 2 three-sty' fr. dwells., flat roof, stoves; \$9,000; o. & b., L. E. H. Jones.

Columbia Road, nr. Dorchester Ave., Ward 18, 4 three-sty' fr. dwells., 25' x 60', flat roofs, furnaces; \$24,000; o. & b., Boyd & Berry, 3 Grant St., Dorchester; a., P. A. Tracy.

Maryland St., nr. Savin Hill Ave., Ward 20, three-sty' fr. dwell., 26' x 45', flat roof, furnace; \$5,000; o. & b., Daniel J. Daley, 33 Savin Hill Ave.

Leedaville St. and Dorchester Ave., Ward 20, three-sty' fr. dwell., 23' x 47', flat roof, furnace; \$4,500; o., Patrick Mullaney; b., David Campbell, 32 Magdalia St.

E. Seventh St., Ward 14, three-sty' fr. dwell., 24' x 52', flat roof, stoves; \$5,000; o., Anna A. Dowd; b., Daley Bros.

Bay State Road, nr. Ashby St., Ward 25, 6 four-sty' bk. dwells., 24' x 53', flat roofs, furnaces; \$125,000; o. & b., Luther M. Merrill, 30 Globe Building; a., G. Wilton Lewis.

Main St., Nos. 36-40, Ward 5, three-sty' bk. dwell. & stores, 40' x 63', flat roof, stoves; \$9,000; o., Annie E. Donovan; a. & b., Donovan & Co.

Talbot Ave., No. 234, Ward 20, two 2-sty' fr. dwells., 27' x 29', pitch roofs, furnaces; \$5,000; o., Adelaide L. Connelly; b., J. E. Poland, 169 Dudley St.

Claybourne St., nr. Bowdoin St., Ward 20, 2 two-sty' fr. dwells., 28' x 47', pitch roofs, hot water; \$4,500; o., Chas. Mashburn; a., E. J. McKay; b., Decker Bros., 783 Washington St., Dorchester.

Wicklow St., Nos. 21-23, Ward 25, 2 three-sty' fr. dwells., 27' x 48', pitch roofs, furnaces; \$9,000; o. & b., J. E. Larkin, 49 Spring St., Brighton.

Webster Ave., No. 26, Ward 6, three-sty' fr. dwell., 19' x 23', flat roof, stoves; \$3,000; o. & b., J. J. Carpodile, 17 North Sq.

Harold St., cor. Waumbuck St., Ward 21, 2-sty' fr. dwell., 25' x 44', pitch roof, furnace; \$5,000; o., T. H. Shea; a., Sam'l J. Rantin.

Cambridge, Mass.—*Esplanade and Greenhalge Sts.*, four-sty' bk. & st. dwell., 39' x 83'; \$38,000; o., Dr. A. H. Tuttle; b., J. M. & J. C. Buckley; a., C. H. Bartlett.

Chicago, Ill.—*Michigan Boulevard*, No. 3337, three-sty' & base, st. dwell., 25' x 90', containing 12 rooms; \$25,000; o., H. E. Greenbaum; a., H. L. Ottenheimer, 134 Monroe St.

Garfield Boulevard, No. 830, three-sty' bk. & st. dwell., 45' x 65', 18 rooms, pitch roof, hot water; \$40,000; o., James O'Leary; a., Z. T. Davis, 79 Dearborn St.

Prairie Ave., nr. 48th St., 3 two-sty' st. dwells., 22' x 60', pitch roof, hot water; \$25,000; o., Miss Mary K. Slyne; a., Z. T. Davis.

Everett, Mass.—*Garland St.*, two-sty' fr. dwell., 60' x 120'; \$5,000; o., Lawson & Voorhees; b., Wm. Woodley, Elm St., Washington Park.

Somerville, Mass.—*2-sty' fr. dwell.*, 30' x 58'; \$6,000; o., E. G. Davis; b., Starbird & Johnson, Charlestown; a., Prescott & Sidebottom, Boston.

Broadview, 2-sty' fr. dwell., 50' x 47', pitch roof, furnace; \$8,000; o., E. G. Davis; b., Starbird & Johnson.

West Newton, Mass.—*Hillside Ave.*, two-sty' fr. dwell., pitch roof, furnace; \$6,500; o., Mrs. M. L. Leland; b., Wm. Kellar; a., E. L. Clark, Boston.

COMPETITIONS.

BUILDING.

(At Oshkosh, Wis.)

The building committee of the Ladies Benevolent Society desire plans for a \$10,000 building. 1335

COURT-HOUSE.

(At Ortonville, Minn.)

Detailed plans and specification will be received by the County Commissioners until August 17 for a court-house, cost not to exceed \$30,000. H. L. ZWIENER, co. aud. 1336

PROPOSALS.

Treasury Department, Office Supervising Architect, Washington, D. C., July 20, 1901. Sealed proposals will be received at this office until 2 o'clock P. M. on the 29th day of August, 1901, and then opened for the construction (except heating apparatus, electric wiring and conduits) of the U. S. Custom-house and Post-office at Brunswick, Georgia, in accordance with the drawings and specification, copies of which may be had at this office or the office of the Postmaster

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at Brunswick, Ga., at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1335

COURT-HOUSE.

(At Crawfordville, Ga.)

The Board of Commissioners of Tallapoosa County will receive bids for the erection of a new court-house until August 6. L. F. Goodrich, of Augusta, is the architect. TITUS RICHARDS, chairman board. 1336

HOSPITAL.

(At Abilene, Tex.)

Sealed bids are invited for the construction of an epileptic hospital near this place. Bids to be received by August 8. Plans at office of J. L. O'Connor, architect, Austin, Tex. The State reserves right to reject any and all bids. J. D. Sayers, governor, R. M. Love, comptroller Public Accounts, J. W. Robins, treasurer. 1335

LIBRARY.

(At St. Cloud, Minn.)

Sealed proposals will be received until August 1 for the erection of the St. Cloud public library. The cost is estimated at \$80,000. 1335

SCHOOL.

(At Springfield, Mass.)

Bids are wanted August 14 for erecting a school on Chestnut and Prospect Sts. EDW. J. MURPHY, chmn. city property com. 1336

ASYLUM.

(At Pine Bluff, Ark.)

Bids are wanted September 2 for erecting a deaf mute asylum to replace the structure recently destroyed by fire. Probable cost, \$80,000. FRANK W. GIBBS, archt., Little Rock. 1336

COURT-HOUSE.

(At Lake City, Fla.)

The Board of Commissioners will receive bids until August 8, for the construction of new court-house to be built of brick and stone. It will cost \$35,000. Address communications to R. T. BOOZER, chairman, Lake City, Fla. 1336

["A Hit, a Palpable Hit!"]—HAMLET.

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PROPOSALS.

ALTERATION AND ADDITION.

[At Rolla, Mo.]
The School of Mines and Metallurgy, Rolla, Mo., Office of George E. Ladd, Ph. D., Director, July 1, 1901. Sealed proposals will be received at this office until 2 P. M., August 2, 1901, and then opened, for the addition and alteration to chemical laboratory and metallurgical buildings, and for the construction of a mechanical building, in accordance with plans and specifications, copies of which may be seen at this office or the office of B. Cunliff and P. C. Fape, architects, 308 Lincoln Trust Building, St. Louis, Mo. The right to reject any of all bids is reserved.
1336

CITY-HALL.

[At Vicksburg, Miss.]
Sealed bids are wanted by Architect J. Riely Gordon, of Dallas, Tex., until August 15 for erecting a city-hall to cost about \$40,000 when completed.
1336

CHURCH.

[At Greenville, Miss.]
Bids for the erection of the Presbyterian Church

PROPOSALS.

at Greenville, Miss., to cost about \$15,000, will be received July 31st, 1901. The drawings and specifications can be seen at the First National Bank, Greenville, Miss., and at the office of H. Wolters, Architect, Louisville, Ky. All bids must be addressed to Maj. J. E. Negus, Chairman Building Committee, and endorsed "Proposal for Church." The right to reject any or all bids is reserved.
1335

HOSPITAL.

[At Washington, D. C.]
Secretary's Office, Dept. of the Interior, Washington. Proposals will be received until 2 P. M., August 2, for the construction of an extension to the Government Hospital for the Insane at Washington, D. C. E. A. HITCHCOCK, secretary.
1335

HEATING.

[At Boston, Mass.]
Sealed proposals, endorsed "Proposals for Heating System," will be received at the bureau of yards and docks, Navy Department, Washington, until 1 o'clock, August 3, 1901, and then there publicly opened, for installing a central heating system at the navy yard, Boston, Mass. For plans, specifica-

PROPOSALS.

tions and forms of proposals address "Commandant, Navy Yard, Boston." MORDECAI T. ENDICOTT, chief of bureau.
1335

Treasury Department, Office of the Supervising Architect, Washington, D. C., July 11, 1901. Sealed proposals will be received at this office until 2 o'clock P. M. on the 22d day of July, 1901, and then opened, for furnishing and delivering the drafting materials required in accordance with the specification and schedule, copies of which may be had at this office. JAMES KNOX TAYLOR, Supervising Architect.
1335

CONSTRUCTION.

[At Boston, Mass.]
Sealed proposals, endorsed "Proposals for Ship Fitters' Shop and Metal Workers' Shop," will be received at the bureau of yards and docks, Navy Department, Washington, until 1 o'clock, August 3, 1901, and then there publicly opened, for furnishing and erecting the buildings in question at the navy yard, Boston, Mass. The estimated cost of each building is \$160,000. Plans and specifications may be seen at the navy yard, Boston, or of inland

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PROPOSALS.

upon application to the commandant of that yard upon deposit of \$25 to secure their return. MORDECAI T. ENDICOTT, chief of bureau. 1335

BARRACKS.

[At Sitka, Alaska.] Headquarters United States Marine Corps, Quartermaster's Office, Washington, D. C. Sealed proposals, in duplicate, will be received in this office until noon August 26, 1901, and then and there publicly

PROPOSALS.

opened, for furnishing all necessary materials and labor in the construction and completion of one set of officers' quarters at the marine barracks, Sitka, Alaska. F. L. DENNY, colonel, quartermaster, U. S. Marine Corps. 1336

HEATING.

[At Cincinnati, O.] Bids are wanted July 31 for installing a system of steam heating at the University Building, Brent

PROPOSALS.

Woods Park. JAS. M. ROBINSON, chmn. com. on bldg., bd. dir. of University of Cincinnati. 1335

JAIL, ETC.

[At Vincennes, Ind.] The board of commissioners of Knox County will receive bids until August 1 for the erection of a jail and sheriff's residence in Vincennes. JAMES D. WILLIAMS, auditor. J. W. Gaddie, architect. 1335

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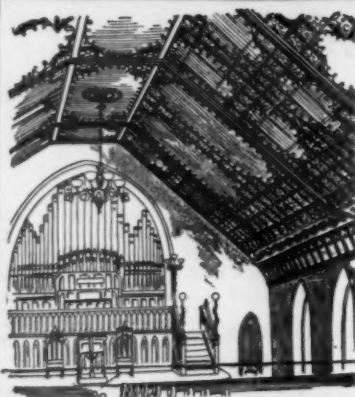
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