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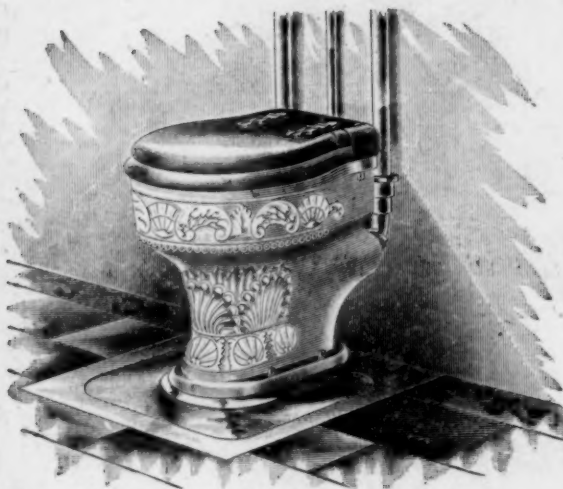
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AN important case, relating to conspiracy by a labor organization, was recently decided in England. It appears that the plaintiff, Temperton, was a builder and contractor. He made an agreement with some real-estate owners to build houses for them, using bricks supplied by them. For some mysterious reason, this arrangement displeased the rulers of the Bricklayers' Society, who ordered their men in Temperton's employ to strike. The strike failed, and the officials of the Society, as usual, sought revenge by other means. They found that he had contracted with a certain firm for concrete sills and lintels for the houses, and succeeded in persuading the firm to break its contract. Temperton brought suit against one Russell and others, as representing the Bricklayers' Society, for damages for this interference with his business, and was awarded by the jury the comfortable sum of two hundred and fifty pounds, while the judge granted a perpetual injunction, to prevent future attempts of the sort. The Bricklayers' Society appealed, but the House of Lords confirmed the judgment, on the ground that a conspiracy to persuade persons not to enter into a contract with another, or to break a contract already made, with the object of injuring the person with whom the contract had been or was to be made, was a malicious and wrongful act, for which damages could be recovered.

AN International Congress of Medicine and Hygiene, in connection with an exhibition of medical and hygienic appliances, is to be held in Rome, during the months of September and October next. The exhibition is to comprise plans of buildings for experimental research in biology and hygiene, and apparatus for investigation of surgical instruments of all kinds; life-saving apparatus, with what we should call emergency installations; systems of water-supply and drainage, and appliances for draining, warming and ventilating private dwellings. There is no doubt that a very interesting exhibition can be made with this material, and the necessary charges for space have been made very moderate, apparently in order to invite a full display. The exhibition is to be held in the Palace of Fine Arts, in the Strada Nazionale, the principal street in Rome, the use of this beautiful building having been offered by the City Government of Rome. The charge for floor-space is ten francs—two dollars—for each square metre of ground, and six francs for each square metre of wall-surface; but an exhibitor who engages floor-space

adjoining a wall will be entitled to two square metres of wall-surface for each square metre of floor-space adjoining the wall. As a square metre is about eleven square feet, it will be seen that the expense of space sufficient for a large display of goods is very trifling. Where an exhibitor chooses an isolated floor-space, at a distance from the walls, so that visitors can walk entirely around his exhibit, he is charged with half a metre in width of passage-way around the space which he occupies, at the regular floor-space rates; but, as a sort of compensation, he is allowed to make his exhibit as high as he likes, instead of restricting it to two metres from the floor. Glass cases may be hired at various prices, from the authorities of the exhibition, who will send drawings and lists of charges to any person who may apply for them. Electricity may be engaged beforehand for lighting or power, but no gas or oil will be permitted to be used for either heating or lighting. Exhibits will be insured against fire, if the exhibitor specifies the value in his application. All goods sent by foreign exhibitors will be carefully unpacked and placed in position, free of charge, but Italian Exhibitors must attend to these operations themselves, or arrange with the authorities to have them done for them. Transportation of objects to be exhibited over the Italian railways has been arranged for at reduced rates, and coupons, entitling the holders to the benefit of these rates will be sent to exhibitors on request. Similar coupons will also secure to exhibitors exemption from customs and active duties. Medals and diplomas will be awarded for the best exhibits, on the recommendation of international juries. Objects to be exhibited will be received from the fifteenth of July to the fifteenth of August, but applications for space must be made before June fifteenth. The exhibition itself will open on the fifteenth of September, and remain open at least until October fifteenth, and perhaps longer. Applications for space, and all inquiries, should be addressed to the President of the Exhibition, Professor L. Pagliani, Ministry of the Interior, Rome, Italy.

M. CHARLES CHIPIEZ recently communicated to the French Academy of Inscriptions his answer to the question whether the Greeks were the original inventors of Doric architecture. This question is by no means a new one, but, as hardly any two persons agree in their reply to it, M. Chipiez's opinion is interesting. Architects versed in the literature of their profession will remember one author who maintained, some years ago, that the Doric order must have been the invention, not merely of the Greeks, but of one particular Greek. He found in it such consistency and harmony that it seemed to him impossible that several minds should have been concerned in composing it, and he concluded that some architect of colossal genius invented it all out of his own head. Unfortunately for this theory, the so-called Proto-Doric work at Beni-Hassan, in Egypt, which would probably have been familiar to an educated Greek architect, is too similar, in proportion and light and shade, to the Greek building of a thousand years later, for the resemblance to be accidental, and it is only reasonable to suppose that during the interval of time between the Beni-Hassan tombs and the temples of Corinth and Magna Græcia, buildings of intermediate character must have been erected, in which the style would naturally have been developed and refined. That such intermediate buildings were erected, and that the style was, in them, so developed, M. Chipiez asserts positively, and he says that the most interesting of these buildings were those of the mysterious people who inhabited Mycenæ, Tiryns and Hissarlik. Strange and un-Hellenic as is the smaller work of the pre-Homeric cities of Argolis, the discoveries of Dr. Schliemann have demonstrated, according to M. Chipiez, the fact that all the forms of Doric architecture existed in the edifices which Perseus and Andromeda, Agamemnon, Achilles, Paris and Helen, built and lived in; and, although with different proportions, the entablature of the most ancient Doric temples reproduces, member by member, and form by form, the wooden entablature of the Mycenaean palaces. M. Chipiez must understand thoroughly what he is talking about, and would not answer carelessly a question put to him by the Academy of Inscriptions, but the idea that the Doric temples were copied from the palaces of the so-called Pelasgians of the Peloponnese gives a rather novel aspect to the history, or rather, the

traditions of early Greece. If the returning Heraclidae were animated with the hatred for the whole race of the Atridae which is attributed to them, why should they have copied their buildings? If the Heraclidae had been ignorant barbarians, like the Romans or the Normans, they might have imitated what they found, for want of any other source of ideas; but they were so far from being barbarians that they translated the wooden construction of Mycenæ into stone, and refined it into the most beautiful architecture that the world has ever seen. Again, what association of ideas led them to regard the forms of Agamemnon's palace as suitable for the temples of the gods? and what were the Mycenæan temples like? Notwithstanding the common ideas about the Dorian influence in Greece, no fact is more conspicuous than that the early inhabitants of Peloponnesus were regarded throughout the historical period as having been half-divine. From Perseus down to Orestes, all the kings of Mycenæ were not only of divine blood, but familiarly attended by the gods, their relatives, and the legends relating to them formed the half-sacred literature of all Greece as long as Greece had a literature. This alone indicates some mysterious relation between the two races, and it would be curious if architectural details should help to explain this relation.

A COMPETITION grievance of a rather new sort is reported from England. A firm of architects in Liverpool heard that designs for a hospital had been invited by a certain County Council in Scotland, and wrote for full particulars. In reply, a document was sent them, containing a description of the requirements of the building, but saying nothing as to whether the author of the design placed first would be employed to carry it out. Wishing to be certain of this point, they wrote again, asking whether the winner of the competition, if an architect of known skill, would be employed to execute his design "on the usual English terms." The answer to this was a letter, saying, "In all probability, if the successful competitor is a capable man, he will be entrusted to carry out the work." Those who have learned from experience that the honesty of officials in such matters is very apt to be in proportion to the grammatical correctness of their expressions, would have had their suspicions excited by this letter, but the Liverpool architects, taking it in good faith, proceeded to make two sets of plans, one for a small hospital and the other for a larger establishment. In due time, they received notice that their design for the larger building was placed first in the competition, and their other design second, and, coupled with this information, was an inquiry whether they would undertake to carry out the work, including the furnishing of all drawings and specifications, superintendence, measuring up quantities, and so on, for a commission of three per cent on the cost.

THE astonished architects wrote back, calling attention to the question which they had asked before entering the competition, and the reply which they had received, and asking for an opportunity to appear before the County Council for an explanation. In answer to this application, the clerk of the Council sent a printed circular addressed "To Architects," in which it was mentioned that the premiated plans were to become the property of the Council's committee. The architects then wrote again, requesting a hearing before the Council, and offering as a compromise, to accept the terms recognized in Glasgow, although they did not know what these terms might be. After a time a communication was received, making an appointment for the architects to meet the committee. The appointment was set for Good Friday, but the architects presented themselves as requested. They wished to read the very brief correspondence as to terms, in accordance with which they made and sent their designs, but permission to do this was refused, the members of the committee, according to the architects' story, shouting "Yes or no," "We can't sit here all day," and so on. Finally, the architects withdrew, promising to reconsider the matter and write again in a few days, but no sooner had they departed than the committee passed a resolution, withdrawing their offer of three per cent, and ordering a letter, dated on the day of the meeting, sent to the architects, informing them that the negotiations were at an end, and enclosing a check for the first and second premiums, amounting

to seventy pounds, about one-fourth of one per cent on the proposed cost of the building. The architects, who seem to have shared the terror of lawsuits usual among busy men, abandoned the case at once, and contented themselves with writing to the *British Architect*, hoping that this "unsatisfactory transaction" would excite "indignant protests" on the part of the profession. That such a performance would excite indignation enough is certain, but it ought to excite something else, of which County Councils stand in much more dread than they do of the "indignant protests" of architects; that is, judgment and execution for damages against the county on the architects' behalf. According to the statement of the architects, their case is perfectly clear. The correspondence in regard to terms shows that they were induced to compete by the promise that "in all probability" they would, if their design was the best, be commissioned to carry it out, and, no objection being made to their proposal that their compensation should be on the usual English terms, they were left to infer that these would be followed. Relying on this promise, although it was made with a slight reservation, they did the work they were invited to do, and when they asked that the promise made to them should be fulfilled, a different offer was proposed to them, and, on their objecting to this, their property was coolly stolen from them. The circular sent them afterwards to justify the theft is, of course, of no importance whatever, and the Council's committee stands in the position, according to the architects' story, of having got possession of their property by false pretences, and, after failing to induce them to accept terms different from those offered, of having confiscated it. It would be a strange court that would not punish rigorously such a performance, and it is a thousand pities that the ruinous expense of lawsuits prevents those who suffer by such tricks from bringing those who practise them to justice.

MR. WILLIAM WALDORF ASTOR'S purchase of a great country house in England seems to be a matter of much interest to his fellow-citizens, judging from the number and variety of the newspaper comments on the transaction. According to the *Builder*, the house on the estate, known formerly as Cliefden, but more recently as Cliveden, was originally built for George Villiers, the second Duke of Buckingham, during his prosperous days. On his death, the estate passed to the family of his uncle, Sir Edward Villiers, whose eldest daughter, Elizabeth, brought it to her husband, Lord George Hamilton, afterwards Earl of Orkney. The descendants of this pair held the estate for more than a hundred years, but the house was occupied for a time by the Prince of Wales, for whose entertainment the poet Thomson wrote there, in conjunction with Mallet, the libretto for the operetta of "Alfred," in which occurs the familiar song of "Rule Britannia." Nearly fifty years later the middle portion of the house was destroyed by fire, leaving only the wings. These were repaired, but no attempt was made by the Orkneys to rebuild the central portion, and, in 1819, the property was divided into lots and sold at auction. The lot containing the house fell into the hands of the Duke of Sutherland, and, thirty years later, after a second fire in the buildings, Sir Charles Barry was commissioned to design a new central portion, which was erected in the Italian style, in brick covered with stucco, the principal front being ornamented with a two-story order of engaged columns. The original house, as built for Buckingham two hundred years before, was of "red brick and ashlar," but, notwithstanding the difference in material, Barry left the two wings, which were still in good condition, untouched, contriving to join them agreeably with his central colonnade in stucco. Those who may be curious to study further the arrangement of the English mansion of an American gentleman can find the plan and elevation in the "*Life and Works of Sir Charles Barry*." Since Barry's time no important change has been made in the house, although the estate has passed into different hands, but some subordinate work has been done. The terrace, four hundred feet long, which extends along the front of the house, and is, perhaps, the most noted feature of a very celebrated estate, dates from Buckingham's time, and must have accommodated many a lively party of Cavaliers. Mr. Astor, as is well known, is a man of taste and imagination, and he could hardly find a house with stronger, or, on the whole, pleasanter associations than Cliveden.

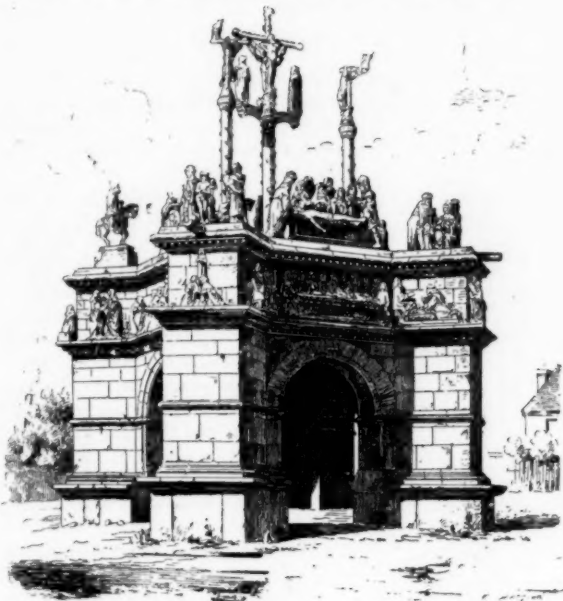
COMMEMORATIVE MONUMENTS.¹—I.

Fig. 1. Calvary at Pleyben, near Châteaulin.

COMMEMORATIVE monuments are constructions reared to perpetuate the memory of some historic fact or some great individual. Many of these will be found classed under special generic terms derived from their form, where it has seemed to us that the reader would be likely to look for them. For instance, triumphal arches are described under the heading "*Arc de Triomphe*" (Vol. I, p. 263). For the same reason, triumphal gates like the *Porte Saint-Denis* and the *Porte Saint-Martin*, both erected in glorification of the victories of Louis XIV, are placed under the word "*Porte*."

The inscriptions on the Egyptian obelisks prove conclusively that they were commemorative monuments. The stelæ and cippi of the ancients were originally raised to record events worthy of being chronicled for posterity; sometimes the text of the laws and decrees was inscribed upon them; but later, the custom of using them to honor the memory of the dead became general. Examples of such will be found in our article on "*Funerary Architecture*" (see *American Architect* for February 15, 1890, *et seq.*) as well as a few remarkable types of decorative constructions reared in recent times in honor of historic personages. When placed above the remains of the dead, they should be considered as genuine tombs. There are very beautiful examples of them in many churches in Italy, France, Germany, England and elsewhere. The most interesting are reserved for the sketch in which they naturally belong.

The Athenian Lysicrates, who lived in the fourth century, B. C., erected at his own expense a remarkable monument to celebrate the winning of the musical prize by his compatriots, in a competitive contest, at the festival of Bacchus. But its interest lies mainly in the fact that it is the earliest known specimen of the Corinthian style. We have already had occasion to speak of it from this standpoint (see "*Architrave*"); and full details will be found under the word "*Chorégique*."

Commemorative monuments were very common among the Romans: Cicero said that one could not take a step in Rome without treading on history. These were at first trophies, as in Greece; that is, the arms and spoils of the vanquished were hung up in the vestibules of houses or attached to the porch columns of public edifices; reproductions of these in stone, marble or bronze naturally followed. At the time of the first war against the Carthaginians, it became the custom to fasten the beaks of ships captured from the enemy to pilasters or columns, which hence acquired the title of "*rostral columns*." Sometimes portions of the prows and sterns were added to these, as well as grappling hooks, anchors and pieces of cordage.

In Gaul, long before the Christian era, the Druids erected huge stones in commemoration of important events; at least, this is supposed to have been the object served by the menhirs.

In the last chapter of the Book of Joshua, it is recorded that

this leader of the Israelites, just before his death, assembled his people and made them swear to continue faithful to the worship of Jehovah. The Bible account adds that he set up a commemorative stone on the occasion. Such stones are called "*witnessing stones*."

In the Middle Ages, religious worship absorbed almost all the manifestations of the architectural art. Mediæval commemorative constructions are consecrated to the portrayal of important scenes in the life of our Saviour. In Brittany, numerous calvaries may still be seen in public squares, usually in front of churches. We cite especially those of Saint-Ivonec, near Morlaix, of Plougastel, in the vicinity of Brest, and of Pleyben, near Châteaulin, in Finistère (Fig. 1). Nearly all these constructions were erected in the sixteenth century; they are often of granite.

At the same period, that is, at the beginning of the French Renaissance, the entombment of Christ was also represented in the churches by genuine monuments of a most interesting character. They are nearly always in the rear of a chapel, forming a sort of richly decorated porch, under which is portrayed in round relief the familiar historic scene; it appears as a kind of living tableau with life-size figures of Joseph of Arimathea, the rich Jew, Mary Magdalen, Mary the mother of Christ, servants, etc. Some of them are very remarkable, both from the standpoints of architecture and sculpture. See, for example, the one in the Cathedral of Pontoise (Fig. 2). In the chapel of the abbey of Solesmes (Sarthe) there are two, both exceedingly interesting. The one in the right transept belongs to the latter part of the fifteenth century. There are eight isolated figures of full-size, besides the body of the Christ laid in a winding sheet above the sepulchre and half lifted by two servants. The scene is enacted in a sort of loggia opening in front by an elliptical arch richly decorated with mouldings and openwork crestings. On each side of the piers, in round relief, are warriors standing out from the plain of the wall, and as large as the other statues. The upper part of the loggia is adorned externally with a broad sculptured frieze and surmounted by a screen terminating in a cresting with floral

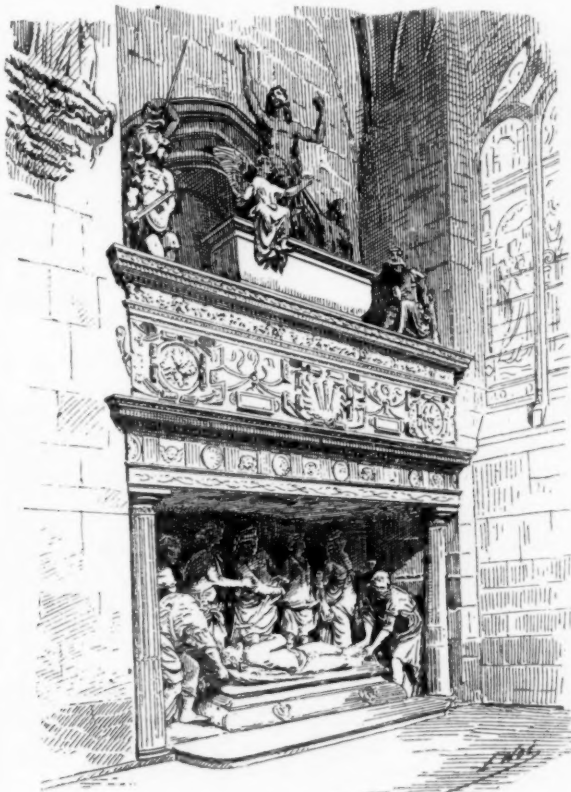


Fig. 2. Entombment, Cathedral of Pontoise.

enrichments. The one in the left transept is of the Renaissance period. Here the loggia opens by three unequal arches borne on columns, with pilasters at the sides and niches containing statues. The crowning above the cornice forms a new story and figures a triumphal arch with openings increasing in height toward the central one, which dominates all the others.

¹ From the French of L. C. Boileau fils, in Planat's *Encyclopédie de l'Architecture et de la Construction*.

A large number of figures in round relief, grouped beneath the arches, and small pillared constructions, after the style of those in the portal of Saint-Eustache at Paris, complete the decoration.

With the Renaissance came a return to the ideas of antiquity, commemorative monuments being generally inspired by occurrences connected with the national life.



Fig. 3. Trajan's Column, Rome.

Often they are designed to honor the memory of an individual, whether because he played a prominent part in important events, whether because he personified his country's history in the time when he lived, or whether, finally, because of his services in letters, science, art, industry, commerce, or in war, politics or statesmanship. In all these cases, the monument usually resolves itself into a statue set on a pedestal. It is in the latter, therefore, that its importance architecturally mainly lies, since it may be developed by means of steps, socles

and projecting masses, and embellished with bas-reliefs and accessory figures.

There are also certain constructions serving two ends which might be termed commemorative. These are generally fountains dedicated to illustrious men. The idea of connecting a memorial with some necessary or attractive feature of the ordinary life of cities, has suggested itself to a great many municipalities. Nothing is lost architecturally by the combination, for flowing water can be utilized most successfully for decorative effects.

Ought we likewise to include under the same term such vast edifices, for example, as the Sacré-Cœur at Paris, or Notre-Dame-de-Fourvières at Lyons? There is perhaps an appreciable shade of difference here. These structures were erected in fulfilment of certain vows and the designation "votive edifices" is perhaps more fitting; in any event, however, the reader would, we think, be apt to look for them under the heads "Eglise" or "Chapelle." Under the same words also the so-called "Chapelle Expiatoire," erected at Paris (Boulevard Haussmann) to the memory of Louis XVI and Marie Antoinette, should be classed.

For the sake of order, we begin the discussion of our subject



Fig. 4. Column in the Piazza Santa Maria Maggiore, Rome.

with those monuments which come especially within the domain of architecture, namely, columns.

COLUMNS.

Columns, which are more modest and less massive than triumphal arches, must be ranked as elegant monuments *par excellence*. They offer an appropriate type for the adornment of squares where divers streets meet from different directions and which are surrounded by handsome edifices that ought not to be hidden in any way.



Fig. 5. Column in the Piazzetta, Venice.

Trajan's Column at Rome (Fig. 3) was reared in the first century of the present era, as a sort of trophy, to celebrate the victories of the Emperor Trajan. It is wholly of white marble, the column proper being in thirty-four blocks and the pedestal in eight; the capital consists of a single piece. The shaft is embellished from bottom to top with an unbroken spiral of bas-reliefs, the figures of which are 33 centimetres in height. These are supposed to have been gilded, and must have stood out on an ultra-marine background. The pedestal is adorned with other bas-reliefs representing trophies, of very remarkable workmanship. The forms of the various weapons and pieces

of armor served as models to all of the artists of the Renaissance.

The height of the column, with base and capital, is 25m. 98; the total height is 42m. 87, including the crowning statue which, to-day, represents St. Peter. Pope Sixtus V had it put up, to replace the figure of Trajan which had long before been broken in one of the numerous sackings of Rome by the barbarians. The composition of the monument is attributed to the architect Apollodorus.

The columns of the Basilica of Constantine, at Constantinople, are of porphyry; they are noted for the laurel wreaths which mark the joints of the sections of the shaft. The capitals are Corinthian and of bronze. The column in the Piazza Santa Maria Maggiore, at Rome, is from this basilica. The capital is surmounted by a small entablature (Fig. 4). The figure at the top is that of the Virgin. The total height is 14m. 30.

The two columns in the Piazzetta, at Venice, were brought from Syria by Doge Domenico Michieli in 1126, at the close of a war between the Venetians and the Turks. They are of granite and in Byzantine style. One (Fig. 5) is surmounted by a winged lion with the Gospel of St. Mark under his paw; on the other is a marble statue of St. Theodore on a crocodile. We reproduce the first because its very characteristic form is peculiarly adapted to the kind of construction under discussion.

The column in London known as "The Monument" was erected in 1761 to commemorate the great fire of 1666. It is in the Doric style, entirely of stone, decorated with bas-reliefs and salamanders, and crowned with a large vase from which flames are escaping (Fig. 6). The architect was Christopher Wren.

The column of the Place du Châtelet, at Paris (Fig. 7), called also the "Colonne du Palmier," was reared in 1808 in memory of the Egyptian campaign. It is very elegant; the shaft, in imitation of the trunk of a palm-tree, is encircled by bands inscribed with the names of victories. The capital

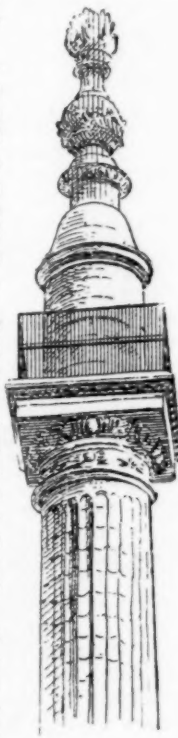


Fig. 6. The Monument, London.

flares slightly at the top and supports a hemisphere which is surmounted by a Winged Victory holding aloft crowns. The figures about the lower part of the shaft are by Boizot. The architect was Bralle. The column was placed in its present position in 1858, when it was raised three metres by a pedestal decorated with engaged sphinxes, designed by M. Davioud.

[To be continued.]

THE SEWERAGE OF CHARLOTTETOWN, P. E. I.

THE little city of Charlottetown lies on a bay deeply indented into the southern coast of Prince Edward Island, in the southern part of the Gulf of St. Lawrence, opposite the northern coast of the Province of New Brunswick. It is the capital of the Canadian Province of Prince Edward Island, which has a population, almost exclusively agricultural, of about 110,000. The population of the city itself is not far from 12,000 and it is not expected that it will ever be more than twice as large. It occupies the southern end of a low promontory which is bounded at each side by considerable estuaries, called rivers, in which the tidal flow sets back for many miles. These estuaries have wide expanses in their courses and the volume of water flowing out of them and through the harbor, on its way to the sea, sweeps the shores of the town with a vigorous and cleansing movement. A few miles below the town, the sides of the harbor are contracted to a relatively narrow passage with a considerable widening toward the Gulf beyond this.

The highest point in the city is about fifty-five feet above low-water mark, and much of its area, not only along the shores but following the courses of an inflowing creek through the valley behind the town is only about ten feet above low water. The central portion of the town, perhaps two-thirds of its occupied area, is not only high enough for good drainage but has very good slopes. The low border of the town, along the west side and around to the north, has an inclination which, while slight, is sufficient to give a good flow to the harbor south of the town at an elevation of two or three feet above low water. But as the ordinary tides rise and fall eight feet, suitable drainage into the harbor at high water is impracticable for this district.

Along the easterly side of the town the same condition prevails, but the valley running round to the rear is absent so that the distance to be covered is considerably less.

It would be a moderate statement to say that the existing sanitary appliances of this city hardly satisfy the demands of the most advanced modern practice. There are two or three small private sewers with a few connections running to the harbor, one from the Parliament House and other public places and another from the principal hotel. Ordinarily, the primitive privy-vault prevails and liquid wastes are either discharged into the street-gutters, or, what

is quite usual, through small bore wells driven into the porous rock below with rude strainers to hold back solid matters. This seems to be a modification of the cesspool system and, as each man is careful to extend his hole to a water-bearing seam of the rock, it is clear that in view of the undulating and broken character of this rock there is a chance for an interchange of rather an alarming character between cesspools and wells. It is not, therefore, to be wondered at that typhoid fever has been and still is prevalent, and that the more enlightened physicians of the city have been the most earnest advocates of sanitary improvement. An excellent system of water-supply, belonging to the city and well managed, is now in full operation. Although the works are not yet three years old, and although the water-rates are moderate, the income is already sufficient to pay the interest on the bonds and the expense of maintenance, and to set aside a satisfactory contribution to the sinking-fund. Rather curiously, the most effective argument, from a business point-of-view,

for introducing sewers, is this: The sewers will enable the people to use water much more freely, which they are eager to do, and the additional water-rates will more than pay the interest and sinking-fund of the sewer-bonds.

In considering the method of sewerage this town and providing a proper disposal of the outflow, a somewhat intricate problem was presented. The large central portion of the town was susceptible of being easily sewered to the harbor's edge above the level of high water. The westerly side could be sewered to a point a little above low water. The easterly side, having a much larger area at the lowest elevation, could, with difficulty, be provided with a similar outlet at the easterly end of the water-front. These difficulties were made much more serious when the question of ultimate outlet and disposal came to be considered. It would not do to discharge sewage into the harbor on the in-coming tide nor could it be discharged so near the end of the falling tide as to be brought back when the tide turned and the strong and rapid flow began. It seemed necessary that everything discharged should have time to get beyond the narrower outlet of the harbor into

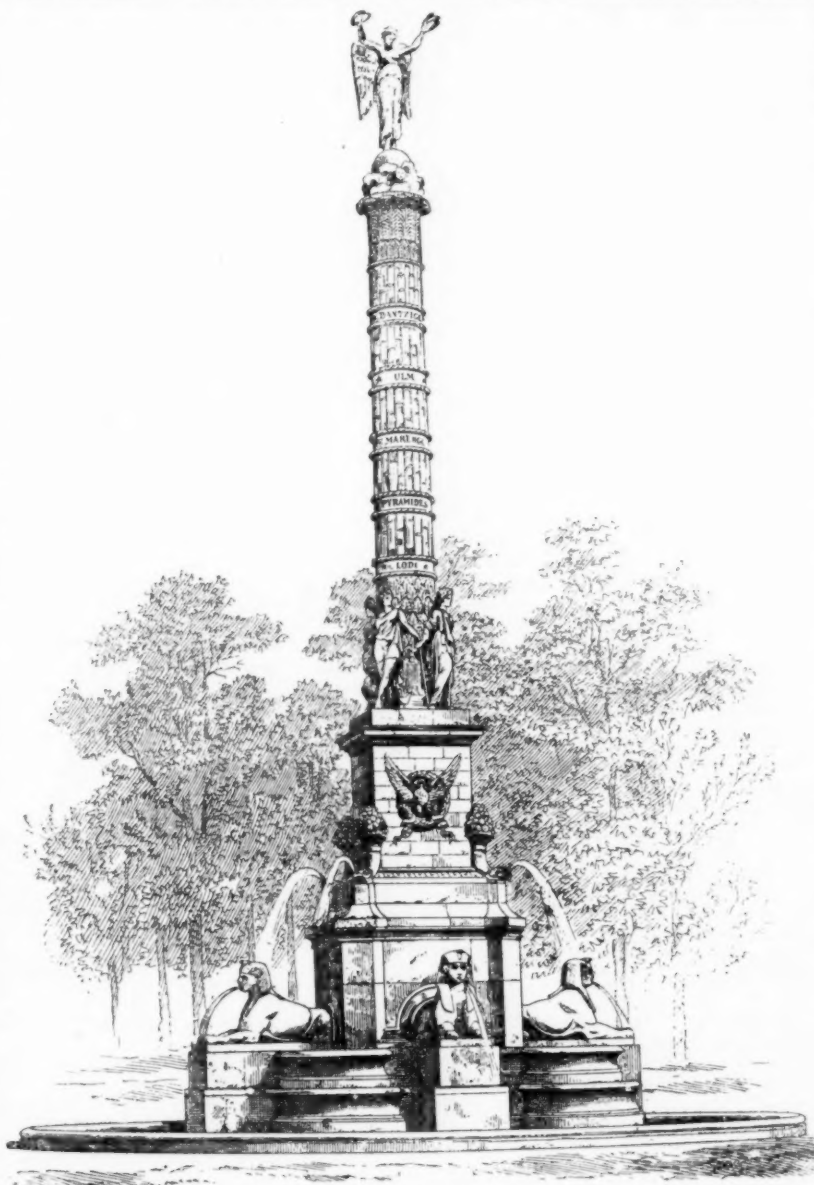


Fig. 7. Column in the Place du Châtelet, Paris.

the outer bay, which would require the cessation of the flow at least an hour before low water. In order to comply in an economical and advantageous manner with all of the conditions imposed by this involved state of affairs, it became necessary to concentrate the outlet-works at a single point—finally placed at Pownal Wharf, near the westerly end of the water-front. This point, however, is so far from the low region along the easterly side of the town as to make it impossible to drain it by a gravity-sewer on a regular inclination delivering even at low-water mark or considerably below it. If the drainage could be so delivered, constant pumping, day and night, would be necessary to maintain a proper condition of the sewers of that not very large but very important portion of the city.

The following description is made with reference to the accompanying plan (See Illustrations):

OUTLET WORKS.

The principal feature of the outlet-works is a reservoir 100 feet

long and forty feet wide, having its bottom at an elevation of three feet above low water, holding sewage to a depth of ten feet, and with walls rising one foot above the water-line. To this reservoir is connected a twenty-inch iron pipe, leading from a depressed sump at its northwest corner and running thence along the floor of the harbor, beside the wharf, to a point beyond the pier-head where a deep and constant channel is found. There is placed in conjunction with this a pumping-well twenty feet in diameter and twenty feet deep, the general level of its bottom being fourteen feet below low water with a sump-hole two feet below that. This well will be emptied by a pair of duplex pumps of the Worthington type, either of which would be capable of emptying the well in less than one hour. The discharge-mains from the pumps will be carried over the top of the reservoir and down to the sump in which their mouths will be submerged so that the actual head against which they are to operate will not exceed that of the elevation of the sewage in the tank. The sewage will be delivered at these works in the following manner. That from the higher central portion will enter the tank at all times by gravity, near its bottom, the incoming sewer having such a rise that the flow, even when the reservoir is full, will not set back far enough to do harm. The sewage of the westerly low portion will enter the tank a little above its bottom by gravity, until such a depth shall have accumulated as to set the dead-water too far back on the main line. Then a by-pass will be opened and its discharge will be into the pumping-well. The sewage from the low easterly portion will be brought to the well by siphonage as will be described farther on. Thus the entire flow of the central portion and a very considerable part of the flow of the western portion, will enter the reservoir by gravity, while a portion of the western flow and all of the easterly flow will be lifted into the reservoir by pumping. After the tide shall have fallen one hour, or sufficiently below the level of the sewage in the tank at the moment, the twenty-inch gate will be opened and will be kept open until one hour before low water. It will then be closed and kept closed until the proper point of the next falling tide. Thus the sewage will, roughly speaking, be stored during eight hours and discharged during four hours of each tidal period.

Naturally, with a town that is now entirely without sewers, and which has very few plumbing-fixtures, the excellent water-supply system having been only recently completed, it will be a considerable time before the amount of sewage delivered into the tank will reach an elevation so high as to require the use of the by-pass to the well from the western low main. It will probably be a considerable time also before the population of the easterly low district, mainly persons of small means, will deliver sewage enough to fill the pumping-well even once a day. The capacity of the reservoir and its appliances has been based on a possible production of 300,000 gallons of sewage in eight hours. It is not very likely that this will be reached by the present population even when plumbing-work and sewer-connection shall have become universal. Should future exigency require it, the storage-room can be increased without difficulty, but this contingency is too remote for present consideration.

THE SIPHON MAIN.

In order to furnish an outlet for so much of the easterly portion of the town as cannot be drained into the gravity-main, an outlet-main has been devised in the form of a siphon line about 5,000 feet long. The sewage of this district, occupying one-half of the southerly front of the city, and bounded by Prince, Dorchester, Hillsborough, Sidney, Weymouth, Kent, Cumberland, Fitzroy, Grafton and Pleasant Streets, is led, as shown on the map, to two different deep wells, the one at the foot of Grafton Street being fifteen feet deep and extending to five feet below low water, and the other at the foot of Weymouth Street twenty feet deep and ten feet below low water. The pumping-well which is worked in connection with the siphon line is twenty-five feet deep and fourteen feet below low water. The wells at Weymouth and Grafton Streets are six feet in diameter. The lowest sewer entering the Grafton Street well runs in three feet above low water, the lowest, at Weymouth Street, one and one-half feet above low water.

These two wells are connected with each other by a line of ten-inch cast-iron pipe made absolutely tight, and turning down nearly to the bottom of each well. The Grafton Street end of the horizontal run is one and one-half feet above low water and the Weymouth Street is two feet above low water. The Weymouth Street well is connected with the pumping-well in like manner by a line of similar construction twelve inches in diameter. As in the other case, the delivery end of the horizontal run is six inches higher than the receiving end. These siphons are practically below the level of the sewers delivering into the two wells, as a temporary set-back of sewage in the line at Weymouth Street may be disregarded.

Siphon lines have been successfully used as substitutes for main-sewers, notably in the case of Norfolk, Va., where I recommended the construction of a fourteen-inch siphon 1,850 feet long which has been in constant and most successful operation for nearly eight years. This line has been, as in the case with siphons generally, subject to an accumulation of air at its high point, which is thirteen feet above the inlet of its sewer, making it necessary to resort to the use of a special pump for exhausting this air at frequent intervals in order to maintain the line in full service. This difficulty is obviated in the case of Charlottetown by placing the siphon so low that it can be entirely submerged without interfering with the discharge of the

sewers leading to the wells. It is provided at the delivery end of its horizontal run—its higher end—with an air-valve opening outward. Whenever the accumulation of air makes it necessary, or when desirable for any other reason, the emptying of the pumping-well, into which the siphons ultimately deliver, is stopped, and the sewage, flowing by gravity accumulates until its level in the three wells has risen to somewhat more than two feet above low water. This rising of sewage into the siphons forces contained air to the high points and drives it completely out of the siphon through the air-valves. The flow through the lines will be so slow under such conditions as to cause a certain amount of deposit. Therefore, when pumping is begun, it is begun vigorously and maintained for a short time at full speed to insure a thoroughly cleansing flow through the whole length of the siphons.

Practically, at Charlottetown the well will probably be emptied only about twice in twenty-four hours. The pumping will not be begun until the sewage has reached the submerging elevation. So that when the siphons are brought into use, it will always be with an entire absence of accumulated air, and a full flow will be ensured. The limbs of the siphon descend to different depths in the different wells, approaching somewhat closely to the hydraulic inclination needed for emptying the upper well within a given time. No harm will be done if either of the receiving-wells becomes pumped out so as to admit air to the siphon, for this will be expelled through the air-valves as the sewage rises, before the next pumping.

THE GRAVITY MAINS.

The two gravity main-sewers, described in connection with the outlet-works, are carried on a very low grade (1 to 750) so as to keep them as far down the slope as possible and to receive the sewage of the largest possible area. In order to obtain a cleansing velocity at this inclination, it is necessary to use sewers at least fifteen inches in diameter, and these would require for a cleansing velocity frequently to flow at least half full. The districts which they drain are relatively small and they would never carry by constant flow nearly enough to maintain a proper velocity. Provision has therefore been made to accumulate in a flush-tank at their upper ends enough sewage (300 cubic feet) to wash them out effectually by introducing this volume as fast as the pipe at its upper end can receive it. The flush-tank on the low-gravity main is at Douglass Street in the northerly part of the town. It receives the incoming sewage at an elevation of about twenty feet above low water and discharges it at about fourteen feet above. The high gravity main has its flush-tank at the intersection of Weymouth and Grafton Streets. It receives its flow at twenty feet above datum while its delivery is at fourteen and one-half feet above.

The local sewerage of the districts tributary to the various mains is effected by the use of lateral and sub-main sewers six and eight inches in diameter, with flush-tanks at their heads and with man-holes and inspection pipes conveniently placed along their general course. This portion of the work does not differ from that usually carried out in the sewerage of towns on the same system, save that nearly all of the north-and-south streets of Charlottetown and three of the east-and-west streets are one hundred feet wide. It was decided that it would be better on these streets to lay two sewers, one on each side, than to lay a single sewer in the middle of the street. The original construction of the sewers is somewhat more costly, but this is much more than compensated for by the shortening of house-connection drains. The sewers are placed under the sidewalks, which are not paved, at a distance of five feet from the property line. This has the further advantage of giving to this short house-drain the same total fall that would otherwise have to be divided over a much longer course. It is a further important advantage that the streets themselves will not be disturbed during construction, save at crossings, and that there will, hereafter, be no occasion to break them up to make house connections or to remove obstructions from house drains.

The total estimates of the cost of this work amount to \$133,533.40. Of this, the sewerage-system proper, including siphon-wells, flush-tanks, man-holes, etc., 4,940 feet of siphon and 640 feet of 20-inch cast-iron outlet, consumes about \$116,000, the remainder being applied to the large reservoir, pumping-well, pumps, etc., constituting the outlet-works.

GEORGE E. WARING, JR.

DISCOVERY OF A BURIED GUATEMALAN TOWN.—According to the *Rundschau für Geogr. u. Stat.*, a buried town has recently been discovered at the foot of the volcano Agua about two miles to the east of Santiago de los Caballeros, an important town of Guatemala. Excavations were undertaken at the instance of the owner of the site, Don Alvarado, he having previously found certain articles much resembling the household utensils in use among the aborigines at the time of the discovery of the New World. At depths varying between six feet and sixteen feet the workmen brought to light a large number of household utensils (including engraved and painted vases) weapons and articles of personal ornament, amongst which were many necklaces of precious stones. The vases were found to be decorated with well executed drawings, and with inscriptions in hieroglyphics. There were also discovered some statues in black basalt, remarkable for their execution if it is to be assumed that only stone tools were used on them, there being no trace of metal implements of any description in the excavations. The ruined walls of tenements were met with at a depth of about five feet, and on a level with the foundations of these houses numerous human skeletons were discovered.—*The Builder*.

COMPARATIVE MUNICIPAL BUILDING LAWS.—XXVII.

[Note:—In these tables bracketed letters invariably refer to preceding passages in the same column.]

Tenement-houses: Construction.

Boston:—*a.* Every building hereafter built any portion of which above second story is to be occupied by more than one family shall be a first-class or second-class building.

b. Every building five stories or more in height hereafter erected or enlarged, to be occupied as lodging, tenement or dwelling, shall have basement and first story constructed as required for first-class building (Sect. 23, law of 1892), and in such building no closet shall be constructed under first-story staircase.

c. Exterior walls of tenement and lodging house, not having an exposure on open space, street, court or passageway more than 20' in width, shall not exceed 30' in height.

d. No building erected or enlarged for or converted into tenement or lodging house shall occupy above level of second floor more than three-quarters of the area of lot (measured to centre line of streets and passages on which it abuts).

e. Every such building shall have at least two exposures on land of owner of part of public way, open spaces at least 10' wide, such spaces to have aggregate length of 1' for every 25 square feet of area actually covered by building. Such spaces open to sky and undiminished as long as building is occupied as tenement or lodging.

Baltimore:—*f.* Building more than three stories high occupied or built to be occupied by more than two families above cellar shall be constructed fireproof. When lower part is used for business purposes, the first floor, if there is a cellar below, and the ceiling above store floor, shall be constructed fireproof, and the hall partitions and partitions from front to rear, from cellar to top of second-floor beams, and the entire stairway, shall be built of fireproof material.

g. Front and rear tenement-house shall not be erected on same lot unless there be an open space of at least 30' the whole width of lot between same.

Brooklyn:—*h.* No tenement-building erected without consent of City Council.

Chicago:—*i.* Building in front of lot shall not be used as tenement or lodging house where there is another building in rear of lot unless there is a clear space exclusively belonging thereto extending upwards from ground, minimum distance between buildings, if they are one story above ground, 10'; if two stories, 15'; if three stories, 20'; if more than three stories, 25'.

j. Building used as tenement or lodging house on back part of lot shall have clear open space of at least 10' between it and any other building. Permit from Department of Buildings may lessen or modify such distances when through ventilation of open space can be otherwise secured.

Cincinnati:—*k.* Every house designated to be used in part or whole as tenement-house, lodging-house or hotel shall have clear open space between front and rear of such building and any other building of minimum width; between buildings one story high, 10'; between buildings two stories high, 15'; three stories high, 20'; more than three stories, 25'. In every case, length of space not less than three-quarters width of building.

Cleveland:—*l.*

Denver:—

Detroit:—

District of Columbia:—

Kansas City:—*m.* Buildings for tenements or lodging-houses in any part of city subject to requirements for brick buildings unless expressly excepted.

n. Brick building hereafter erected or altered to be used for tenement or lodging house (except where there are not more than four families, and having two separate stairways) shall have stairways enclosed in brick walls.

o. Not less than 8" thick the entire height, or terra-cotta partitions, or stud partitions with brick or terra-cotta noggin throughout, and no wood lath used on stair side of such partitions, and if lighted with skylight such skylight framed of metal.

p. And no opening or aperture made in said walls except requisite doors for entrance thereto and external windows. The whole area of stairway not occupied by well-rooms to be deafened.

q. Other better fireproof or fire-resisting construction substituted by permission of Superintendent.

r. Every such building occupied by more than four families above the first floor shall have additional staircases or means of egress judged necessary for safety of inmates by Superintendent.

s. If such staircase partitions commence at a level above cellar-bottom, they may be erected upon iron girders and properly protected from fire, the floor within said walls at level of girders entirely of incombustible material.

Louisville:—

Memphis:—

Milwaukee:—

Minneapolis:—Hotels, boarding, tenement, lodging and apartment houses shall have partitions enclosing or adjacent to stairways constructed of incombustible material.

Nashville:—

Newark:—Buildings used as tenements or French flats in which lower portion is used for any purpose other than dwelling shall have hall partitions built of brick to the second-floor beams.

New Orleans:—

New York:—Dwelling arranged to be occupied by more than one family above first story shall be provided with entrance to cellar from outside of such building.

Building hereafter erected or altered to be occupied as hotel, every dwelling-house exceeding five stories high erected or altered to be occupied by more than one family on any floor above the first, and every dwelling-house over 60' in height erected or altered to be occupied by more than one family, shall have halls and stairs enclosed with 12" brick walls; but 8" walls not exceeding 50' in vertical measurement may enclose said halls and stairs and be used as bearing walls where distance between outside walls does not exceed 33' and area between said enclosure walls does not exceed 180 square feet.

Floors, stairs and ceilings in said halls and stairways shall be wholly of hard incombustible material, and at least one flight of stairs shall extend to roof and be inclosed in bulkhead built of fireproof material.

Omaha:—*t.* The entire height, and provided with ventilating skylight so arranged with ventilating skylight as to be operated from lower hall; if plastered, unless on outside wall, shall be plastered directly on brickwork (*m*) by one inch of mortar or two thicknesses of asbestos. Other fireproof or fire-resisting construction may be substituted. (*p*).

Philadelphia:—

Pittsburgh:—

Providence:—Lodging or tenement house over three stories high or 2,000 square feet area shall have exterior walls of brick, stone or concrete.

On streets 30' or less in width, not over 35' high. Such house exceeding 2,000 square feet area shall be divided by brick walls without openings.

Building occupied as tenement or lodging house, in which lower part is used for business or manufacturing, or which is intended to be occupied by more than four families, the hall partitions from cellar to second floor shall be built of non-conducting, incombustible material.

Tenement or lodging house shall have proper means of escape in case of fire. Stairs shall have proper balusters or railings and be kept in good repair.

St. Louis:—Tenement or lodging house more than two stories high and lower part intended to be used for business or manufacturing shall have hall partitions from cellar to second floor built of incombustible material.

San Francisco:—

Wilmington:—

Tenement-houses: Sanitary Requirements.

Boston:—*a.* Every tenement and lodging house shall have in every sleeping-room not communicating directly with external air two ventilating or transom windows not less than 6 square feet area each, one opening into another room or passage having an exterior window of not less than 6 square feet area and movable sashes.

b. No transom window in partition-wall inclosing main stairway. Every room in every tenement and lodging house

c. Shall be not less than 8' in clear in every story except attic, where one-half area of each room shall be 8' high.

d. Every such room shall have one or more windows on an open air-space with an area at least one-tenth as great as that of room.

e. The top of at least one window on such air-space in each room shall be at least 7' 6" from floor, and the upper sash of such window movable.

f. Every such building shall have adequate chimney through every floor, with open fireplace, grate or place for stove properly connected with chimney for every family and set of apartments;

g. Shall have proper conveniences and non-combustible receptacles for ashes and rubbish;

h. Shall have water furnished at one or more places, or in yard thereof, adequate and reasonably convenient for occupants;

i. Shall have floor of cellar cemented water-tight.

Outside and appurtenant to it suitable space satisfactory to Inspector for temporary deposit of garbage and other refuse.

j. Halls on each floor shall open directly to external air, with suitable windows, without obstruction at end, unless light and ventilation are otherwise provided in manner approved by

k. Board of Health.

l. No cellar or underground room used without permit from Board of Health as dwelling or lodging unless

m. In every part at least 7' 0" in height from floor to ceiling

n. For at least one foot of its height above surface of street or ground adjoining or nearest to same.

o. An open space at least 2' 6" wide in every part extending along entire frontage thereof, upwards from 6" below level of floor to surface of street or ground, and outside and adjoining said vault, cellar or room,

p. Effectually drained by drain uppermost part of which is at least one foot below level of floor.

q. A clear space of at least one foot below level of floor unless cemented

r. Appurtenant to the use of water-closet or privy.

s. Having external window-opening of at least 9 square feet clear of sash-frame, window-opening fitted with glazed sash at least 4½ square feet, to open for ventilation;

t. Provided, if an inner room is rented with front room for joint occupation it shall be sufficient that inner room is connected to front room by door, and also by ventilating or transom window, and, where practicable, also connected by similar window or hall or passage with external air.

u. Or so let and occupied before passage of this Act.

v. Steps needed for access to such vault, cellar or room may be placed in area adjoining, if not over, across or opposite external window, and so as to allow 6" clear space between every part of such steps and external wall of room, and with risers open.

w. Over and across such area steps needed for access to building above may be placed if not over, across or opposite external window.

Baltimore:—

Brooklyn:—

Charleston:—

Chicago:—Every habitable room (*e*).

x. Every such room shall have at least one window connecting with external air, or other the door or ventilator of perfect construction connecting it with room or hall which has connection with external air.

y. And so arranged as to produce cross-current of air.

z. (*e*). Total area of window or windows in every room communicating with external air shall be at least one-tenth superficial area of such room (*e*), to open full width.

aa. Every habitable room of less than 100 square feet area, if it does not communicate directly with open air and is without open fireplace, shall be provided with special means of ventilation

bb. By separate air-shaft to roof, or otherwise as Commissioner may prescribe. (*f*); (*g*); (*h*); (*i*); (*j*) by Commissioner of Buildings.

Cincinnati:—*cc.* Every habitable room, except in roof, shall be at least 7' in clear in every part. Habitable room in roof shall be at least 7' in clear for one-half its area.

dd. Every room used as sleeping-room which does not communicate directly with external air shall have movable window or transom sash not less than 3' square which shall open into an adjoining apartment which has direct communication with external air. (See "Cellars.")

Cleveland:—(See "Cellars.") (*cc*); (*dd*).

Denver:—

Detroit:—

District of Columbia:—

Kansas City:—*gg.* Every tenement or lodging house to have in roof at top of hall a ventilator, also provided with means of escape in case of fire approved by Superintendent.

hh. Every sleeping-room not communicating directly with external air shall have ventilating or transom window with opening area not less than 3 square feet over door leading into adjoining room if such room communicates with external air, and

ii. Also like window in such other place as Superintendent directs, (*b*) and with proper stairs, strong balusters, posts and railing kept in good repair.

Every habitable room in such building (*e*); (*x*); (*z*); (*e*). (*aa*) approved by Board of Health and Superintendent.

(*f*); (*g*); (*h*); (*j*); (*k*). (*l*); (*m*); (*n*); (*o*); (*p*); (*q*); (*r*); (*s*); (*t*); (*u*); (*v*); (*w*).

Louisville:—

Memphis:—

Milwaukee:—

Minneapolis:—

Nashville:—

Newark:—

New Orleans:—

New York:—

Omaha:—

Philadelphia:—

Pittsburgh:—

Providence:—(*hh*), and also over door leading into hall; and where said room cannot ventilate into hall, it shall have window opening into adjoining room which communicates with hall.

Halls on each floor shall have suitable windows, and shall not be obstructed by rooms or otherwise at ends unless light and ventilation therefor are otherwise provided.

Roof of such house kept in good repair, and no water therefrom to cause dampness in walls, yard or area. (*h*).

(*aa*), (*f*), and is subject to such other regulations for safety and ventilation as the Board of Health deems necessary.

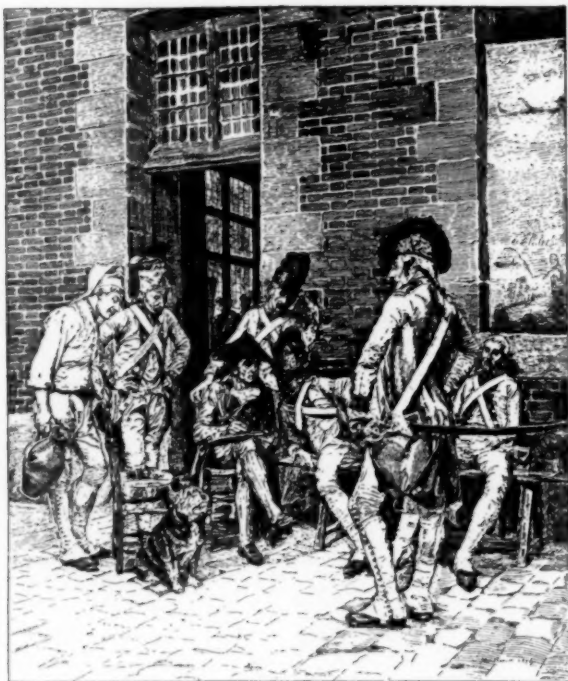
St. Louis:—

San Francisco:—

Wilmington:—

Compiled by HENRY A. PHILLIPS.

MEISSONIER IN LONDON.



"The Portrait of the Sergeant": by L. J. E. Meissonier. From the *Art Annual* for 1881.

It was a good idea bringing over Meissonier's sketches from Paris; it will probably augment the prices later on at the Hôtel Drouot, and it certainly enables us here in London to see what a marvelous worker the man was, and what an incomparable draughtsman. Moreover the exhibition will put a good many florins into the pockets of the three charities which are to benefit thereby—the Société de Bienfaisance Anglaise, Paris, the French Hospital, London, and the poor of Poissy, where the painter lived for part of the year.

Meissonier's greatness is exemplified in this exhibition as it never has been before. We all know his little pictures, those marvels of "finish," a quality which has always been so popular with the public, from Dutch days downwards. But the knowledge of what to leave out, has never been seen in Meissonier's work before—or at all events as it is here. Innumerable studies of horses and men, portions of uniforms, one of the Old Guard in divers positions, and the endless studies, for "1807," of mounted cuirassiers rushing by like a whirlwind, open-mouthed and screaming—these things we have not seen until now, except one or two, here and there, by chance. All these studies are marvels of draughtsmanship. One seems to feel the discontent of the artist with his work—never really satisfied, always making fresh studies. And note, too, that these studies are mostly in oil or watercolor and, as far as they go, finished; showing, that Meissonier, like many a smaller painter, failed to grasp the effect of a thing unless it were in the condition in which it would be when completed in the picture. He would have none of those rough, careless scribbles, which satisfy some artists as sketches: scrawls to be developed as they go on. Meissonier made a study, more often many studies, of half a man, or the legs only, or the head; he took infinite pains to get the right action, the right twist of the body, the right turn of the head. Trouble, either in research, or in doing and undoing, he never thought of, and there is a characteristic story told of his displeasure with some man's cravat—it did not seem correct. He thereupon went to the Bibliothèque and hunted up some old books, in which he discovered that the stuff should have been cut on the cross instead of on the straight. Away went the cravat, scraped off to the panel, to be done all over again. But with all this care, with endless trouble and industry, is it possible to reproduce perfectly a past age? You may have the furniture and the clothes, but you cannot expect the modern man to personify the eighteenth-century "Chess-player" or "Warrior"; and even on the stage, it is rare that an actor can positively identify himself with a past age.

When Meissonier began his career, artists were supposed to paint "out of their heads." They studied from life, but when study was over, the "grand style" of historical or of classical pictures were painted from the knowledge gained during the school-days: working from models was unusual when the picture was in hand; certain conventions were observed, but Nature was ignored. Meissonier revolutionized all this, and did his smallest piece of work direct from life. Had he been born only a few years later, he would probably have given us more of modern life. It was a great step to make an exit from the "grand style," historical or religious, which treated every subject in exactly the same fashion, and with equal

disregard for Nature; and to work, not from memory, or knowledge, or imagination, but from the living man or horse, in every variety of action. Probably this departure from the grand style, particularly as regards size, was the foundation of his great reputation. For the select few, his admirable qualities as a painter were early recognized; but to the general public, the minute size of his work was the wonder. After the yards and yards of canvas covered by Ingres, Géricault, Gros and other painters of the early days of the century, it was a marvel to see Meissonier's little *bonhommes* and *gentilhommes* so perfectly finished in all their details; and being a new departure, his fame was made.

As a colorist Meissonier leaves much to be desired; there is a monotony in his tones, a want of variety in his flesh tints—none of those pearly grays, those greens and pinks that one finds in Velasquez and Ter Borch; none of those brilliant golden hues which characterize a Rembrandt. Even in the "Portrait of the Sergeant," which is one of the finest pictures, there is no playing with the tones of the white uniforms, and the bricks of the wall are all of exactly the same depth of red. One asks, too, is the place under cover, or outside? In landscape, also, the painter shows his want of the sense of variety in color—crude, metallic green trees, and dull, sunless stone bridges. But no human being is perfect, nor is any artist; and it is mere grumbling to demand what is not to be found, when so much exists in such splendid perfection. What strikes one above all in Meissonier's work is the truth of his attitudes, the precision of his outlines, the living expression of his faces, the movement, the "go" of his figures. Who else has expressed anything like the rush of the cuirassiers in the "Jéna," or the "1807"? The men in the latter seem to be screaming at the top of their voices. Again, the eagerness of his chess-players, and the passion of the combatants in "La Rixe"; or the concentration expressed in the artist's face in the "Portrait du Sergent"; or the rollicking toss of the head of the connoisseur in the "Peintre d'Enseignes," as he stands, inspecting his new signboard of a Bacchus astride a beer-barrel. All this is admirable, perfect, unsurpassed even by the Dutchmen; but where the latter excel is in their coloring. If one thinks of the red walls in a De Hooghe, the one in the sergeant's portrait is not to be compared.

M. Dumas in his preface to the catalogue, speaks of Meissonier's tribute to Fortuny's talent: "that he (Meissonier) would cut off the little finger of his left hand to be able to handle water-colors in Fortuny's manner." But I doubt if any artist would not be willing to lose his left hand and both his legs to paint as Fortuny, or Meissonier, or any other great man. Fortuny is said to have copied Meissonier's pictures to gain precision; which is a proof of the usefulness of copying—not held in such honor in these days as formerly.

Sunlight is another characteristic of Meissonier's, although in this he did not excel De Nittis and Montenard—I am thinking of the "Chemin de la Salice," the "Route de la Salice," and other results of his journeyings in the south.

In water-color the painter seems to be more vivid even than in oils—that is, in his sketches; the water-color "Friedland" not being comparable to the larger work, now in America. But the studies are fresher in the former medium, more freely laid on, less labored; in saying which, one feels a sort of shame lest any one should think we do not fully appreciate what has been so lavishly laid at our doors. If the exhibition had no other merit, it would be a wondrous example of a life of work, and of love of work; both rare virtues in these days of craving for idleness. It is not the Meissoniers who desire a day's work to be limited to eight or ten hours. Such men feel that the greatest happiness is to work at what they love.

Meissonier is generally placed at the head of the military painters; but his pictures of that class are limited to the Napoleonic period—they are essentially the glorification of the "Man of Bronze" with one or two exceptions, such as "1814," which treats of the great retreat from Russia. But of the horrors of war, Meissonier unfortunately gives us naught. His "Jéna" represents the battle as seen from an eminence upon which stand the generals and their staff. The cavalry are rushing along in the distance, but the carnage caused by the charge is out of sight—it might be a mere review; one dead body alone is placed in a corner where it is scarcely seen. War *coulour de rose*, was Meissonier's idea. How different from the suffering depicted in De Neuville's works, and the horrors of Verestchagin's. The former painter makes the tears start from our eyes; the latter makes us shudder; but Meissonier encourages the young man given to soldiering by only representing splendid uniforms and accoutrements, and dashing war-horses. Of wounds, mutilations, starvation, thirst, slaughter and fire, nothing; the army trips along as for a march-past; and human misery and animal suffering are judiciously placed out of sight. *La Gloire—voilà tout.*

S. BEALE.

FOR BROWNING BLUE-PRINTS.—Dissolve a piece of caustic potash as big as a soup bean in 5 ounces of water. Place print in this solution, and it will fade to orange yellow. When all blue prints have disappeared, wash print thoroughly in clear water. Then dissolve a partly heaped teaspoonful of tannic acid in 8 ounces of water. Put the yellow prints in this bath, when they will turn to a brown that can be allowed to assume a tone of any required depth. Then wash well and dry.—*Scientific American.*



ANNUAL MEETING OF THE CANADIAN INSTITUTE.—THE WATER-SUPPLY OF TORONTO.—THE FURTHER HISTORY OF THE TORONTO COURT-HOUSE.—WORLD'S FAIR EXHIBITS.

THE forty-fourth annual meeting of the Canadian Institute was held early this month at the society's building in Toronto. The annual report read by the secretary shows the Institute to be in a flourishing condition and to have accomplished a large amount of useful and interesting work, though the field of its labors being immense and the funds at disposal by no means adequate, the results that have been attained are very far short of what the society might do, and which it would be well that it should do, if it were properly supported by the many interested in the results. It is gratifying to note that certain schemes emanating from the Institute have been carried out by the Government, as, for instance, the preservation of the Algonquin Park as a place where the wild animals of the country may be protected and bred, to prevent the extinction of their species; a report of a royal commission on this subject just issued shows this to be an accomplished fact. Another result of the year is that the Old Fort at Niagara will be taken care of by the Government and preserved as an historical monument. Action was taken by the Council to secure some commemoration of the crossing of the Atlantic by the first steamer in the year 1833. Dr. Sanford Fleming has proved conclusively that the Canadian steamer "Royal William," was the first to steam all the way, while the "Savannah" which laid claim to the distinction, made use of its engine on calm days only, and that during her voyage, which occupied twenty-nine days eleven hours, she steamed only three days eight hours. A joint committee of the Institute and the Astronomical and Physical Society has prepared a circular to be sent to all observatories and astronomers, asking their opinions regarding a change in time-reckoning, whereby the astronomical and civil day shall begin at mean midnight and suggesting that the change shall commence in 1901. During the past year twenty-four meetings of the Institute were held at which thirty-four papers were read, covering a great field of research. Professor Ramsay Wright was elected president for the ensuing year.

We have alluded in past letters to the water-supply of the City of Toronto, drawn from Lake Ontario by a costly pumping plant, through a six-foot steel conduit that crosses the harbor or bay into which all the sewage from the city is drained. The bursting of this pipe and the attempts at patching were also spoken of, and it was left to the spring of the year to show whether the repairs had been successful. The cost of laying this new conduit was nearly \$200,000 and nothing more than carelessness proved its ruin. The engineer in charge of the repairs reported from time to time that he had executed certain works and that he believed the pipe to be sound, which, of course, meant that there was no possibility of the sewage of the bay getting into it, but as often as he reported, analysis showed that the water supplied was still bad, and now it has become nearly certain that this costly conduit is useless. Municipal bad management, the employment of unqualified heads to the department because they were cheaper than good men is the first cause, and we have a serious instance of "spoiling the ship for a 'hap'orth' of tar." There is no doubt that water of the best quality can be supplied to the city by gravitation from springs or lakes north of Toronto, but it has been hard to get the authorities to countenance any such scheme in view of the immense sums spent on the existing system. However, they have been obliged to face the inevitable and the City Engineer has been instructed to inquire into and report on the feasibility of one scheme by which water shall be brought to the present reservoir from springs eleven miles off. Several firms have come forward with offers to supply the city with pure water at rates far cheaper than under the present system by which the citizens are supplied, while they are daily warned of the necessity of boiling all they would drink. Messrs. Curry & Gunther propose to supply 25,000,000 gallons daily at an annual cost of \$150,000, while Messrs. Moore & Wallace, of New York, for the Toronto Aqueduct Co., offer an unlimited supply of pure water at a rate of five cents per 1,000 gallons for domestic purposes, street-watering and general use, and one cent per horse-power per day for manufacturing purposes. They undertake to spend \$1,000,000 in the work of construction before the end of '94, and \$3,000,000 before the end of '95. In the meantime citizens must wait the engineer's report, which is to include the whole subject of water-supply to the city, the present, the advisable, the practical and the impracticable; he is asking for a grant to enable him to proceed with his inquiry and no doubt it will take a long time before he begins, so that for a long time water for drinking will have to be boiled and people must be content with water sometimes a thick white, sometimes brown, and must not object to having small fish, paper and such things come through the

taps as has been the case for some months past, while diphtheria claims its victims and cholera looms on the horizon.

It is nearly ten years ago since the Corporation of Toronto acquired a site for a new court-house (often mentioned in these letters), at a cost of \$210,000 nominally, though the expenses in connection with the purchase and the clearing of the site of dwellings and so on mounted up to a very high figure in addition. The final by-law on the subject empowering the issue of debentures for \$1,632,000 in this connection was passed just four years ago and was consented to by the rate-payers under the impression that commissioners were to be appointed who would be responsible for the due carrying out of all contracts, and who would supervise and control the works generally until completed. It was soon found that there was actual deception practised, and as soon as the Corporation were empowered to raise the money, they refused to appoint or pay commissioners. Action was taken to enforce this, but the citizens were beaten, and since then the works have been in the hands of a committee whose personnel changes every year.

The architect, desirous no doubt of saving himself as much as possible from the annoyance and hindrance of butchers and grocers and such men who under the circumstances would be his masters, fenced himself in by his agreement with the Corporation in such a manner that now all responsibility for the satisfactory completion of the works rests with him, and if at any time he appeals to the committee for instruction they quietly remark that they have nothing to do with the matter and request him to use his own judgment. The failure of the contractor and the seizure of the works by the architect are now matters of ancient history. After those events the architect, by day's-labor, put the building (or so much of it as was nearly completed a little above the ground-floor plinth) into shape for tendering, and tenders were asked for and submitted for the finishing of the building. A cry was made that it should be done by day's-labor but it was shown by the expression of public opinion that such a proceeding would be not only folly but iniquitous, and that if carried out the chances were that no one now living would see the completion of this white elephant. The tender of Messrs. Brown & Love of Toronto was accepted by the architect and they with their tender made the required deposit of \$7,000. Now they refuse to sign the contract, stating that the architect's conditions of contract are too stringent, and the architect, who finds the next tenderer also refuses to sign, determines to proceed by day's labor. The architect on a previous occasion expressed himself as being quite agreeable to turning builder, and considers that he and his clerk-of-works will be a match for all the men they employ and be perfectly able to cope with the Union-men, who by their present attitude evidently mean to give him all the trouble they can. The architect's position is not a pleasant one. He recently submitted to the City Council a report of his proceedings in connection with the works to date, from the time of the failure of the original contractors, winding up with a statement of his intention to proceed by day's-labor. The reading of his report was greeted by a burst of laughter from the august members of the Council, one of them going so far as to offer sarcastically a vote of thanks to him for the information conveyed by his report.

It is evident therefore that the architect is to be left to his own resources to complete the building within a certain sum of money, he is to be bullied by the men he employs, he is to be neither backed up nor assisted in any way by his employers. They practically say, we have given you the work to do—proceed as you like without reference to us, but if anything goes wrong we hold you personally, absolutely and entirely responsible, and do not look to us for any assistance. As to whether there is any time-limit for the completion of the works seems to be a matter of indifference to the Council and since it will be the object of the men to make the work last as long as possible under the day's-work system and as they will have only a clerk-of-works to keep his eye on them they are likely to render its completion a matter of the very distant future, while the possibility of troubles and delays, injunctions and counter-actions is very materially increased.

The Dominion of Canada exhibits for the World's Fair have for the most part been shipped and even placed in position, and they are said to be remarkably good and to compare well with the exhibits from all other countries, but what a pity it is that an industrial exhibition cannot be carried out without child's play. A cheese weighing so many tons may be a good advertisement of the fact that the Dominion Government can make cheese at its experimental farm, but otherwise what a useless and foolish expense it is to make such a thing and convey it by a special train to the place where it shall be seen and smiled at by so many thousand sight-seers a day for a few months; surely the craze of the age for exaggeration is but child's play, after all. But the exhibits of minerals from the Government and from the Province of Ontario are really very fine and it was well worth while to spend a large sum on their preparation, the only regret concerning them is that they show the wealth of the country without being able to show, that all this mineral wealth is being drawn upon, and that Canada is growing richer every day. The specimens and descriptions may be accurate to a degree, but it has to be confessed that at present the wealth is all under ground and that very little attempt is being made to develop it. However, the display may incite capitalists to come and assist in bringing it to the surface. Money is all that is needed.

SIDE-LIGHTS ON VIOULET-LE-DUC.¹ — III.

Detail of Doorway, Hotel Lallemand, Bourges, France.
From *La Construction Moderne*.

ville, hastened to let Paris know what the situation was, begging earnestly that they should send him cannon at least.

"The general learned only subsequently that his demand had provoked a discussion between the members of the Government to ascertain whether it were not best to abandon the works at Gravelle and La Faisanderie, the key of this important position."

"It is in this way," adds Duquet, "that General Trochu, at the beginning of the siege understood his duties as commander." In his turn, Francis Garnier says, "A kind of vertigo seemed to have seized the generals and their staffs."

But what was to be done with the Garde Mobile, a national guard undrilled and insufficiently organized; and then supposing that these improvised soldiers could be of some help, would they be really useful for the defence? These were the points which our generals had to consider.

Amongst these several corps there was one, La Légion du Génie Auxiliaire de la Garde Nationale, organized from building mechanics by Alphand and Viollet-le-Duc. Its officers were at first, architects, engineers and contractors. Alphand was the colonel and Viollet-le-Duc the lieutenant-colonel. The studies which the latter had made in the military art of the Middle Ages naturally pointed him out as particularly fitted for the active part of the defence. One of his first cares, in connection with M. Alphand, was to point out to the Government the weak and dangerous point at Nogent-sur-Marne. Beside the danger of being taken in the rear from La Faisanderie, the fort could in a single night be carried by a bold stroke. The enemy, crossing the Marne on pontoons, could take possession of it, and once this position in their hands, what facilities did it not offer for making a breach in the ramparts. It is thus, at any rate, that Alphand and Viollet-le-Duc must have reasoned, for the Légion du Génie Auxiliaire was employed to fortify Nogent, and their solution was so exact that they alone were charged with its defence. No officer came to inspect their work. In his first day's work Viollet-le-Duc conquered the suffrages of all beholders by the remarkable sketches of military fortifications conceived on the spot, as if throughout his whole life he had done nothing but such things as these. Why should not I quote the opinion of Admiral Saisset, contained in the military report, which it is curious to consult from more than one point-of-view. This report is dated October 6, 1870. "For the last six days the occupation of the barricaded village of Nogent-sur-Marne makes every attempt on the part of the enemy to throw a bridge over the Marne a very perilous one for him. All the dispositions taken by those in command seemed to me as able as they were complete." Whenever the officers of the Génie Auxiliaire, all strangers as they were to this kind of work, came to Viollet-le-Duc in search of instruction, he used to take his pencil and note-book, made a sketch or two with his well-known dexterity, adding a few words of explanation to his sketches, and the officer was then able to carry on the work. He himself staked out trenches, carefully taking note of the defilading. If there happened to be in front an eminence upon which hostile sharpshooters or batteries could be placed, a trench was cut so as to avoid their fire. Was a flanking earthwork needed to hinder the enemy in throwing a bridge across the Marne, there at the very point designated, as if the enemy were already at work, such earthwork rose up as if by enchantment. It is thus that he planned the works on the Ile de Beauté, which were

connected with a line mounting toward the village, where means of retreat were prudently provided.

The point at which the enemy actually crossed by the bridge at Brie was not less carefully studied. Not only was the road barricaded with a battery, but all the converging fires formed flanking points in the shape of redans and covered the entire field without dead points, either by trenches or by loop-holes pierced in the walls of houses which connected with one another. The park of Marshal Vaillant, one of the members of the Defense Nationale, transformed into a vast redoubt, connected this line of defence with the fort at Nogent, and, moreover, certain roads lying farther out were also defended. Two batteries on the banks of the Marne swept the plain of Joinville. Before the trenches there were lines of *chevaux de frise*; and this describes the general arrangement of the defence at Nogent. This defence was so useful that Vice-admiral Saisset wrote to the Governor and General Ducrot, October 31, the following letter: "Three shells have just passed through the walls of the casemates of the fort at Rosny. The fuse is still lighted in one of them. I hope to put it out. I have four men killed and a number wounded. What ought I to do?" (signed) "Vice-admiral Saisset." This information was of the gravest importance, and I do not question that after reading this extract from the report of Admiral Saisset, all my readers will think as I do. If the shell had pierced the magazine, the fort was destroyed, and Paris open to the Prussians; but General Ducrot tells us that he did not delay to answer this note, and here is his answer: "Bury the dead in the moat." (signed) "General Ducrot." This was witty and quite in the Gallic spirit; but was it quite sufficient?

The Légion du Génie Auxiliaire de la Garde Nationale knew how to do its duty under the direction of Viollet-le-Duc. One should have seen with what feverishness he used to follow the works, passing twenty times a day along the front, encouraging this one, aiding that one, explaining to another the reasons why it was necessary to modify the plan. He knew how to come down to the level of each one and how to make himself understood by the simplest soldier. Thus every one, gay and calm in spirit, feeling full of courage, earnestly desired to see the Prussians approach, for behind their works, their loaded guns beside them in the trenches, the sappers had full confidence. This day (September 18) came at length. Uhlans appeared on the plain. At the sight of them the strength of our soldiers was increased tenfold. It was a real event. The excitement all through the day was great. Viollet-le-Duc, calmer than usual, gave more care to the works on the Ile de Beauté, and by his presence obliged the bellicose sappers to keep at work. One must have all the activity of Viollet-le-Duc, all his firmness, and possess all the ascendancy he had over his followers to be able to control them as he did. I recall the moment when he gave the order to enter the park of Marshal Vaillant what astonishment and hesitation there was when it was necessary to upturn those alleys, embank the walls and cut down the trees. "What," said he, "do you hesitate? Is it the man's name that frightens you? Do you not know that if the Marshal were here, he would be the first to say to you, 'Go ahead, cut down my trees, uproot my park and, if it is necessary for the defence, tear down my house.'" All this was said with that *bonhomie* and assurance which always restored confidence to the most discouraged. He never deceived himself in his man, and could guess at a glance what he could get out of him; and this obliges me to recount in what way my connection with him began. I had equipped myself at my own expense, and this equipment was not like that of the Génie Auxiliaire when I wished to enlist in it. I presented myself to Viollet-le-Duc, explained that I had entered Paris two days ago, coming from Avignon, and that I desired to aid in the defence of my country. While talking, we came near Nogent. What charm did I find in his simple conversation, in his affable reception of me. I said to myself, How is this, that this very head and front of art is so easy to approach and so benevolent! What is there that I can do to make myself useful to him? I was engaged in these reflections when a countryman approached us and said to Viollet-le-Duc, "There is on the bank of the Marne a vast lumber-yard. It seems to me that you ought to know it." Then at once Viollet-le-Duc, as if he had gauged my capacity, said to me, "Will you go and have a look at this?" And in order to be certain upon the point whereon he wished to inform himself, he sent with me an engineer from the Arts and Manufactures, M. Émile Chaperon, for not only I had followed him, but there were about him other staff-sergeants of engineers, and M. Chaperon was surely of all these the most sympathetic and the best companion. Together, we two examined the lumber-yard, and returned shortly to render an account of our mission to the lieutenant-colonel. During our mission I had acquired so high an appreciation of the intelligence and knowledge of my companion that I left to him to make the report. Then when he had finished, Viollet-le-Duc turning to me, said, "And you, what did you see?" I gave him my reasons for thinking that the material could be used for the works of defence. He asked me several questions, to which I replied as well as I could. While I talked he did not remove his eyes from my face, and when I had finished he said, "Would it be agreeable to you to become my secretary?" My reply was expressed with a radiant feeling of pleasure. "All right," said he, "To-morrow you shall have your commission; but to-day you must not leave me." This little fact paints the man that I have known and admired.

¹ Extracted from "*Viollet-le-Duc et Alphand au Siège de Paris*" by Massillon Rouvet, Paris. Librairie Imprimeries Reunies, 1892. Continued from No. 906, page 84.

AN ARCHITECTURAL - KNOCKABOUT - SECOND SERIES -



THE Fates having again become propitious, and allowing me to see within my grasp the realization of another trip abroad, I hugged myself with the knowledge that once more had arrived the chance of exploring "furren parts," encountering adventures of various sorts, and of perhaps seeing and doing something that my patient and forgiving friends would like to hear and read about afterwards.

My mind wandered back to my other jaunt through Europe and the experience then had in foreign travelling, while grim memories thrust themselves upon me. With a pang, I looked back upon the days of hopeless misery then endured, the homesickness and melancholia gone through and questioned myself as to the direct causes of those feelings.

Lighting my pipe (the old affair that I formerly declared had saved my life from the fury of the "wicked brigand in Pompeii" — that was in '87 and '88), I arranged matters with this old friend, for it had saved my life (though many of my so-called adherents doubt the veracity of my most sacred anecdotes), and this old briar and I are upon terms of the best mutual understanding. Albeit there are times when its mouthpiece becomes unendurable and clogged, refusing to let me draw from its charred old remains the quiet, and often the inspiration, that I crave.

Having arranged matters, as I said, with this old pipe, I arrived at the conclusion that my troubles abroad were the direct cause of non-companionship, with no one to starve and stint with me, or share in my enthusiasm, and endure the many annoyances, with which at home even a fraction of myself would not have put up, and the lack of an abundant supply of this world's goods. There was only one thing to be done. I remembered a cousin, who wished to go abroad about this time. We will call him George Jones, — a better-hearted fellow never trod this earth. He was as quick-tempered and impulsive as myself, though good-hearted and generous to a fault. He was neither architect nor artist. He did not know or care much what he was. He was fresh from college and athletics and "wanted to go to Europe." He "liked art," and vowed that where I led he'd follow, — and beside all this, he was very big and I was the younger, and had a sneaking idea that, should it come to the test, he certainly could thrash me. Kind fate, however, saved me from a trial of his abilities in this line.

The fact of our going abroad having been settled, I set to work to get up a plan of campaign, as it were, and pondered long over what country we should favor with our presence. Having been over those parts of Europe most frequented by artists and architects, I directed my thoughts upon Spain and Africa, as rather a good field for shaking us up a bit, and as probably giving us the pleasure of being stilettoed a few times, captured and kidnapped by bandits, imprisoned in remote dungeons, all but starved and murdered, and, finally, happily saved only to be paralyzed by some pair or pairs of black Spanish eyes or Moorish orbs!

I told all this to George, who straightway declared that it "hit him way down to the ground" — and that to Spain and Africa he would go. We were to sail in February, on the good ship "Brittanic" of the White Star Line, to Liverpool (as the memory of the fourteen days it took to reach Antwerp on the "Westernland" of the Red Star Line, on my former trip, was still with me). A great deal of the fun of an ocean trip is in making believe you comprehend the plan of the ship, showing the staterooms, which is always sent to you on application. To select your stateroom is a great art — in which you are given a great deal of advice by your friends. It's great fun to argue over the advantages of "forward" or "aft," and to me, the contemplation of the trip across, with the pleasure of preparation, is fraught with as much true enjoyment as the realization itself. We

took an inside stateroom (much cheaper than the outer ones, but just as good, and as eminently respectable), and our preparations were soon completed. Beside quite a sketching paraphernalia I took a Kodak camera in complete form, anticipating great enjoyment and pleasure from it; George also had one, and, indeed, they proved of great use from the very start. We both took five hundred films and felt we were amply equipped to stay for years! After taking a fond farewell of our families, and receiving their blessings given in a trembling voice (as the very names of Spain and Africa suggested awful possibilities to them), we departed for Gotham, en route to the steamer.

We were to board her at night, and sail early the next morning, and after eating our "bon voyage" dinner at a little place of which I know, and receiving enough pleasant wishes to get us both safely landed home again, we arrived at the dock, parted from our companions of the evening, and wandered quietly in search of our staterooms, which, with the help of a sleepy steward, we found. George and I immediately "tossed up" for the lower berth, and it is hardly necessary for me to say that I was the loser, as history repeats itself, and I go through this formality merely to prove to myself what a believer in fatality I am, and I do not like to let the other fellow think he is getting the object "tossed up" for as a matter of course.

George shivered into his lower six-foot by two-foot bed, and sank immediately, and vulgarly, into a troubled sleep. What hate and feelings of utter contempt, aggravated by your own sleeplessness, you have for a companion who has no difficulty in this line, and does any one recollect the horrid feeling of a stateroom occupied, when your good ship is still in port, and you squeeze yourself about, assailed on all sides by the smell of newly-painted walls (and that paint smell is not the good land paint odor, I can tell you)? And the chill which creeps into your bones makes you think of what you are about to go through, and the faces of those you love and are about to leave come softly into view. I looked about me, and tried to decide the best way of forgetting all sentiment and reaching my upper berth without stepping upon the head of my slumbering chum, or without bumping my own against the iron stanchions of the decks above. Oh! the difficulty of trying to get into the bed-clothes, which seem to be "apple-pied" purposely by the steward, and which in fair weather or foul you have to remake every night you occupy them. Then the donkey-engine, with its noise, more uncanny even than its namesake's, that once heard at night is like no other conceivable sound, and one that you can hardly ever forget!

We both awoke (I am positive I had slept but ten hideous minutes) at the knocking of the steward upon our door, who brought us our coffee, and told us if we wished to see the last of Sandy Hook we had better get up quickly. This was enough, and it acted upon George like a bucket of cold water, and away he rushed scarcely clothing himself, to see the last of his native land. I, also, finally joined him, and we both stood silently watching the shining strip of land, until it disappeared upon the now deserted horizon save for, here and there, a tiny sail and the smoke of ocean steamers, putting out, like ourselves, to cross to shores beyond.

"George," said I, "let's get ourselves into shape after breakfast, look around us, see what we are in for, and take a look at the passengers."

On entering the smoking-room later in the morning, we found the inevitable trans-Atlantic "drummer" ensconced in the favorite corner, giving forth clouds of smoke from an indifferent cigar or pipe, and indulging in frequent libations of Bass's ale or beer. No one spoke — passengers never do until after lunch: when that meal was over, we were, of course, upon the most intimate of terms. Among the occupants of the smoking-room was one queer specimen of humanity, who proved to be the self-appointed "butt" of the room. He was the most comical looking and acting individual that

ever was seen. "An Irishman," he said, "living in Canada," and "doing business in England," with the significant name of O'H —. He had red hair, little dots for eyes, and spoke with a rich brogue, most delightful to hear. He knew (or it went for that) everything in ancient or modern times, and was conversant with every story or song of either period. This gentleman proved himself a veritable *bonne bouche* for us all, and was a delightfully good-natured human waste-basket for all our worn-out jokes during the very rough and disagreeable days, which seemed interminable in their length. His great politeness made him listen to any old, old story (which, by the way, is a great art to do well) while others sat in grim and sullen silence.



O'H —.

At the end of the anecdote, his glorious Irish guffaw made every one laugh *nolens volens*, to the infinite gratitude of the unfortunate narrator.

There was another Canadian, whose name I fail to remember; he was an American, born of French parents, and lived in O'H — s

town. They were bitter and deadly enemies, and great was the enjoyment of the smoking-room, over their outspoken aversion to one another. The peculiar thing they each did to spite the other, was to seize the other's pouch of tobacco, smoking it furiously and unseen by the owner, and offering it *carte blanche* to the other smokers. This was a mortal insult, and many were the scathing remarks hurled by one at the other, both being delightfully quick and sharp at repartee, much to our amusement. There were others who interested us, but none so much as our Canadian friends. Being assigned seats at dinner, George and I, much to our satisfaction found ourselves *vis-à-vis* to three pretty girls—English, we knew at a glance. It was George's first trip over, so he did not plunge into matters as I did, having learned by experience that the quicker it is done, the more pleasant the results are apt to be; so putting on my best smile, and preparing to engage my fair enemy across the table, I



Another Canadian.

whispered George to do the same, but on watching him found that he had no system whatever. My direct *vis-à-vis* was a petite blonde, with a clear splendid complexion, beautiful eyes and a divine figure. She always wore a patent-leather tarpaulin sailor hat, with a veil, and upon her small feet, when one could see them, were the most charming of little gaiters. She looked me over, and through and through, but never caught my eye. Politely asking for the pepper, I next begged for the bread, everything seemed to be on her side of the table—she whispered to her neighbor (a fair tall girl who was with her sister), with great emphasis and meaning, that we were "Americans." By this time having collected all the salt-cellars, butter-arrangements, pepper-caster, bread, and even the rest of the lunch around my plate, I made no attempt to push any of them away, wanting to compel her, if she wished for anything, to ask for it politely: at length, after eying me and the afore-mentioned articles several moments in silence, she finally, with feminine brightness, took in the situation, and seeing apparently my motive, asked with a smile, and a delicious voice with just a *soupeçon* of brogue in it, "If I were not going to use all the things before me at once would I be so kind as to loan her for a second the 'ginger biscuits'?" A beautiful, cordial, generous American smile overspread my countenance, whilst I promptly pushed all my late seizures to her plate, much to her amusement, that of the other girls and George who had been watching, with great interest, the *coup d'état* that had been in operation. So, through the medium of "ginger biscuits," we all became great friends, and George and I managed to divide up the three girls most systematically and happily, though so far as I was concerned my Irish friend, for so she proved to be, became my particular star, and seemed perfectly satisfied with the red fire burnt by me at her Hibernian shrine. She was fond of riding—and a great horse-woman she must have been, so quick and bright she was! We got along beautifully, and thought that Fate must have ordained that I should keep the ginger biscuits on my side of the table, until she was



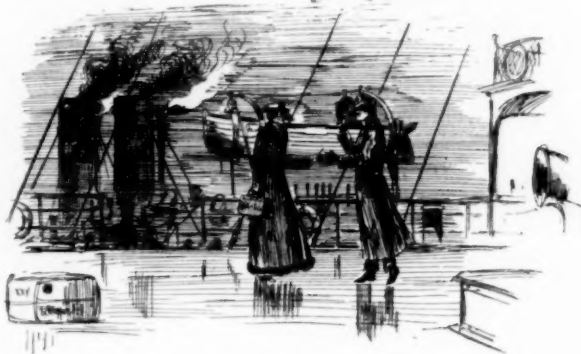
Miss Ada L.—.

starved into acquaintance. The other girls were more reserved, but very open and generous, and many were the pretty afternoon teas they gave us when the ship had any keel on at all.

About two days from land we ran across the wreck of a schooner: she had evidently collided with a steamer in the fog, for a great

gaping hole in her bow was visible to all, as she lay moaning in the wind, with one mast broken off, and rolling slowly from side to side, giving forth a low murmur, as if in pain at every wave that washed over her. It was a pitiful scene, though a grand sight, entirely new to us, and one that I must own I had always wished to see. We whistled to her as we ran alongside, we stopped and whistled again but she gave forth no sign of life aboard; our sailors stood ready to lower away their boats to board for salvage, but the captain refrained from giving the order and slowly turned on the bridge, and with a long, last look at the derelict rang to "go ahead," then suddenly catching sight of George and myself, asked, "Will you gentlemen get your Kodaks," (he had seen us previously using them on deck) "and take some negatives of this wreck for me?" It took us but a moment to dive below, and much to the interest of the passengers, the continued click of our instruments showed that we were photographing her from every point. The Captain asked for the pictures immediately on our arrival, to be of service for reference, and in making a report to Lloyd's.

So our trip was not uneventful, as Atlantic voyages are apt to be. My Irish friend lived in County Dublin, and rejoiced in the name of Miss Ada L.—, and she made that voyage one to be always very kindly remembered by me. She left our ship at Queenstown, and alone in a very foggy night we parted. I was to put her onto the "tender" (and it was, in truth, a very tender parting). Asking her gently for some last remembrance, she said, "Do you really want a 'gaggy dammer'?" "A what?" I said, surprised and a little hurt that at this awful moment of parting, she could joke. "Oh!" she replied, "I always say it that way when I am embarrassed." Up went her dainty little hands to her head, and plucked from her veil a pretty little pearl pin; "Good-bye," she cried, — and off she



Gaggy Dammer.

went in the darkness, leaving me in the damp fog alone with my thoughts, and my precious "gaggy d'amour," or, as she would rather have it, "gaggy dammer."

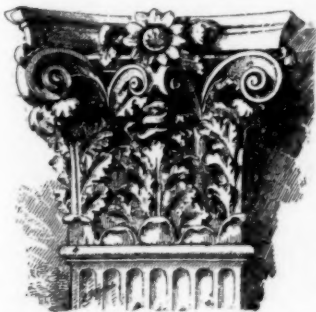
We arrived at Liverpool the next morning, and were very glad to get on terra firma once more. The Misses N— (our two other friends, to whom we had both tried to be polite under the circumstances) were met by their parents, in the tender that came out to meet the "Britannic." We were soon introduced and given a most hearty welcome. Their daughters told them that we had taken care of them the whole way over. George, I think, held his head higher than I, and with a clearer conscience, as my "gaggy" was then flaring out from my necktie in daring relief, still I bowed and accepted with George, the first land meal we had indulged in for some time. The N—s proved to be most charming people, and they did a great many kind things for us while in Liverpool and all the way to London, to which metropolis we journeyed in Mr. N—'s private car, and dined *en famille* on a most delicious dinner served by the dapper butler of this most excellent and hospitable family.

F. L. V. HOPPIN.

[To be continued.]

AN UNDERGROUND TROLLEY SYSTEM.—An underground trolley system, the invention of Malone Wheels of Tennessee, is being tested on a three-quarter-mile section in Washington, D. C. Briefly described, the road is laid with 40-pound T-rails, yokes of 180 pounds each, and 40-pound slot-rails. The conduit, midway between the rails, is 16 inches deep by 17 inches wide, and inside is a loose wire on insulated brackets. This wire is cut in 200-foot lengths, and carries a current only when the car is moving over one particular section. The copper feeding cable is laid parallel to the trolley wire. Without going into details, the car is fitted with two ordinary 20 horse-power motors, and a pair of trolley-wheels passing through the slot connects the motors with the trolley-cable. In each 200-foot section is an iron switch-box containing an electro-magnet, and as the cars enter a section a storage-battery of several cells on the car vitalizes the magnet and lifts an iron armature and connects the trolley and the feed cables, and thus supplies power to the motors, while the main line current cuts out the local battery. On reaching the next section the current is again automatically switched on and is also cut off from the rear section. When the car stops the current is instantly released from the trolley-wire, and the same is the case when going down hill. The car can travel in either direction by turning a reversing switch. The cost, for single track, is said to be \$30,000 per mile.—*Engineering News*.

THE AMERICAN INVENTOR.



From the Musée de Lille, France. From
La Construction Moderne.

Of all the countries of the world, none is so prolific in inventions as America. There are several reasons for this. The ease of obtaining patents, and their cheapness, holds out to every man the chance of creating for himself a piece of property by the exercise of his brains. The high rate of wages insures the inventor of a labor-saving appliance a patient hearing from capitalists, while the independence of thought and feeling, which pervades all classes, leads to original views, and to bold attacks on difficult subjects. Hence every one is a potential inventor, especially if he have an acquaintance with science or manufacture. Whatever a man's occupation, he must daily find himself called upon to do or to suffer many things from which he would gladly emancipate himself. The proverb says, "There is a remedy for every ill but death," and seeing how many ills there are, the opportunities for devising remedies are not only numberless, but they are present to all. The unenterprising bear with patience the inconveniences that surround them, but those of active mind busy themselves in devising expedients to lighten the burden of life, and look for their reward under the provisions of the patent law. The inventor is the greatest benefactor of the human race, and especially of that part of it which is indigent; he is the real friend of the poor man, and, indeed, almost his only friend. The rich can always find sources of pleasure, and since happiness is principally a matter of comparison, they probably fared even better in this respect in earlier ages than they do now. The Roman millionaire was certainly far better situated than his American representative of to-day. It is true that he could not travel at sixty miles an hour, his yacht could not steam independently of the winds, and his letters took days and weeks to reach their destination, and often miscarried. But his expectations had never soared to such rapid transit, nor to such perfect communication. On the other hand, he enjoyed the unspeakable luxury of perfect service; his slaves were drilled like an artillery regiment, and anticipated his slightest desires; his home was decked with everything that was beautiful, and contained the choice products of the entire world; his food and his wines were not only better prepared than those of common people, but these were different in substance. He had the intense satisfaction of feeling himself apart from the herd of humanity which surrounded him; his superiority was patent to all, and was unquestioned. When he journeyed he did not form a unit in a crowd on an unclassified vehicle, as does the American millionaire of to-day, and when he voyaged a thousand steerage passengers did not share equally with him in the latest outcome of the shipbuilder's art. His chariot and trirème were his own, and were beyond the wildest dreams of hope on the part of those beneath him in station and in fortune. We need not confine ourselves to Rome for illustrations to show that the rich derived more benefit from their riches in the past than they do to-day. The case of the mediæval baron is one in point. He lacked the delicacy and refinement of surroundings which characterized the Roman, and was, in fact, subject to much we should consider as hardship. But then he was of rough fibre and hardy nature; his ideal of happiness consisted in mastery, and he enjoyed it to the full. In his own district he reigned supreme, not seldom contriving that the king's writ should be of little avail as against his will. His servants were absolutely under his control, and as regards his tenants he pushed his interference, at any rate under some forms of tenure, into the most sacred relations of life. The opinion that he was of a different order to common humanity was not only held by himself, but was received by his social inferiors, and acts that would have roused the deepest resentment if attempted by others, were accepted as natural and right for him. Even so late as the commencement of the present century the baron's descendant—the English lord—was paramount in his own district. One could neither live in his village without his good-will nor publish opinions that he disliked. He was surrounded by people who, to all appearance, regarded him as the fountain of knowledge and light. The school-children curtsied at the sight of his coach, the laborers doffed their hats before him, while even substantial tenants treated him with extraordinary deference. Every one conspired to give him a good opinion of himself. What a contrast to all this was the life of Jay Gould! In spite of his millions, he could not walk the streets in safety without an escort. On all sides he saw lowering faces, and his ears were assailed by threats and curses; he knew that men hated him, and that even those who, for sake of gain, cooperated with him in business, would have been glad to have seen the money-market freed from his preponderating influence, and his securities distributed among themselves. His home was the only spot in the world where he found love and confidence, and, unless the American "help" is much maligned, he must have had to exercise considerable self-control there for the sake of peace and quietness. His wealth resulted from the skill, ingenuity and enterprise of the American people, but the very forces

that created it combined to prevent it bringing him that satisfaction and general adulation which still attaches to the wealthy in slower-moving communities.

It is when we compare the condition of the poor to-day with that of previous ages, that we see how much the inventor has done for humanity. To know how hard life must have been before the advent of machinery, we have only to imagine a family set down on an island, and called upon to provide all their food and clothing without the aid of modern mechanical appliances—to plough and reap; to thrash, winnow and grind; to raise cattle, kill and dress them; to shear, card, spin and weave their wool; to make and mend their clothes; to provide soap, candles, tools, cutlery, earthenware, paper, pencils, nails, medicines, leather, boots, ropes and the thousand and one things that are needed in a home. Evidently it could not be done, even if labor were continued from dawn to eve, and then extended far into the night. And this under the favorable conditions of a yeoman's family without rent to pay. How much worse it must have been under the exactions of a feudal landlord. Two-thirds of what we consider necessities must have been omitted from the list of that day, and to sore toil must have been added scanty fare and insufficient clothing.

Long before America was discovered, the inventor had commenced the amelioration of the lot of the race. The man who devised a form of ship's rigging that would enable a vessel to beat up the wind, unlocked the fetters of thousands of galley-slaves, and by rendering communication easier and cheaper, made matters better both for buyer and seller. The windmill and the water-wheel released woman-kind from the immemorial task of "grinding at the wheel" to provide the daily ration of flour. The movable type and printing-press did a still greater work by conveying the knowledge of the few to the many, and thus putting the ignorant and the inapt in possession of the experience of the wise and the skilful. Besides such notable inventions as these, hundreds of a less-imposing nature had been made, and their authors had passed away and been forgotten. It was only when the patent law was passed in this country that an enduring record was commenced of the names of those who have endeavored to use their brains to save their time and muscles.

The colonization of America commenced, from an Anglo-Saxon point-of-view, with the settlements in the early part of the sixteenth century. By that period an immense progress had been made in arts and manufactures, but still the load of labor pressed very heavily on the lower classes. It was only when the windmill and the water-wheel could be utilized that work could be undertaken on a large scale. The sickle, the scythe, the flail, the hand-loom, the spinning-wheel, the sledge-hammer, the axe, the hand-saw, the file, the wagon—these were the implements with which the clearing and peopling of the forests of the New World were commenced. Much progress was made by their aid but only as the result of great suffering, indomitable perseverance, and endless labor. In some cases whole settlements perished for want of supplies, cut off from civilization for lack of means of communication; and in others it was only the bounty of nature, in respect of fish and game, that turned the scale. The rigorous climate prevented outdoor work during several months of the year, and manufacturing operations were not sufficiently advanced to enable labor to be fully utilized under shelter. It was the policy of the home Government to make the colonists purely agriculturists, and to pay for their foodstuffs and raw products in goods, and for a long time this was successfully pursued. The American inventor had scarcely a market until the connection with England had snapped. Then the aspect of affairs was changed, and the desire to become manufacturing people soon found expression in the passage of a patent law. The first patents were granted in the year 1790, and there were only three of them for that year. The first was to Samuel Hopkins, for a process of manufacturing "pot and pearl ash"; the second was to Joseph Sampson for manufacturing candles, though the method of dipping candles was very generally followed for sixty years after that. The third patent was awarded to Oliver Evans for a method of manufacturing flour and meal. Thirty-three patents were granted in 1791, nine in 1792, twenty in 1793, twenty-one in 1794, eleven in 1795, thirty-seven in 1796, fifty-one in 1797, which appears to have been a year of unwonted activity in the demand for patents, as only one week passed without one being granted. In 1798, the business fell off one-half, only twenty-five patents being awarded, and in 1799, thirty-nine were granted. Among the patents for these ten years we find sixteen for nail-making machines, though nearly all the nails used even during the first years of this century were made by hand, as blacksmiths formerly made horseshoe nails. During this period only two patents were issued for washing-machines, and 128 such machines were patented last year, and several thousand patents had already been issued for such devices. We do not find a single patent issued for a churn during these ten years, though the pump was patented nine times. Here we note that Eli Whitney's cotton-gin was patented March 14, 1794. Hodgen Holmes, of Georgia, also patented a cotton-gin two years later, March 12, 1796, and John Murray, of Georgia, also patented one December 23, of the same year. John Fitch's patent for propelling boats by steam was taken out August 26, 1791.

During the last ten months of 1790, five patents were awarded for candle-making, twelve for all kinds of mills for sawing or grinding, twelve where steam was the leading word in the titles, one for the manufacture of boots, one for a bed, four for the handling and treating flax, five for distilleries, five for threshing-machines, seven

for all kinds of tile and brick making devices, eleven for methods of propelling boats, three for the pendulum, two for the windmill, four for paper-making, three for looms and weaving, four relating to iron and steel, four for iron stoves, three for cleaning rice, two for printing-presses, three for bridges, three for pills, two for bread and dough making, three for salt-making, four for saws, and two for tobacco-making. During these ten years one patent was issued for each of the following articles: A bell, wire, furnace, piano, plough, clock, saddle, boat, broom, cultivator, comb, chimney, window, soap, a fire-engine and a tooth-extractor. During the last decade of the last century only 249 patents were issued by the Government. Even as late as Jefferson's Administration, cabinet meetings were frequently called to consider applications for patents. A thousand patents are now issued for one during the last ten years of the last century.

Thousands of patentees for only a brief period enjoyed the ownership of the property their talents created, and even during that period they realized only a very small portion of the benefit flowing from their inventions, the public reaping the larger share in added comfort and lower prices. In order to induce able men to give their time and talent to inventive work, Congress was authorized in the Constitution to secure "for limited times to authors and inventors the exclusive right to their writings and discoveries," in order "to promote the progress of science and useful arts," and all can now see how grandly the useful arts have been promoted by the patent laws. While James Watt made money out of his steam-engine patents, the amount he made compared with the benefit he conferred upon the human race and the wealth his inventions created, is an exceedingly small fraction of the one-thousandth part of a sovereign. We can have no better illustration than this, that the great and permanent value of inventions and discoveries goes to the human family, and lifts the race to higher levels.

Exclusive of applications for the registration of trade-marks and labels, the total number of applications received at the Patent-office for the year 1891, including mechanical applications, designs, and re-issues, was 40,552. The total number of patents granted was 23,244, and the total number of registrations was 1,899. The total receipts of the office for the year were \$1,271,286, and the expenditures were \$1,139,713, leaving a surplus of \$131,000 to be turned into the Treasury of the United States. The balance now in the Treasury to the credit of the patent fund is over four millions of dollars. During the year, 1,928 patents were granted to citizens of foreign countries, 1,538 of them being from England, Germany, Canada and France. Persia, Peru, Portugal, Roumania, Tasmania, Turkey, Bulgaria, Cape of Good Hope, Ceylon and Chili asked and obtained one patent each; Japan, San Domingo, Java, Scotland, and South Africa took two each; Brazil, India and Queensland three each; and South Australia took four.

It is curious to note that while Mississippi takes one patent for every 20,469 of her population, Connecticut takes one for every 1,018 of hers. South Carolina takes one patent for every 23,490 of her population, and Massachusetts one for every 1,055 of hers. North Carolina takes one for every 21,288, and Rhode Island one for every 1,191. Georgia takes one patent for every 14,817 persons, and New York one for every 1,635. Alabama took one for every 18,457, and Illinois one for every 1,944. Where we find the largest general intelligence, the widest diffusion of the benefit of free schools, there we find the largest inventive activity and the best fruitage of mechanical talent.

Many great American inventors have earned world-wide fame: Fitch and Fulton for steam-boats, Whitney for the cotton-gin, Evans for milling machinery, Whittemore and Jenks for looms, Terry, Ives, and Jerome for clocks, Lorillard for tobacco-making, Edwards for leather-making, Wood for ploughs, Blanchard for lathes for turning irregular forms, Spencer for geometrical lathes, Hoe, Adams, and Gordon for printing-presses, Collins and Root for axe-making, Ames for shovels, Woodworth for wood machinery, Fairbanks and Howe for scales, Howe and Crosby for pin-making, Knott and Mott for stoves, Stuart for sugar-refining, Baldwin and Winans for locomotives, Pullman for sleeping-cars, McCormack and Ketchum for reapers, Colt, Sharp, Spencer, Smith, and Wesson for fire-arms, Phillips for matches, Wells for hats, Goodyear for india-rubber, Ericsson for naval construction and hot-air engines, Howe, Wilson, Singer, Gibbs, Grover and Baker for sewing-machines, Morse for the telegraph, Tatham for lead-pipe, Whipple for screws, Chickering and Steinway for pianos, Burden for horseshoes, Yale for locks, Roebbling for wire cables, Corliss for steam-engines, Disston for saws, Stephenson for horse-cars, and Gatling for quick-firing guns.

The result of all this activity is to be seen in the comfortable condition of the working-classes in America. During the term of his patent the inventor, or his assignee, may make money out of it, but when it expires it practically becomes a gift to the masses. The producing power of the world has been increased manifold, without any corresponding increase in the consuming power of the upper classes. The wealthy do not eat more bread and meat to-day than they did years ago. Yet the output of these commodities has been vastly augmented, and they are consumed in large quantities by a section of the population which once seldom got flesh food, and often went short of bread. And so of nearly every other industry; the working-classes take the bulk of what is produced, for the very good reason that they are able, by the aid of machinery, to turn out several times as much work in a day as could their forefathers. At the same time that their production has increased, their actual labor has

diminished. A man with a heavy job in a foot-lathe not only worked slowly, but painfully. When his long day was ended every faculty was exhausted, and he tramped home to rest, expended both in body and mind. Now he looks on while the lathe does the work, and in the evening discusses the provisions of the Employers' Liability Act. His hours, too, are shorter than they were, while the appreciation of gold, which has taken place, has enormously increased his wages by augmenting their purchasing power. — *Engineering.*

FOREST GROWTH AND TIMBER CONSUMPTION.¹

ON BOARD S. S. ALLER, April 5, 1893.

Dear Sir, — Just as I was starting on my journey for the purpose of collecting an exhibit for the World's Fair, illustrative of the methods employed in German Forest Departments, a friend handed me an article published April 1 in the *Evening News* of Washington, over the signature of Henry Gannett, the Chief Geographer of the United States Geological Survey, in which the writer undertakes to show that efforts to bring about a more conservative and rational forest policy in the United States are unnecessary, because the relations of forest-growth to climatic, soil and water conditions are presumably of no practical significance, and because in his opinion the timber-growth in the United States is certainly renewing itself much faster than it is being consumed.

Let the assertions of this writer be given circulation without contradiction and thereby assume the dignity of authoritative statement which may to some render it doubtful whether the work of the Forestry Division or of the American Forestry Association has been directed in the right channel, I take the liberty of addressing this letter to you, to be published if you see fit. The official position which I hold renders it incumbent upon me to arrest, so far as I may be able to do so, the promulgation of such false statements and inferences as are contained in Mr. Gannett's article; and, since the tendency of the article is undoubtedly to throw discredit on the work of the forestry movement, and of the Forestry Division in particular, justice to them and to the Division seems to require that public refutation be made.

That there is a certain amount of truth in Mr. Gannett's statements and arguments makes them only the more dangerous, for this little truth hides from ready discovery the misstatements and the flaws in the argument, and the public — not over critical — too readily inclines under their authority to erroneous conclusions. In the case of Mr. Gannett's statistics, the misfortune is that they cannot indeed be met positively with absolutely correct data on the other side, but only negatively with the certainty of their incorrectness.

Briefly, regarding the status of our timber-supply, Mr. Gannett states that the wooded area of the United States covers approximately 1,113,000 square miles (712,320,000 acres); that each acre produces annually forty cubic feet of wood; that we consume annually between twenty billion and twenty-four billion cubic feet of wood (accepting the estimate made by the Forestry Division); that, therefore no shortage is to be feared, but that an overproduction of from six billion to ten billion cubic feet of wood takes place on this area.

Mr. Gannett has become more conservative regarding the forest area than he has been in former statements. He has asserted that fifty per cent of the United States is wooded; he now comes down to thirty-seven per cent. The Forestry Division, by correspondence with well-informed residents in each state some years ago, ascertained the area under forest to be below 500,000,000 acres. But we may readily concede the larger area, simply remarking by the way that the failure to arrive at more certain figures is perhaps chargeable to Mr. Gannett's voice in shaping the policy of the last Census, for he it was who objected to the present writer's contention that it would be proper for the Census to gather forestry statistics.

As far as Mr. Gannett's estimates and calculations of woodland areas are concerned, they are wholly irrelevant to the question at issue, namely, the question of timber-supply; for he overlooks entirely the character of such wooded lands as timber producers. The merest tyro in forestry matters, or any observant logger or timber-looker, will be able to point out to Mr. Gannett the difference between waste brush lands, such as to my own knowledge are figuring in the estimates of the Geological Survey as woodland, and timber-producing forest-growth. The one is occupied by woody growth, to be sure, but of kinds which do not grow to useful size or useful quality and which prevent by their very existence the occupation of the area by desirable timber-producing kinds, becoming thus a positive hindrance to useful forest-growth. Here is one considerable element of uncertainty which Mr. Gannett entirely overlooks, thereby exposing an utter lack of knowledge regarding timber-production. Again, the merest tyro in the science of wood-growth is well aware that forty cubic feet of annual growth of such character as enters into our wood consumption, and to which the accepted estimate of consumption of twenty billion feet refers, has nowhere been known, at least in the temperate zones, and as an average, over an area of more than a million acres.

With more knowledge than Mr. Gannett in these matters, I venture to say that his figure exceeds at least ten times the actuality. How he arrived at his extravagant figures I am at a loss to understand. Since this question of wood-growth per acre per year is of considerable general interest, I will explain its conditions more fully

¹ Letter to the Secretary of Agriculture.

and cite statistics of more than usual reliability, which are fortunately available to me.

In the well-managed forests of Prussia (some 35,000,000 acres), largely stocked on poor land, the average total production of wood per acre for a long series of years has not been more than twenty-one cubic feet, but this includes branch wood, brush and roots, which are not used in our country. Of this only fourteen per cent, or hardly three cubic feet, represents material fit for the industrial uses and we should add in the United States firewood is also made from such material. In the Government forests of Prussia (some 8,000,000 acres), exemplary in their management, the production reaches nearly six cubic feet. The highest wood-production in German forests is reported from Baden (over only 4,330,000 acres of forest) with somewhat over fifty cubic feet of wood per acre per year. Assuming also a larger per cent of sizeable timber, namely, twenty per cent, we would here find the annual production per acre of such material as we are in the habit of using at the rate of ten cubic feet per acre. Competent writers on the subject, who believe that the Government reports understated the annual growth, have calculated the same to be as high as fifty-five cubic feet per acre (see report of Forestry Division, 1886, p. 184), of which they assume twenty-seven per cent to represent wood over three inches in diameter; even this larger figure would bring the product of sizeable wood to less than fifteen cubic feet per year. And I repeat what is well known, that in the United States we hardly use the smaller sizes even for firewood.

To come now to more familiar measurements, we can figure out the possibilities or probabilities in the following manner, leaning toward extravagance rather than conservatism: Any lumberman acquainted with the various forest regions of the United States will admit that, leaving out the exceptional conditions on the Pacific coast, a cut of 20,000 feet (board measure) per acre from our virgin forests would be an absurdly large average estimate; this would represent, with excellent practice in the preparation of the material, say 2,000 cubic feet of round forest-grown timber, and since the trees cut to yield such material are at least 150 years old — they are in reality mostly over 200 years — the annual production would appear under such conditions as fourteen cubic feet per acre per annum, or about as much as the most advantageous results reported from well-managed German forests.

Apply this most extravagant figure to the area as given by Mr. Gannett, and we find that our consumption is at present from ten billion to fourteen billion cubic feet in excess of what the area could possibly produce as an annual crop; or that we are cutting into our capital to the extent of more than fifty per cent of our consumption, and not, as Mr. Gannett would have it, that we are laying up for the future, which, by the way, increases the demands for wood material at the rate of more than thirty-five per cent every decade.

The above statements show clearly how utterly untenable is Mr. Gannett's position, and how evidently lacking he is in knowledge of the subject he discusses. Regarding his knowledge of the relation of forest cover to climate, soil and water-flow, the same lack of familiarity with the real facts and their significance is apparent. As these will be fully brought out in a publication of the Forestry Division (*Bulletin 7*) now in press, I will forego arguments in proof of this accusation, in order not to lengthen this letter.

One cannot but deeply regret that men whose position before the public imposes upon them the responsibility of leading public opinion intelligently and upon the basis of well-established facts should thus be found ignoring their responsibility. I am encouraged to hope, however, that your well-known policy regarding the rational and conservative use of our forest resources and the extension of forest areas where desirable will be strengthened rather than weakened by such groundless and unwarranted assertions by advocates of a policy of *laissez-faire* in this matter.

Respectfully yours,

B. E. FERNOW,
Chief of Forestry Division.

HON. J. STERLING MORTON,
Secretary of Agriculture.



SKETCH-CLUB OF NEW YORK.

THE April meeting of the Sketch-club was held on Saturday, May 6, at the Hotel Viano, the Club having recently given up its room on 42d Street, with the intention of leasing others in the fall.

After the dinner, Mr. James Cantwell, artist, addressed the meeting on the subject of Outdoor Sketching; offering many suggestions and referring to his own experience. Mr. Julius Harder, of Chicago, a former president of the Club, was present at the dinner, and spoke of Chicago and the World's Fair buildings.

The decision on the April competition, for a Memorial Library, was made by ballot by the members present. Robert Kendrick receiving first mention and Charles H. Israel's second.

There will be one meeting more of the Club before the summer vacation.

EDGAR A. JOSSELYN,
Recording Secretary.

ENGINEERING ASSOCIATION OF THE SOUTH.

ON the occasion of the regular monthly meeting at Nashville, Tenn., May 11, 1893, the resident members extended their courtesies to the non-resident members in an excursion to some points of technical interest near Nashville. In the forenoon visits were made to the extensive new shops of the N. C. & St. L. Railway, to the city reservoir and to the power-plant of the combined street-railroads. After dinner was served, the party, about sixty in number, spent the afternoon in an excursion on the river, visiting the city pumping-station, the most recent electric-light plant, the site of the lock now under construction on Cumberland River, and the three Cumberland River bridges.

At the evening session, a discussion followed on "the durability of yellow pine." Mr. Hunter McDonald thought that yellow pine is not so durable now as formerly, ascribing as a reason, among others, the common practice of tapping pine for turpentine, also the fact that much of this timber comes from "old field pine," a secondary growth which has followed the clearing of the original forests. He thought erroneous the theory that tapping removes the turpentine from the sap only and not from the heart, and that the whole stick is made more porous for the absorption of moisture. Some bridge timbers of pine not tapped were mentioned which were sound after fourteen years' service, while nearly all pine timber now has to be renewed in five or six years. He does not now paint wooden members of bridges, but houses them, allowing free air circulation. In the Tennessee River bridge, at Johnsonville, are housed timbers, sound after twenty-one years of use. He believes that if timber could be protected two years, then well painted, it would add four years to its usefulness. He finds more difficulty in telling when a stick is unsafe from decay than in protecting it, and thinks some practical test for timber while in place would be of great benefit.

Mr. W. C. Smith agreed that timber when from original forest and not tapped lasted better than otherwise, and called attention to the hastening of dry-rot by confining timber in walls; the confined ends of joists have rotted in nine months, when the rest was still good; in his practice he either leaves an air-space around the ends of the joists, or builds projecting bearings for them. Poplar lumber sawed from river rafts he found decayed in two years when exposed to the weather and at the same time lasted well on interiors. A number of other interesting facts were elicited by the discussion.

Next meeting, June 8, 1893, at the rooms of the Association, Cumberland Publishing House Building, Nashville, Tenn.

WALTER G. KIRKPATRICK, Secretary.



[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

HOUSE OF GEORGE WILKINSON, ESQ., PROVIDENCE, R. I. MR. E. I. NICKERSON, ARCHITECT, PROVIDENCE, R. I.

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

WE understand that this is one of those rare cases where the owner of a building—in this instance the Manager of the Gorham Manufacturing Company, a man of cultivation and acquired taste—may with more than ordinary justification say that "I designed the building myself."

ARCHITRAVES AT VENICE AND THE CORNICE OF THE LOGGIA DEI LANZI, FLORENCE, ITALY. MEASURED AND DRAWN BY MR. W. M. MACCAFFERTY, *American Architect* TRAVELLING-SCHOLAR FOR 1892.

[Issued with the International and Imperial Editions only.]

ENTRANCE TO THE PALAZZO VENDRAMIN, VENICE, ITALY. MEASURED AND DRAWN BY MR. W. M. MACCAFFERTY, *American Architect* TRAVELLING-SCHOLAR FOR 1892.

[Issued with the International and Imperial Editions only.]

STAIRS TO THE CHAPTER-HOUSE, WELLS CATHEDRAL, ENGLAND. SKETCHED BY MR. T. MACLAREN, FORMER PUGIN TRAVELLING-STUDENT.

[Issued with the International and Imperial Editions only.]

TOWER OF EVERCREECH CHURCH, SOMERSETSHIRE, ENGLAND. SKETCHED BY MR. T. MACLAREN, FORMER PUGIN TRAVELLING-STUDENT.

[Issued with the International and Imperial Editions only.]

DESIGN FOR A COUNTRY HOUSE. MR. R. H. ROBERTSON, ARCHITECT, NEW YORK, N. Y.

HIGHLAND SUB-DISTRICT SCHOOL-HOUSE, PITTSBURGH, PA. MESSRS. BARTBERGER & EAST, ARCHITECTS, PITTSBURGH, PA.

SEWERAGE PLAN FOR CHARLOTTETOWN, P. E. I.

SEE article elsewhere in this issue.

[Additional Illustrations in the International Edition.]

THE GARFIELD MONUMENT, WASHINGTON, D. C. MR. J. Q. A. WARD, SCULPTOR, NEW YORK, N. Y.

[Gelatin Print.]

STAIRCASE IN THE PALAIS DE JUSTICE, BRUSSELS, BELGIUM. M. POELAERT, ARCHITECT.

[Gelatin Print.]

OTHER views of this vestibule have been published in our issues for December 26, 1891 and June 4, 1892.

DOORWAY TO HOUSE OF H. H. FAY, ESQ., 416 BEACON STREET, BOSTON, MASS. MR. J. T. KELLEY, ARCHITECT, BOSTON, MASS.

[Heliochrome.]

BATSFORD PARK, MORETON-IN-THE-MARSH, ENG.: ENTRANCE FRONT. MESSRS. ERNEST GEORGE & PETO, ARCHITECTS.

HEWELL GRANGE, BROMSGROVE, ENG.: MESSRS. BODLEY & GARNER, ARCHITECTS.

AT RATISBONNE, AFTER A DRAWING BY SAMUEL PROUT.



THE BUILDING COST OF WORLD'S FAIRS.—The Auditor of the World's Columbian Exposition at Chicago reports, to March 31, that the sum of \$16,708,826 had been expended upon that enterprise, and that \$14,411,506 represents the amount spent upon buildings, etc., coming under the direction of Mr. Burnham, Director of Works. What this total means can best be understood by comparing it with the money expended upon the exhibition grounds and buildings of previous world's fairs, bearing in mind the fact that these exhibitions have constantly grown in space occupied and the number of exhibitors, and that in area of grounds and number and splendor of its buildings and appointments the Chicago fair exceeds all previous efforts in this direction. From such records as are at hand we find that the total expense of the London Exhibition of 1851 was \$1,424,882, and the main building represented \$604,810 of this amount. The three buildings of the Paris Exhibition of 1855 cost about \$3,495,000; the buildings for the London International Exhibition of 1862 cost \$2,092,595, and the total amount raised previous to the Paris Exhibition of 1867 was \$5,883,400; but just what part of this was spent upon buildings and grounds is not stated. The Vienna Exhibition of 1873 was a financial failure, owing to prevailing hard times. The Austrian government appropriated only \$3,000,000, while the total expenses were \$12,000,000, including the buildings and grounds. The result was a deficit of \$9,000,000, as the attendance barely paid the running expenses. The buildings erected by the Centennial Commission of 1876, in Philadelphia, cost \$5,242,295, while \$922,782 in addition were expended in grading, draining and fencing the grounds, in bridges, etc. The cost of the buildings for the Paris Exhibition of 1878 is not available; but the sum of \$9,000,000 was appropriated for the total expenses, and the net returns at the close of the exhibition showed a profit. The actual cost of the three main structures on the Champ de Mars for the French Exposition of 1889 was \$3,957,714; and the total amount of money available, from the National Government, the City of Paris, sale of bonds and concessions and from exhibits by the Nation, was \$11,069,562. — *Engineering News*.

THE STRUCTURE OF A VENETIAN WELL.—It may not prove uninteresting in England to know how a Venetian well is constructed. It consists of a basin more or less wide, according to the conditions of the place, closed all round and at the bottom by a stratum or bank of clay to prevent the filtration of salt water from the outside. In the inner part of this basin is built a pipe (*canna*) of baked clay, which is placed on a slab of stone (*piatto*) laid on the clay. The pipe is constructed of circular bricks (*pozzali*) joined together with cement of pure clay and sand, to render them permeable, so that the water may pass through them into the pipe from the surrounding basin. The basin is then filled with marine sand to be taken from the dunes, and not with river sand which putrefies easily. The salt sand can be easily purified by frequently putting sweet water into the well and taking it out until all the sand is well washed and purified of its salt ingredients. In the inner part of the basin and all round the pipe are constructed the reservoirs (*cassoni*) in which rain-water is collected through exterior perforated slab stones (*sigilli*). These reservoirs are also made of baked bricks joined together, like those of the pipe, with pure clay and sand to allow the water with which they are filled to percolate. They are covered with large plates of stone or vaults. One of the greatest difficulties in the construction of such a well is the selection of suitable clay. The quality of clay used here is obtained from the neighboring moors. The clay must be worked in such a manner as to be rendered a soft mass without any heterogeneous substance, and laid on the subsoil with all possible care and skill. Even here, where all the wells are constructed in this way, few workmen are fitted for the work, and only special workmen are constantly employed. From the proper or improper moulding and laying of the clay depend the success or failure of a well. With regard to the St. Ambrogio water now distributed at Venice, it is most satisfactory to state that it is of a high degree of purity, needs no filtration, is cool in summer, and is entirely approved

by all consumers. The municipality and the engineer, Chevalier Filippo Lavezzari, who represents the owners of the water-works, deserve the greatest credit for the prompt solution of a question which was of paramount importance to Venice. — *The Architect*.

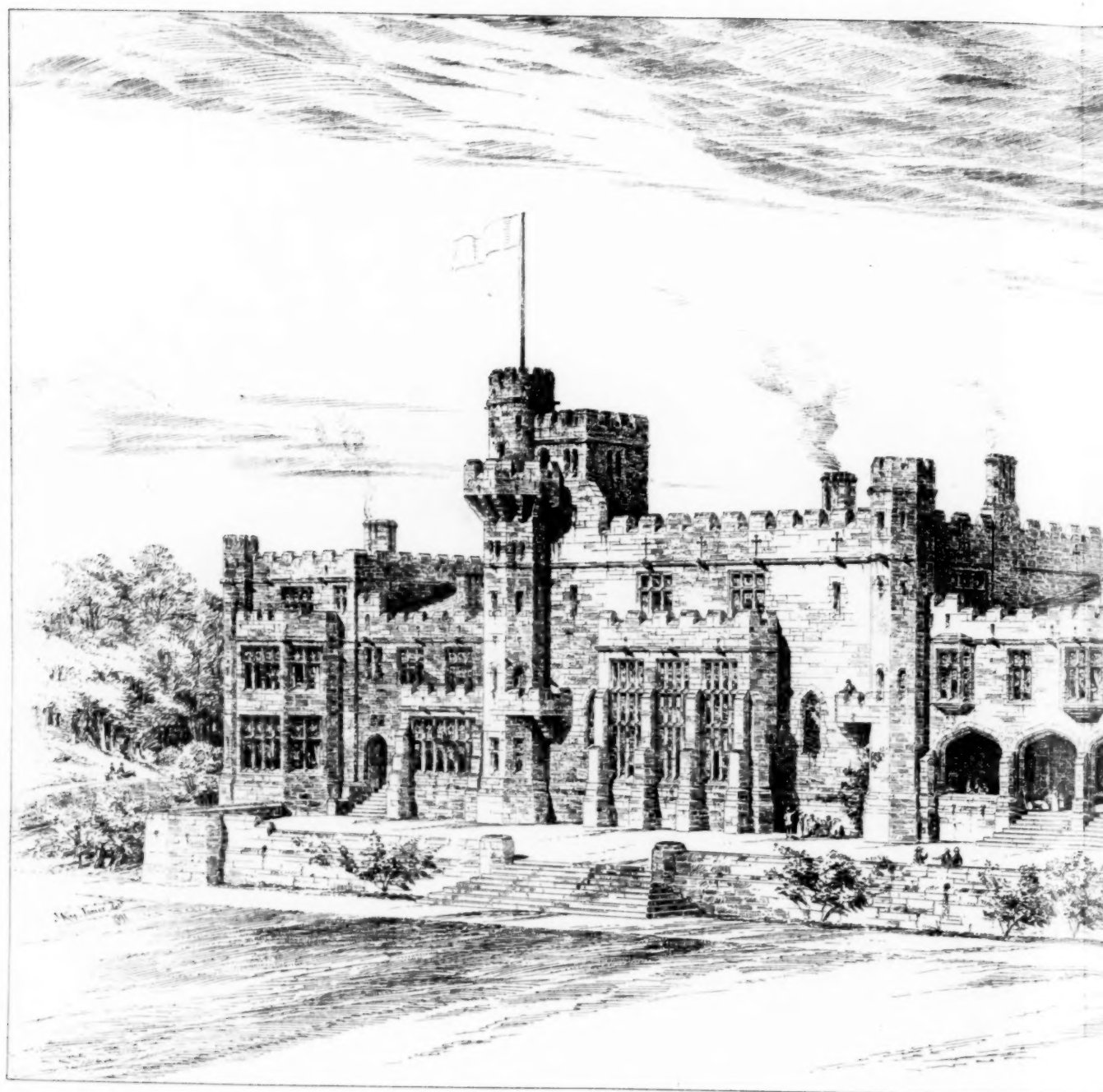
THE LATE WILHELM LÜBKE.—There can be no doubt that the late Wilhelm Lübke was a worthy representative of German scholarship and industry. He could turn out books that related to art with the regularity of a machine, and apparently without any mental or bodily inconvenience from his unceasing production. Publishers believed in his system, and they spared no expense to supplement his descriptions with wood-cuts. The pile of big volumes which bear Lübke's name on the title-page will appear less remarkable if we remember that he was a professor in a great many colleges, and that it was safe for him to print his lectures, for before the opportunity came for redelivering them he was likely to be in another class-room. Wilhelm Lübke was born at Dortmund in 1826. His ambition was to teach, and he studied philosophy in Bonn and Berlin. But in a region where everybody can expound philosophy there are many competitors for every office connected with it, and Lübke prudently turned his attention to the history of art. He was fortunate in gaining the position of teacher of the history of architecture in the Berlin Academy of Building in 1857, and henceforth his course was marked out. Four years afterwards he was invited to become Professor in the Zurich Polytechnikum, which he accepted. In 1866 he received a call from Stuttgart, where he remained for several years, and then he went to Karlsruhe, where he remained until his death. His unceasing industry at his desk affected his eyes during his latter years. Lübke deserved all the respect which he enjoyed. He made the knowledge of the history of art acceptable to all his countrymen, but it may well be doubted whether German artists would not be more successful if they were less hampered by the belief that every detail of their work must be in accordance with something or other that is recorded somewhere in a book. — *The Architect*.

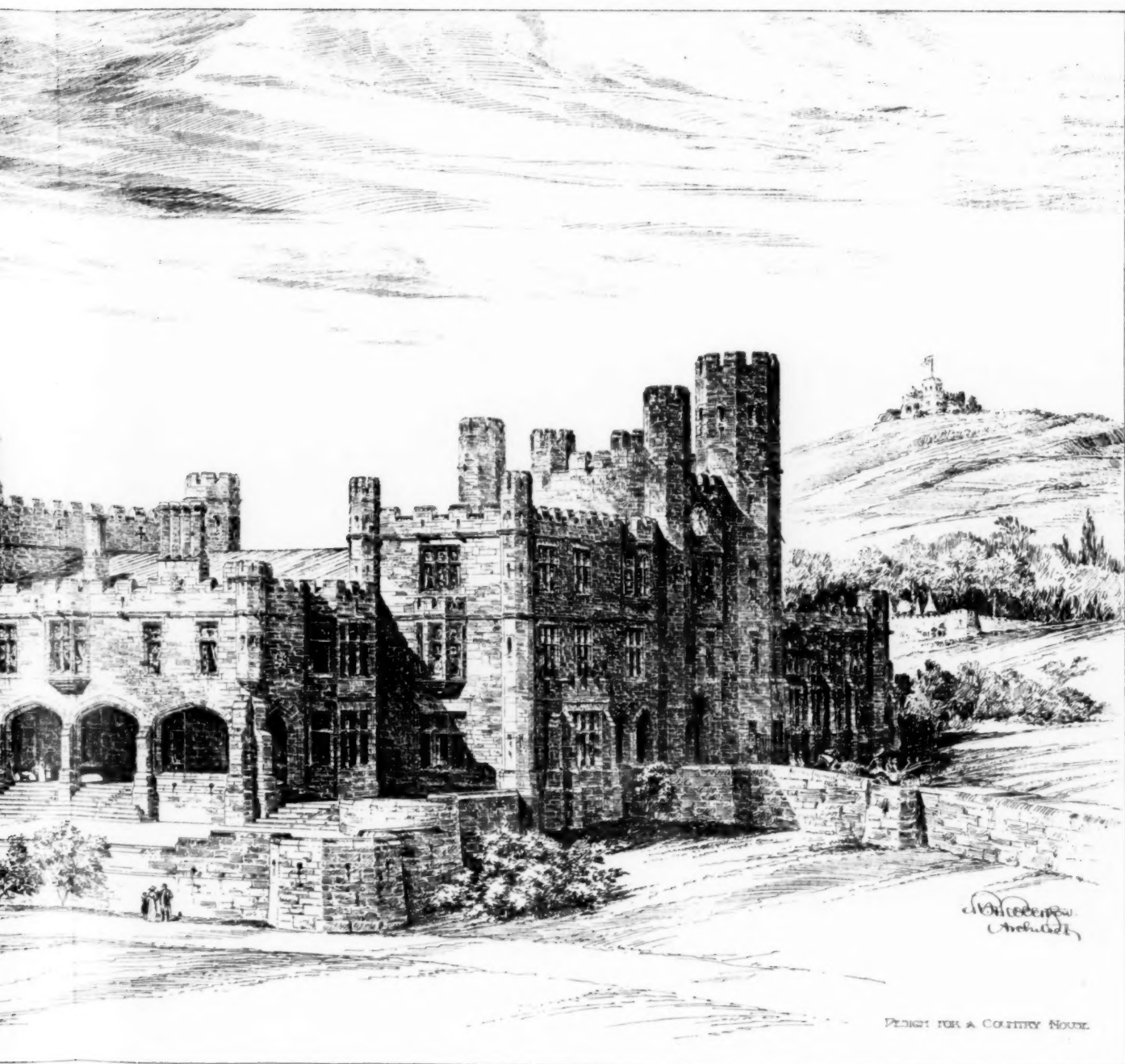
ELECTRICAL SUNSTROKE.—"Electrical sunstroke" is an affliction which, it is alleged, the workers round electrical furnaces in which aluminium is produced are liable to suffer from. The intense light causes very painful congestions, which the wearing of deep colored glasses cannot altogether prevent. We have no knowledge of any actual case of such "sunstroke," but if such a danger exists it should not be long before a remedy is found for it. — *Invention*.



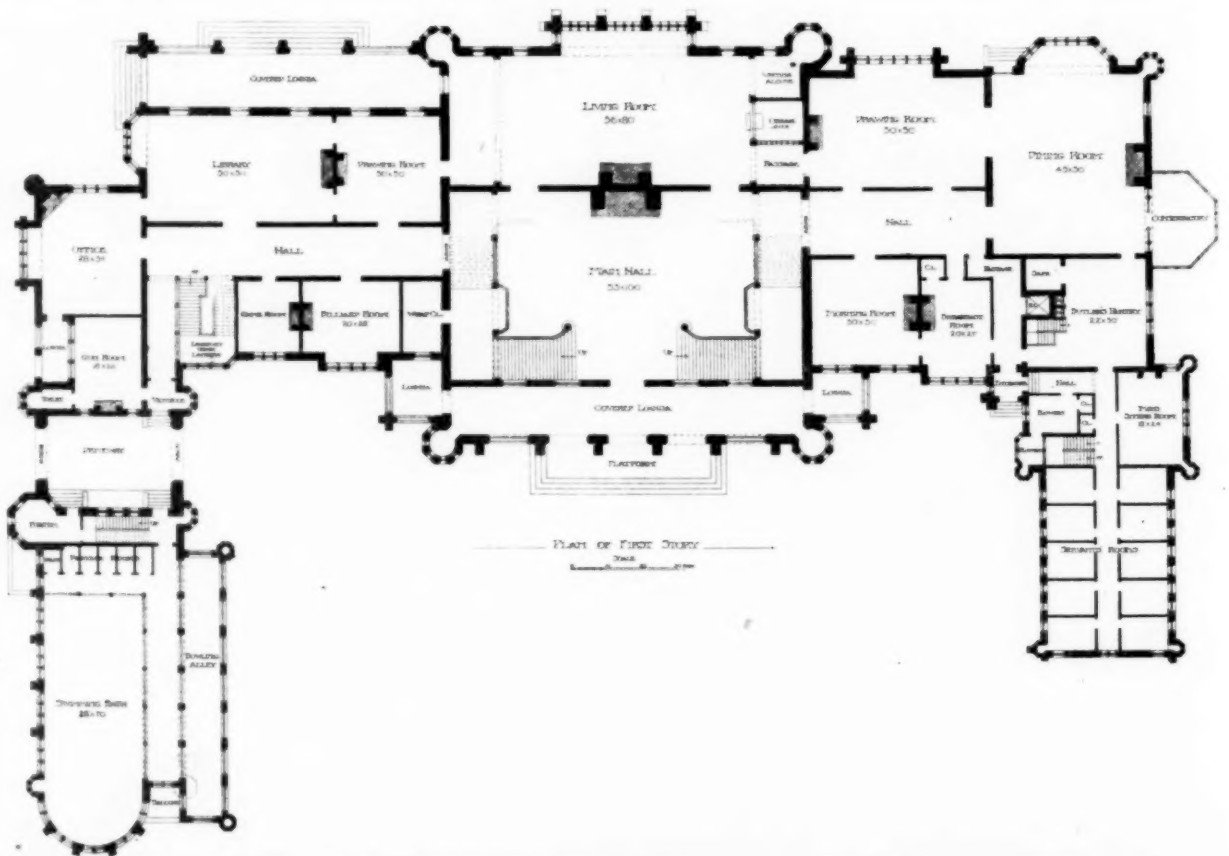
REPORTS made during the past two weeks from many large and small manufacturing centres widely separated confirm previously-expressed conclusions regarding the activity and healthfulness of industries. The later reports cover ship, car, boat and machinery building, and all kinds of equipments and appliances for field and shop work. In the great majority of instances, the shops, mills and foundries are full of work. This is especially true of New England, though there are a few exceptions. "Work is crowding in" is the general statement of industrial managers. The failures are mostly confined to banking institutions that were recklessly managed. Enterprise has been held in check in many directions because of the difficulty of obtaining money, but it is, perhaps, best it should be. The low prices ruling show that production is ample. No perceptible restriction has been effected in a general way. A panic from lowering prices is a very remote possibility. A study of industrial conditions warrants the statement they have seldom been in a better condition, leaving narrow margins out of account. The Wall Street attack on industrials will have its influence on future trust combinations in that direction. The business world is suffering from an effort to do an increasing volume of business with a standing capital. No new developments have taken place during the week. Buyers and sellers are acting as though they expected unusual incidents. Manufacturers of machinery, equipments, appliances, etc., are hurrying through with work in hand, having knowledge that there will be more to take its place. New elevated-railroad projects are announced in several engineering and railroad journals. Sewers, tunnels, pipe-lines, bridges, short lines of railway, wharf and dock building schemes have been multiplying of late. To what extent work of this sort will be hindered by provoking financial stringency and resulting loss of confidence no one can advise, but the chances are the actual necessities of the country will be supplied, regardless of what rate of interest speculating interests create for speculating purposes. Companies are being rapidly formed for all manner of enterprises. The country has not taken alarm, and will not. The columns of trade journals show vigorous conditions in the industries. Agricultural reports are also bright, though speculators have been killing winter-wheat. The farming classes are emerging from hard conditions. With over one-half the farms in the Western States free from mortgage-indebtedness, and the volume of it being steadily reduced, there is hope for larger trade with those communities in the near future. For years the farmers have had to economize to pay interest and exorbitant freight charges. The interest account, in the aggregate, has been greatly reduced, and railroad charges are much more reasonable. In the Gulf and Southwestern States the conditions are also improving steadily. Textile-goods manufacturers report clogged distribution. Retailers have all the stocks they are inclined to carry. In hosiery interests a sudden depression has developed, and the great hosiery centres are half idle. In the hardware industry, the conservative management of the past year has laid the ground for general shop activity at this time. In glass-works, potteries, brick-works and other like industries prices have declined to a point where competitors have felt obliged to confer with a view of mutual protection. In lumber, the strong tone continues, and there is a great distribution in progress, especially of lumber for house-building. Architects report fair building activity everywhere. The building-permit lists are long, and there appears to be an assured season of activity through the summer months. Much ado is made of slow collections, small profits and an absence of feverish impatience to place orders, but it must be said in all fairness that the business of the country is on a sound basis, and that a gradual expansion of trade may be reasonably expected.

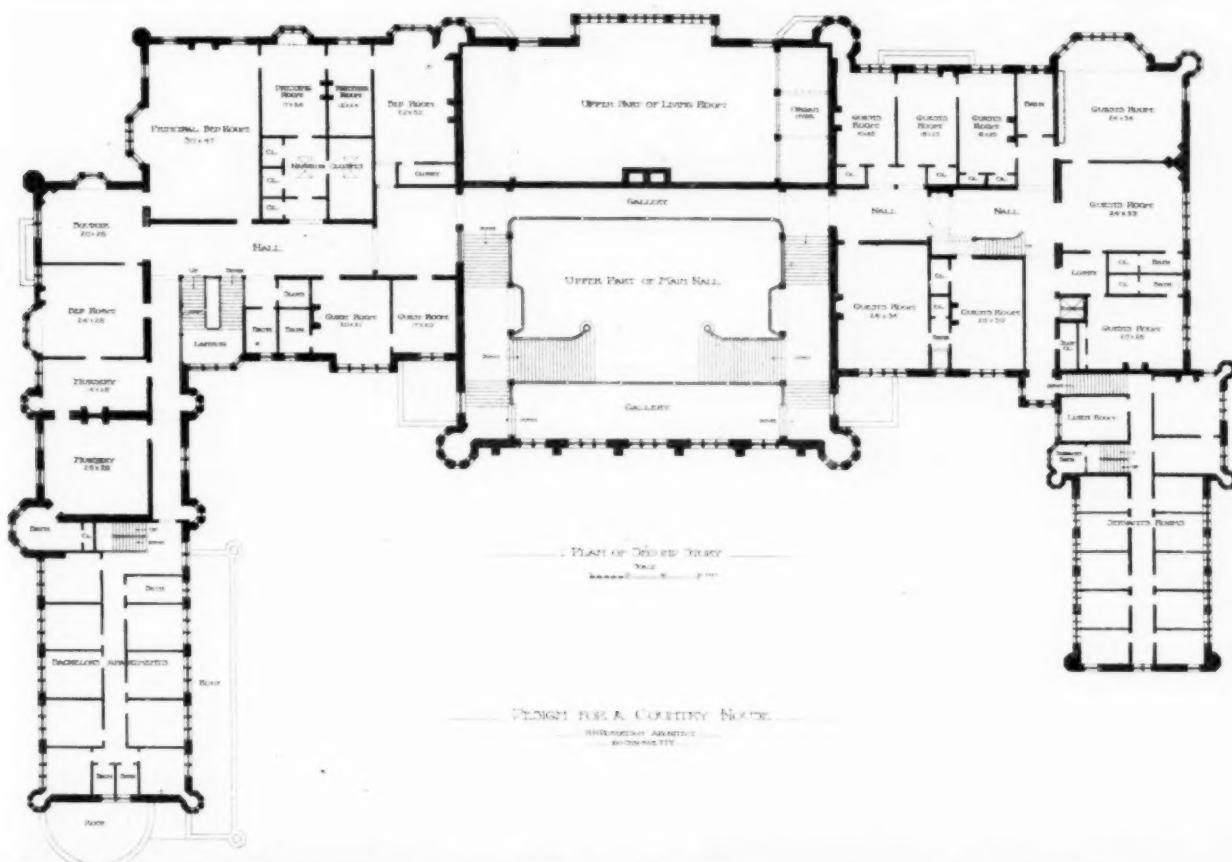
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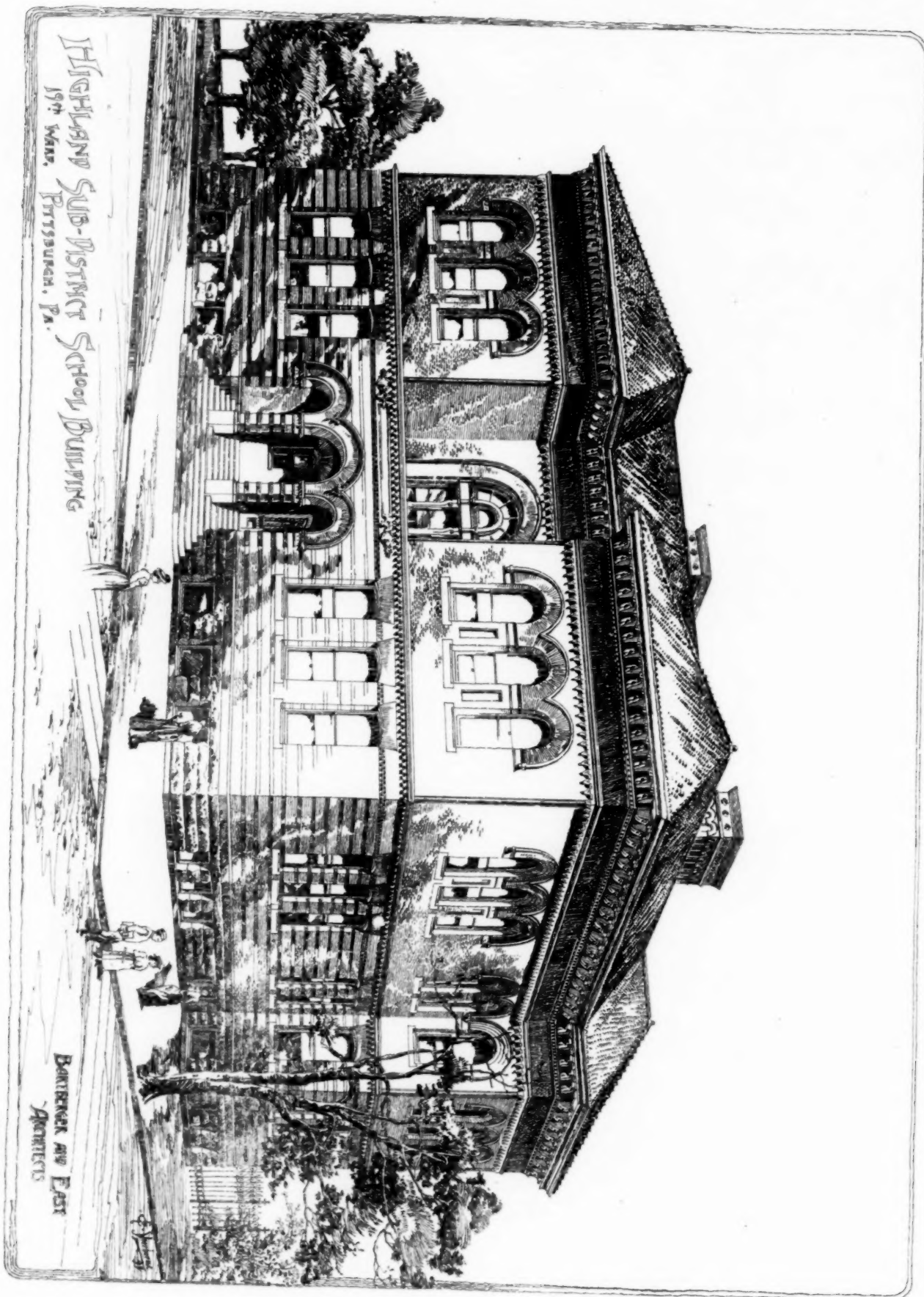




DESIGN FOR A COUNTRY HOUSE.







HIGHLAND SUB-DISTRICT SCHOOL BUILDING
17th WALK, PITTSBURGH, PA.

BARTON AND EAST
ARCHTDS

