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## SUMMARY:—

|                                                                                                                                                                                                                                                                                                |    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| Losses attending the Paris Exhibition.—The Outcome of the Fall of a Bridge at the Paris Exhibition.—Death of W. J. Stillman, Writer.—Death of Napoleon Le Brun, Architect.—Death of A. B. Tower, Architect.—Objections to the Use of Quick-setting Plastering.—Interstate Ownership in Rivers. | 17 |
| THE ROYAL PALACES OF LONDON.                                                                                                                                                                                                                                                                   | 19 |
| CLOCKS, CARILLONS, AND BELLS.—I.                                                                                                                                                                                                                                                               | 20 |
| SPANISH ART IN THE GUILDHALL, LONDON.                                                                                                                                                                                                                                                          | 21 |
| CEMENT IN LATIN AMERICA.                                                                                                                                                                                                                                                                       | 22 |
| THE MING TOMBS AND THE GREAT WALL OF CHINA.                                                                                                                                                                                                                                                    | 22 |

## ILLUSTRATIONS:—

|                                                                                                                                                                                                                                                                                                                                         |    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| A Low-cost Dwelling-house, York, Pa.—Extension of the I. O. O. F. Crematory, San Francisco, Cal.—A Premiated Design for Aquarium and Horticultural Building in Belle Isle Park, Detroit, Mich.—Mercantile Trust Building, St. Louis, Mo.—Design for a Church at Pittsburgh, Pa.—The new Entrance to the Hofburg, Vienna, Austria.       |    |
| Additional: House of E. G. Jennings, Esq., No. 2 East 82d St., New York, N. Y.—No. 1008 Fifth Avenue, New York, N. Y.—House of L. G. Bloomingdale, Esq., 21 East 63d St., New York, N. Y.—House of Howard Willets, Esq., White Plains, N. Y.—Staircase-hall in same House.—Hall and Staircase in same House.—Stable on the same Estate. | 23 |
| NOTES AND CLIPPINGS.                                                                                                                                                                                                                                                                                                                    | 24 |

**E**CHOES of the Paris Exposition continue to be heard, and, just now, they are rather doleful ones. The great railway companies have been making up their balance-sheets for the last year; and, almost without exception, they find that the Exposition season brought them a net loss, in some cases a heavy one. The reason for this appears to be that the Exposition travel was much less than had been expected, while nearly all the roads had made very costly preparations for it, and the expense of operation, under the conditions of the Exposition, was greatly increased. Thus, the Western Railway, with an increase of ten million francs in receipts, found its operating-expenses increased by fourteen millions, without counting the demand for thirteen millions for the guarantee fund. The Northern Company, which had no new stations to build, or new tracks to lay, reports an increase of twenty-two million francs in gross receipts, but an increase of twenty-four millions in expenses, leaving the net profits of operation two million francs less than in the year preceding the Exposition. The Orléans Railway, which built the magnificent new station on the Quai d'Orsay, and the underground tracks connecting with it, reports a net profit from operation of two million francs, reduced, however, to a deficit of about two millions by the interest and sinking-fund requirements on account of the new constructions. Even the Paris-Lyons-Mediterranean Railway, the most energetic of all, with no special constructions for the Exposition except the enlargement of its existing station, reports a gross increase of twenty-four million francs, with an increase of ordinary operating-expenses of twenty-three millions, but with special expenses which reduced the balance available for dividends to more than two millions less than the year before; while the comparatively small Southern Railway, with a million and a half gross increase in receipts, found its operating-expenses increased by two millions and a half, and was confronted with a demand for three millions guarantee in addition. As for the "barnums," as the French call, collectively, the various side-shows with which the Exposition Grounds were encumbered, the complaints with which their proprietors began to rend the air before the Exposition was half over have not yet ceased; but, as their affairs are not matters of public interest, they are left, like poor Félix, whose Palace of Costume ruined him, to bear their losses as best they can. As for the hotels, there is room for suspicion that the anticipations of the beginning of the year were not, in all cases, realized. The hotels of the first class did not raise their rates very materially, and were probably well filled through the season with their old customers and their friends; but their own expenses were much larger than usual, to say nothing of their subscriptions to the various guarantee funds, and it is doubtful whether many of them found their net profits very satisfactory.

**T**HE most serious of the matters, however, which have just been brought to final accounting is that of the fall of the bridge over the Avenue Suffren, connecting the Celestial Globe with the Exposition grounds. It will be remembered that this was a bridge in concrete, with embedded iron, with a central span of something like sixty feet, and that on Sunday afternoon, May 29, immediately after the removal of the centring, it fell, killing eight people, and injuring eight others. The engineer and builder were immediately arrested, and their trial has just been concluded. The evidence shows great carelessness in the conduct of the whole affair. It is acknowledged that no detailed plans of the bridge were ever made; that the engineer simply made a sketch, to see how much iron should be ordered, and that, after the rough plans were ready, the contractor found that the bridge would interfere with some trees, and arranged with the surveyor who was staking it out to make two angles in it, instead of carrying it through in a straight line. The evidence is conflicting as to whether the piers were increased in size to resist the uncounterbalanced outward thrust introduced by this change, and one witness claimed that there could be no thrust in concrete construction; but the experts appointed by the Court reported that there was a thrust, and that the piers, as built, were insufficient to resist it, and that to their failure was due the fall of the bridge. The Court, while pronouncing the consulting-engineer of the Celestial Globe Company, who had directed the work, guilty of "the most culpable negligence," and the contractor under him, as well as the concrete building company, which was the sub-contractor, equally responsible, took into consideration the honorable standing, personal and professional, of the accused, and imposed on each the very light sentence of six hundred francs fine, and two months' imprisonment, still further lightened by the application of the Berenger law, which permits sentences of imprisonment to be held in suspense for five years, and, if the accused incurs no other condemnation for infraction of the law during that period, to be cancelled.

**M**R. WILLIAM JAMES STILLMAN, who died a few days ago in England, was, at one time, a frequent visitor to architects' offices in this country, as the representative of William Morris, for whom he obtained, we think, a considerable number of commissions. Many of those who were, at that time, young assistants or pupils will probably remember the tall, spare figure and intellectual face, as well as the manner, full of quiet energy, which marked the hero, as we then believed, of the Cretan insurrection, and the husband of the Greek lady, reputed to be the greatest beauty in Europe. Nothing, however, lasted very long with Mr. Stillman, and for many years those who had once been proud of their acquaintance with the American knight-errant have had to be content with reading an occasional letter from him in the *Evening Post*, or the *Nation*, or some artistic or literary monthly. These letters always showed learning and ability; and if, as, for example, in his attempt to identify the Venus of Milo with the statue of the "Wingless Victory," from the temple at Athens, his impulsive temper occasionally led him further in his theorizing than a more sober world was willing to follow, his writing never failed to show the sincerity which wins friends, if not disciples.

**N**APOLÉON LE BRUN, one of the oldest and best-known architects in New York, died there a few days ago, at the age of eighty. Mr. Le Brun was born in Philadelphia, of French parents, who had taken refuge in this country from the storms of the Revolution in their own. The elder Le Brun was a highly-educated man, and earned a living in Philadelphia by teaching. The son, after passing through the public schools of his native city, was placed in the office of Mr. Thomas U. Walter, the architect of the Capitol, at Washington, where he remained six years. At the end of that time he began practice for himself, finding success and distinction. In 1864 he removed to New York, which then offered a wider field for architects, and spent the rest of his life there. He was one of the oldest members of the American Institute of Architects, and was prominent in the New York Chapter. Some years ago he took into partnership his two sons, one of whom had already

won professional honors by his admirable judgment in collecting the architectural casts with which the Metropolitan Museum was supplied through the Willard bequest; and since that time they have shared his labors. Besides the Academy of Music and the Roman Catholic Cathedral, in Philadelphia, Mr. Le Brun built, in New York, the Church of the Epiphany, the Masonic Temple, the Foundling Asylum, and other buildings; and, in partnership with his sons, the Home and Metropolitan Life Insurance buildings. Mr. Le Brun belonged to the school that still regards the practice of architecture as a profession, not as a trade, and this, added to a certain Gaelic impulsiveness, made his manner in his intercourse with his fellow-architects delightfully frank and sincere.

**M**R. ASHLEY B. TOWER, an architect of note in New York, died recently, at the age of fifty-four. Mr. Tower devoted himself particularly to the engineering side of the profession, and designed, partly in connection with his brother, Mr. D. H. Tower, a large number of mills, including, perhaps, nearly all the paper-mills in New England. He was City Engineer of Holyoke for several years. More recently, he had turned his attention to steel-construction for office-buildings, and had, in connection with Mr. Wallace, carried out much work of the kind.

**INSURANCE ENGINEERING** offers a sort of challenge to the profession, in a recent issue, in speaking of the resistance of ordinary plastering to fires, by saying that it is surprising that our architects, to whom every one interested in building, whether owner, contractor, or material-man, looks for advice and wisdom, assuming that they have thoroughly investigated every meritorious improvement of this advancing twentieth century, should permit walls and ceilings to be covered with plaster which, as the *Brick-builder* says, "generally falls off in the early stages of a fire." *Insurance Engineering* thinks, apparently, that architects are culpably blind in not specifying, for their buildings, instead of ordinary plastering, some one of the proprietary plasters which, as it has discovered, will resist, without crumbling, a temperature higher than that of melting copper. It is hardly necessary to say that, as usual in such cases, *Insurance Engineering* looks at the matter only from one point, forgetting that the architect has to consider his materials under a multitude of different relations. Any architect could have told *Insurance Engineering* that plaster-of-Paris, which is the basis of the so-called "hard plasters" used in building, resists crumbling from fire. The sight of the old-fashioned plaster cornices, made with gauged mortar, that is, with a mixture of plaster-of-Paris and lime, clinging, intact, to the brick walls on which they were run, after a fire which had stripped the ordinary lime plastering from the adjoining surfaces, is a familiar illustration of this fact; and if architects, knowing this, continue to specify lime plastering, the fair inference is, not that they are ignorant of the properties of the materials which they employ, but that they have reasons, apart from the fire-resisting quality, for using the lime. One of these reasons is the greater cost of the proprietary plasters, a cost which ought not to be incurred without the consent of the owner, and which the owner, very frequently, does not wish to incur. Another reason is the slow drying of the hard plasters, in comparison with lime plastering. Those who sell the hard plasters generally claim that they dry more quickly than lime-mortar, and they certainly harden more quickly; but, in hardening, they combine with a large proportion of water, and, as a matter of fact, they often retain for a long time a dampness which delays the finishing of buildings in which they are used. A third reason why hard plasters are used by architects with discretion is that they are sometimes so acid as to affect iron exposed to them. Plaster-of-Paris itself is highly acid, and, if kept moist, will soon destroy, by corrosion, iron lathing covered with it. The proprietary hard plasters are less acid than pure plaster-of-Paris, and may be applied to metal lath, in a dry situation, with safety; but no architect would willingly risk exposing structural members, or costly wrought-iron ornamental work, to the action of mortar containing a large proportion of plaster-of-Paris, in a situation where it might frequently be wet, or even damp. If unskillfully used, or made, the plaster-of-Paris, or gypsum, mortars are subject to further troubles, in the way of swelling and cracking, want of adhesion of the different coats, and so on. It is, however, fair to the makers of the best-known proprietary

sorts to say that the materials supplied by them are so prepared as to give very little trouble in this way, and are used to a large extent by architects, where, in their judgment, they are applicable; and, in our opinion, they might be still more used if those who sell them would modify their policy of accusing architects who use anything else of ignorance and incompetence, and would, instead, listen occasionally to the suggestions of people who understand thoroughly the defects of ordinary materials, and, while they are ready to welcome any new material that they find to have good qualities, are not disposed to form their opinions at the dictation of patentees, or of the public.

**A** VERY important suit is now pending before the Supreme Court of the United States, to determine the rights of States to the use of water from streams having their source within their borders. The present suit is brought by the State of Kansas against the State of Colorado, to restrain the latter from using the water of the Arkansas River, which rises in Colorado, but flows through Kansas, for irrigation; but it is understood that other suits will follow, to prevent the use for irrigation in Colorado of other rivers which rise in that State, but flow through others. Within a few years, agricultural irrigation has taken a great development in Colorado, and the value of the farming products now sold from the State is said to surpass that of the ore and bullion from its mines, which were, only a few years ago, almost its sole wealth. A great deal of this farming by irrigation is done along the upper course of the Arkansas River, which afterwards, on its way to the Mississippi, flows through Southwestern Kansas, and is there used, by ditching, for agricultural purposes. The representatives of Kansas claim that the diversion of the water of the Arkansas River upon the Colorado farms diminishes the amount available for filling the ditches of Kansas; and, as the theory of law which makes it incumbent on owners of land on streams not to divert them so as to diminish the value of the water-power below, they demand that the farmers of Colorado shall be prohibited from diminishing the flow in the Kansas ditches. As a matter of law, it is questionable whether the principles governing the respective rights of riparian owners would apply where the owners lived in different States, or were the States themselves, as well as whether the taking of water for agricultural purposes, to the detriment of other agriculturists below, is the same thing, legally, as diverting water-power; but, in any case, the State of Kansas, to obtain an injunction against Colorado, would have to show actual damage; and it is upon this point that the interest of the case centres. According to the representatives of Kansas, the farmers of that State, through the operations of those of Colorado, "have been deprived of the moisture and water necessary to insure their property." On the other hand, the Attorney-General of Colorado says that a large part of the irrigation-water taken from the Arkansas River finds its way back into the stream, and that, as a matter of fact, old settlers in that part of Kansas declare that there is more water in the Arkansas valley than ever before. According to the ordinary view, the irrigation and cultivation of the once desert lands of Colorado should do much to increase the rainfall in Southwestern Kansas, and diminish the evil effect of the "hot winds" which have for many years made agriculture in that part of the country a very uncertain matter. To lose some water from the ditches of the Arkansas valley, and get in exchange warm rains, in place of parching winds, would be a most profitable operation for Kansas, and, if it can be shown that the operations of the Colorado farmers have had, or are likely to have, this result, the United States Courts will, assuredly, not interfere with them. Every one who knows anything about Kansas will remember that the southwestern portion of the State has been notorious for producing a crop of wheat only about one year in five, the harvests of the other four years having been, as a rule, blighted by the winds from the Colorado desert. Seven or eight years ago there were serious anticipations that the entire region would have to be abandoned, to become in its turn a desert. Shortly after that, and almost contemporaneously with the beginning of irrigation in Colorado, matters in Kansas began to improve, and during the past three years, the very period in which the Colorado farmers have begun to make their irrigated lands profitable, while the Kansas people complain that they have suffered through the abstraction of water from the streams, there have been three successive enormous crops of wheat in Southwestern Kansas, a thing perhaps never known before.

## THE ROYAL PALACES OF LONDON.

THE death of Queen Victoria and the accession of Edward VII to the throne of Great Britain have caused frequent mention to be made of many things pertaining to British Royalty which, though perfectly understood by every Englishman, are little comprehended by the dwellers upon this side of the Atlantic, unless accompanied by some explanation. This is the case with regard to the royal residences. The late Queen died at Osborne, on the Isle of Wight. She had a residence in Scotland at Balmoral Castle. Holyrood Palace, in Scotland, is also Crown property, and there are lodges and cottages in various parts of Great Britain which have been from time to time occupied as residences by the late Queen or a part of her family. All the time, Windsor Castle has been, par excellence, the royal residence. London, however, is at all times the capital of the British Empire and the official residence of the sovereign. We naturally look to that city to find the Royal Palace and a residence worthy of the grandeur of the King of England and Emperor of India. As a matter-of-fact, we find several palaces in that city, and the mention made in history of others, but none of them of architectural importance commensurate with the functions they are intended to perform. It requires, therefore, the exercise of some self-restraint on the part of the present writer to confine himself in this paper to notes, topographical and architectural, regarding these buildings, instead of wandering off into the more attractive field of historical interest which surrounds each.

Due east of St. Paul's Cathedral, with windows opening upon the Thames (whence it was quite convenient to toss the body of Edric into the river), stood the "palace" of King Canute. But Edward the Confessor removed his royal residence to Westminster. In "Old Palace Yard" and "New Palace Yard" and in the Houses of Parliament (which are called the Palace of Westminster) survives the name of Westminster Palace, a large portion of which, including all the living-apartments, was burned in 1512. Its site is occupied by the Houses of Parliament. Westminster Hall was the hall of the palace, and is now the vestibule of the Houses of Parliament. It is all of the old palace that survived the fire of 1834.

The hall was built by William Rufus towards the end of the thirteenth century, its roof being of Irish oak, about which there was a tradition that no spider would web or breed in it. The hall was rebuilt by Richard II, a century later, and its present magnificent framed, hammer-beam roof, with its single span 68 feet wide, 290 feet long, is of chestnut. Macaulay was, therefore, eloquent but inaccurate when he described the "old rafters of Irish oak" in the "Hall of William Rufus" as resounding with the voice of Burke in the trial of Warren Hastings.

The next palace to claim our attention is Whitehall, really the finest London palace the sovereigns of England ever possessed. It "might justly contend with any palace in the world for riches, nobility, honor and grandeur," says one of the Harleian manuscripts of 1691. It was originally built by Hubert de Burgh in the reign of Henry VIII, and became an archiepiscopal residence in 1248. For three centuries it was called York Place. Henry VIII took possession of it after the fall of Wolsey and it became the royal residence.

Although never as a whole a very magnificent edifice, despite the encomiums heaped upon it by the writers of that age, it possessed some very fine features. One of these was a beautiful gateway designed by Holbein and built of tessellated glazed brick of two colors. This was taken down in the eighteenth century, all its parts being numbered with a view to its reerection at Windsor, but this was never done. Another fine feature was the gallery over which in the seventeenth century were the apartments of the Duchess of Portsmouth, "pulled down and rebuilt," Evelyn tells us, "no less than three times to please her."

In 1615, the palace was nearly destroyed by fire, and James I undertook in 1619-21 to rebuild in accordance with a design by Inigo Jones, which, had it been carried out, would have given to London a palace worthy of a great Empire. It was to have had seven courts, and its extreme dimensions were to have been 1,152' x 720'. At the opening of the Civil War only the Banqueting Hall was completed.

In April, 1691, in a conflagration originating in the carelessness of a woman who allowed some linen she was drying to catch fire, "all the buildings over the stone gallery at Whitehall, to the water-side, were burned." The Guard Chamber, Council Chamber, Secretary's Office, King's Chapel, Long Gallery and Queen's Lodging were consumed.

The Banqueting Hall remained intact, — one of the best examples of the Palladian style, the most celebrated example that England possessed of the genius of Inigo Jones, and a remarkable monument of seventeenth-century art. Its ceiling was adorned with paintings by Rubens. It was converted into a chapel by George I. Ten years ago it was dismantled and handed over to the Royal United Service Institution for a museum. It was enlarged and judiciously adapted to its new use. The remainder of the palace long since disappeared.

St. James's Palace is the oldest of those now remaining in London. It was built by Henry VIII for a royal residence upon a site once occupied by the Saxons as a leper hospital. It was intended to be subsidiary to Whitehall, which was less than a mile distant. It was enlarged by Charles I, damaged by fire in 1809, and since restored. It is no longer occupied by the sovereign, but is the official and diplomatic seat of the British monarchy. It is a dingy and shabby

pile of brick, having little to boast of externally, but it is commodious and, in the arrangement of its rooms, well adapted to Court ceremonials and levees. The rooms have been found too small for the "Drawing-room" functions which are now held in Buckingham Palace. The dining-room is quite unworthy of a palace, being narrow and exceedingly ordinary in appearance. The picturesque brick gate towards St. James's Street (resembling the Holbein gateway at Whitehall already mentioned), the interesting Presence Chamber and the chapel known as the Chapel Royal, date from Henry VIII's time.

In Buckingham Palace we have one of the actual palaces of residence of the late Queen. It stands at the western end of St. James's Park on the site of a garden of mulberry trees planted by James I. In 1703, the Duke of Buckinghamshire built what was then considered the most splendid house in London. It was sold to George III, in 1761, for £21,000. It was that year described as "a building that attracts more eyes and has more advantages than almost any about town, not that it is, in fact, the most beautiful, but because it appears so, an advantage which it derives only from its situation." It is otherwise described as "large without being magnificent, and devoid of interest of any kind, historical or architectural." In appearance, it is certainly inferior to the palaces of Continental sovereigns, but in the extent of its gardens it is greatly superior.

First and last, more than \$5,000,000 have been spent in patching up this very unsatisfactory palace, and yet the building has little to show for it. George IV had little, if any, architectural taste, and spent prodigious sums upon it, thus necessitating like expenditures to undo all that he did. At the beginning of the Victorian reign it was called "the new Palace at Pimlico." The Queen took up her residence there in 1837. The Prince Consort built a new Eastern façade 300 feet long, which was some improvement, and added the ball-room. "Belgravia" has arisen upon lands adjoining the palace-garden.

Buckingham Palace was in 1894 (perhaps derisively) proposed for a board-school. It was state property and unoccupied (so it was declared) as a royal residence, and might be turned to some useful purpose.

Kensington Palace, where the late Queen was born and passed much of her youth, is a large, plain, red-brick building, three miles from the Houses of Parliament, upon property purchased by the Crown in 1689. William III was then occupying the throne. He was asthmatic and found it impossible to live at Whitehall, and was not sorry to see that palace burn down two years later. After entering into negotiations for the purchase of Holland House, he finally decided upon Kensington. He intended to make Hampton Court his chief abode, and during a brief residence there he laid out the Gardens, and they remain to-day an admirable monument to the best Dutch taste. But the bad roads of those days made Hampton Court too remote from the heart of the Kingdom.

Hampton Court is twelve miles from Charing Cross, and is hence not within the scope of this paper, though in many respects the most interesting of the noted buildings of England. It is a haunted palace, and it is on record that the Corporation of the City of London once ordered that twelve hundred masses be said for the purpose of laying the ghost. That was several centuries ago. For an excellent sketch of Hampton Court the reader is referred to the *American Architect* for August 7, 1897.

William III was much attached to Kensington, and added largely to the house, Wren and Hawksmoor being his architects. As a palace it bore only the remotest resemblance to the former house. He retained, however, the quality of unpretentious solidarity which first attracted him. This quality still characterizes and completely dominates Kensington Palace, for each monarch subsequent to William of Orange who has enlarged the mansion has done so in keeping with his original intention.

It is so severe and pathetically plain that its dignity is lost on the vulgar beholder. Leigh Hunt called it "a palace to drink tea in." And a poor man is said to have exclaimed when he saw it, "Call that a palace! I should say it was Kensington work-house," and turning to the work-house he added, "I should call that the palace."

Kensington Gardens consisted originally of twenty-six acres. Queen Anne added thirty, and Queen Caroline took in nearly three hundred out of Hyde Park. Out of some unwholesome ponds she formed the Serpentine River. She had a passion for "enclosing," and asked Sir Robert Walpole what it would cost to enclose St. James's Park and make it exclusively a resort for the royal family. The witty reply was, "Only three crowns, Madam." The Kensington Gardens have long been one of the principal features of the West End of London.

In Carlton House Terrace survives the name of another London Palace, famous in the eighteenth and early nineteenth century. It was once the residence of Lord Carlton, and was sold in 1732 to Prince Frederick of Wales, son of George II. In 1783 it was almost rebuilt and furnished in a style of splendor before that time unknown in England. It stood in Pall Mall where the steps leading to St. James's Palace now are. The northern side looked upon Waterloo Place. When it was demolished in 1827 its portico was removed to the National Gallery, and a stately colonnade was removed to Grosvenor House. The site and edifice were fine and immense sums of money had been lavished upon the building, and a reason for its destruction is therefore not easily found. The riding-house remained nearly half a century, and was then pulled down to be replaced by two of the finest houses in London.

Marlborough House was built about 1710 at a cost of £70,000. Wren was the architect: it became Crown property in 1817. On the occasion of the marriage of the Prince of Wales (now King Edward VII), it was greatly improved, and has since been the London residence of the Prince up to the time of his accession. It is of brick trimmed with stone. A new entrance-hall was added on the side of Pall Mall, and the former entrance-hall was converted into a *salon*. In the course of this conversion large oil-paintings representing the victories of the Duke of Marlborough were brought to light and restored after having been concealed by whitewash for many years. The library is a very pleasant room, its windows facing the gardens.

What Edward VII will do in regard to fixing and maintaining his royal residence remains to be seen. It seems that the Victorian Age has not displayed its architectural glories in royal palaces in the Imperial capital, and there is little prospect that we shall have an Edwardian Era which will manifest itself in that direction.

L. VIAJERO.

### CLOCKS, CARILLONS, AND BELLS.<sup>1</sup>—I.

IN introducing these three subjects to your notice in the order named, I propose to commence at once with the practical application of each to present-day requirements, and to relieve the dryness, inseparable from a technical paper, by the introduction of drawings, models and illustrations, which have been specially prepared for this occasion.

Tower-clocks may be divided into three classes:—

1. The timepiece, or non-striker.
2. The striking-clock.
3. The chiming-clock.

In the case of non-striking clocks, the question of surroundings does not matter, but for striking and chiming clocks the conditions of traffic should be carefully considered. We have a good illustration of this in the case of the clock at the Royal Courts of Justice, where the quarter bells, although weighing five tons in all, are often imperfectly heard unless there be a lull in the traffic. Then again provision should be made in towers for the sound of bells to escape. This is done by cutting openings in the walls at belfry, and inserting louver boards to keep the wet out. All this should be thought of and provided for while a building is in process of erection, and not wait until it is finished. Another equally important matter in connection with the erection of a turret-clock is provision for the ascent and descent of the weights. All large clocks are driven by weights, and the longer the drop the less winding required. The most convenient form of providing for the weights is to let them descend in one of the corners of the tower, trimming each floor they pass through and casing them in with wood to prevent any one standing underneath. The safest arrangement is for the weights to run to the ground, but, where this is impracticable, they may descend to a "set off" in the wall, or to steel girders built in to stop their progress should the line which supports them give way at any time.

Keeping pace with the times, public clocks have been improved upon in their construction and manufacture, as one generation succeeds another.

In support of this statement we have before us the old St. James's Palace clock, which, up till twenty years ago, did duty on that historic building. Although there is no date on this clock, it is evidently two hundred years old, and the inscription-plate on it notifies that it was restored by order of the King, William IV, in 1832, by Mr. Vulliamy, the Court clockmaker. As you see, it is still capable of work, but it is lightly constructed, and lacks the stamina and power of clocks of modern times. In comparison with it we show you a small turret-clock of modern construction, which we made and exhibited at the 1889 Paris Exhibition. Machine-cut wheels and pinions now take the place of the hand-cut wheels of former days, and the entire work is carried out in a weightier and more substantial manner. This is absolutely necessary when we consider the growth and increased traffic of large towns, which require that their public timekeepers should be well heard. Fifty years ago the chiming machinery at the Royal Exchange was considered equal to its obligations. Five years ago we took it away, and put a machine with hammers of double the weight.

Without boring you with too much technicality I ought to mention briefly the component parts comprising a turret-clock. The frame containing the works should be of cast-iron in one solid casting, which thus ensures absolute rigidity and immunity from warpage. Then the feet should be planed so as to stand perfectly level, and the top of the frame, on which the bearers rest, should be treated in the same way. In the best clocks nothing but gun-metal wheels are now used. Brass was formerly the rule, but it is a softer and more spongy metal than the former, and, therefore, not so durable.

The pinions also, in a first-class clock, which run in the toothed wheels, should always be cut out of solid steel where there is heavy work to perform. Many clocks are made with lantern-pinions, as being very much cheaper. The result is that, should the pin-wires get the least bent or misplaced, they begin to cut into the teeth of the wheels like a knife, and soon render the wheel useless. The best kind of pendulum for a turret-clock is that which is compensated.

Clock-towers are, as a rule, damp and changeable in temperature. Wood, therefore, warps and gets out of shape, so a metal pendulum

is a decided acquisition, and by making it of zinc and iron tubes, with a centre-rod of steel, compensation for changes of temperature is thus secured. The days of long pendulums are over. The pendulum of the church-clock at Rye, in Sussex, which occupies four seconds to the beat, is 56 feet long, and swings in the body of the church. This is very inconvenient, and now quite unnecessary. The largest pendulum we ever make is 15 feet 8 inches, and beats once in two seconds. We always take care also when fixing a two-seconds' pendulum to hang it against the wall out of the way. This entails putting the works of the clock against the wall, and this is often necessary, the floor not being strong enough in the centre. In olden times one solid weight was used for driving purposes. This was inconvenient if the line supporting it happened to break, as the weight, being a solid, heavy mass, was difficult to be reinstated. It is the usual custom to divide the actual weight for working into so many segments, so that a section may be added or removed at will, and for restoration of suspending-cords. These latter are now of all-steel wire, and devoid of any hemp-strands, which reduces the breaking-strain, as also does galvanizing. The hammer-work in connection with a chiming or striking clock is an important feature, and is often overlooked. In order to do justice to the tone of the bells, the hammers which strike them should be a certain weight, and allowed to fall a proportionate height. They must also be kept clear of the bells, and not allowed to touch, except by the force of their own momentum in falling. This is effected by means of strong steel springs attached to the bell-frame, and on which the hammers, on being released by the clock, fall.

All hammer-work in clock-towers should be attended to occasionally; the bearings oiled; the wires renewed, and the ironwork painted.

The accepted ratio for the weight of a hammer to its bell, to bring out the full tone, is one-fortieth, and this should not be exceeded for safety. Chime-hammers need not be so heavy in proportion, the sounding of the hours being the chief feature in a striking clock.

Having given you a brief summary of the internal mechanism of the clock, I now come to the question of clock-faces, or "dials," as we call them. These are for the most part of three kinds:—

1. The cast-iron skeleton-frame.
2. The sheet-copper.
3. The white "opal" face for illumination.

We have a sample of each before us. The first is especially adapted for village churches, where there is no prospect of illumination, and it is frequently the only face possible for ornate or sculptured towers, where a solid black face would be an eyesore. Where these skeleton-faces are adopted they should be fixed to stand out a few inches from the wall, when they show up in relief to greater advantage than if nailed on the flat. Iron, however, rusts after years of exposure, and begins to corrode, and the paint and gilding, if not renewed, wear off, leaving the metal bare and unsightly. The renewal of paint and gold-leaf is a simple and inexpensive process, and should be undertaken about once every ten years.

The copper face, planished convex, and painted black, with gilt figures and hands, is the most durable of all dials. Nothing stands the elements so well as copper, and it has the great advantage of being impervious to rust. It will turn green in its old age, but it never decays nor falls to pieces. A copper clock-face should last a century. Sometimes copper "dials" are painted in various body-colors, as this one is, as a relief; but for churches and public buildings, black and gold are the standard colors, and stand the weather best.

The opal-glass dial is the most popular, as it can be illuminated at night. This is formed of an open cast-iron framework, glazed with opal-glass. Several kinds of glass have been tried in this connection, but there is only one that is a success—the opal. Plate-glass has often been tried, but it becomes discolored and brown. If it is ground, the rough surface collects and retains the dust; if it is stippled, the paint chips off in time, whereas opal-glass always retains its original whiteness, and the more rain it gets the fresher it looks. Even with opal-glass, as with everything else, there is more than one quality. There is the flashed opal, and there is the solid opal. Until twenty years ago, nothing was used but the former, which is infinitely superior for illumination, but with the increasing thirst for cheaper prices, which consumes the British public, the poor clock-maker was forced in self-defence to compensate his losses by the introduction of the solid opal, a glass which costs a quarter the money and causes twice as much gas to be consumed. Keen competition is not an unmixed blessing all round.

The small illuminated dial before you is glazed with flashed opal. It is no better in the day than the cheaper glass, but, after dark, there is no comparison. The figures are cut out of sheet-copper, and the circles are bent round out of zinc sash-bar. This gives a neatness and finish to the work not obtainable in castings. In order to relieve the glaring whiteness of opal-glass, we sometimes introduce colored glass in front of the opal, bedding the two firmly and closely together, so that no dust gets between them. We have just carried this system out at Windsor Castle, and the effect is artistic.

As to the size most desirable for a clock-face, the generally adopted rule is 1 foot diameter for every 10 feet elevation. This is seldom exceeded, although, unfortunately, it is very often reduced to an inordinate degree. We have on the wall a clock-face of rather imposing dimensions. This is a full-size diagram of the clock we are now erecting at Toronto City-hall. These faces are surrounded by an ornamental cast-iron moulding, weighing 25 cwt. The strokes

<sup>1</sup> A paper by A. A. Johnston, read at a meeting of the Society of Arts, and published in the *Journal* of the Society.

representing the hours are 2 feet 9 inches long, and 12 inches in width.

The minutes are 6 inches long by 3 inches wide. From centre to centre the distance between the minutes is 11 inches, which, therefore, is the distance traversed by the long hand per minute—55 feet per hour, quarter of a mile per day, and 91½ miles per annum.

There is a specialty of our firm in this clock known as the Remontoire Train. We seldom introduce this in ordinary clocks, as it is expensive work, but for exceptionally large faces such as these it is an absolute necessity in order to overcome the inertia of the hands. Briefly, the principle of it is to accumulate the power of the clock till the completion of the thirtieth second, when the four pairs of hands move forward simultaneously and occupy the alternate divisions. As each pair of hands with counterbalance weighs 2 cwt., you can appreciate the advantage of this patent. The ordinary hand on a tower-clock is cut out of copper-sheet, 18 B. W. G., and stiffened at back with cast-brass ribs to prevent the wind blowing it about. These Toronto hands are made differently and are much more costly. They are elliptical, formed of double sheets of copper, convex towards the centre, and rivetted together every 4 inches at the rim. They have also internal brass cross-bars for rigidity. The minute-hands are 9 feet long by 9 inches wide at base, tapering to 6 inches at top, and weigh 56 pounds each. The hour-hands are 5 feet 6 inches long, 14 inches broad, and weigh also 56 pounds.

When it is borne in mind that those hands have to do their work at an elevation of 250 feet from the ground, and under climatic conditions of great rigor during the winter months, you will readily understand that much care and attention has been necessary in order to ensure a steady performance of this clock, which we understand will be the largest clock yet erected in the New World.<sup>1</sup>

It may interest you to know what those faces will weigh when completed. The face itself is cast in twelve sections and bolted together. Each section weighs 2½ cwt., so the dial altogether weighs 30 cwt., or the four faces 6 tons. The inner circle (which is made to open to get at the hands for clearing away snow, etc.) weighs 2 cwt. The glass in each dial weighs 15 cwt. The grand total works out as follows:—

|                                   |      |
|-----------------------------------|------|
|                                   | cwt. |
| Ring moulding round the face..... | 25   |
| Framework of dial.....            | 30   |
| Centre framework.....             | 2    |
| Glass.....                        | 15   |
| Bolts and nuts.....               | 3    |
| Weight per dial ...               | 75   |
|                                   | 4    |

Total weight of the four.... 300

The weights for driving this clock are:—

|                                |      |
|--------------------------------|------|
|                                | cwt. |
| For working the hands.....     | 15   |
| For striking the hours.....    | 20   |
| For striking the quarters..... | 10   |
| Total....                      | 45   |

The hammer for striking the hours weighs 250 pounds, and is made to lift 12 inches before it falls. We have just learned that the bell has been heard twenty miles.

The illumination of a clock-face is quite an important business. If left to local talent the result is generally a maximum consumption of illuminant in conjunction with a minimum amount of light. Now that the electric light is obtainable in many quarters, it offers great advantages for the illumination of clocks. Gas is the worst form of illuminant. It corrodes the works, smokes and discolours the glass, dries up the oil, and is altogether most unsuitable. Lamps are preferable, were it not for the trouble of trimming. To illuminate a clock-face well, the lights, whatever they be, must stand back not less than 15 inches from the glass.

If placed too close, they will show through, instead of giving an equally diffused light.

If placed too far back they will lose their power. They must also be judiciously placed so as to assist each other, and not placed round in a circle close to the circumference of the dial (as I have too often seen them) burning 12 jets where 4 would give a better light, if arranged in the form of a tree. It is the clock-face which is to be lit up, not the walls of the tower.

#### CARILLONS.

The word "carillon," as its name suggests, is of French origin, and signifies a chime. It is a mistake to suppose the carillon machine is of recent importation. At the present time there are many automatic tune-playing machines attached to peals of bells in various

<sup>1</sup> LARGER DIALS.—As additional discussion of "Clocks, Carillons and Bells," I submit that there are at least two clocks with larger dials than those of Toronto City-hall—one in Minneapolis, Minn., with dials 22 feet 8 inches diameter; the other the Philadelphia City-hall clock. Here are some figures relative to the latter, taken from an article by Warren S. Johnson, in the *Journal of the Franklin Institute*, February, 1911: Diameter of dials, 25 feet; height above pavement, 332 feet; length of minute hand, 12 feet; width of hour hand at centre nearly 2½ feet; total weight of hands and counterbalances, 1 ton. Motive power of suns, compressed air. Compressors in quadruplicate, two electric and two hydraulic. Illumination of faces by 600 electric-lights with reflecting shades. Weight of the four dials, their reflecting sheets and supporting framework, 43 tons. Timepiece, an astronomical clock, located in a dust-proof room 200 feet below the dial-room. The temperature of this clock-room is 75° Fahr. with maximum variation of 1°. — A. O. GRANGER, Cartersville, Ga.

parts of the country. The reason why they are not more in evidence is because no one attends to them when they get a little out of order. We have restored many such and can make them play again satisfactorily only with less power than a modern machine. But it is only within the last thirty years that any attempt has been made to improve on the old order of things and to introduce machinery which will play tunes automatically on bells with a certain amount of success. It is generally conceded that our first introduction to the system of automatic bell-music emanated from the Low Countries. But whilst the idea, no doubt, originated with them, their means of putting it into execution were, and are, clumsy in the extreme. I have seen the machine in the belfry of Bruges (immortalized by Longfellow) at work, or, rather, at play. A Belgian machine does all its lifting and releasing direct off the barrel. This may answer where the bells are small and the hammers light, but when you come to deal with heavy bells and hammers to correspond, it stands to reason that the mere fact of having to lift weighty hammers is a great strain on the barrel itself and tends to upset the regularity of the tune.

In this country of late years we lay claim to certain improvements in the releasing power of carillon machinery, chief of which is the separation of the releasing and the lifting power. In connection with our patent system, the tune-barrel lets off the hammers, whilst a continuous worm-screw gradually replaces them into an uplifted position ready for another release.

The tune-barrel and this worm-screw have no direct connection, and, therefore, no matter what the hammers weigh they do not drag on the barrel. Another advantage of these modern machines is that the barrels being interchangeable and easily lifted out and in, by having a number of them an indefinite number of tunes may be played, as each barrel is capable of playing seven tunes, and four barrels would, therefore, provide 28 tunes—a fresh tune daily for four weeks. The number of tunes that can thus be played by one of these machines is limited, not by the machine, but by the number of bells available.

We have here a small peal of model bells attuned to resemble a standard ring. Inasmuch as all ringing bells must be necessarily cast, and tuned to the diatonic scale, we select our tunes accordingly to put the same bells to a double use.

By the introduction of one or two semitones, with the addition of a note above the treble, the number of tunes that can be played is greatly increased. Even on six bells a few tunes can be played, such as "Lead, Kindly Light," "Rousseau's Dream," and a few others. When we come to a peal of eight the selection increases a hundredfold, and add but a semitone, a B flat in the key of C, and their number is legion.

There is no mechanical reason why any tune should not be played, provided the scale of bells admits of it, but all tunes are not expedient. A tune that harps on one note is to be shunned. The best tunes are those possessed of an easy, methodical rhythm. This gives the hammers time to pull themselves together again ready for the next blow. Jerky staccato music is unsuitable, and, moreover, the sound of each bell must die away unassisted, a damper not being possible as in the case of a piano, and any attempt to produce florid passages in carillon music inevitably results in chaos. For the same reason, chords in campanology are not a success.

The plain, simple air gives the most satisfaction. Last year I played through every tune in "*Hymns, Ancient and Modern*," in order to analyze their adaptability to bells cast in the diatonic scale. There are two of them on five bells, which can be so played, 16 on six bells, 65 on eight bells, and 96 on ten bells. Not a large proportion out of 650 tunes. Add but a semitone or two, and you could play them nearly all, although the addition of new bells to an old peal is not always attended with success, as the alloy may be different.

In the earlier machines, such as those at Manchester Town-hall, Boston (Lincs.), etc., we used mahogany barrels on which to fix the pins, but of late years we have been casting the barrels in bell-metal, and drilling them for steel pins.

The metal barrel is preferable in many ways, as it does not twist and warp in damp towers like wood, and therefore the pins are better able to retain their original positions. The erection of these machines is not confined to this country. We have put them up at such widely divergent centres as Caracas Cathedral, Venezuela; St. George's Church, Montreal, and Maritzburg Town-hall, South Africa.

[To be continued.]

#### SPANISH ART IN THE GUILDHALL, LONDON.

VELASQUEZ and Fortuny together would make a very respectable and exhaustive show; but the Exhibition also contains some Murillos, a large number of Goyas and a few works of a much-less known painter, Coello. Of Murillo, little need be said; he is always the same sentimental mannerist, pleasing the multitude, but having no surprises for the initiated; and yet many persons express great admiration for his cherubs and beggar-boys, the golden lights and brown shadows of his best works, and all his other conventionalities and weaknesses.

Coello's portraits are upon the lines of Mytens; there is the same precision in the painting of rich brocades, jewels and other details of sixteenth-century costume. Coello was a friend of Sir Antonio Mar, whom he accompanied to Lisbon. He died in 1590.

Goya was represented by seventeen works, mostly portraits. He was, as a painter, a many-sided man—sometimes reminding one of

Gainsborough in pearly-gray tones, sometimes of De Troy, Boucher and other masters of pale pinky flesh-tones. At times he was as near perfection as any—see the "Dr. Peral" and note the lips painted with one touch of the brush, a refined, masterly portrait. Then pass on to the "Cucaña and the Bulls," and you perceive the tremendous dramatic power of the man. Again, the "Señora de Cean Bermudez and a Lady" attract us by the exquisitely refined tones of the flesh—that pink-gray complexion which one sees in some of the modern Spaniards, betokening their Austrian parentage.

But the richness of the Exhibition is best seen in Gallery III, which is devoted to Velasquez. There are the two "Bodegones," "The Steward and the Two Young Men at a Meal," painted when quite a youth. The first of these is a study of still-life, and such is the richness of the collection that it is possible to follow the painter's methods chronologically from early youth to the end of his absolutely successful, but short, career.

Then comes the Duke of Wellington's "Water-carrier of Seville" and the late Sir Francis Cook's "Omelette." The former was, in 1780, in the royal palace at Madrid, and was looted by Joseph Bonaparte when he fled from Spain in 1813. It was captured by the British at the rout at Vittoria, being found in the Prince's carriage, with a quantity of plate and jewels. Wellington proposed to restore it to Spain, but King Ferdinand begged him to keep it, as a personal gift. Unfortunately, whether one stands near, or some distance from, the pictures, the glass reflects a mass of sailor-hats, summer costumes and one's own features. So that Velasquez's masterly work is difficult to study. Next, chronologically, painted about 1623, are the still life "The Beggar and the Globe," and the "Portrait of Isabel de Bourbon." It is difficult to realize how Justi could speak of this princess as "the loveliest subject of the pencil of Velasquez"; but there is no doubt about the beauty of the color and the perfection of the art. It was probably painted under the eye of the king, as at this time Velasquez had his studio in the palace, with a secret passage connecting it with the royal apartments.

In 1628, Rubens, senior to Velasquez by twenty-two years, visited Madrid, and we know that the two painters fraternized for nine months—Rubens being given apartments in the palace; but his influence upon the younger man did not affect the Spaniard's scheme of color. In 1627, Velasquez painted the "Conde de Olivares," a portrait belonging to Mr. Edward Huth—that superb combination of power, brutality and unscrupulousness, whom some have described as a "high-bred, noble and adroit politician."

Four portraits of the little Don Baltasar Carlos hang on the walls: the Duke of Abercorn's picture of the child with three masterly painted dogs; another belonging to the Marquis of Bristol; King Edward's, which was presented to Charles I by the Spanish king; and the Duke of Westminster's grand portrait of the boy on horseback. A duplicate of this picture, but not nearly so rich in color, is in the Wallace collection, having passed to Hertford House via the poet Samuel Rogers. Justi, in his "Velasquez and His Times," says: "The young prince showed a great talent for horsemanship. . . . Philip often referred to the matter in his correspondence with his brother Ferdinand, who on his part sent encouraging presents, such as a suit of armor and two Italian greyhounds. There also came a pony, described as a 'little devil,' who, before being mounted, was to be carefully bridled, and to receive half a dozen lashes, after which 'he would go like a dog.' Perhaps this is the identical pony on which the prince . . . is taking his first lessons in the riding-school." This is a brilliant example of the rich coloring and dexterous handling.

In 1649 Velasquez visited Italy for the second time, and the magnificent "Pope Innocent X" is one of the results. A slight study for this is in the Hermitage at St. Petersburg, and had it been in a travelling condition, the Czar would have sent it for exhibition at the Guildhall. It is a pity it could not have been placed side by side with the Duke of Wellington's picture, as most interesting studies might have resulted from comparison. But the Duke's picture is also possibly only the finished study for the canvas in the Doria-Pamfili Palace at Rome. The Pope was so pleased with the latter work that he presented Velasquez with a gold chain and medal, bearing his own likeness in relief. And what a marvel of harmonious coloring and splendid brushwork it is! probably firing the ambition of Millais and Mr. Watts in undertaking the portraits of Cardinals Newman and Manning. We see, too, the individuality of the man; cunning, sensuality, vindictiveness, dishonesty (he allowed Cardinal Pamfili to steal books he could not buy)—all are there added to unscrupulous cruelty and vice.

A number of pictures by Fortuny add to the charm of this exhibition, mostly masterpieces of this original painter, who influenced modern Spanish art for good and for evil. It is curious how completely prosaic it all is—hard, dry, unpoetic realism. The miniature finish of the "Spanish Marriage" is in its way unique. The background of the sacristy is a marvel of careful study, and yet one almost wishes the group of figures could be cut out of the canvas. And the same applies to the "Garden of the Poets." It is all alive—persons and plants; and yet there is an uncompromising hardness of tone and texture that offends one's taste amidst much that demands our admiration. The "Selection of the Model" is a *tour de force* as regards technique; but the acute realism of the figures leaves an unpleasant sensation upon the spectator. The model is exquisitely painted, but she is drawn with the imperfections caused by the wearing of clothes. Fortuny never idealized nature. And of the group of inspecting artists the less said the better. Had Fortuny remained

faithful to his earlier studies, such as the "Matador," the "Espada," the "Moorish Guard," the "Moorish Farriers," the dainty "Butterfly," "An Arab" and the like, his reputation in the future might have been greater. The subtle coloring, rich and restrained, of his early life gave place to an alarming and fatal dexterity. The realism in the Spanish character, the utter want of idealism, became uncompromising, and as a result, Fortuny was only saved from the highly-scented vulgarity of his compatriots by his own individuality. Throughout Spanish art, this lack of the ideal forces itself upon us. It is dexterous, it is finished, well composed; but it is also exaggerated, hard, artificial, meretricious and tawdry; not so vulgar as modern Italian art, because more sumptuous, but equally wanting in repose, in sincerity, in refinement; and one can almost trace these idiosyncrasies of modern Spanish art to the insincerities and artificialities of Murillo and his school. Velasquez stands apart as a giant amongst dwarfs.

The Exhibition remains open until August.

S. BEALE.

#### CEMENT IN LATIN AMERICA.

STATEMENTS from various consular officers located in Central and South America concerning the development of the trade in cement have been received at the State Department of the United States, from which it is seen that in Costa Rica only does the United States rank first on the importing lists. In almost every case, however, the reports indicate the possibility of advancing the interests of the United States in this particular article, and for Mexico, especially, the facilities for shipment are said to be excellent. In this latter Republic Portland-cement was imported during the fiscal year 1899-1900 to the value of \$130,324, England occupying the first rank, with a valuation of \$46,612. Germany and the United States were next in order, with \$30,676 to the credit of the latter country and \$30,375 for the former. It is stated that the consumption of Portland-cement in the City of Mexico ranges from 500 to 600 tons per month and is increasing steadily, and prices range from \$4 to \$5 per barrel. The *Mexican Herald* for June 9, 1901, states that "within the last five weeks 2,200 carloads of Portland-cement have passed through the Juarez custom-house destined for interior points."

In Costa Rica the market is not a large one, and as German exporters have established the precedent of shipping their cement in iron barrels, Consul Caldwell thinks it advisable the practice be followed by the United States dealers also, as it has met with favorable results. A quick-setting lime is demanded in Costa Rica, and the retail price in San José is about \$11.45 per barrel. For the eleven months of 1900 included in the report, receipts from the United States amounted to 707,452 pounds, Germany and Spain following with 460,087 and 164,309 pounds, respectively.

Guatemala obtains most of the cement used in that Republic from Germany, about 4,000 100-pound barrels being reported by Consul-General McNally during the year 1900, the retail price being \$12. The annual importation is about 1,500 tons, and varies in price from \$1.75 to \$2 per barrel. Such imports as are received from the United States consist largely of cement landed under bond, manufactured chiefly in Belgium. Haytian imports have fallen off considerably during the past years, from 4,000 to 5,000 barrels having been formerly received at Port au Prince, whereas now the annual importation does not exceed 2,000 barrels. The price is \$10, Haytian currency, and Germany supplies practically the entire demand.

From Buenos Ayres, Consul Mayer reports that the cement imported by his consular district during the fiscal year 1900 was valued at \$192,550, Germany, France and England having control of the market. Very little United States cement is on the market, but in the Consul's opinion there is no doubt that were an agency established and credit given to reliable dealers, success would follow. Germany and England control the Chilean market, with the preponderance in favor of the former country. The retail price is \$11 per barrel. In Ecuador, the demand for Portland-cement is very slight, Germany being the principal country of supply, followed by Belgium and the United States. In Paraguay the yearly importation is about 3,000 barrels, the average price being about \$2 per barrel. Uruguay imports a considerable amount of cement, but the United States has no part in the trade, as England, Belgium, France and Germany control the market. For the years 1896, 1897, 1898 and 1899, the imports amounted to 4,500,000 kilogrammes annually, and in the opinion of Consul Swalm the demand will advance steadily.—*Bureau of the American Republics.*

#### THE MING TOMBS AND THE GREAT WALL OF CHINA.



We were all off at 8 A. M. Eight officers—Harper, Greenleaf, Lindsay, Burgess, O'Keefe, Karnes, Paymaster Luckesh, of the navy, and myself—formed the party. Captain Hyer commanded the escort, Troop L, Sixth Cavalry; with him were Lieutenants White, Nicklin and Loeb. The dust was dreadful until we marched about twelve miles from Pekin, where we reached sandy soil, and thereafter the marching was more comfortable. We stopped for tiffin at Tching-Ho, where the Mandarin had a spread of cakes and tea. At 4 A. M. we reached Chang-Ping-Chou, our camping-place for the night. I found a clean place outside the wall for the troop, and the rest of us put up in Chinese houses. Distance marched, twenty-five miles.

In the evening Captain Hyer and I called on the German commander, and found him entertaining several German officers from Pekin, who, like ourselves, were on a sight-seeing tour.

Wednesday, March 29, 1901, at 9 A. M., we started for Ming Tombs, sending wagons direct to Nankau at the opening of the pass through which we would ascend to the Great Wall. The Ming Tombs are situated along the foot of the mountains, which here rise in a semicircle, forming a vast amphitheatre. Evergreen trees and yellow-tiled roofs mark the location of the tombs. There are thirteen in all, separated from one another about one-half mile.

The tombs are much alike, and to see one is to form an idea of all. It is not the tombs so much as the approach thereto that excites wonder. Several miles before they are reached the way is marked by pailows, or immense marble gates, through which passes what at one time was a road made of great blocks of granite, that are now tumbled about or have been carried away. Farther on, the first view is had of an avenue on either side of which stand colossal figures of men and animals carved from stone. In the distance the animals appear very life-like, and a strange feeling came over me, a feeling of awe and a sense of being transported to remote ages; everything was hushed; the sight of these immense stone images standing there guarding the passage to the tombs brought us to a halt without the word of command, and for several minutes not a sound was uttered nor movement made. Every one felt the solemnity and grandeur of the scene, and when we marched forward it was in silence and with reverence. The great images on our approach loomed up in all their grandeur.

The avenue is about 100 feet in width and nearly one-half mile in length; the stone images stand about 200 feet apart, facing the roadway—first, two immense crouching lions, then two lions standing, followed by unicorns, horses, camels and elephants. Between the standing elephants a line of officers was formed, with the troop of cavalry behind, and a photograph taken. The head of the elephant near me reached several feet above my head, although I was mounted upon a large horse. After the animals were passed the images of priests and warriors begin; grim old chaps, they have stood there for hundreds of years, the priests in mitres and robes, the warriors in armor and carrying at their sides great swords. It struck me as strange to see the similarity of the robes and mitres to those of bishops of to-day and the armor of the Crusaders protecting the limbs of these old warriors. The images are hewn from solid blocks of stone; to remove them and place them in position must have required skill that would tax the ability of mechanics of the present day.

We made for the nearest tomb, which proved to be that of Ching Ling, the founder of this grand system of mausoleums, and one of the greatest of Chinese emperors. The encircling walls embrace several large buildings of the prevailing Chinese imperial architecture, yellow-tiled roofs supported by large columns of wood. There was no one to explain their uses, and being left to conjecture, we decided that they were meeting-places for the departed spirits of Ching Ling and his contemporaries. The remains are said by some to lie beneath a marble slab set upright in a mausoleum constructed in rear of the large buildings. The slab is carved with Chinese characters describing the life and virtues of the great monarch. Others claim that the remains do not lie here, but in the heart of a round-top hill directly in rear of the mausoleum. Wherever they may rest his memory will remain fresh, marked as it is by imperishable monuments. For several hours we wandered about the enclosure or rested beneath the evergreens.

It is six miles from the gates of Chang-Ping-Chou to this tomb, and about the same distance from the tomb to Nankau, which place we reached at 4 P. M., and found our wagons arrived and a good camping-ground selected by the men in charge. The troop pitched only one tent, for its officers, the remainder of the party putting up at the Nankau Hotel. The place was deserted, but we had everything, including servants, and were not put out by the absence of the landlord. If the wall of Nankau could speak what an interesting history would be revealed, situated as it is at the south end of the only pass through the mountains that divide China proper from Manchuria and Mongolia. Through this gateway for centuries have passed the camel-trains bearing furs and rugs from the north and silk and tea from the south. Over the same road have marched the Mongols, the Tartars, the Manchus, on their roads for plunder and conquest. There is not elsewhere in all the world a roadway of such historic interest, but much of its history is written in characters unknown to modern scholars, or is lost in oblivion. What more appropriate place than this to view the Great Wall of China, the greatest of the great wonders of the world!

March 30, 1901, at 8 A. M., we set out for the wall. The day was clear, calm and crisp, and every one was in the best spirits. The distance from Nankau is twelve miles, the ascent at the rate of 200 feet to the mile. When we reached the wall we were at an elevation of about 3,000 feet, and we found the air decidedly cooler than at starting. The mountains rise on either side to an elevation of 5,000 to 6,000 feet, and present, as one passes through, all the variety of mountain scenery. Along the road flows a stream of pure, clear water, the only one I have seen in China. Our first view of the wall was at ten miles from Nankau, where in its windings to follow the crest of the ridges it approaches the road.

A sharp rise of about one mile brought us to the summit of the pass, and to the gateway through the wall, which here descends to cross the road, and having done so climbs again the everlasting hills, disappearing amidst the crags only to reappear farther on in its

windings from the sea to the heart of Asia. For 3,000 miles, over mountains, through valleys, across plains and deserts, stretches this work of man; and no shiftless, careless work it is, but a solid, well-constructed piece of masonry. The wall is on an average about twenty feet high, with a width at the top, measured inside the crests, of 14 feet. The facings of the body of the wall are hewn blocks of granite, the space between being filled with gravel mixed with cement. The top and battlements are of large bricks, and every few hundred yards a tower rises many feet above the battlements, its sides extending beyond the wall to give a flanking defence. From the tower on the crest east of the road can be seen, to the north, the plains and mountains of Manchuria, to the south the mountain-sides sloping to the narrow stream along the roadway, and to the east and west the trail can be traced for many miles. It is well worth the traveller's time to ascend the wall to this tower; the effort will be well repaid by the view obtained of the grandest works of nature and the greatest work of man.—H. J. Gallagher in the *Army and Navy Journal*.



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

A LOW-COST DWELLING-HOUSE, YORK, PA. MR. B. F. WILLIS, ARCHITECT, YORK, PA.

THE object in offering these views is not because of the character or importance of the structure, but to illustrate its low cost, even in this section, to those who must deal with this prosaic side of our calling.

This house was completed and occupied one year ago last March. It is a well-built structure. The accompanying first and second floor plans will show at a glance the floor-areas, thickness of walls, etc. The cellar-walls are built of native white limestone to the top of first floor. This material cost, delivered at the site, 85 cents per 2,500 pounds, which is supposed to be 25 cubic feet of stone.

From first floor up, the walls are laid with machine-made "stretcher" work, every seventh a "header" or bonding-course. The best of the brick were selected for all of the face parts and laid with brown mortar, cut-joint. The weathering effect of these bricks produces an agreeable soft red tint. The bricks were delivered at the site for \$4.50 per thousand run of the kiln. At this time they would cost \$6 per thousand at site.

The roofs are covered with Eureka green slate of very small size. The exterior woodwork is painted a grayish-white. All brick walls are furred off.

The first-story ceiling height is 9' 6", second story 9', third story 8'. The third floor is provided with two large bedrooms, a sewing-room and a large trunk-room. The chimney-breasts in dining-room and parlor are constructed for future gas and coal grate respectively. The interior woodwork throughout, including staircase, is cypress, with a good rubbed-down varnish finish.

The entire cost of the work, as taken from our books, less my services, was as follows:—

|                                                             |            |
|-------------------------------------------------------------|------------|
| General contract.....                                       | \$5,046.00 |
| General contract, addition to.....                          | 110.00     |
| Cesspool.....                                               | 15.00      |
| Furnace and setting in double air-chamber, brick walls..... | 226.00     |
| T. C. drain-pipes and labor.....                            | 30.00      |
| Out-door concrete walks and curbing.....                    | 216.94     |
| Lighting fixtures.....                                      | 148.10     |
| Total.....                                                  | \$5,792.04 |

When the building was completed I expressed my hope to the contractor that he would come out on the right side of his contract financially.

He made reply, "There will be enough to pay the bills."

EXTENSION OF I. O. O. F. CREMATORY, SAN FRANCISCO, CAL.

A PREMIATED DESIGN FOR AQUARIUM AND HORTICULTURAL BUILDING IN BELLE ISLE PARK, DETROIT, MICH. MR. F. CARL POLLMAN, ARCHITECT, DETROIT, MICH.

ALTHOUGH this design shows one of the three premiated designs, the structure actually to be erected was designed by Messrs. Nettleton & Kahn, of Detroit.

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OVERSIDE STREETS.—Wide streets are generally supposed to be good things, whether in big towns or little ones, but when it comes to laying pavements, highways unnecessarily broad require an expenditure that may delay or entirely prevent the making of the improvement. The President of the Michigan Engineering Society, in his recent annual address, had much to say on this subject, and he cautioned the officials of small towns not to be too ambitious in laying out their roads, since it was better to have narrow ones well paved than wide ones not paved at all, or at an expense the community cannot afford. He instanced the case of Wauson, Ohio, where the main street is 72 feet between curbs and contains no car-tracks. "I advocated a 60-foot pavement," said the speaker, "that being more than ample for the needs of a village of 2,500 or 3,000 inhabitants. The 72 foot pavement, however, was put in. A light fall of snow shortly after the pavement was finished showed the width of pavement they really required. Three days after that snowfall, I took the Council over that street, and all of the traffic that had passed over it could have been handled on a 32-foot street. At the sides the snow was unbroken, excepting where a pedestrian or a dog had walked across it. At Delta, a small village of perhaps 1,000 inhabitants, 18 miles west of Toledo, the main street is 50 feet wide. They have something like a mile of street-paving under contract, and the width settled upon is 18 feet for streets which have little travel and no teams hitched on them, and 24 feet and 30 feet on the business street. Thus far it has been found that these widths are ample, and the paving has been put in at a very low cost to the property-owners. The mistake is very often made by property-owners of paving a street for 30, 40, or 50 feet width where a 24-foot or 30-foot street would do just as well." All this, however, is rather an argument against unduly wide roadways than against wide streets, the latter term meaning the space between the private land on each side. Every village should prepare for future growth, and avoid the troubles imposed upon New York by the narrowness of many of its down-town cañons. — *N. Y. Times*.

PROFIT-SHARING TO HELP ENGLAND.—One of the Article Club's monthly dinners took place recently at St. Ermin's Hotel, Westminster, when Earl Grey presided. In calling on Mr. Mathieson to open a debate on "Profit-sharing in Industry," Earl Grey said that it had lately been realized that by profit-sharing the industry of this country could be Americanized, and have imported into it some of the vigor which characterized great businesses on the other side of the Atlantic. Profit-sharing gave the employees an interest above their wages. Without the system of profit-sharing in existence industry had to contend against a difficult condition of things. There were two separate armies of employers and employed—the employer, trying to get as much as he could out of the worker, and the worker trying to do as little as he could for the wages received. The general idea which prevailed among workmen was so to labor that their employer found it necessary to engage three men where two would do. If industrial firms wished to be as successful as their competitors across the seas it was absolutely necessary that there should be the fullest coöperation between all who were concerned with the firm, whether he was a director or workman. In America they did not go in for profit-sharing much, but in that country they had great advantages. The workmen drank less. (Laughter.) He had looked into the question lately, for he was interested in a public-house scheme—(hear, hear)—and he had found that the consumption per head in America was half what it was in this country. In America there was a higher standard of man, and there was a smaller social difference between workman and employer. The American employer was more inclined to consider suggestions made by the workingman than were employers in Great Britain, where those who brought forward new ideas were too often snubbed. After mentioning some firms who had tried the copartnership system with the greatest success, Earl Grey expressed his opinion that if the principle were applied by more firms in this country it would increase the solidarity of British industry. (Cheers.) — *London Post*.

NEW YORK'S BRIDGES.—New York has but fourteen bridges, and thirteen of them cross Harlem River and Spuyten Duyvil Creek. The other is the suspension-bridge over East River. Four new bridges over the East River are authorized, and some of them are partially constructed. The matter of names for these new bridges is under consideration, and the American Scenic and Historic Preservation Society has established a prize-competition for the best list of names for them. What assurance there may be that the names considered by this society the best will be adopted by the city, we do not know. The officers of the Society, it is said, are much disturbed just now because on a recent map the historic Kingsbridge Road, so designated from King's Bridge, over the Harlem, that got its name when rebuilt during the Revolutionary War, has been renamed Broadway. King's Bridge was substituted for the first bridge built in New York, in 1693, a toll-bridge which for more than sixty years was a source of income to the Philipse family, until Benjamin Palmer built a free bridge near it. Kingsbridge Road is, in fact, a continuation of Broadway, and perhaps it was inevitable that it should lose its distinctive name. Many believe that New York is destined to become a city of bridges, and that the East River will rival the Thames and the Seine in the number of structures crossing it. Perhaps the tunnel-schemes in contemplation may prevent such a development. — *Boston Herald*.

THE COPYRIGHT IN OLD WORKS-OF-ART.—The difficulties of the law of copyright, if it can be supposed to have any relation with examples of ancient work, were revealed in a case which was heard a short time ago in Paris. The Comte de Brouville is the possessor of some old Aubusson tapestries which he prizes because they are thought to be unique. He was, therefore, surprised when he saw in a shop in Paris a room which was hung with identical pieces. He at once came to the conclusion that they had been copied from his property, for on one occasion he confided his tapestry to the owner of the shop for reparation. He sent a legal demand for the withdrawal of the copies and for the prohibition of the sale, on the ground that his property was diminished in value through the existence of the copies. The judges in the French court where the case was tried said it was incontestable that there was property in artistic work, however old, and an owner could refuse to approve of its reproduction; but while admitting the identity of the subjects it was maintained that the Comte de Brouville had not proved that the copies were taken from his tapestries. It was also uncertain whether he was the possessor of the only set of that design which had been produced at Aubusson. The case shows the facilities which Paris possesses for imitating works-of-art with expedition, and it is well known that experts can be deceived by the copies. — *The Architect*.

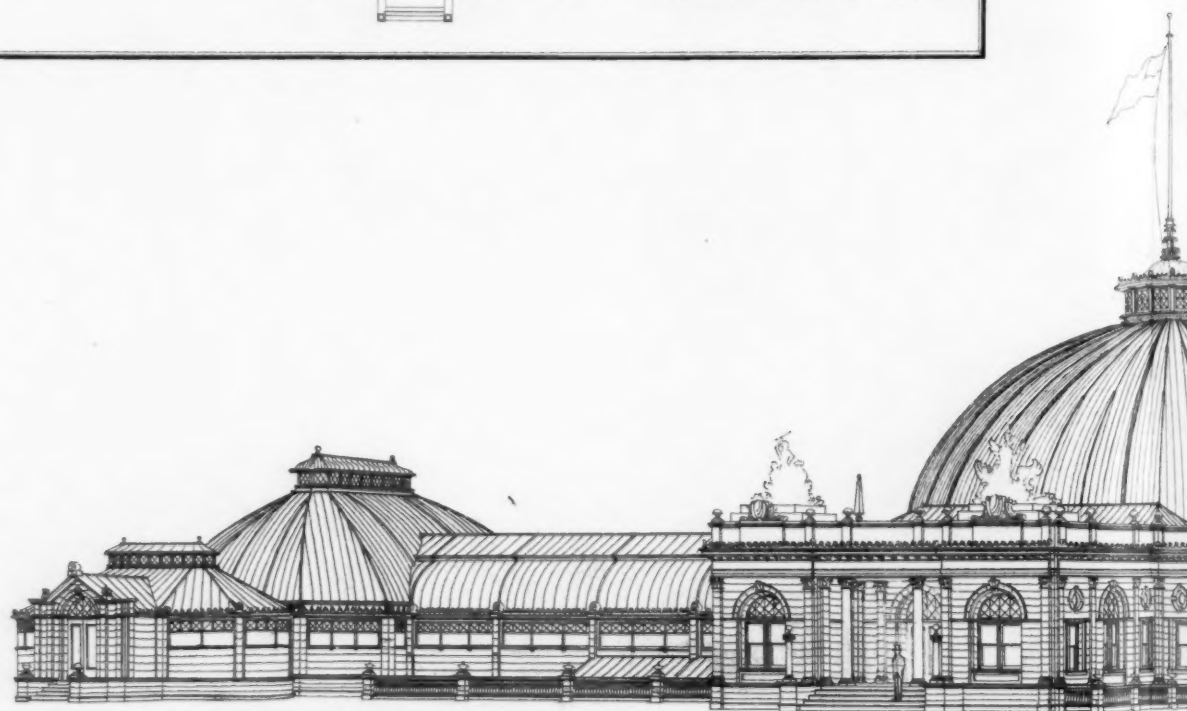
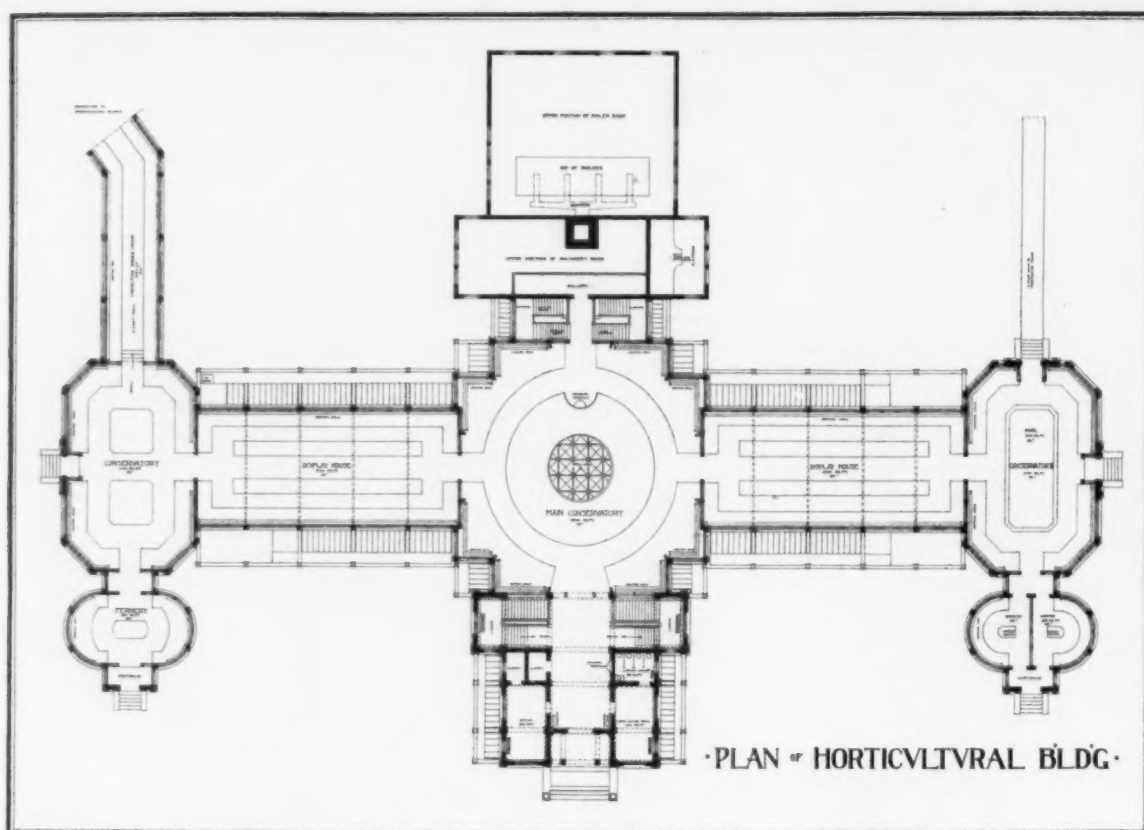
END OF THE ARTIFICIAL-ISLAND SCHEME FOR NEW YORK HARBOR.—The scheme of E. F. Cragin, the promoter, to create an artificial island in New York Bay, between Ellis and Bedlow's islands, has vanished. Cragin made application to the New Jersey Riparian Board for the grant of a large tract of land under water, saying that grain-elevators would be constructed thereon, and that all the leading railroads having terminals in New York and vicinity would connect their tracks with this great grain-delivery and storage-station. Cragin, it was said, expected to induce J. Pierpont Morgan and other capitalists to invest. They were not persuaded. Then Cragin announced that mammoth dry-docks would be erected, and he tried his persuasive powers on Federal officials. He received encouragement, but no positive promise, by the New Jersey Riparian Board, and was told that he must secure the sanction of the Harbor Line Board, a Federal institution. The Harbor Line Board reported adversely, and the intelligence reached the New Jersey Riparian Board recently that Secretary Root has sustained the finding of the Harbor Line Board. — *Exchange*.

A BALLOON AS A LOCOMOTIVE.—Two Styrian engineers, Herren Balderauer and Brockebusch, from the town of Salzburg, have been experimenting with great success with a novel mode of locomotion, which they have named "Gebirgsbahn." It consists of a captive balloon attached to a single suspended rail fixed on to the side of a precipitous mountain, whose steep slopes no other form of railway could climb. The balloon remains about twelve yards above the rail, to which it is attached by a wire cable, and is manoeuvred up and down the side of the mountain at the will of the engineer. When ascending, the balloon itself furnishes the lifting-power by means of hydrogen gas; in the descent a reservoir in the balloon is filled with water, which serves as ballast. Under the balloon a circular car is suspended, through the centre of which the cable passes, and is attached to the regulator on the rail. Not a single accident has occurred during three months of experiments, and the system is without any danger. — *London Mail*.

THE ARCHITECTURAL LAYOUT OF THE ST. LOUIS EXPOSITION.—The following architects compose the commission of Louisiana Purchase Exposition architects: Cass Gilbert, of St. Paul and New York, Carrère & Hastings, of New York, Van Brunt & Howe, of Kansas City, Walker & Kimball, of Omaha and Boston, D. H. Burnham & Co., of Chicago, Isaac S. Taylor, Eames & Young, Barnett, Haynes & Barnett, Widdemann, Walsh & Boissellier, and Theodore C. Link, of St. Louis. — *Exchange*.

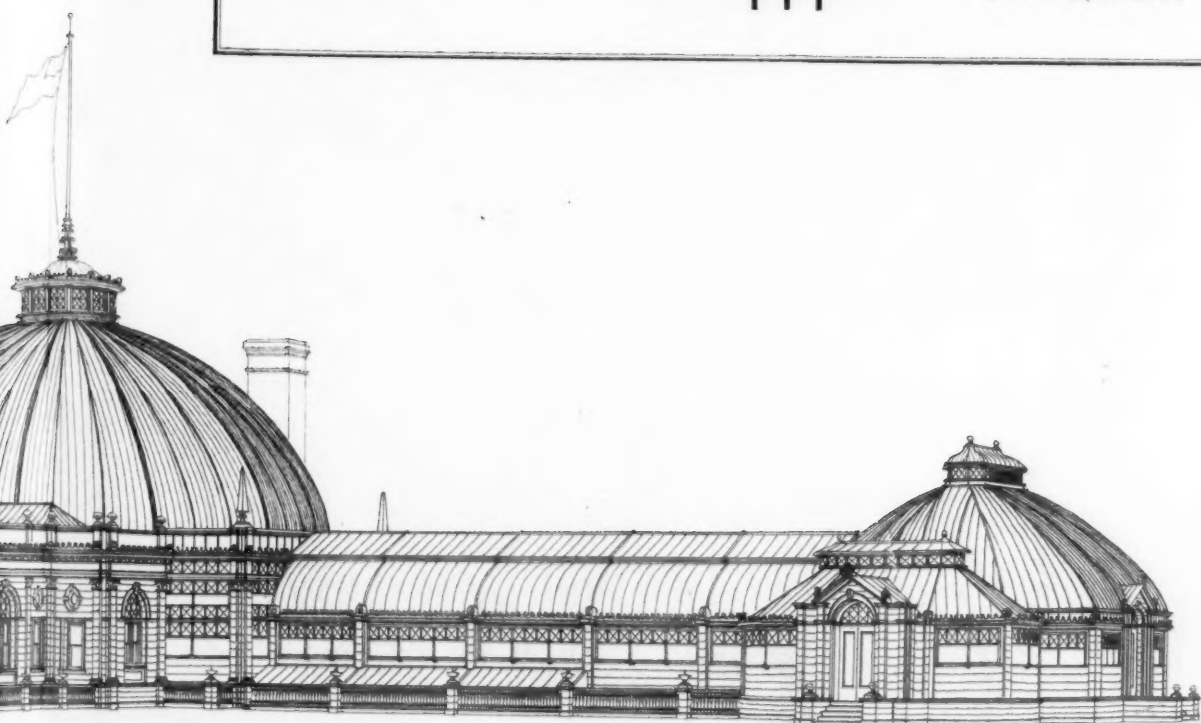
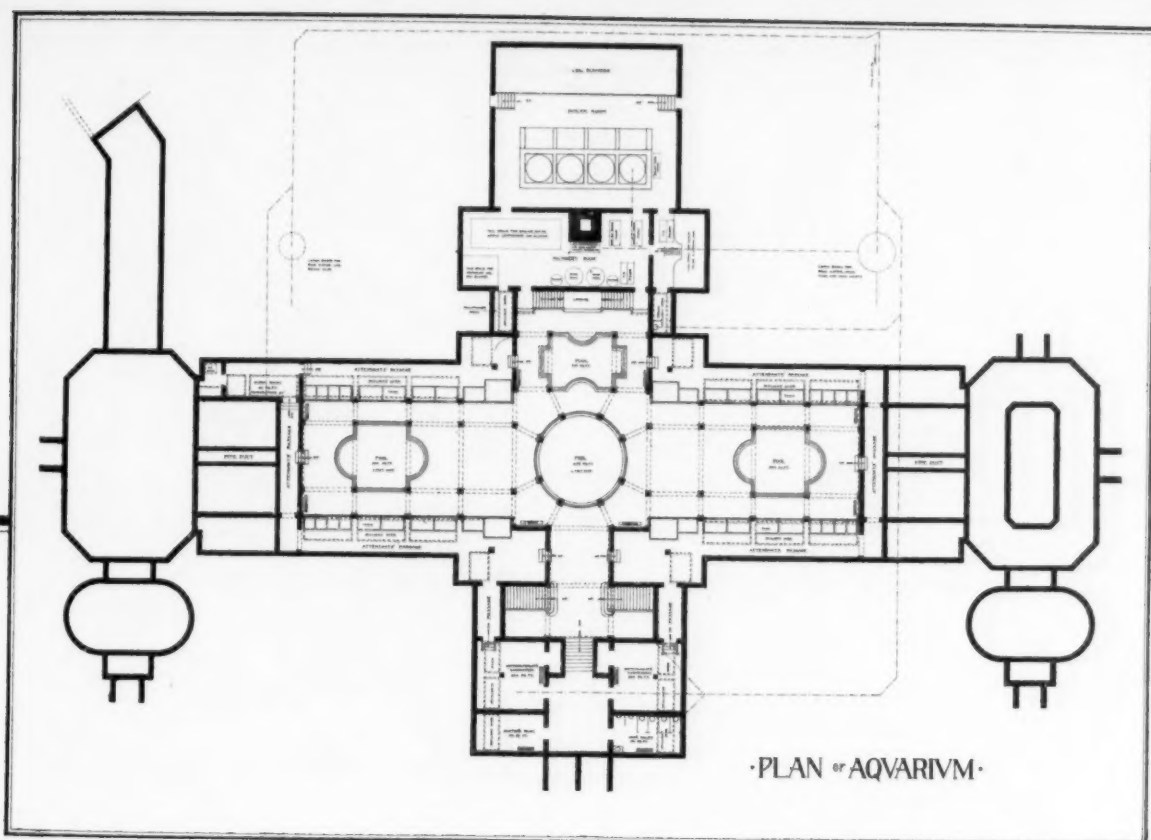
PROJECTED STATUE OF WASHINGTON FOR BROOKLYN.—Eight models representing General Washington in various poses have been submitted to the Art Committee of the Washington equestrian statue, which is to be paid for by Register Howe of Brooklyn, from the fees of his office, and erected at the fountain at Bedford and Division Avenues. The sculptors represented are Charles Niehaus, W. Clark Noble, George Gray Barnard and H. Shrady. — *N. Y. Evening Post*.





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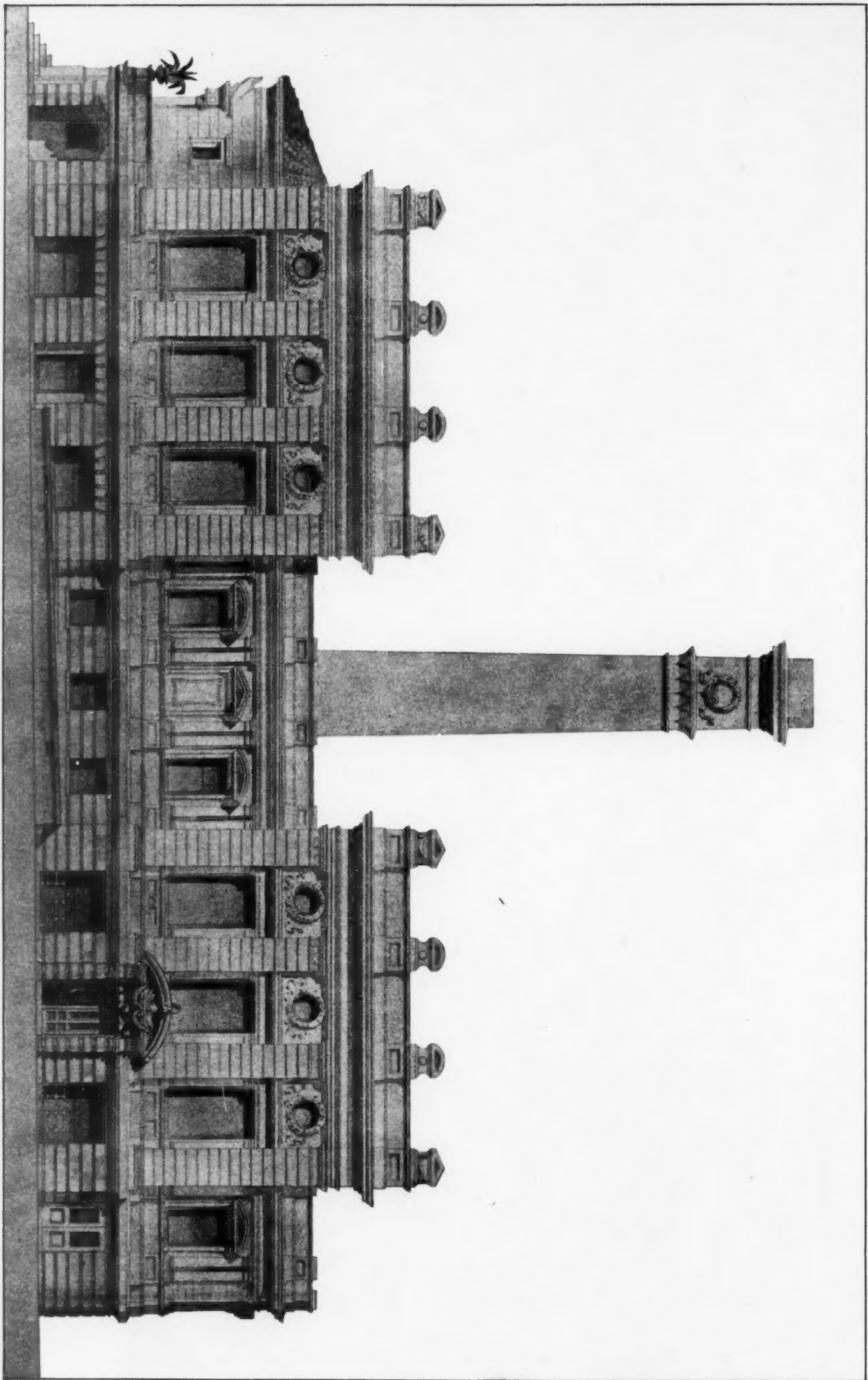


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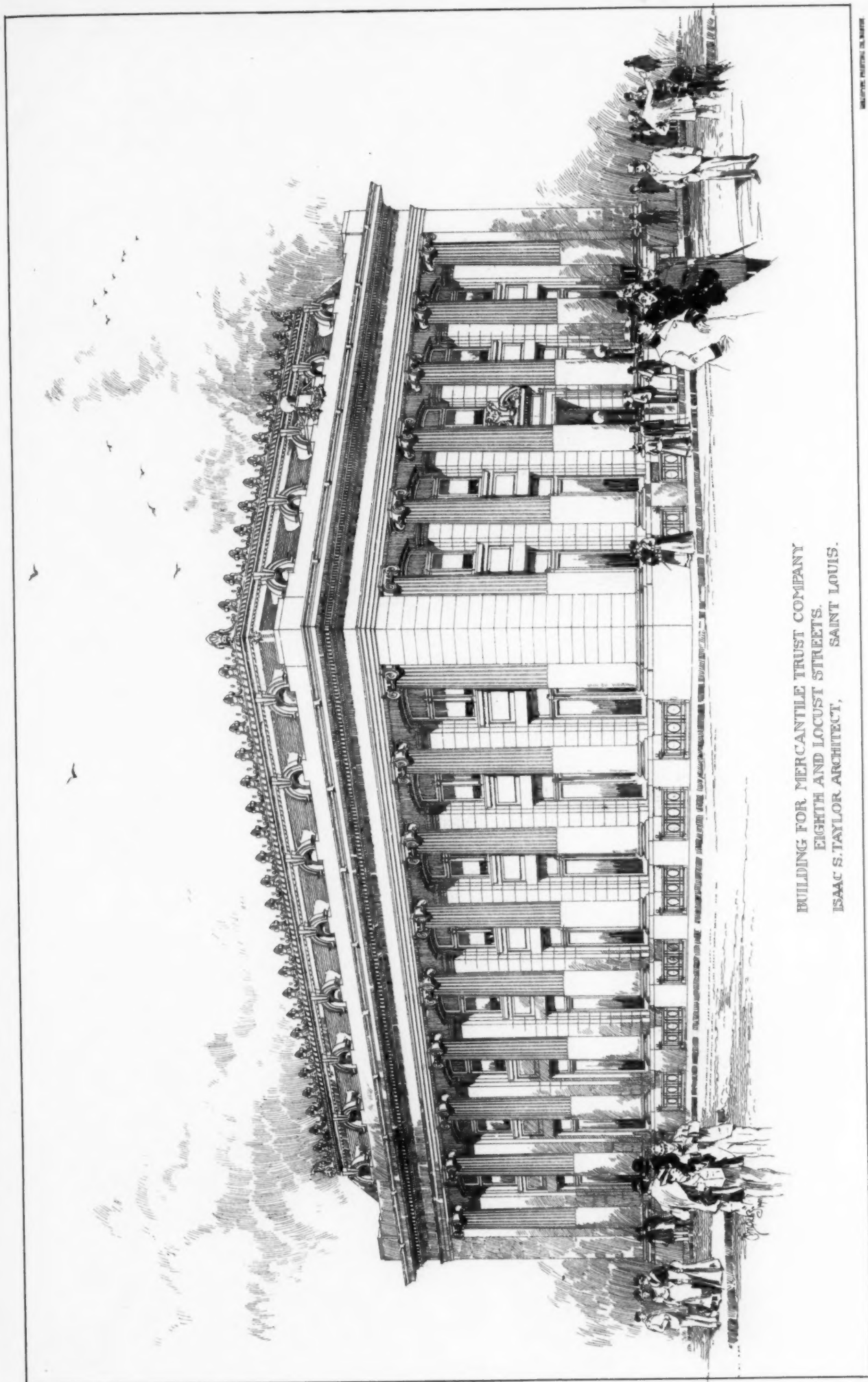


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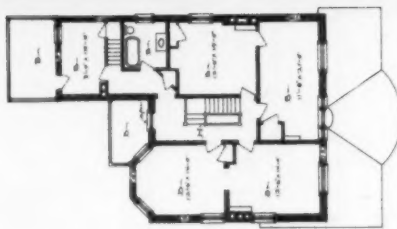
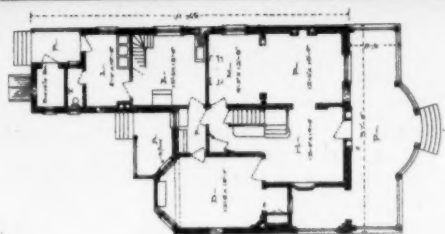
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Taylor, J. W.....[Photography.  
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Vale & Young.....[Sightlights.

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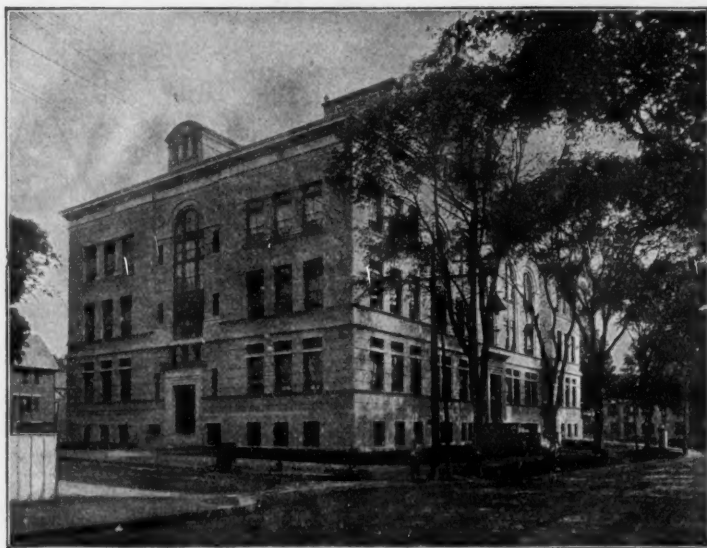
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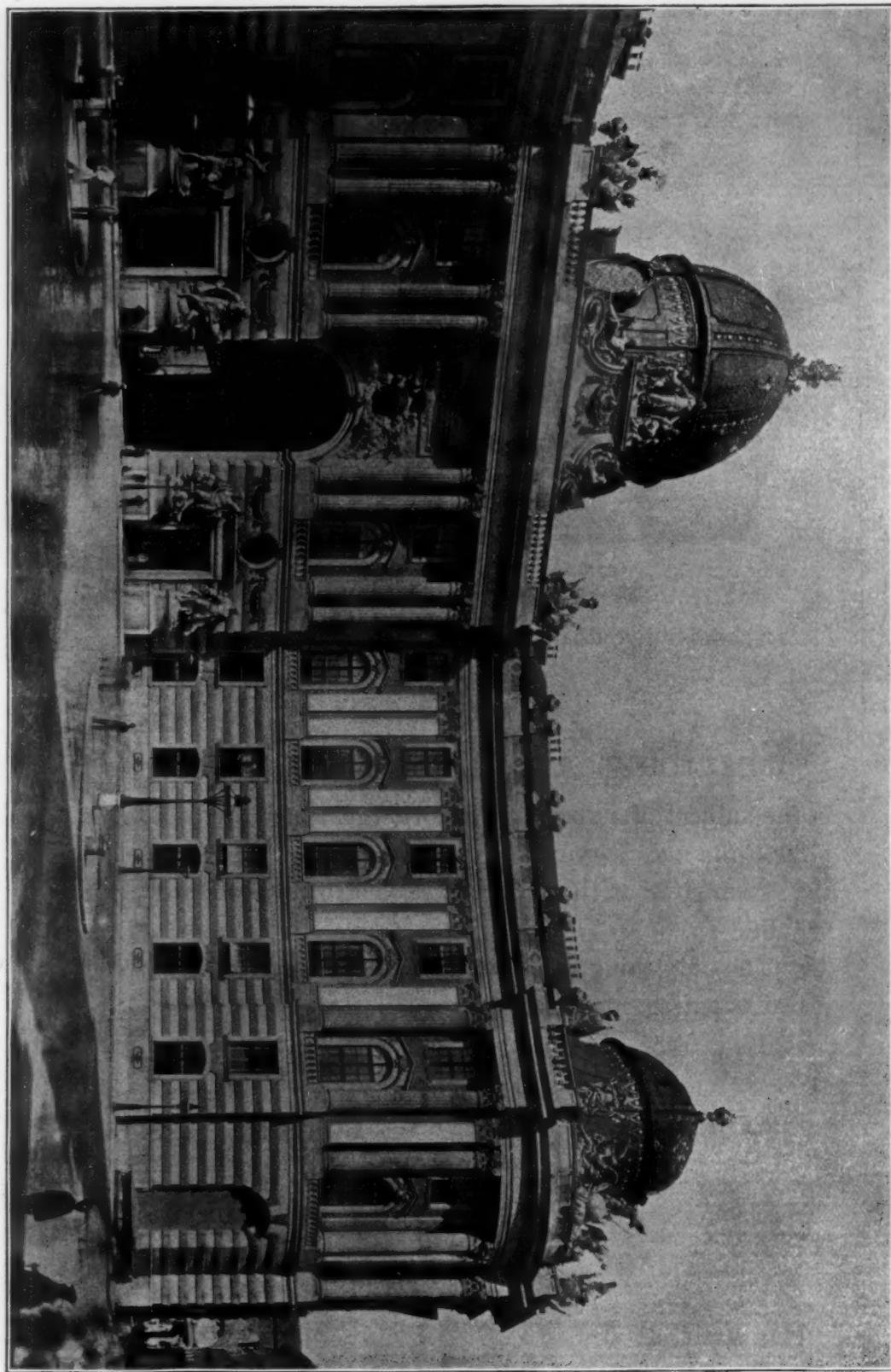
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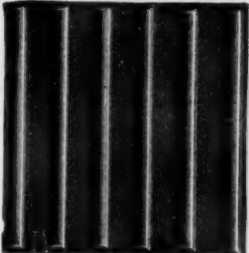
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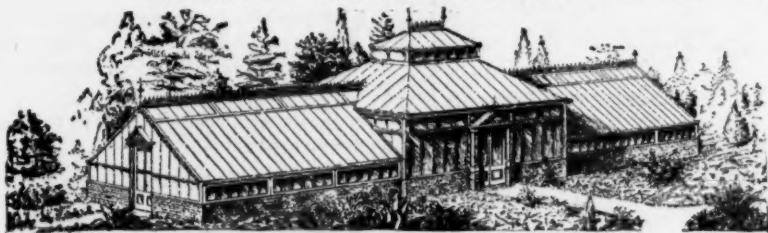
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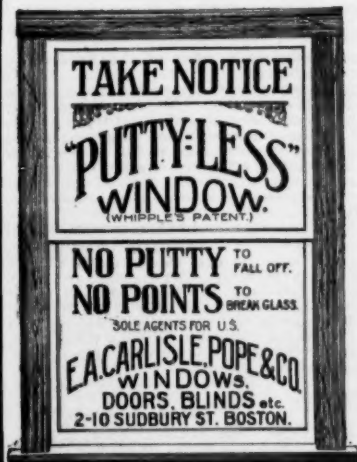
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**Minneapolis, Kan.**—A new high school is soon to be erected at this place at a cost of \$15,000.

**Montevideo, Minn.**—F. D. Orff, Lumber Exchange, Minneapolis, is preparing plans for the \$20,000 three-story pressed brick Odd Fellows' Hall, to be erected in this city.

**Nashua, N. H.**—The plans of Cram, Goodhue & Ferguson, 53 State St., Boston, are stated to have been selected for the Hunt Memorial Library, to cost about \$50,000.

**New York, N. Y.**—The new building which the Hanover National Bank will erect at the southwest corner of Pine and Nassau Sts. will be twenty-two stories in height. Work of demolishing the old structure will be begun early in the fall. The Hanover Bank now owns a plot fronting about 100 feet in Pine and Nassau Sts.

The contract for finishing and equipping the new Hall of Records Building has been awarded to John Pierce, who has the contract for the structural work on the building. His bid was \$1,359,000.

Fifth Ave., southeast corner of 75th St.; Simon Guggenheim, who recently purchased the plot 57' 2" x 120' at this location for \$385,000, will erect thereon a dwelling for his own occupancy.

**Norfolk, Va.**—Mr. S. B. Hutchins has been awarded the contract for the erection of Central's new church, at \$18,477.

The congregation of St. Mary's German Catholic Church will erect a new church building to cost \$75,000.

**Olivia, Minn.**—The plans of Fremont D. Orff, Lumber Exchange, Minneapolis, have been accepted for a court-house to be erected here, at a cost of about \$75,000 and contracts will be let during July by the County Commissioners at Beaverfalls, for constructing the basement story.

**Parkersburg, W. Va.**—A new opera-house is to be erected here at the cost of \$125,000. Senator J. H. Camden, H. H. Moss and others promoters.

**Pittsfield, Mass.**—A modern brick power-house building, to cost over \$200,000, will be erected soon for the Berkshire Street Railway Co.

### EDUCATIONAL.

**Columbus, O.**—E. Livingston Ave., three-sty bk. school, 68' x 160', slate roof, furnace; \$60,000; o., Board of Education, James A. Williams, clerk; a., David Reibel.

**Philadelphia, Pa.**—Thirty-fifth St. and Lancaster Ave., two-sty bk. steel & fr. school, 60' x 100'; \$21,

### BUILDING INTELLIGENCE.

(Educational Continued.)

300; o., Friends Society; b., W. B. Dougherty; a., Morgan Bunting.

### FACTORIES.

**Brooklyn, N. Y.**—Washington St., cor. Plymouth St., six-sty bk. factory, 100' x 115' 6", gravel roof, steam heat; \$60,000; o., Robert Gair, Washington & Water Sts.; a., W. Higginson, 21 Park Row, N. Y.

**Philadelphia, Pa.**—Sixth and Cayuga Sts., 2½-sty machine-shop & foundry, 60' x 187' & 108' x 228'; \$90,000; o., James Barker; b., Wm. Steele & Sons.

**Watertown, Mass.**—Three-sty bk. manufacturing building, 50' x 91', stone trimmings, flat roof, steam; o., Union Carpet Lining Co.; b., J. W. Bishop Co., Boston; a., Arthur F. Gray.

### HOSPITALS.

**New York, N. Y.**—Lexington Ave., cor. 55th St., seven & eight-sty bk. & st. hospital, 40' 5" x 80' & 36' 5", tile, copper & asphalt roof; \$20,000; o., The Babies' Hospital of N. Y., 657 Lexington Ave.; a., York & Sawyer, 156 Fifth Ave.

### WAREHOUSES.

**Worcester, Mass.**—Exchange St., three-sty bk. storehouse, 100' x 150'; \$12,000; o., Walker Armington; a., Cutting, Carleton & Cutting; c., E. D. Ward.

### MISCELLANEOUS.

**Brockton, Mass.**—N. Main St., two-sty bk. & fr. building, 45' x 90', for Old Ladies' Home, pitch roof, steam; \$12,000; a. & b., C. L. Mitchell, 663 Cary St.

**Minneapolis, Minn.**—Third Ave., cor. 7th St., two-sty & base bk. & st. telephone station, 50' x 97', steam; \$40,000; o., Twin City Telephone Co.; a., Keith Co.

**New York, N. Y.**—Boston Road, June 179th St., three-sty bk. home, 31' 6" x 81' 6"; \$39,000; o., Peabody Home for Aged Women, on premises; a., E. A. Sargent, 18 Broadway.

### PROPOSALS.

#### LIFE-SAVING STATION.

[At Amagansett, L. I., N. Y.]  
Treasury Department, U. S. Life-saving Service, Washington, D. C. Sealed proposals will be received at this office until 3 o'clock P. M. of Tuesday, July 23, 1901, and then publicly opened, for the construction of a life-saving station at Amagansett, Long Island, New York. Plans and specifications, forms of proposal, etc., can be obtained upon application to this office. HORACE L. PIPER, acting general superintendent. 1334

#### LIBRARY.

[At Huntsville, Tex.]  
Bids will be received by secretary of the building committee, Sam Houston Normal Institute, Huntsville, Tex., until July 29, for the erection of a library building on the grounds of the Sam Houston Normal Institute. A certified check amounting to 2 per cent of bid shall accompany each proposal. Plans may be seen at the offices of J. L. O'Connor, Austin, Tex., Oile & Larehn, Houston, Tex. 1334

Treasury Department, Office of the Supervising Architect, Washington, D. C., July 9, 1901. Sealed proposals will be received at this office until 2 o'clock P. M., on the 3d day of September, 1901, and then

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### PROPOSALS.

opened, for the completion of the interior finish (except heating apparatus, plumbing, electric-wiring, conduits, etc.) of the U. S. Post-office, Court-house, etc., at San Francisco, California, in accordance with drawings and specifications, copies of which may be had at the discretion of the Supervising Architect, upon application at this office, or at the office of the Superintendent at San Francisco, California. Applications must be accompanied with a certified check for \$250, which will be held at this office until the return of the drawings and specifications. JAMES KNOX TAYLOR, Supervising Architect. 1334

Treasury Department, Office Supervising Architect, Washington, D. C., July 9th, 1901. Sealed proposals will be received at this office until 2 o'clock P. M. on the 3d day of September, 1901, and then opened, for the complete mechanical equipment, including plumbing, boilers, engines and generators, switch-board, electric wiring and conduits, heating and ventilating, and elevators for the U. S. Post-office, Court-house, etc., San Francisco, Cal., in accordance with drawings and the specification, copies of which may be obtained at this office or at the office of the Superintendent of Construction at San Francisco, Cal., at the discretion of the Supervising Architect upon deposit of a certified cheque payable to the Treasurer of the U. S. for \$250, which upon return of the complete set of drawings and specification will be returned. JAMES KNOX TAYLOR, Supervising Architect. 1334

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

### CHURCH.

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

[*"A Hit, a Palpable Hit!"*]—HAMLET.

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### PROPOSALS.

#### HEATING.

Bids are wanted July 31 for installing a system of steam heating at the University Building, Brent Woods Park. JAS. M. ROBINSON, chmn. com. on bids., bd. dir. of University of Cincinnati. 1335

#### HEATING.

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

#### CONSTRUCTION.

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

### PROPOSALS.

3, 1901, and then and 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 obtained upon application to the commandant of that yard upon deposit of \$25 to secure their return. MORDECAI T. ENDICOTT, chief of bureau. 1335

#### JAIL, ETC.

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. Gaddis, architect. 1335

#### BARRACKS.

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 opened, for furnishing all necessary materials and labor in the construction and completion of one set

### PROPOSALS.

of officers' quarters at the marine barracks, Sitka, Alaska. F. L. DENNY, colonel, quartermaster, U. S. Marine Corps. 1336

Treasury Department, Office Supervising Architect, Washington, D. C., July 26, 1901. Sealed proposals will be received at this office until 2 o'clock P. M. on the 31st day of July, 1901, and then opened, for the installation of a new elevator plant in the U. S. Custom-house and Post-office, New Orleans, La., in accordance with drawings and specification, copies of which may be obtained at this office or at the office of the Custodian at New Orleans, La., at the direction of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1334

#### SEWERS.

[In District of Columbia.] Office of the Commissioners, D. C., Washington, D. C. Sealed proposals will be received at this office until July 27, 1901, for constructing sewers in the District of Columbia. Specifications and blank forms of proposal may be obtained at this office. HENRY B. F. MACFARLAND, JOHN W. ROSS, LANSING H. BEACH, commissioners, D. C. 1334

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| PROPOSALS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | PROPOSALS.                                                                                                            | PROPOSALS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Treasury Department, Office Supervising Architect, Washington, D. C., July 2, 1901. Sealed proposals will be received at this office until 2 o'clock P. M. on the 7th day of August, 1901, and then opened for the construction (except heating apparatus, electric wiring and conduits) of the U. S. Post-office and Court-house at Abilene, Texas, in accordance with the drawings and specification, copies of which may be had at this office or at the office of the Postmaster at Abilene, Texas, at the discretion of the Supervising Architect. | ing Architect. JAMES KNOX TAYLOR, Supervising Architect. 1334                                                         | 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 Superstructure of the U. S. Public Building at Boise, Idaho, in accordance with drawings and specification, copies of which may be had at this office, or at the office of the Postmaster at Boise, Idaho, at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1334 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>SCHOOL.</b> [At Collinwood, O.] Bids are wanted July 24 for erecting a school. ALLEN H. TYLER, clk. bd. educ. 1334 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Treasury Department, Office Supervising Architect, Washington, D. C., July 3, 1901. Sealed proposals                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

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SECTION 4. No Member should guarantee an estimate or contract by personal bond.

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SECTION 6. It is unprofessional to advertise in any other way than by a notice giving name, address, profession, and office hours, and special branch (if such) of practice.

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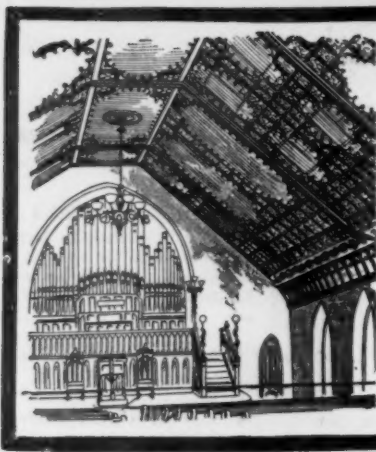
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SECTION 13. No Member shall compete in amount of commission, or offer to work for less than another, in order to secure the work.

SECTION 14. It is unprofessional to enter into competition with or to consult with an architect who has been dishonorably expelled from the "Institute" or "Society."

SECTION 15. The assumption of the title of "Architect" should be held to mean that the bearer has the professional knowledge and natural ability needed for the proper invention, illustration and supervision of all building operations which he may undertake.

SECTION 16. A Member should so conduct his practice as to forward the cause of professional education and render all possible help to juniors, draughtsmen and students.



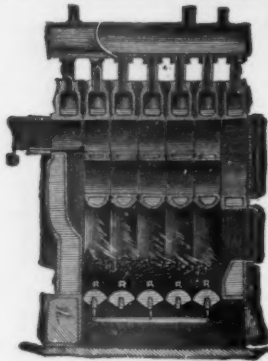
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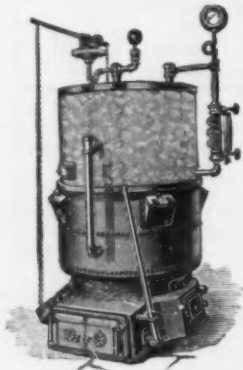
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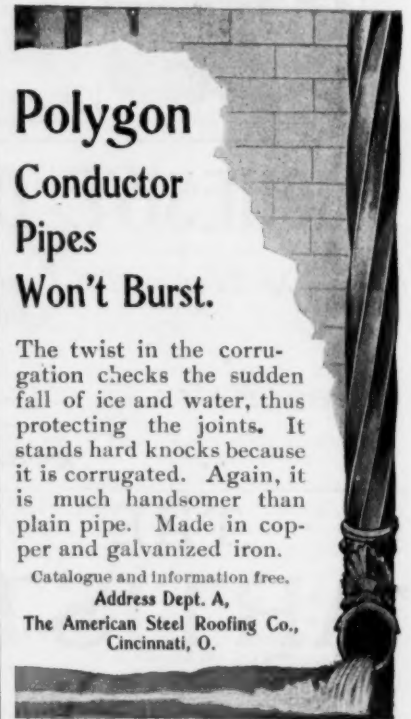
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