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CONTENTS.

SUMMARY:—

The Water-Supply of Paterson, N. J.—A former Malarial Epidemic at Warwick, N. Y.—Bartholdi's Statue of Liberty.—Dr. Le Plongeon's latest Discoveries in Yucatan.—Mr. Cushing and the Zuñi: Spiritualism practised by this Tribe.—The Panama Canal.—Archæological Convention at Madrid.—New Building Regulations at Paris.—Value of Real Estate at Paris.	117
MR. ST. GAUDENS'S STATUE OF ADMIRAL FARRAGUT.	119
THE FARRAGUT MONUMENT.	120
CARBONIC OXIDE AND CAST-IRON STOVES AND FURNACES.—II.	120
THE ILLUSTRATIONS:—	
The Farragut Monument, New York, N. Y.—Double Cottages, Newton Centre, Mass.—Western National Bank, Baltimore, Md.—Scottish Sketches.	122
ARCHITECTS' CHARGES.	122
DRAINING A BOG.	124
THE AQUEDUCTS OF PARIS.	124
TEXT-BOOKS ON ACOUSTICS.	125
HYDRAULIC WORKS.	125
CHANGES AT WESTMINSTER HALL.	125
THE MOSAICS IN THE HOUSES OF PARLIAMENT.	126
COMMUNICATIONS:—	
Cremating Sewage.—Carbonic Oxide.—The Cradock House, Medford, Mass.	126
NOTES AND CLIPPINGS.	127

THE same trouble that befell the citizens of Paterson, N. J., a year ago has come upon them again in the shape of a scanty water-supply, for which they have to struggle with the owners of the mills on the banks of the Passaic. At best, the river-water is hardly fit for human consumption, but such as it is, the manufacturers are technically entitled to the first benefit of it, the surplus only being available for pumping into the reservoirs of the Water Company. During the day there is no surplus, the supply being quite inadequate even for the mills, but by closing the race-ways at night, the Water Company has succeeded in accumulating enough for temporary use. What will be the result if the drought continues until this resource fails, it is difficult to say. The explanation of the water-famine which has now become of annual occurrence at Paterson is said to be the disuse and abandonment of the small mill-dams farther up the stream, which formed so many small storage reservoirs, preventing freshets in spring, and retaining a supply for the dryer months. To this may, perhaps, be added the denudation of the country for cultivation and improvement, in the way which has only just begun to be considered injudicious. Conflicts of interest between the owners of a valuable water-power and the inhabitants of towns which depend upon the same stream for household use have arisen in several previous cases, and grow more and more threatening, but in no other instance, perhaps, has the real distress occasioned by the mill-owners' monopoly been so great as it became last year in the towns bordering on the Passaic.

AN interesting account is contributed to the *New York Times* of the circumstances of a malarial epidemic which visited the town of Warwick, N. Y., many years ago, in much the same way, and apparently from the same cause, as that which has created so much excitement at Lenox, Mass. Warwick village lies upon the Wawayanda Creek, in a valley between two parallel ranges of hills. For generations the valley had been famous for the salubrity of its climate and the fertility of its soil, until about 1820, when a mill was built half a mile below the village, and a dam constructed, which, as the fall was not great, overflowed the banks of the stream far back beyond the town. In a short time malarial diseases made their appearance, accompanied even with typhoid fever, soon reversing the ancient reputation of the valley for healthfulness. The noxious influences constantly increased until there came a year in which out of three families, all related to the *Times's* correspondent who tells the story, six persons died, and several others were dangerously affected. The neighborhood agreed that something must be done to abate the nuisance, but while they were deliberating, an opportune storm and freshet came, and swept away the dam, not, it was hinted, without some help from human hands. A committee was immediately formed to buy the ruined property, and all the inhabitants of the place pledged themselves not to help in any manner to rebuild the dam. The ground was purchased, and resold at little loss, and the former bottom of

the pond ploughed and sown with oats and rape-seed. It soon regained its original condition, that of a fertile and luxuriant meadow, while the malarious influences disappeared, and have never since returned.

THE report, brought by Minister Noyes, that Bartholdi's statue of Liberty for New York Harbor was in a fair way of speedy completion has drawn from the daily journals, as well as from private individuals, some remarks which, whatever their value as criticism, do not show that regard for the feelings of the persons who have spent so much money in making New York what they supposed to be the most acceptable gift in their power which would seem to be demanded by ordinary courtesy. Especially do we regret to see the name of Professor D. Cady Eaton, of Yale College, signed to a letter in the *New York Tribune*, which informs the readers of that journal that "when a statue or a painting surpasses certain dimensions it ceases to be a work of art, and becomes a monstrosity;" afterwards, however, qualifying this surprising assertion by explaining that Phidias's statue of Athena in the Parthenon "may have impressed by its mass in comparison with the dimensions of the temple," but that Bartholdi's statue "could not fail to be ridiculous in the expanse of New York Bay." Considering that the figure is not to be situated in the "expanse" of the bay, but on an island, and in the immediate neighborhood of other islands, all more or less covered with buildings which would serve as measures of comparison, it is difficult to see in what way it should necessarily be more "ridiculous" than the giant effigy by Phidias of Minerva Promachos on the Acropolis of Athens, or the Colossus of Rhodes, which stood in a situation almost precisely analogous to that of the New York statue. In other respects than its relation to its surroundings, we can see no reason whatever for Professor Eaton's undignified suggestion that the "arms" of the figure should be removed from Madison Square and "given to some enterprising barber," or that the completed work "may find a resting-place in front of a gigantic *café chantant*." Except from the small model and a few rough sketches, we have no means of judging concerning the merit of the finished statue, and it would be not only more decent, but more wise, to wait until we are sure that the greatest work of the foremost sculptor in Europe in his own specialty will be intolerable to our delicately artistic organizations before we take pains to insult the generous nation which offers it as a token of affectionate friendship.

DR. LE PLONGEON, the energetic explorer of Yucatan, has made some new discoveries at Uxmal, among others a figure of the ancient Maya god Cay, but his investigations are seriously embarrassed by the unfriendly disposition of the natives. The statue of Chac-mol, discovered a few months ago, was destroyed by the Indian populace, and in order to protect his new treasure, Dr. Le Plongeon has surrounded it with dynamite. In the same place he has found what he calls the ruins of the "ancient Masonic temple," where the priests and magicians celebrated their mysteries, and believes that he can distinguish between the apartments appropriated to the Masons of the first degree, which faced the north, and those of the second and third degrees, which fronted in the opposite direction. Besides these discoveries, which seem to show great power of inductive reasoning, as well as enterprise, some objects which are considered to be well-recognized Masonic attributes have been picked up, as, for instance, some "mystical dice," a "cabalistic stone," and a slab sculptured with a representation of an apron and hand. How the "cabalistic stone" differs from other stones, we are not sufficiently versed in Masonic mysteries to know, but a correspondent is of opinion that he has himself found a similar one in the temple of Heliopolis. The explorer is now "trying to establish the relation between these discovered Masonic attributes and those found at Memphis and Thebes,"—a task in which, we should judge, he would find the assistance of an imaginative newspaper reporter of much value.

A REPORTER, gifted with a style of diction which would appear unusually ornate even in a Chicago journal, has been "writing up" Mr. Frank H. Cushing, who was commissioned by the Smithsonian Institute about two years ago to make investigations among the pueblo Indians of New Mexico. Mr. Cushing, if not "the greatest ethnologist that America has yet produced," must be at least a young man of remarkable enter-

prise and courage. Like Mr. Bandelier, the agent of the Archaeological Institute, he found that no satisfactory information could be obtained from the distrustful and reticent Indians respecting their own history and traditions without entering into close personal and confidential relations with them; and for this purpose he attached himself to the tribe which still inhabits the pueblo of Zuñi, abandoning entirely his connection with the civilized world, adopting the Indian costume, making himself master of their language, and entering with tact and discretion into the affairs of the tribe. Naturally, it was a long time before his good intentions were fully credited, and on several occasions his life was for a time in danger by reason of some sudden suspicion; but patient good-will, as with Mr. Bandelier, seems at last to have awakened an answering regard, such as with the simple Indians soon ripens into sincere affection. First formally adopted into the tribe, as the son of one of the priests, he soon took a prominent part in its affairs, and was made a chief, ranking as the second citizen of the pueblo.

In this capacity he was admitted to the most secret councils of the tribe, and allowed to share in the knowledge of those mysterious ceremonies and traditions which have hitherto been so jealously guarded by all the pueblo Indians from the curiosity of strangers. In the account of these it is difficult to distinguish between the facts observed by Mr. Cushing and the embellishments of the reporter, but it is safe to say that a great deal of most interesting information has been obtained. As usual, the "secret rites" of the "twelve sacred orders" which exist in the pueblo are announced to bear "a strange resemblance" to the "institution of Freemasonry," more particularly, we suppose, in the "ceremonials both beautiful, profound and grotesque in character," of which, unfortunately, no details are given. A more important story, which can hardly be due entirely to the reporter's imagination, is that relating to the discovery of a similarity between the religion of the Zuñis and the vague modern belief called spiritualism. The pueblo, according to the account, has its scances, its circles and its mediums, who transmit communications from the spirit world, and even exhibit the phenomena of materialization, precisely like those of more civilized communities; but these rites are kept strictly guarded from profane eyes, and even Mr. Cushing would probably have been kept in ignorance of them if he had not accidentally happened in conversation with the Indians to speak of certain spiritualistic phenomena which he had witnessed, thereby leading them to imagine him a fellow-believer, and inducing them to reveal to him their most cherished secrets. There is a little savor of treachery in disclosing such communications to the unsympathising world, but it may be hoped that the poor remnants of the races which fought so bravely against the power of Spain may gain some material benefit from the increasing scientific interest of which they are now the objects.

GLOOMY accounts are given by returning travellers of the present condition of the works upon the Panama Canal. It has been repeatedly denied that even a beginning of actual excavation had been made, but according to the report of a New York physician recently returned from the Isthmus about two hundred and fifty laborers are now constantly employed on the ground. The climate, however, makes terrible havoc among them, and the supply must be constantly renewed. Dr. Peitsch speaks in terms of strong condemnation of the treatment which the men receive. They are gathered from all quarters by paid agents, and brought by sea to Aspinwall, and thence carried over the railroad to Panama. They are paid seventeen dollars per month, and are lodged and fed by the Company, at the smallest possible expense. If they fall ill, and are unable to work, they are discharged, and die of starvation, if not of disease. To return home is out of the question, as the railroad journey to Aspinwall alone costs twenty-five dollars, independent of the sea-voyage back to Europe or the West India Islands, which furnish the greater portion of the laborers; and although some attempt has been made to provide hospital accommodation, its benefits are confined mainly to the French representatives of the Canal Company. If this is the condition of things on the Pacific side of the Isthmus, it is appalling to think of the misery which must attend the opening of active operations at the other end of the line. The banks of the Chagres River, which will form the northern terminus of the canal, are renowned for their deadly malaria. The construction of the Panama Railroad is said to

have cost thirty thousand lives, and the excavation of a sea-level canal, which must be carried on in the lowest and most unhealthy part of the river valley, with constant exposure to water and the exhalations of the freshly-opened ground, will be a still more dangerous task.

On the twenty-fifth day of September the fourth biennial congress of the Association of Americanists will open its sitting at Madrid. The previous meetings have been held in Northern Europe, the first at Nancy, the second at Lunenburg, and the third at Brussels, and the assignment of the fourth to Spain furnishes a gratifying indication of the growing interest which archaeology is exciting in that country, as well as an augury of the brilliant success of the meeting. For about a century the history of America is practically included in that of Spain, and numberless documents relating to the Spanish conquest and dominion must still remain in possession of families descended from the followers of Cortez and Pizarro, who will be very likely, stimulated by the prospect of adding to the renown of their ancestors, to make special efforts to have them brought to light and presented to the Association. Among the subjects to be discussed at the meeting will be the condition of the three provinces of the empire of the Incas at the time of the conquest; the character of the races which inhabited Central America and Mexico before the invasion of the Aztecs and other northern tribes; the evidence regarding an expedition of the Biscayans to the coasts of Newfoundland before the time of Columbus; the probability of an ethnographic affinity between the races of America and Oceanica, and the emblematic or religious value of the idols and effigies found in various parts of the Continent; besides many other interesting matters.

SOME new rules have been issued by the French Commissioners for the regulation of construction, which besides modifying slightly the present requirements in regard to the height of buildings, and providing for ample interior courts, prescribe certain appliances for ventilation which although in common use have not previously, so far as we know, been made the subject of strict legislation. For instance, it is made compulsory throughout the city of Paris to provide over every range or stove of any kind used for cooking, a hood, communicating with a ventilating flue. This arrangement is looked upon with us as a costly luxury, and an attempt at enforcing its general use would be felt as a great hardship, but scientific ventilation is now rather popular in France, and the comfort of the Parisians at least will be promoted by the ordinance. A more valuable regulation, and one which might be imitated in our cities with advantage, directs that every gas-stove for heating or cooking shall have a proper chimney to the outside of the building; and it is further ordered that every store, office and workshop, kitchen, porter's room and staircase, of less than one thousand cubic metres capacity, which is lighted or heated by gas, shall be ventilated by means of an opening not less than one square decimetre (sixteen inches) in area, placed at the highest part of the room, and communicating directly with the outer air. The use of gas, hitherto confined mainly to public places, is rapidly spreading in private houses in Paris, and it will do no harm if the fear of bad effects from its combustion, which have been so general on the Continent, should lead to the adoption of a freer aëration of dwellings.

THE rapid increase in the value of real estate well situated in large cities is shown by some facts cited in the *Journal des Entrepreneurs* respecting transactions in Paris. Less than twenty years ago a tract situated upon what is called the plain of Passy, not far from the Exposition buildings of 1878, was bought by Maître Jolly, a lawyer, for seventy-five centimes (fifteen cents) the square metre. Very recently the same land has been conveyed by him to the city of Paris at prices ranging from one hundred to one hundred and fourteen francs the metre, an advance of about fifteen thousand per cent. But in comparing the prices of centuries ago, instead of a score of years, with those of the present day, the difference is something astonishing. In the year 1260 a shoemaker named Geoffroy and his wife Marie presented to the Hôtel-Dieu an estate valued at twenty-seven and a half francs. The street still called Geoffroy-Marie was laid out over the property, improvements were made, and in the time of the Second Empire, six hundred years after the poor shoemaker and his wife made their modest gift, their land was sold again for twenty-eight millions of francs, or very nearly a million for one.

MR. ST. GAUDENS'S STATUE OF ADMIRAL FARRAGUT IN NEW YORK.

It may, I think, be claimed without hesitation for Mr. St. Gaudens's statue of Admiral Farragut erected in New York in the month of May last, that it is the best monument of the kind the city has to show. New York statues fall, perhaps, even below the average of those which decorate some of our other towns, those of Boston, for example, so recently criticised in these columns. Those which stand nearest to the Farragut are the worst of all, and its excellence is thus more prominently shown. The column which commemorates General Worth cannot be called interesting, but, being less ambitious, it is less offensive than the seated figure of Seward at the south-west corner of Madison Square. The Farragut monument is placed at the north-west corner of the same park fronting on Fifth Avenue. Another site might have displayed it to more advantage, as will hereafter be noted, but it holds at all events a position than which none could be more prominent. It is constantly under the immediate glance of a throng of passers-by whose taste, we may hope, will be improved by repeated involuntary contrasts drawn between it and the Seward near at hand, or the Lincoln in Union Square.

The commission for the statue was given to Mr. St. Gaudens in December, 1876, by an association of leading citizens, General Dix being the first president of the committee and being succeeded at his death by Mr. Benjamin H. Field. It is not often that a non-professional committee are to be congratulated, as in this case, upon the discrimination they showed in selecting an artist who was backed neither by personal influence nor by a wide-spread fame. Mr. St. Gaudens was already well known in artistic circles, of course, though he had but just completed his term of study, — was highly thought of both in Parisian ateliers and in those home circles which take the initiative in the forming of artistic reputations. But, as I have said, such strictly professional recommendations are not usually those which weigh heavily with committee-men. It is well that such an instance of discrimination should have been rewarded by a successful monument, and one recognized as such by the community at large. Between the time when the commission was given and the day when the completed work was shown, there occurred an interval of more than four years, during which the young artist's reputation had greatly grown. The works which he had produced were of a different sort, however, and it still remained doubtful whether he could successfully deal with a civic monument destined for the open air. The plaster cast of the figure of Farragut, which is only a part of the entire design, was exhibited at the *Salon* of 1880 and won much praise from Parisian critics. Supplementing their approval of the sculptor's technique, several of them commented upon one characteristic of the figure which to my mind also seems deserving of especial praise. I refer to its strong national accent — an accent which is present in all good portrait-art of every time and place, and which is something quite different from the correctness with which the mere individual traits may be rendered. We have had portraits for many years, of course, which were truly "American" in their flavor, but they have usually been wanting in the technical ability and the artistic taste which alone can elevate a rendering to the rank of fine art. When this manual dexterity, this cultivated taste, had been acquired by our artists, — almost invariably in foreign schools, — they were apt to produce a result in which the local flavor had been refined out of all recognition. A few noteworthy examples to the contrary, we may yet make the general statement that it is only of late years that we have seen the beginning of a national portraiture in which the strong general characteristics of the American man and woman are preserved under an accomplished technique and refined feeling for pictorial "style." That these beginnings should persist and enlarge is absolutely indispensable if our art is to become at all characteristic of ourselves, if it is to be anything more than an echo of foreign schools, a reproduction of foreign impressions. When I say that the subtle qualities of race and national character are strongly prominent in Mr. St. Gaudens's statue, while the general canons which bind in all ages the sculptor's art have not been in the least transgressed, I note one of its best claims to approval and one of the points that were especially insisted upon at the time of last year's *Salon*.

On the 26th of May last the monument was unveiled with appropriate military ceremonies. A notable point in the performance, one which struck all those who take an interest in art and who were fain to believe that the setting up of so good a work might have a strong influence upon the state of popular taste, was the small reference made by any of the speakers of the day to the artist himself or to the artistic qualities of his work. Criticism was not in place, of course, nor was technical comment to be thought of. But it was due to the public no less than to the artists that some stress should be laid upon the worth of the monument as a work of art and some incitement given to efforts toward securing such worth upon future occasions. The press, however, did its best to supply the orators' deficiencies. Seldom has there been so much said in the way of technical criticisms of a public monument. Seldom has the conscientious work of an artist been more conscientiously approved.

The fine heliotype which accompanies this notice, and which was taken under the supervision of Mr. St. Gaudens himself, precludes the necessity of a detailed description here. It will be noticed, as I have said, that this is a monument in the strict sense of the word, and not a portrait-statue merely. From the beginning it had been Mr. St. Gaudens's intention that such should be the case, but he met

with much opposition before he gained his point. A long-standing rule of the Park Department called for a certain limitation in size and a certain uniformity in effect in the bases of all statues set up within its jurisdiction. Fortunately, after a long battle, the sculptor was allowed to have his way to a certain extent, and in conjunction with Mr. Stanford White, the architect, placed his figure as here shown. Fortunately, I say, for while the present base is open to certain objections it is far more satisfactory than a simple pedestal could have been. Moreover the rule of uniformity has been broken, and sculptors of the future can profit by the fact. Mr. St. Gaudens's original desire had been for a base similar to the actual one in plan, but with the wings much more extended, — a base which, as seen in his design, is more beautiful. It may however be as well that this first design, though so good in itself, was not here carried into execution, for the objections which have been brought against the present erection might in that case have applied with greater force. These objections refer not to the structure itself, but to its appropriateness to its actual position. Strictly speaking, the form of the substructure is better adapted to the angle of a building or to a niche in some natural or artificial elevation, — to some situation, in a word, where its lines would be supplemented by stronger ones and, above all, where its rear elevation would not be visible. As it stands, it lacks, not stability of effect exactly, but that evidently perfect adaptation to place and purpose which is the highest excellence of an architectural erection great or small. The surrounding trees, furthermore, break and injure the effect of massive simplicity which would have appeared in the monument had it been differently placed. It is too much, I suppose, to hope that the Park Commissioners will do what they now might to enhance the appearance of the work — that they will remove, for example, some of the trees which confuse the eye, and plant immediately behind the base low shrubs which would conceal its back while not rising high enough to break the outlines as seen from the front.

When this much has been said in the way of criticism, — and in the case of so fine a structure it is due to artists and public alike that criticism should say all it can, and leave no ground for the assumption that the work has been tenderly dealt with, — there remains but praise to give. The outline of the substructure has been well calculated, running neither into a conventional rigidity, nor into an evident effort to escape therefrom. Its decorations combine "representative" with mere "decorative" work, — a difficult problem, but one which has been most cleverly met. The introduction of the sword which lies against the washing water on the central block has been somewhat criticised. But it cannot be doubted that some such rigid lines were needed just where they are introduced and, considering the symbolic nature of the whole scheme of ornament, it is difficult to see how they could better have been formulated. The modelling of the low-relief figures is especially to be praised. It is in work similar to this that Mr. St. Gaudens has won a good part of his fame, and it is a fresh proof of his ability that he has been able here to harmonize such delicate work with the strong effect of the crowning statue. The figure to the left of the spectator is "Loyalty," that to the right is "Courage." Imaginative in idea, the faces are finely expressive, as it seems to me, and widely removed from the conventional types which have so long done service to an army of modern sculptors. The inscriptions note the main facts and dates of the Admiral's career, and include the following words, "That the memory of a daring and sagacious commander, and gentle, great-souled man, whose life from childhood was given to his country, but who served her supremely in the war for the Union, may be preserved and honored, and that they who come after him and will owe him so much may see him as he was seen by friend and foe, his countrymen have set up this monument."

When we pass to the consideration of the statue itself, we are struck first of all by the freedom and spirit of the pose, combined as they are with great simplicity of outline and a frankness of aim that is far removed from all deliberate seeking for novelty or unconventionality. There is no attempt at "action" such as usually degenerates into affectation or theatricality or unrest; but there is no rigidity, and nothing commonplace or hackneyed or insipid. The statue stands well upon its feet and is as solid as could be wished — with the solidity of a living figure and not the mere *avoirduis* of a lump of bronze. Moreover, the attitude, simple though it is, has been so well designed that the veriest land-lubber must at once recognize the poise of a sailor on a shifting surface. To secure this effect and yet not fall into the suggestion of instability shows most forcibly the sculptor's power. Some fault has been found with the modelling of the trousers, but in common with the rest of the habiliments they are evidently clothes clothing a man, and not mere corrugated surfaces of metal. The treatment of the coat-flaps lifted by the wind breaks the straight outline of the dress and aids the impression of place and circumstance primarily given by the pose of the figure. The poise of the head is spirited, and the features full of life and animation. Here one must notice the masterly modelling, broad yet delicate, vigorous yet full of refinement. The spectator should carefully compare the treatment of this face with that of the low-reliefs upon the stone below, if he would appreciate how the sculptor understands the problems of his art and how skilfully he treats them. Such comparison will show not only the way in which the decorative elements of a monument should be subordinated to its main feature, but also the different modes of treatment proper, respectively, to bronze and stone. The last is the most elementary point in the art, perhaps, but

it is nevertheless one with respect to which our monument-makers constantly go astray. From top to toe, this statue of Mr. St. Gaudens is a fine work technically considered and it is a living portrait — not, as has so often been the case with our figures of a similar sort, the cast-iron imitation of what seems to have been a cast-iron original. That the figure is not only life-like and individual, but statuesquely agreeable, and this in spite of the stiff modern dress, is naturally the fact of especial interest. The drapery with which the sculptor of the Lincoln on Union Square tried to mitigate its ugliness adds but another element thereto. Comparing these two works, we shall see that upon the sculptor's hand and not upon the model's dress depends the grace and dignity of the result. This is not to say, of course, that our current dress, whether civil or military, is well adapted to the requirements of the statuary — only that few problems are so difficult that they may not be resolved by the touch of genius. In choosing the severe costume that he has, Mr. St. Gaudens has done more than give us one good statue. He has given strong encouragement to all his co-workers to meet, fairly and squarely, the problems of characteristic expression and contemporary dress, has shown that the best results may be drawn therefrom — nay, that *only* therefrom can ever be drawn a work of art, fresh, original, and valuable in any other sense than as a more or less intelligent reproduction of what other men have already done. Mr. St. Gaudens has proved to the satisfaction of New Yorkers that in future commemoration of their dead they need not fall back upon "classic arrangements" of costume; nor, on the other hand, content themselves with the erection of such inartistic and unscholarly figures as have been set up by scores throughout the country since the Civil War, bearing the names of particular heroes or symbolizing the sailor or the soldier, as the case may be.

I may note, in conclusion, that the pedestal of the statue is formed of North River bluestone, and that the bronze figure was cast in Paris. Of course only the structure of the base is due to Mr. White, all its sculptural elements being from the hand of Mr. St. Gaudens.

M. G. VAN RENSSLAER.

THE FARRAGUT MONUMENT.

NEW YORK, June 23.

THE Farragut statue, in Madison Square, including its pedestal, is the most elaborate of the public monuments of New York. It is noticeable also as being the only monument in which much stress is laid upon the architectural and sculptural appendages of the figure. The figure itself will be admitted to be the most successful portrait-statue in New York, with the exception of Bartholdi's Lafayette in Union Square, which ranks with it. It has the fundamental merit, which of course ought to be a commonplace, and which equally of course is a distinction among American portrait-statues, that it is, to begin with, a human figure, and not a military or naval tailor's dummy. It is, in the next place, distinctly a sailor, and an American sailor. Moreover, it is a naval commander in command, and at sea. Nothing in the work is so admirable as the subtleties of pose and modelling by which this special character is expressed, without detracting from the repose of the figure. The legs are well apart, as on the deck, and the figure is braced against the motion of the ship on the one hand, and on the other against the strong head breeze which blows back one of the coat-skirts, and against which the whole figure, as it were, leans forward. To carry this expression so far, without carrying it too far, to stop so clearly short of the line where animation becomes inconsistent with dignity, must be pronounced an unusual achievement in sculpture. It is questionable, for example, whether this line is not overstepped and the severity of sculpture partly lost in the picturesqueness and spirit of the Lafayette, which is the only statue with which it does not wrong Mr. St. Gaudens's work to be compared. In this, as in that, the figure is everywhere felt through its intractable drapery. Every inch of the Farragut shows study, and even bronze trousers, the despair of modern sculptors, lose some of their intractability, and evidently enclose the respectable human leg. Where study has been so thorough as in this work, no criticism of detail can be hypercritical, and the arrangement of the hair as seen from behind is not in this case a trivial detail, for it really derogates sensibly from the dignity of the figure seen from that point of view, and withdraws attention from the Admiral to his barber, whose office has evidently been performed very conscientiously and very recently.

The statue is thus an unmistakable and successful representation, in the first place of a man, and in the second of a naval commander. Some French critics have added that it is as unmistakably the representation of an American naval commander, and upon this point they ought to be, and doubtless are, better judges than American critics. The eye "of little employment hath the daintier sense" of the subtler distinctions of race which divide a civilized American from a civilized European. But, admitting the Americanism, when we have an American naval commander, we have not yet obtained an American naval hero; and it is perhaps in the heroic element rather than in the nautical and national elements of his problem that Mr. St. Gaudens has come short of complete success. Possibly this is another way of saying that the sculptor has been more successful in specialization than in generalization, whereas the power of generalization, of abstraction, of typification, so to speak, is commonly recognized as the "note" of creative power in sculpture.

So much of the pedestal is sculptured decoration that it is not

easy to decide upon the architect's share in it, or how far the design of the pedestal has been modified with reference to the sculpture it is meant to receive, and for the sake of which it exists. Mr. St. Gaudens's work here also is interesting. No doubt most of your readers have been made aware, from the illustrated article in the *June Scribner's*, of the general form of the monument, a high-backed settle of bluestone, the seat of which is interrupted in the centre by the pier which carries the figure, and the ends of which return to form arms. With the exception of the sitting figures cut in very low relief which lean against the central pier, and of the lettering, the sculptural decoration is supplied from marine motives. A bluestone billow crosses the central pier, with a sword occurring promiscuously in it and floating upright. The arms of the seat are formed by diving dolphins overlaid with a watery veil. This is a pretty conceit, and the execution of it is very deft indeed, but the conceit can scarcely be called monumental, and except in the figures, — and indeed in the figures, — sculptural severity is abandoned altogether throughout the decoration of the pedestal in favor of a suggestiveness entirely pictorial. In the inscription, legibility is sacrificed to pictorial suggestiveness, which latter, it is asserted by some, is attained. Suggestiveness is a convenient word, since it does not commit one as to the quality suggested, but it is hard to understand what can be suggested which is not distinctly expressed by Roman capitals. It is perhaps conceivable that an inscription might be made to impart an artificial texture to a wall, like a decorative pattern; but most certainly that result has not been attained here, and it is questionable whether it ought to be sought for anywhere. If an inscription is recognized as a disagreeable necessity in a work of decoration, and made as inconspicuous as is consistent with legibility, we shall probably have exhausted its decorative possibilities; and any attempt to go beyond this is apt to be rank affectation, as the lettering on this pedestal seems pretty clearly to be. There is really nothing romantic in capital letters, nor do they appeal to the imagination when they are cut and arranged irregularly. As Mr. Yellowplush justly observed in his celebrated letter to Bulwer: "You may, for instance, call a coronet a coronal, if you like, as you might call a hat a 'swart sombrero,' a 'glossy four-and-nine,' a silken helm, to storm impermeable and lightsome as the breezy gossamer;" but, in the long run, it's as well to call it a hat. It is a hat." And as with hats, so with inscriptions. They are inscriptions, and it is doubtful whether they can advantageously be made anything else.

The monument is worthy of notice, among other things, as being the only public statue in New York in which the architect's share has been important enough to be commemorated, as in the present case it is by a bronze crab in the pavement of pebbles in front of the seat in which rude capitals record that as Mr. St. Gaudens was the sculptor, so Mr. Stanford White was the architect of the work. But for this, the critical spectator would be moved to regret that a picturesque sculptor should not have had the assistance of an architect when he came to design a structure. For it is not too much to say that of any specially architectural training the work gives no evidence whatever. To use the image of a hero as an incident of the back of a sofa, even as the crowning incident, is not a monumental disposition, not even if the sofa is itself a monumental sofa, which the present sofa is not. In construction it is as primitive as possible, being a series of stone slabs set on end, after the manner of a Druidical cromlech rather than of a classic *exedra*, to which it has been likened. There is a course of stone under this cromlech, which may by courtesy pass for a plinth, although the treatment of it is extremely rudimentary, and another course of stone above it, which can scarcely by any stretch of courtesy be described as a coping. The absence of anything like architectural treatment, or of any technical knowledge or device, the frankness and innocence with which the sense of structure is sacrificed to attain an ideal form, are, in one way, almost attractive traits. They would be, at least, if the construction were actually the work of primeval man, done in the childhood of the race, instead of only a reminiscence of the Druidical style, by a modern architect. But as it is out of the question that a modern architect can be ignorant that there are more refined constructions than the cromlech, one is obliged to set the work down as one of affectation rather than of innocence. However winning artlessness may be as a trait of character, it is not possible to give a very high rank to a work of art of which the most marked characteristic is artlessness; and the asseveration of the bronze crab does not perceptibly affect one's regret that the sculptor of the Farragut monument should not have had the assistance of an architect.

CARBONIC OXIDE AND CAST-IRON STOVES AND FURNACES. — II.

THE question which I proposed to answer as far as it lay in my power to do so was this: Is carbonic oxide a constituent of the air of rooms heated by cast-iron stoves and hot-air furnaces, particularly if these are of bad construction and in bad condition? There are plainly two sources of danger to keep in mind: 1. The passage of carbonic oxide through cast-iron heated to a high temperature; and, 2. The escape of the gas from fissures in the walls of the stove or furnace.

A careful study of the methods which have been used in all the

¹ Carbonic Oxide as a Source of Danger to Health in Apartments heated by Cast-Iron Furnaces or Stoves. By Ira Remsen, Professor of Chemistry in the Johns Hopkins University.

earlier experiments led me to the belief that better results could probably be obtained by the use of Hempel's method than by any other, though, of course, much depends upon the accuracy of Hempel's statements. If the method is as delicate as is claimed, then it is better adapted to the purpose of such an investigation as this than any other which has ever been used. Accordingly, I first undertook an examination of the method itself, for the purpose of convincing myself of its value. I may say at once that my own experiments fully confirm the statement of Hempel concerning the delicacy of the method, and after an examination of other methods and a comparison of them with this one, I am fully convinced that it is the best one now at our command for the purpose for which it is intended. In order that the experiments described in this report may be intelligible to those who have not familiarized themselves with the method of Vogel already referred to, and of which that of Hempel is a modification, I give here a brief description of the method as used by myself.

The original method, as given by Vogel, is thus described: "If it is desired to test the air of any room with reference to the presence of carbonic oxide, it is best to empty in the room a flask of about 100 cubic centimetres capacity and filled with water. In the empty flask there are then poured 2-3 cubic centimetres of blood, so strongly diluted with water that it is only faintly colored red, but at the same time distinctly gives the two known absorption bands when examined in a small test tube with the spectroscope. If this solution is shaken with the air only one minute, the action of carbonic oxide, if it is present, can be seen even in the change of color of the blood. It appears more of a rose-color; the absorption bands are a little paler, less distinct, and moved a little farther to the left than those of pure blood. This change alone is sufficient to enable a skilled spectroscopist to detect the presence of carbonic oxide. Those who are less skilled may convince themselves, however, by the addition of 3-4 drops of strong ammonium sulphide, which, as is well known, causes the disappearance of the two bands of pure blood, and the appearance of a broad, indistinct shadow in their place, while the bands of the blood which contains carbonic oxide are not changed by ammonium sulphide."

The smallest quantity of the gas which Vogel could detect was 2-5 parts in 1,000. Hempel's modification of the test consists, as already mentioned, in allowing mice to breathe the air under examination, killing the mice, and then proceeding with the blood as Vogel recommends. The mouse used is placed in an apparatus made of two glass funnels, joined together at their mouths by means of a wide rubber band. The air is drawn through this apparatus by means of an aspirator, and at the end of the experiment the mouse is killed by the most convenient method. I have found it best to drop the animal into a tall and narrow cylinder, and to fill this completely with water, bringing down upon its mouth a glass plate. In a very short time death follows. The mouse is then brought into a small, clean beaker with a little water, and cut in two in the neighborhood of the heart by means of a pair of small, sharp scissors. On squeezing the pieces with a pestle, enough dilute blood is easily extracted for the observations. If the mice have been used to examine the air of buildings situated away from the laboratory, the dilute blood, obtained as above described, is best brought into strong glass tubes, so as to completely fill them, and the tubes then tightly corked and taken to the laboratory for examination.

In order to thoroughly accustom ourselves to the use of the method, my assistant and myself made a series of observations, the results of some of which are here recorded.

1. Into a gasometer, the capacity of which is 16,750 cubic centimetres, and which was filled with air, there were introduced 83.75 cubic centimetres CO, so that the air contained 0.5 per cent of the gas. The mixture was allowed to stand about 20 hours to secure thorough mixture of the gases; 10 litres of the mixture were now passed through the Hempel funnel, in which a mouse was placed. In five minutes the mouse appeared to show symptoms of poisoning, and in half an hour it could hardly move. The spectrum of CO was very distinct. The time occupied in the passage of the 10 litres of air was two hours.

2. In the same gasometer as that used in the first experiment, 33.52 cubic centimetres of CO were introduced with air, the mixture thus containing 0.2 per cent CO. In other respects the two experiments were identical. The mouse was plainly affected. The blood spectrum gave unmistakable evidence of the presence of CO.

3. Ten cubic centimetres CO in gasometer mixture contained 0.06 per cent CO. Time, 2½ hours. Volume of gas, 15 litres. CO spectrum easily recognized, particularly by comparing the blood with that of a mouse unaffected by the gas.

4. Air contained 0.05 per cent CO. Time, 3 hours. Volume of gas, 14.5 litres. CO spectrum recognized.

5. Air contained 0.04 per cent CO. Time, 2½ hours. Volume of gas, 14.5 litres. CO spectrum recognized, but weak.

While the experiments thus briefly described will serve to give an idea of the character of our preliminary work, it should be mentioned that each one of the experiments was repeated a number of times with the object of thoroughly accustoming our eyes to the characteristic features of the carbonic oxide spectrum. These repetitions were especially desirable in the last experiments, involving the smallest quantities of the gas. At first we were unable to detect 0.05 per cent with any degree of certainty, but after considerable practice with small quantities we had no difficulty in detecting 0.04 per cent.

This is less than the lowest limit mentioned by Hempel, viz., 0.05 per cent, but there can be no doubt in regard to the accuracy of this statement. The experiments with 0.04 per cent were frequently repeated, and we subjected ourselves to such conditions as to make self-deception impossible. Several specimens were prepared by my assistant, some of them being affected with carbonic oxide, and the rest not; without any knowledge in regard to the nature of the different specimens, they were examined by me, and, after the necessary practice, those which were contaminated with carbonic oxide were detected unerringly. The same process was then reversed. I prepared the specimens, and my assistant detected those which contained the carbonic oxide as readily as I had done. Having thus trained ourselves for the work with this method, and being thoroughly convinced that we can detect carbonic oxide in air when it is present to the extent of 0.04 per cent, or 4 parts in 10,000, it remained to examine the other methods for which great delicacy has been claimed.

By agitating 10 cubic centimetres of blood from five to seven times, each time with about 6 litres of the air to be examined, heating the blood to 90-95 degrees, and passing a current of air through it, and then through an aqueous solution of palladium chloride containing 1 part of the chloride to 50 of water, S. von Fodor claims to be able to detect the presence of 0.5 part of carbonic oxide in 10,000 of air. By this method he claims to have detected carbonic oxide in the blood of rabbits which had been kept for some time in an atmosphere containing only 0.4 part of the gas in 10,000 of air. He also recommends the use of test papers, prepared by moistening fine filter paper with a 0.2 per cent solution of palladium chloride, and states that if the air contains $\frac{1}{10000}$ of carbonic oxide, the paper becomes covered with a black film in a few seconds; if $\frac{1}{100000}$, the change is effected in 2 to 4 hours; if $\frac{1}{200000}$, in 12 to 24 hours.

The difficulty with this test has already been pointed out. Other substances beside carbonic oxide exert a reducing action on palladium chloride, and the separation of minute quantities of palladium can scarcely be regarded as furnishing very strong evidence of the presence of the gas. I have made a number of trials with this method of von Fodor, but I have not been able to get results as good as those described by him, nor as good as those which I could easily get by using Hempel's method. It may be that in my experiments some essential conditions were not fulfilled, but, at all events, the fact remains that, striving earnestly to give the method a fair trial, I could not finally accept it, and I certainly cannot indorse the statements of von Fodor concerning it.

The same writer claims, further, that the color reactions of blood containing carbonic oxide are better adapted to the detection of the gas than the spectroscope. He recommends that the blood be shaken with ammonium sulphide in a test tube, and then examined by transmitted light. If it contains carbonic oxide, it appears red; if not, it is turned violet. This difference in color is said to be recognizable when the blood has stood in a flask of 10 litres capacity in contact with air containing 0.05 per cent carbonic oxide. I examined this method carefully, but soon became convinced that it possessed no advantages over the Hempel method, and the results seemed always to be less reliable. While I never failed to detect 0.04 per cent of the gas by the latter method, 0.05 per cent was the least that I could detect by means of the color reactions, and I found that the opinion of neither my assistant nor myself could be relied on when it was based solely on an examination by this latter method.

As a result of the work thus far described, then, it will be seen that there is a method the indications of which are unmistakable, and which renders it possible to detect the presence of 0.04 per cent of carbonic oxide air.

Armed with this method, the next step in the investigation was, of course, to apply the method to the examination of the air of such buildings as seemed to be most suspicious. The indiscriminate examination of buildings without previous careful inquiry in regard to the condition and character of the heating apparatus used in them was not desirable. It seemed best to inquire first of those most likely to be informed in regard to the condition of furnaces in various public and private buildings in this city. Accordingly, a number of the city officials, including the health commissioner, fire commissioners, and others, and several of the leading manufacturers of furnaces and stoves, were visited and asked for the desired information. My thanks are due to all these, who so readily responded to the questions asked. Much valuable information was gathered in this way. It is unnecessary to go into details in regard to the places which we selected for examination. Suffice it to say that from first to last the air in a comparatively large number of rooms was examined. Whenever a particularly bad furnace was heard of, mice were stationed in the immediate vicinity of the hot-air flues connecting with it. If any special complaint was heard regarding bad air supposed to be caused by a furnace or a stove, mice were put on the scent. It is believed that in some of the places examined there were as bad furnaces as could well be found anywhere. Not infrequently the disagreeable "close" character of the air was very striking. In short, it is believed that the examination was as thorough as it is possible to make it. The result of the examination is simply this: that carbonic oxide was not detected in a single case, and the conclusion is justified that in rooms heated by cast-iron stoves and furnaces there is not present in the immediate vicinity of the hot-air flues as much as 0.04 per cent of carbonic oxide.

This result is in accordance with those reached by Vogel, by Gott-

schalk, and by Wolffhügel, referred to in the earlier part of the report, and cannot be disregarded in any future discussion of the question under consideration.

Another question remains to be answered, and that is, whether carbonic oxide in smaller quantities than those which can be detected by Hempel's method may not be present. There is not, however, any reliable method for detecting smaller quantities, so that the question is as yet unanswerable. It is also very difficult to decide whether such small quantities of the gas are injurious to health or not. I have not undertaken any experiments on this point. Those who have discussed it differ in their opinions.

H. Vogel thinks that any quantity of carbonic oxide which cannot be detected by his original method cannot be dangerous. He says: "When the air of a room containing a very small quantity of carbonic oxide has not the power to react on the very dilute blood used, this air also has no power to poison the much more concentrated blood of the human lungs. The large quantity of oxygen acts as a natural antidote, and I consider the presence of smaller quantities of carbonic oxide in the air than 2.5 parts per thousand as decidedly not injurious. Indeed, it is possible that the human organism may be able to endure even a larger quantity, for it is a fact that in tobacco smoke, which is inhaled by millions, carbonic oxide can be easily detected by means of the blood test, and, judging by the strength of the reaction, the gas is present in the smoke in larger quantity than 2.5 parts per thousand. It is probable that the harmfulness of small quantities of carbonic oxide has been over-estimated."

Wolffhügel accepts Vogel's view, and suggests this guide for sanitarians, — that as long as air does not contain enough carbonic oxide to be detected by Vogel's test (that is, 2.5 parts per 1,000), it may be regarded as uninjurious.

On the other hand, von Fodor takes quite a different view of the matter. According to his experiments, when air contains 4 parts of the gas in 1,000, rabbits become unconscious in it in 4 hours; if 3 parts are present the effect is reached in 24 hours, and even with 1.3 parts decided symptoms are produced when the air acts for several days on the organism. But man is more sensitive to the action of carbonic oxide than animals, as Friedberg has shown in his treatise, "Vergiftung durch Kohlendunst" (Berlin, 1866), and as follows from the fact that animals easily recover from unconsciousness, whereas human beings usually die if they once lose consciousness. . . . Further experiments with rabbits showed that even 0.5 part per 1,000 of carbonic oxide causes difficulty in breathing; the animals staggered and took no food, and were sleepy when the quantity of gas was reduced to 0.25 part, so that in this dilution it must be regarded as injurious to health. The views of von Fodor may be summed up briefly, thus: As 1.5 parts of carbonic oxide per 1,000 of air are dangerous to health, 0.5 part, when inhaled for considerable time, is injurious, and 0.04 part is not without influence, it is desirable that the heating-apparatus and gas-pipes in public institutions and private dwellings should be examined with reference to the question whether they permit carbonic oxide to enter into the air used for breathing.

To decide between these widely differing opinions is not part of the work which I originally had in mind. It does not, indeed, belong to a chemist to deal with such matters. The only point I would make in this connection is that it is better to err on the safe side, if err we must. If carbonic oxide can be detected by any method in the smallest quantities in the air to be used by human beings, measures should be taken to prevent its further presence.

The cases thus far experimented upon are such as were actually met with in occupied buildings. While the uniformly negative results made it appear probable that experiments with any specially constructed stoves would also yield negative results, I thought it desirable before closing the investigation to test the matter somewhat further. Through the kindness of Messrs. Hutchinson & Bros., manufacturers of furnaces in this city, I was furnished with a stove of peculiar construction for the purpose of further experiments.

Since the investigation of the French commission, in which a cast-iron stove was used, no experiments except those of Wolffhügel have been made on stoves specially constructed for the purpose of determining whether carbonic oxide passes through cast-iron heated to redness or not. As the method of detection used by the French commission is not infallible, and as that used by Wolffhügel is not as delicate as the one used in this investigation, it was thought that possibly the use of the more delicate method might show that the gas really does pass through, as stated by the French commission, though denied by Wolffhügel. Two kinds of experiments were performed: 1. Those in which the air examined was drawn from the top of the stove consisting of cast-iron heated to redness; and, 2. Those in which the air was taken from a space on the side of the stove in direct contact with the hot coal.

The stove used is a simple cylinder of wrought-iron, about two feet high and one and a half in diameter. It is so arranged that it can be filled with coal, and the supply of air regulated with ease. The top is a piece of cast-iron carefully fitted to the cylinder by an airtight joint. At the side of the cylinder is a space about six inches square, furnished with carefully made grooves, into which plates of cast-iron of different thicknesses may be placed, and fitted in airtight, if necessary, with luting.

Experiment 1. The stove was heated to as high a temperature as possible, so that the top of cast-iron was nearly all white-hot. The temperature was kept about the same throughout the experiment, the dampers being closed the greater part of the time. A metallic

funnel was brought down close to the hot plate; this was connected by rubber tubing with a glass U-tube placed in water for the purpose of cooling the air; then connection was made with the double funnel containing the mouse, and by means of an aspirator, air was slowly drawn through the whole system. Twenty litres were drawn through in one and a quarter hours. The mouse was killed and the blood immediately examined, but the spectroscope failed to reveal the presence of any carbonic oxide.

Experiment 2. The same stove was used as in the last experiment, but a piece of cast-iron three-eighths inch in thickness was introduced so as to form part of the side of the stove. The coal in the stove was above the top of the cast-iron plate, and the plate was kept considerably above red-heat during the experiment. The funnel was applied to this place and the experiment was, in other respects, conducted the same as the last one. No evidence of the presence of carbonic oxide was obtained.

Experiment 3. Same as Experiment 2, except that the cast-iron plate used was thinner, being from one-fourth to one-eighth inch thick. The space from which the air was drawn was white-hot. No carbonic oxide found. Special precautions were taken to prevent the mouse from breathing fresh air in the brief interval from the time the passage of air was stopped until the mouse was killed, which was, of course, as soon as possible. On stopping the aspirator, both ends of the Hempel funnel were closed; one end was then connected with the hydrant and the air displaced by water.

Experiment 4. Same as Experiments 2 and 3. The plate in this case was one-sixteenth of an inch in thickness. No carbonic oxide found.

All these experiments then, it will be seen, give negative results, and show that under apparently the most favorable conditions not as much as 0.04 per cent of carbonic oxide passes through heated cast-iron.

In view of the accumulating mass of testimony, of which this report furnishes a part, against the correctness of the conclusion first authoritatively stated by the French commission, it appears to be highly desirable that the work of the commission should be repeated, account being taken of the influence of the possible sources of error to which attention was called in the first part of the report. The work would be tedious and would require the greatest possible care, but the importance of the question involved would justify the necessary expenditure of time. If this work were repeated it might be possible to discover what the real cause of the bad effects of furnace air is.

In conclusion, I will only say that, in view of the results reached in these experiments and those of some earlier experimenters which have been referred to, the confident references to carbonic oxide as a source of danger to health in rooms heated by hot-air furnaces and cast-iron stoves, which we so frequently hear, certainly should be modified to accord with what is actually known. The hypothesis is perhaps justifiable that carbonic oxide is present in such rooms, but not that it is present in quantities as great as 0.04 per cent; and it remains to be shown whether such minute quantities of the gas, if present, can act injuriously on the health of those who breathe it.

THE ILLUSTRATIONS.

WESTERN NATIONAL BANK BUILDING, BALTIMORE, MD. MR. C. L. CARSON, ARCHITECT, BALTIMORE, MD.

This design was selected in competition. The building will measure 50' x 90', and will be fire-proof.

PROPOSED DOUBLE COTTAGES FOR C. P. CLARK, ESQ., NEWTON CENTRE, MASS. MR. C. A. RICH, ARCHITECT, NEW YORK, N. Y.

SCOTTISH SKETCHES BY MR. J. W. SMALL, F. S. A. SCOT.: — OLD CUSTOM-HOUSE, DUNDEE; MANOR HOUSE, CRAIG ROUSTON.

THE FARRAGUT MONUMENT, NEW YORK, N. Y. MR. AUGUSTUS ST. GAUDENS, SCULPTOR, AND MR. STANFORD WHITE, ARCHITECT, NEW YORK, N. Y.

[Gelatine Print.]

For description see elsewhere in this issue.

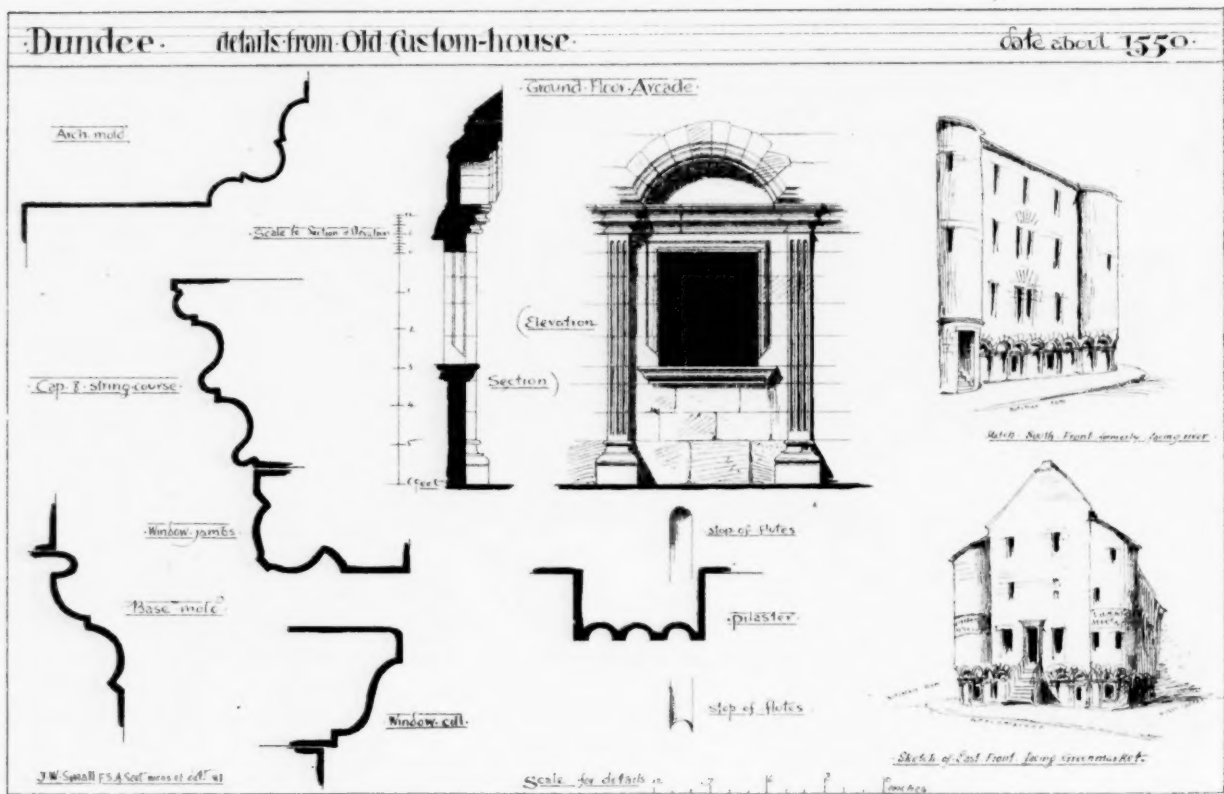
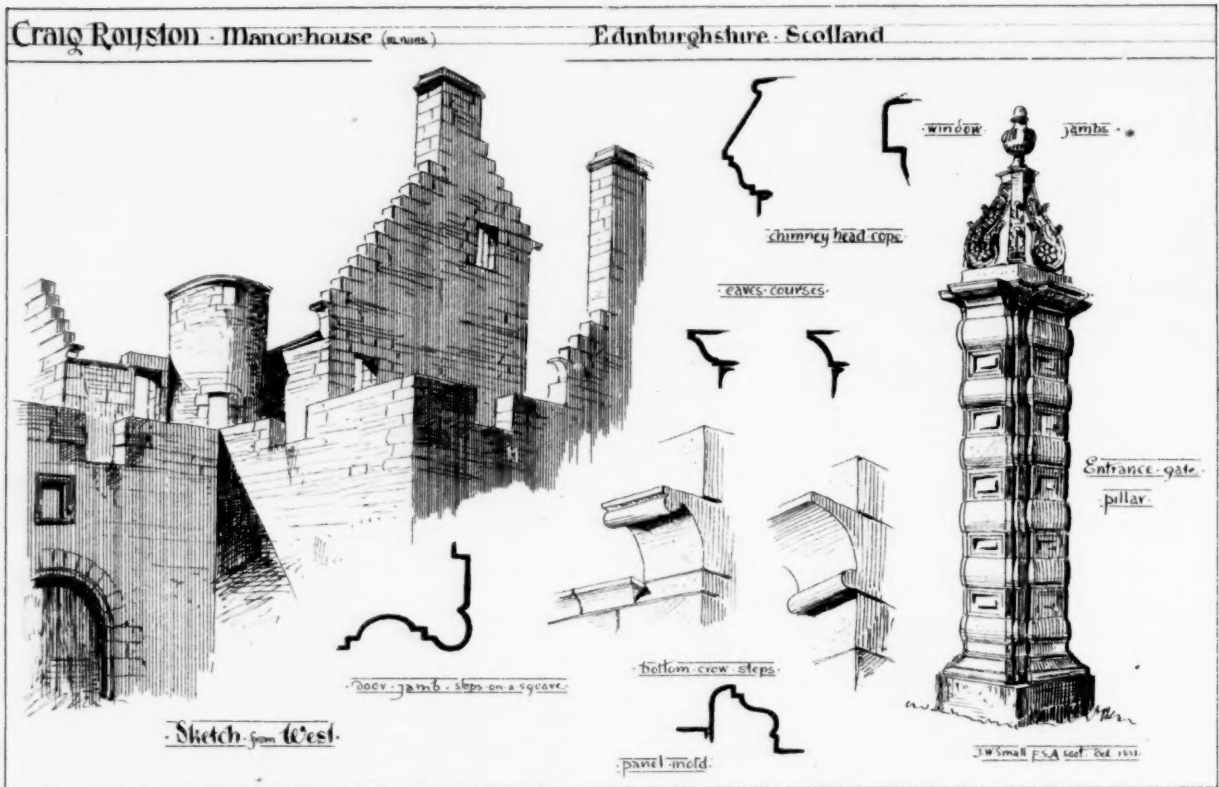
ARCHITECTS' CHARGES.

AN arbitration case [English], which involved several important points as affecting architects' charges, was concluded at the Institution of Surveyors on Friday, the 5th ult., after having occupied two days. The claimant, Mr. Paraire, sought to recover £3,000 for preparing plans, obtaining an estimate for the Alcazar, Leicester Square, and for negotiating for financing the company.

Mr. Glynn was counsel for the claimant. Mr. Winch and Mr. A. Ward appeared for the Alcazar Company. Mr. John Whicheard, past-president of the Royal Institute of Architects, is the arbitrator.

Mr. Paraire stated the nature of the work done, and Mr. Allbutt, a financier, described the progress which was made in financing the company when the building project was abandoned. The nature of the case will be gathered from the counsel's speeches. It was agreed not to call any architects as witnesses to the custom of the profession, the arbitrator himself being pre-eminently qualified to judge upon points of practice and the reasonableness of the charges. Mr. Glynn, however, read a letter from Mr. Cates, who was unable to be present, stating that he considered the amount claimed by Mr. Paraire to be fair and reasonable; and though the urgency of the

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PROPOSED DOUBLE COTTAGE

For Chas P Clark New

CHAS ALONSO



..COTTAGES..

Mark Nelson Center..

S. Alonzo Rich. ARCHITECT.

company prevented the completion of the work, it involved more cost to Mr. Paraire than if it had been carried out in the usual way. The object was to obtain a *bonâ fide* tender, and that Mr. Paraire procured, and his claim to remuneration for it seemed perfectly clear. Mr. Glynn further stated that he should have called Professor Roger Smith, whose evidence would have been to the same effect.

Mr. Ward said his evidence would, on the contrary, have been that these charges were four times too much.

Mr. Glynn remarked that Professor Smith took two and a half per cent, instead of three per cent; and he had the Professor and another architect present to prove the facts, but he agreed to leave it in the arbitrator's hands without calling them; but he wished to say that the evidence he could tender would have struck him with astonishment.

Mr. Whichcord said he should feel perfectly at liberty to call upon any one of the witnesses on either side to come to him afterwards if he thought it necessary.

The counsel on both sides agreed that this might be done.

Mr. Glynn called the surveyor who took out the quantities.

Mr. Stephen B. Wilson, surveyor, 27 Walbrook, stated that he prepared the quantities as produced for the purpose of obtaining a builder's estimate. He himself prepared an estimate. It was an approximate sum arrived at by comparing this with other similar buildings. Mr. Paraire gave him the drawings which had been put in, and likewise attended him to explain the way in which he wished the works to be done. The quantities were not taken out in detail. He had previously made an estimate for the Holborn, and also for the Horseshoe. He took generally the quantities for the brickwork, the slating, the floors, and the main items; and he made a comparison between these and the other buildings which he had named. He took the cube of the several buildings, and then he added to or deducted from it, as the case might be. He formed that into a bill, and the result was the estimate now produced, £65,000, and a builder subsequently accepted that price. He communicated with Messrs. Green & King, builders, and saw one of them at Mr. Blair's, and explained the way in which he arrived at the estimate. After they had gone into the particulars, Mr. King said he should be happy to give a tender if witness would write him a letter naming the approximate quantities. He wrote a letter to the firm on the 7th of January, 1879.

Mr. Ward remarked that that letter was not strictly evidence, but he should not object to it if the arbitrator wished it to be put in.

The arbitrator observed that Messrs. Green & King were a link in the chain, and he thought it was quite relevant to ascertain what took place between them and this witness.

Witness stated that he took the superficial quantities of the roofs, floors, and galleries, and he deduced the prices from the other buildings. The letter of the 7th of January was then put in. In it he wrote, "I approximately estimate the structural cost as follows:" and then gave the details. Messrs. Green & King in their reply said,—"After going into the probable cost we are of opinion that the structure can be built for the sum of £65,000."

Mr. Ward.—Is the witness not suing the company for the value of his work in preparing these estimates?

Witness.—I am.

Mr. Ward.—Then we shall in all probability meet again upon that question.

Examination continued.—He afterwards prepared a schedule of prices. The schedule was put in, and was dated September, 1879. He consulted Mr. Paraire in the ordinary way. He afterwards attended before the directors with that schedule of prices, and they were approved of generally. They went through them item by item, and Mr. Wingfield, one of the directors, said he knew as much about building and the price of a rod of brickwork as any one in London.

Mr. Glynn intimated that that concluded the case for the claimant, and before proceeding to sum up the evidence, he remarked that though his learned friend, Mr. Ward, seemed to think that in the course of the hearing he had cast some reflections on the directors of the company, nothing was really farther from his thoughts, and he unconditionally withdrew anything that could be so construed. There was a noble lord on the board, and he was rather anxious to know what learned lords know about these things; and, of course, the directors looked after their fees; but that was only what everybody did after having done his work. Mr. Paraire, in working for this company, had a great many masters, and he appeared to have done his work to the satisfaction of most of them; and it was important to notice what they wished to be done and what they determined to build. Mr. Paraire was appointed the architect by resolution, and in pursuance of that resolution he did this work. There were certain preliminary services, which were not part of the work of the architect, and for these he claimed £52 10s. This included a structural plan, which, by his advice, was put upon the prospectus of the company; and also charges for attendance at several of the directors' meetings. For all such preliminary services it was well known that the solicitors, the surveyors, the directors, and the promoters, expected to be paid fairly, and more than fairly, because it was disagreeable work, and it was uncertain whether the company would float. The claim in connection with the application for a license was virtually admitted. The next item was £1,625, being two and a half per cent on the tender of £65,000, which Messrs. Green & King said they were prepared to give. He did not care whether the arbitrator

was of opinion that they were prepared to carry that out or not. Mr. Cates and all the witnesses were of opinion that it did not make any difference, as regarded the quantities, whether the tender was accepted or not. Mr. Paraire had done his work, and was entitled to the scale of payment laid down by the Institute of Architects. If the directors had not got a tender, it was their fault. They had chosen to form a ground-rent, and not build the Alcazar at all; but they could not avail themselves of that to refuse to pay these charges. It was exactly the same as an ordinary case of selling property. If you bring buyer and seller together, and the seller then said: "I will employ you no longer; I will not sell," the person who introduced the buyer to the seller is entitled to his commission. They were dealing with professional gentlemen, whose charges were not to be measured in the way that the Alcazar Company seemed to think they should be measured. It was not a mere question of time, as with a cabman, nor of the cost of paper, paint, or pencils. He was entitled to fair remuneration, according to the recognized scale in the profession, and that amounted to £1,625. The next item was £325 for getting the builders' tender. Mr. Paraire was instructed by the board to assist in preparing the quantities which it was desired to get out in a great hurry. For these services, which had nothing to do with the other work, he charged according to scale, and there was no evidence impugning the character of the claim. The only other item in dispute was £680, for obtaining the necessary capital. Mr. Paraire stated that he had bargained with the directors that for financing the company he was to receive one and a fourth per cent on the amount required for the building, and that he succeeded was not refuted, though Mr. Allbutt was cross-examined for two hours and a half. There was a resolution of the company showing that the directors very well knew he was endeavoring to get the money, and if he had not been able to get it he was entitled to fair remuneration for the work he did. But his contention was that he did get it. Mr. Allbutt, a financier engaged by Messrs. Bolton & Co., for the purpose of carrying this matter out, stated that he was prepared to provide the money if the Alcazar Company had gone on; and Mr. Paraire having introduced Messrs. Bolton & Co. to the directors was entitled to his commission of one and a fourth per cent. Mr. Paraire had been kept out of his money for a very considerable time, and he claimed interest, which the arbitrator was entitled to give on the amount which he might award. The very small sum of £1,500 was ordered to be paid into court by the master, and the defendant would have to pay interest upon that as well as on the amount that was due, because it was only paid into court as security for the claim, and they would otherwise not have been entitled to bring this action at all. In conclusion, Mr. Glynn thanked the arbitrator for the very great attention he had given to this matter, and for his kindness in consulting the convenience of the counsel engaged.

Mr. Winch, replying on behalf of the Alcazar Company, stated that when the directors had this bill before them, they consulted gentlemen of Mr. Paraire's own profession, and obtained from them a decided opinion that it was four times as much as it ought to be, and therefore they were bound to dispute it. But that they did not wish to do so unfairly was shown by their agreeing to send it to one who stood at the top of Mr. Paraire's own profession to be decided. There were twenty guineas for services before the company was formed, about which he would not trouble. Then there were thirty-six guineas for the large colored elevation, which was before them, as to which the arbitrator could form an opinion. The substantial part or claim was the percentages. Now, two and a half per cent, if justifiable at all, was justified upon the basis of a document very well known,—the professional charges,—which said that if an architect had drawn out plans complete, with elevations, sections, and specifications, the charge was two and a half per cent commission upon the estimated cost, and if he had procured tenders the charge was one-half per cent extra. But Mr. Paraire's own evidence showed that he had not brought himself within that rule. There was no specification, or drawings, and no plan of the roof. Therefore the claim must fall back upon work and labor. Of course, as the arbitrator had intimated, if a man was asked to design a building, and by a stroke of genius immediately sketched off the key-note of the whole thing, it might be worth £1,000, but that was a gift which ordinary men did not possess. If, however, the arbitrator saw in this design an unusual display of genius, by all means the claimant must have a due sum for it. He would take Mr. Paraire's own figures (£5 a day) for his ordinary work. Allowing these plans to have taken eight weeks, and including Sundays, it would give £280. The addition to be made for genius he would leave to the arbitrator, merely remarking that it was a building which was not put up, and did not succeed. The design was not so brilliant as to induce the public to come forward and subscribe £65,000. He did not say that a man who had to use his brains should only be paid for mere mechanical labor; but he should be very much astonished if the arbitrator put the value on the plaintiff's brains in preparing these plans at £1,400. Then as to the claim for £325. That was put in the summary account as one-half per cent for getting a tender; but as his friend, Mr. Glynn, could not argue that there was a tender here, it was now put on the ground that Mr. Paraire was obliged to give the surveyor an immense amount of assistance in order that he might be able to get out the quantities. But if he did, it was all thrown away, as the surveyor did not pay much attention to it. He squared the floors and the roof, and then got hold of another plan to

compare the figures with, and said that was near enough. Messrs. Green & King's letter was no tender, but simply an expression of opinion that the work could be done for a certain sum. It was an estimate obtained to put before the shareholders to give them some sort of opinion what the building would cost, and that some sort of opinion was £65,000; but whether it could be erected for that was very shadowy. They would agree to do it at Laxton's prices, and well they might, seeing that they were tip-top prices, and tenders were always a percentage under them. In giving the surveyor his assistance, Mr. Paraire was occupied five or six days, and surely this was mechanical work, to be paid for at his own valuation, £5 a day. Then came the last item, £680, for financing, and the question was whether the plaintiff did find anybody who was willing to advance the money. Now, Mr. Allbutt's offer was that he was prepared at once to proceed with the building, provided the undertaking was handed over for reconstruction, three directors nominated by the company to take seats on the reconstructed board along with three appointed by the capitalists, but no liability could be entertained beyond a mortgage of £30,000. The directors would have accepted even this modified contrast conditionally on having £5,000 down, but the parties could not agree. He therefore submitted that Mr. Paraire had entirely failed to obtain the £65,000, or an offer of it. Where a man had made a specific contract of this sort, he either got all his commission or nothing; but the directors did not wish him to be without remuneration, and would give him £5 a day for the time he was engaged in the matter. The company, he was glad to say, were well able to pay whatever might be awarded, but the directors felt they were not justified in drawing a check for this £3,000, and they had adopted the only course a body of gentlemen ought to do, by submitting it to arbitration.

This terminated the proceedings, the arbitrator taking time to consider his award, and, if necessary, to consult professional gentlemen named by either side.

DRAINING A BOG.

THE following account of draining a bog in Holland was furnished the *Times* of London by a local correspondent:—My steps were directed to the well-known reclaimed estate of Mr. Nering-Bölger, called Principell, about two miles from the little station of Mill, on the Bostel-Wesel Railway. I had been promised by a mutual friend a hearty welcome, for our enterprising Amsterdam merchant is proud of the success of his farming experiment, and is pleased to show to any one who takes an interest in what he has accomplished. I, therefore, was cordially invited to thoroughly inspect the estate, which I did, and afterward I passed the evening with Mr. Nering in his study, and found him quite frank and communicative as to all his methods, manures, crops, and profits. I cannot say losses, except in the case of his swine, which had been attacked with fever, and had had to be killed off.

The entire estate is of 1,500 acres, and cost Mr. Nering £10,000 about twelve years ago, he having paid that sum for it when in the original bog state to the community of Mill. Mr. Nering, in the mean time, went over to North Germany and studied the methods of reclaiming bog lands as followed at or near Osnabrück and Arenberg-Meppen, and other places, and after a careful study of those methods returned home, determined to make the experiment on a bold scale. Bold it certainly was, for in addition to his £10,000 paid down as purchase-money of 1,500 acres of a treeless waste of bog, it cost him £12,000 more in draining, labor, manures, and putting up the requisite farm-buildings, including his own residence. As Mr. Nering truly told the writer, those in Holland who have the money will not enter upon experiments of this kind, and those who have not the money cannot.

The general plan of the estate has been to select 1,000 acres for reclamation, which has been done, while the remaining 500 acres are left for future operations, when Mr. Nering's convenience may permit. In the mean time he prefers to wait the result of his 1,000 acres and the experience he will gain year by year before he attempts to reclaim the remaining 500, which will also supply him with fuel for himself, and the fifty men or so who work the farm for him. Mr. Nering commenced operations about eight years ago, by cutting suitable ditches and roads, all in parallelogram form, thus dividing the 1,000 acres into four divisions of about 250 acres each, and each division again subdivided into suitable plots for drainage and cultivation purposes. For each of the four principal divisions Mr. Nering built a suitable farm and outbuildings for stock, etc., and over each division he appoints a farmer, who is put upon his mettle by being made a kind of partner, his remuneration depending entirely upon the results of the land under his care. The whole estate is closely supervised by Mr. Nering himself, assisted by an intendant or bailiff. I, of course, could not see more than the springing crops which, however, seemed quite as backward as in England, many of the fields of oats and maize especially having only just been sown; but the cattle were in capital condition, and Mr. Nering seems inclined to devote himself largely to stock for the development of his estate and for present and ultimate profit. The manure of the beasts is, of course, all used in the cultivation of the land, and as the stock increases, Mr. Nering is enabled to do with less of some of the chemical manures with which he began the experiment after the methods of the Osnabrück and North German school of waste-land reclamation. The land yields capital pasture of grass and clover.

This brings me to the main point of the experiment—viz., the use of chemical manures, which is a method that has only been practicable since the great potash deposit discoveries in the Stassfurth district and Anhalt duchy some dozen years ago, or rather more. Prior to those remarkable discoveries of potash salts in various combinations, the supply of this fertilizing material was limited to costly methods and sources, which made the article too dear for agricultural purposes of this kind, and this discovery may truly be said to have come in time to revolutionize the agricultural procedure in the reclamation of bog land. The method pursued is to dig broad ditches, to drain and to divide the bog into suitable plots, and at the same time to supply the requisite amount of sub-sand to put an even layer of four or five inches in thickness on the neighboring plot of bog land. Mr. Nering then spreads upon the sand after a slight working of it his mineral manures in the following proportions,—viz., of kainit, which is a double sulphate of potassium and magnesium, about 240 pounds per statute acre, which costs 5s. for 200 pounds, including carriage from Stassfurth. He also uses about 80 pounds of nitrate of soda per acre, which costs him about 30s. for 200 pounds, and then he uses a fair proportion of the more costly, but necessary, phosphate of lime, which he makes himself by first buying bones at about £4 to £5 per ton, and mixing them with sulphuric acid.

Mr. Nering uses large quantities of his farm-yard manure, and finds it better to put the farm-yard manure separately on his land, because of the difficulty of evenly mixing it with the mineral manures. These latter he therefore applies as guano is sometimes or generally applied,—i. e., by scattering it with the hand, thereby insuring a tolerably even distribution. He has experimented with various quantities of the kainit per acre, having used as much as 400 pounds per acre; but as he did not find any proportionate advantage, he of course now restricts himself to supplying only 240 pounds per acre. Mr. Nering suspects that the potash and nitrate soon pass away, from their soluble nature, into the drains, and so into the river. Notwithstanding this, he is amply satisfied with the profitable results of his experiments, which have shown a steady four to five to six per cent on his capital outlay per annum since 1875, although the latter seasons have not been propitious in Holland any more than in the British isle.

In a recent pamphlet Mr. Nering's example is cited as a notable example of the North German and Dutch method of bog reclamation, and the assertion is made that Mr. Nering had realized in one year (1875) a net profit of twenty-two per cent on his outlay. I took the opportunity of calling Mr. Nering's attention to this statement, asking if it were really true, and he at once declared that he had never realized more than the modest four or five or six per cent I mentioned before.

Any way, the truth is that Mr. Nering's experiment is a substantial success, and it is well that the error just mentioned has been discovered and rectified at a moment when the Irish land question is to the front, and when, no doubt, vast sums of the public money will be asked for and probably voted for reclamation of bogs in Ireland. It is of the first importance, therefore, that the facts should be known, both in the interests of the Irish and the other nations forming the British Isles. I especially put the question to Mr. Nering as to his opinion of the conditions requisite to a bog being reclaimable, and yielding a reasonable profitable return. He distinctly gave his opinion that the first requisite is that the land can be drained successfully, and the second that the bog is not deeper than five feet, or six feet at the outside; further, that it should rest on sand or on marl, but not on stiff yellow clay; the marl, to be spread on the surface of the bog, would weather and fall under the frosts and rains, and would, like the sand, give the requisite top-dressing upon which the chemical manures could be spread. But if the bog is more than five or six feet deep, it must be pared down to that depth before there can be a reasonable prospect of profitable reclamation, and if that can be done and the water can be drained away, the experiment, properly conducted, must be a success. Mr. Nering's land is, in fact, a mere skin of turf or bog of from one foot to certainly not more than three feet in depth, and probably not averaging more than two feet, and this rests on a hungry sand such as might have been left on the shore of an estuary.

THE OLD AQUEDUCTS OF PARIS.

THERE have been three aqueducts erected in succession at Arcueil, over the valley of the Bièvre: the first between the years 292 and 300, by Constantius Chlorus, to supply the baths of his palace of Thermes with spring-water; the second, between 1613 and 1624, by the architect Brosse, at the order of Queen Marie de Medicis, chiefly for the needs of her new palace of Luxembourg; and the third, between 1868 and 1875, by the engineer Belgrand, to furnish Parisians with spring-water of wonderful purity, gathered up at Champagne and led forty leagues for the well-being of the citizens. The last one—the gigantic aqueduct of La Vanne—follows so nearly the course of the old aqueducts of Arcueil that the digging necessary for its construction brought to light the subterranean ruins of the Roman aqueduct, which was destroyed in the ninth century by the Northmen. It extended farther than the present aqueduct, which has its source at Rungis, and it has been traced as far as Chilly-Mazarin; and between Wissous and Rungis it has been found that there existed a man-hole at the place of union of the feeders from whence the principal aqueduct started. As for the Arcueil aque-

duct, it is just as Brosse constructed it, and although the water furnished by it is to-day of small consequence in the immense consumption of Paris, it is none the less curious to visit. To examine it properly, one should begin at its origin at Rungis; from whence it is possible to walk through its subterranean course as far as the arches of Arcueil, or even up to the fortifications. A unique thing to be seen at Arcueil is the collection of remarkable edifices of six different epochs, situated at a few steps from each other. Here the aqueduct of Marie de Medicis ceases to be subterranean and crosses the valley on arches, and this monument is the Arcueil aqueduct, properly so called. Upon this old structure of large quarried stones, erected by Brosse, Belgrand superposed the aqueduct of La Vanne of gritstone and cement. Immediately in front of the two central arches of the aqueduct of Louis XIII., there is still standing the face of a wall of the Roman aqueduct made of small dressed stones and courses of bricks. Between these ancient structures is partially set, in a small façade of the time of Henri II., of which only a portion can be seen, an elegant gate opening under an arch of the seventeenth-century structure. The general aspect is extraordinary. Brosse's aqueduct is 1,245 feet in length, and has twenty-four arches, — ten of them open, and 60 feet in height above the Bièvre. Belgrand's aqueduct, which surmounts it, is 3,245 feet long, and has seventy-seven arches, and its total height above the same stream is 120 feet.

Belgrand in building the arches of the La Vanne aqueduct over those of Arcueil, in 1869, made two curious discoveries. At about seventy feet beyond the last man-hole of the aqueduct, he found, under the foundations of the structure of Marie de Medicis, the Roman culvert of béton, in a perfect state of preservation, crossing the aqueduct at a right angle, so that, at this point, three aqueducts — La Vanne, Arcueil, and Constantius Chlorus's — are actually superposed perpendicularly. In 1788, the engineer De Fer undertook the construction of a canal which, wherever it crossed private property, became a covered aqueduct. This was to have led to Paris a portion of the waters of the Bièvre, which were stored up at Amblainvilliers; but the work on it was forever suspended during the succeeding year. At some feet beyond man-hole number 14, at the point where the Medicis aqueduct enters the ground, Belgrand found, on private property, and in juxtaposition with the Medicis conduit, De Fer's covered aqueduct, so that, including La Vanne, three aqueducts are still united, and within a space of less than one hundred and fifty feet, four of them are found.

The waters of the La Vanne aqueduct are carried over the arcade in an enormous cylindrical conduit of béton, having an inside diameter of seven feet, and which, kept constantly full, discharges a hundred thousand cubic metres of water into Paris every day. The Arcueil aqueduct (the portion of which between the fortifications and the Observatory has been removed, and replaced by a cast-iron conduit) is now of secondary importance, and discharges its waters into the Pantheon reservoir, where they mix with the waters of the Seine. — *The Building News*.

TEXT-BOOKS ON ACOUSTICS.

IN an article on "Acoustics in Architecture," published in *Van Nostrand's Engineering Magazine* for September, Mr. A. F. Oakey gives the following list of text-books on acoustics, those works marked with an asterisk best covering, in his opinion, the ground for all theoretical and practical purposes:—

* "Sensations of Tone as a Physiological Basis for the Theory of Music," by Helmholtz. London translation.

"Sound." Sir John Herschel. London, 1849.

* "L'Institut, Journal des Academies," etc. Paris: Volumes for 1838-40; "Cours d'Acoustique." Savart.

"Précis Elementaire de Physique." Biot. Paris.

"Memoirs de la Société d'Arcueil." Vol. II. Biot, 1807.

"Cours de Physique," 7th edit. Pouillet. Paris, 1856.

* "Traité d'Acoustique." Chladni. Paris, 1809, and other works by Chladni in German.

* Papers contributed to the *Quarterly Journal of Science, Literature, and Art*, 1827-29.

"Journal of Royal Institution," 1830-31.

* "Proceedings of Royal Institution."

* "Reports of British Association;" all at London, by Wheatstone.

* "Annales de Chimie," etc., 1816; papers by Savart, Wertheim, Lissajoux and others.

Arnot's "Elements of Physics."

"Sound." Brewer. London, 1854.

* "Report on Waves." Meetings British Association, 1843-44. Scott Russell.

* "Acoustique et Optique des Salles de Réunions Publiques." Theo. Lachez. Paris, 1848.

"Observations on the Principles of a Design for a Theatre." Wyatt. London, 1811.

"On the Principles of Sound and their Application to the New Houses of Parliament." Webster, 1840.

"Observations on Sound." Matthews.

* Papers read before the Royal Institution of British Architects, in February, 1847. Scott Russell. See *Builder*, 1847, pages 82-118; *Building News*, 1858, November 26, December 3-10.

* "Description of a Parabolic Sounding-Board erected in Attercliff Church." Pamphlet. London, 1829, by Rev. John Blackburn, M. A.

Paper read before Architectural Association, by T. Roger Smith. See *Building News*, November 19, 1858. Another Paper by the same, before the Royal Institution British Architects, December, 1860. Printed in the "Transactions."

* "Acoustics in Relation to Architecture and Building. The Laws of Sound applied to the Arrangement of Buildings," by T. Roger Smith. New Edition. London: Virtue & Co., 26 Ivy Lane.

HYDRAULIC WORKS.

SOME very useful information will be found in Mr. Matheson's Aid-Book in reference to [English] pile-drivers, air-lock bells, cylinders of brickwork, etc., which may be of service to contractors and engineers. We therefore give the gist of some of the remarks on these heads, referring the reader to more comprehensive treatises for other details. The portability of pile-driving machines ought to be one of the chief considerations for those who are preparing for new works. They should be light and capable of easy adjustment, — as they have to be pushed forward on an overhanging stage, — but strong enough to lift piles into position. For very small works, "ringing machines" are chiefly used, the weight being lifted by a hand-rope and worked by single power, that is, there is only one multiplication of power. For every multiplication, the speed of course is reduced. The "telescope pile-driver" combines portability with strength, and drives diagonal as well as vertical piles. A "ringing machine" is often sufficient for driving the advance piles of a work, and it can be worked from a barge. On these piles a staging for a heavier machine can be constructed. In driving piles, accuracy is insured by attention to the pointing of the pile. Gauge piles for staging should have diamond-shaped points, that is, the pile should be tapered truly on all the four sides, so that the point should be true with the centre line of the pile. An unevenly-pointed pile can never be driven vertically. For sheet-piling the points are bevelled on one side so as to make them drive against the previous pile and make a close wall.

Pile-driving machines are generally from 35 to 40 feet high, and a manual machine has a base of about 8 feet square. With a fifteen-hundred-weight ram such a machine costs about £50 to £60. Steam machines cost, Mr. Matheson says, from £250 to £350, or about £50 less if the wood-work be omitted for export. These are usually 40 feet high, with a base of 8 to 10 feet square, and weigh 6 to 7 tons. "A heavy ram and moderate fall will often do more effective work than the same aggregate force with a lighter ram and greater fall. On the other hand, the energy of a heavy ram may be expended in crushing the pile instead of forcing it downwards," — a remark which the engineer will appreciate. To determine the weight and fall of ram, for a certain purpose, the size of pile and the timber it is made of, no less than the hardness of ground, must be considered. In contract for pile-driving it is better to specify a price per pile, and then a rate per foot of depth, as the staging is generally costly, and every foot driven adds to the expense. Air-lock bells are now frequently used in laying sub-aqueous structures, preparing foundations, etc. They are a kind of diving-bell, having a working chamber at the bottom, but open, and filled with compressed air, of force sufficient to hold back the water. From this open air-chamber a large cylinder ascends to above the surface of water, which also gives access to and means of exit from the air-chamber. In this tube, at a certain position, is the air-lock, with a door and air-cock at top and bottom, by means of which communication is made with either the air above or the compressed-air chamber below. The natural buoyancy of the air-lock bell enables it to be adjusted easily. The air-cylinder differs only from the air-lock bell inasmuch as it can be converted into a bridge pier and permanently retained. There is a working chamber, protected by an air-lock, in which the excavation is carried on to a good foundation. After this is accomplished, the chamber and cylinder above are filled with concrete, the air-lock is removed, and the cylinder remains as an iron column or pier. The cylinder is weighted down by iron or stone, or better, by filling up a portion of it internally all round with concrete or brickwork. The air-caisson is on a similar principle; the bed is excavated by means of an air-chamber, it is then filled up with concrete, and a solid pier of concrete or masonry is built upon it, the tube and air-lock being removed. One of the largest air-caissons was constructed for the foundations of the St. Louis bridge over the Mississippi, where the air-chamber was 82 feet long and 62 feet wide. It was found that the air-pressure at a depth of 120 feet proved fatal to the workmen; that at a depth of 80 feet, healthy men could work for an hour at a time, and this depth is considered as great as can be borne. Sand has been removed by air-pressure through a pipe without any difficulty, and we may refer the reader to detailed particulars of air-lock bells and cylinders sunk upon this plan, which have been described in this journal. — *The Building News*.

CHANGES AT WESTMINSTER HALL.

THE *London Standard*, in a recent issue, says: "Now that the new Palace of Justice, at the corner of Chancery Lane, and to the north-west of where Temple Bar once stood, is approaching its completion, it is not unexpected news that the old Law Courts on the west side of Westminster Hall are to be pulled down. This terrible legal bee-hive has long been a standing grievance to litigants, to witnesses, to members of the legal profession, and, we may add, to the judges themselves. Westminster Hall, itself, formerly the dining-room of the palace of our kings at Westminster, was preserved by Barry as the vestibule of the new Houses of Parliament. It was

originally built in the reign of William Rufus, but was repaired toward the end of the reign of Richard II. The early Parliaments were held in it, and the law courts used to sit in it. There is a famous old wood-cut, much in favor with practising barristers, which represents the interior of Westminster Hall in full term. Against the wall are four little wooden pews, of which one contains the Lord Chancellor and the other three respectively the Justices of the Queen's Bench, the Justices of the Common Pleas, and the Barons of Exchequer.

"Such was Westminster Hall before the Law Courts were built, and when it was visited by Peter the Great, who, asking the business of the gentlemen in wigs and gowns, and being told that they were lawyers, replied that he had only two such thieves in his whole empire, and that it was his fixed intention to hang one of them when he returned. As litigation increased, it became impossible for the judges to sit in Westminster Hall itself, and accordingly the courts which now stand doomed were constructed as an annex to the Hall itself. Anything more inconvenient than the design and structure, it is impossible to conceive. The courts themselves are cramped, ill-lighted, ill-ventilated, and they all have a most inadequate access. The corridors and passages that lead to them are dark and narrow. Some of the courts are higher than the roof of Westminster Hall itself, and are so badly arranged that if fresh air is wanted, judge, jury and audience are frozen with an icy draught, while if warmth is needed, the atmosphere approximates to that of a Turkish bath. The rooms set aside for the judges are dismal little dens, receiving light through grated apertures in thick stone walls.

"When these courts are swept away the space to the west of the hall will remain open, and there will be an uninterrupted view from Broad Sanctuary and the opening of Palace Yard down toward the statue of *Cœur de Lion*. Of course, as soon as the old Law Courts have been carted off, Westminster Hall itself will have to be repaired. Its structure, however, is so colossal that there need be no doubt as to its lasting even longer than the period during which it has already stood. It will remain what Barry intended it to be, the vestibule of the Houses of Parliament, and counsel will no longer be seen in it, with the exception of that portion of the bar which practises before Parliamentary committees. The benefit of the change will be almost incalculable. The new Law Courts, whatever may be thought of their architecture, are, at any rate, commodious, and not inconveniently arranged. There will be excellent lobbies, corridors and waiting-rooms for litigants, witnesses, and the general public, and the turmoil and worry of Westminster Hall will no longer vex a new generation of lawyers and litigants. With the demolition of these buildings, there will be cleared a noble approach to the Palace Yard, and we can only hope that the western side of Westminster Hall may be repaired in a manner worthy of its ancient traditions. We shall at any rate violate none of these traditions by carting away the present Law Courts. Such history as belongs to Westminster Hall belongs to the hall itself, and not to the wilderness of dens and corridors which are now to be improved out of sight. Best of all, we will have Westminster Hall restored to something like its original majesty."

THE MOSAICS IN THE HOUSES OF PARLIAMENT.

THE unfinished state of the mosaic decoration of the Central Hall of the Houses of Parliament was lately brought under the attention of the House of Commons by Mr. Schreiber. He said that for twelve years the subject had been left in abeyance, and only one of the four panels had been filled in. Although the hall was unfinished, it was already, as Mr. Bernal Osborne said, under the mosaic dispensation, one panel having been decorated with a mosaic picture of St. George. The state of the Central Hall would not be tolerated in any other assembly. It might be that the Government was inclined to a policy of fresco, but before they committed themselves to that, he wished to remind them that on July 8, 1869, Mr. Layard, speaking on this subject, said: "The Royal Commission had recommended that the blank spaces in the hall should be filled up by paintings in fresco, but his experience of paintings in fresco had led him to conclude that they were not suited for decoration in this country. Much money had been thrown away. He called on Dr. Percy and Mr. Barry to examine all the frescoes in the Houses of Parliament, and he regretted to say that the result of the examination was that they did not find one which did not show signs of decay." That was their deliberate opinion. The question then was, whether they were to continue this work. The House would not be surprised to hear that a proposal of Mr. Ayrton to vote £500 for another fresco was negatived without a division. It would be difficult to persuade the House to vote six pence for such fugitive decorations. An alternative decoration was mosaics. Their advantages were obvious, — they were bright and intelligible, and they had been employed with effect upon the Albert Memorial. If the Central Hall was somewhat dark, more light might be admitted through the windows. The money question was not worth considering, and the mosaics themselves would give pleasure of the highest kind to the many thousand visitors to the Houses of Parliament. After an absence of twelve years from Parliament, he was much distressed to find that the decoration of the Central Hall remained where he had left it. He asked Mr. Adam when he intended to complete the mural decoration of the Central Hall, and whether he was in possession of the three designs for the three vacant panels. The answer was that the question of the best mode of filling the panels had given rise to much discussion, and had been fully inquired into in the years 1870-71, but that no definite

conclusion had been arrived at. The cost of the panel which had been filled in was about £675, so that the three vacant panels would cost about £2,000.

Mr. Cavendish Bentinck said that, with two exceptions, the frescoes had been failures. As regards mosaics, he should like to have some authority who would say that the mosaics on the Albert Memorial or those at Windsor were satisfactory works. The mosaics in St. Paul's, which were the works of two of our greatest artists, — Mr. Watts and Mr. Stevens, — were absolute failures. He did not believe that it would be possible now to obtain mosaics of a first-rate quality, such as would be a credit to the country and worth the necessary expenditure. If works of the second order were to be executed, the House ought to insist that they should be executed in this country, so that British art and manufacture might receive encouragement. The decorations of great national edifices were never completed at one and the same time. There was no great Italian church, for instance, which was not the result of the labor of ages.

Mr. Shaw-Lefevre said it would not be wise to hasten the completion of the decoration of the Central Hall, and to fill in the empty panels, without being first certain that the work would reach the standard of the highest art. The existing mosaic was inserted by Sir H. Layard in 1869, but did not give general satisfaction. The artist, he believed, had desired that a portion of it should be taken down with a view to its improvement. Subsequently a committee of artists was called together by Mr. Ayrton. It consisted of Messrs. Herbert, Cope, Armitage, and Poynter, who recommended that the empty panels should be filled with frescoes. There would be considerable difficulty in carrying out the decoration at the present moment, the School of Mosaic at South Kensington having ceased to exist, and the artist having declined to execute designs for the unfilled panels. He was inclined to think that in the present unsatisfactory condition of mosaic art, it would be better to leave the panels unfilled than to complete them. Until the House should express a more unanimous desire than any which has hitherto been evinced, he should not consider it his duty to ask for a vote of money for the purpose of filling the empty panels with frescoes. — *The Architect*.

CREMATING SEWAGE.

SPRINGFIELD, O., August 27.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

WITHIN a short period quite a discussion seems to have sprung up on the subject of sewage and its disposition and discharge. At the risk of incurring the jealousy of the "Dons," allow me to state some new propositions upon this subject, the outlines of a new system of sewerage. First Axiom, — The use and advantage of pure water is so desirable in our streams and rivers that no drains conveying offensive matter should be allowed to run into them. Therefore, the solid matters that come under the class of sewage should be disposed of without entering the drains, and the best way of doing this is to burn them up on the spot, thus saving handling and conveyance. The plan I would adopt would be a family furnace taking place of water-closet, and drain or slop-barrel into which garbage is thrown, the use of coal-dust in place of water in the closet, and convenient arrangements for burning a fire at stated intervals in a properly arranged furnace. The details of such a plan might be different in each location, although similar in general design, all liquid sewage being carried to a general filtering bed before passing into any fresh-water stream. For a city like Paris such a plan would be economical and completely effective.

AMERICAN ENGINEER.

CARBONIC OXIDE.

WASHINGTON, D. C., 30th August, 1881.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

ARE not too much time, thought, paper and ink given to the question of escape of carbonic oxide from a stove through the pores of cast-iron?

So long as the fire burns and there is sufficient draught to feed it, the outside atmosphere presses through every opening into the combustion chamber.

When this ceases, smoke, if wood is the fuel, irritating gases, if anthracite is burned, pour out of every draught-hole, imperfect joint and pin-hole or open pore in the cast-iron; and the proper remedies must be applied or the house vacated.

Of what economic or sanitary importance, then, is the question of endosmose or exosmose through the pores of cast-iron, which is compact enough to retain water up to a pressure of two hundred pounds to the square inch, and steam, itself a gas, to nearly as high a pressure?

M. C. MEIGS.

THE CRADOCK HOUSE, MEDFORD, MASS.

ASHFIELD, September 2, 1881.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Sirs, — The old Cradock house at Medford, of which your last number contains an excellent drawing and account, is one of the most interesting monuments of the past in New England. It is more than a mere antiquarian or architectural curiosity. It illustrates more vividly than any other house in the neighborhood of Boston the condition and modes of life of the first generation of colonists. Its destruction would be a disgrace to Medford and a loss to the whole Commonwealth.

I cannot doubt that the people of Medford have sufficient local pride to take the necessary steps for saving the chief distinction of the town. But if this should, unfortunately, prove not to be the case,

will you not, sirs, take measures to organize a committee of architects and others for the purpose of obtaining the comparatively small sum required for the purchase and preservation of this venerable building? I am, sirs, very truly yours, C. E. NORTON.

NOTES AND CLIPPINGS.

CARBOLIC ACID AS A DISINFECTANT.—Dr. G. M. Sternberg, of the United States Army, has recently reported to the National Board of Health the results of his experiments on the value of disinfectants. Carbolic acid he finds of little value. He says that "the popular idea that an odor of carbolic acid in the sick-room, or in a foul privy, is evidence that the place is disinfected, is entirely fallacious, and in fact the use of this agent as a volatile disinfectant is impracticable, because of the expense of the pure acid, and the enormous quantity required to produce the desired result."

THE COST OF SOME FOREIGN BUILDINGS.—An exchange states that some interesting statistics of the cost of celebrated modern buildings in England and on the Continent have been compiled. Reduced to American dollars, they include these: The Paris Grand Opera-House, \$8,000,000; the Paris Hotel de Ville, \$8,000,000; the Paris Post-Office, \$6,000,000; the Brussels Palais de Beaux-Arts, \$600,000; the Antwerp Museum, \$400,000; the Brussels Palais de Justice, \$8,000,000; the London Houses of Parliament, \$17,500,000; the London Foreign Office, \$2,750,000; the London Law Courts, exclusive of special fitting and not yet completed, \$4,500,000.

BLASTING UNDER WATER.—Major Lauer, of the Austrian Engineers, has been testing a new method for blasting rocks under water, at Krems, on the Danube. The chief feature of Lauer's system is to employ a hollow cylinder, like a gas-pipe, and to place the dynamite cartridge, not as hitherto in a hole bored into the rock to be blasted, but in the cylinder in question. The cartridge only touches the surface of the rock which it is desired to shatter. The explosion of the dynamite is effected by means of electricity, and the effect is said to be greater than with the usual cartridge in a hole bored in the rock. The rock is shattered into fragments so small that a fair stream is able to wash them away without help, whereas in the case of gunpowder the rock is only split up into blocks more or less large and troublesome to remove. The Lauer system is calculated to effect a saving of fully forty per cent as compared with the old system.—*The Iron Age*.

THE HOFBURG.—The plans for the reconstruction of the Hofburg—the principal imperial palace in Vienna—have been approved by His Majesty, and the work of demolition and rebuilding is to be begun at once. The central part of the Hofburg will be replaced by a lofty pavilion flanked on each side by extensive wings. These will be extended by means of arcades across Vienna's great boulevard, the Ring Strasse. On the opposite side the arcades will join the new museums, which are themselves of imposing architecture. In the centre of the square, which, when finished, will be one of the finest in the world, will be erected the statue of the Empress Maria Theresa. The left wing of the Hofburg was commenced last spring, and will be used as the imperial town residence during the reconstruction of the rest of the palace. The entire work will not be completed for ten years. When finished, it is anticipated that the new Hofburg will be the most magnificent monarchical residence in Europe.—*New York Tribune*.

THE SINKING OF NEW JERSEY.—Prof. George H. Cook, State Geologist of New Jersey, has come to the conclusion which many South Jersey residents have long entertained, that the land in Cape May and Cumberland Counties is gradually but certainly settling. From knowledge now in his possession he estimates that the surface has settled about eight feet during the last hundred years. During a recent visit to this county, he declared it his intention to test the matter by placing stone posts in the ground at certain localities, a record of which should be kept so as to insure their being found at any future time, said stones to be so set and marked with reference to their height above the sea-level that it may be positively ascertained whether this portion of the State is becoming lower, and at what rate. Old residents of the lower portion of Cumberland County, adjoining this county, and in the neighborhood of the mouth of Maurice River, will show you land that was once considered high land, and contained a light, dry-looking, sandy soil, that now is low, black, and heavy. The great tide which came up in October of 1878 swept farther inland and did greater damage to farms adjoining the meadows, destroyed more timber, and emptied itself into a greater number of surface wells than any of the great tides on record.—*Elizabeth (N. J.) Journal*.

STONEHENGE IN DANGER.—Under the Presidency of Sir Charles Hobhouse, the Wilts Archaeological Society held during last week their annual meetings, and three days were devoted to excursions around Bradford-on-Avon and other parts of North Wilts. During the week's discussions the state of Stonehenge occupied prominent attention. The committee reported that, in conjunction with the Secretary of the British Archaeological Association, a representation had been made to the Society of Antiquaries and the Royal Archaeological Institute of Great Britain, calling their immediate attention to the insecure condition of certain stones on the outer circle, and their imminent danger of falling. At the same time, the question of re-erecting the great trilithon which fell in 1797, and which had been so often advocated by the archaeologists, was again pressed upon the parent societies. A committee of the Society of Antiquaries, including Sir John Lubbock, had consequently visited Stonehenge last month, and made a careful examination of the stones, the result being that the whole question was to be submitted to a general meeting of the Society of Antiquaries next November. In the course of the discussion it was stated that the leaning stone was at an angle of 60 degrees, and that unless some measures were immediately adopted to make it secure its remarkable character would be destroyed.—*London Times*.

THE ROYAL PEW IN KING'S CHAPEL AND ITS OCCUPANTS.—"It is a great pity," says Hon. Josiah Quincy, "that the pew of the royal governors in the King's Chapel was removed, in order that two plebeian pews might be constructed upon its ample site. I used greatly to value this interesting relic, which was just opposite the pew that I occupied. It stood handsomely out, with ornamented pillars at the corners, and lifted its occupants two feet above that herd of miscellaneous sinners who confessed their miserable estate upon the level of indiscriminating democracy. I came too late into the world to see a royal governor enter this august pew: though the ghosts of some of them would occasionally seem to steal up the aisle and creep into it during the drowsier passages of the afternoon sermon; but the flesh-and-blood personage who occupied the pew in my day was, so to speak, as good a governor as the best of them. He was the son of a Massachusetts governor, too; and, surely, there could be no better ideal of those royal qualities which should characterize the ruler of a State than was presented in the Federal leader, William Sullivan. How that pew of royal dignity used fairly to blossom with the large and lovely family of which he was the head! There was a noble poise about them all; and then they were so handsome that it seemed quite proper that they should sit a foot or two nearer heaven than the rest of us. Governor Sullivan left four sons, who were active and leading men during my early manhood. Several of them had large families, and there was every prospect that the name would long be perpetuated in Boston; but this once powerful family has passed away, and I think there is no Sullivan of their blood remaining upon the spot where they were so conspicuous."

FIRE-LOSSES AT EDINBURGH, SCOTLAND.—From Edinburgh has just been received a report of fires in that well-built town, which forcibly illustrates what is true of most other cities in Great Britain. The total number of alarms for the year was 339, of which 55 were false alarms, 61 proved to be merely chimneys burning out, and four were outside the city, leaving the real number of fires only 219. Of these, 66 were extinguished with buckets of water, 94 with hand-pumps, 17 by persons on the spot, before the firemen arrived, 40 with hydrants, and only 2 with engines. Not one of the 219 resulted in any serious loss or damage, and, although there was an increase of 73 fires over the number for 1879, the total of loss was less. Further, it is added, that during the past three years, out of 608 fires, only 3 resulted in loss that was serious. All the more striking do these facts appear when the strength of the department is held in mind. The permanent staff comprised 28 men, and the auxiliary staff 10, or 38 men in all. Of stations, there were 9; of manual engines, 5; of hose-carts, 2; of hand-drawn hose-reels, 10; of fire-escapes, 2; of hand-pumps, 16; of horses, 4, and of steam-engines, a total of 1. Edinburgh recently adopted a new system for the department, and has been able thus to effect a large reduction in expenses. Under the old one, in the year 1872, there were 115 alarms, the average cost of each turn-out being £23 3s. 7 1-2d. Under the new one, last year, the alarms numbered 339, and the average cost of a turn-out was only £7 4s. 11 1-2d. Insurance rates in Edinburgh, under these circumstances, ought to be low enough to suit any one, and if incendiaries are known there, they are doing an extremely unprofitable sort of business.—*New York Times*.

SCULPTORS VS. COMMON CARRIERS.—Works of sculpture may often be injured by railway vans, but it is rare to find a sculptor who ventures to take an action against a company for damages when there has been an accident. Mr. Swinnerton has established a precedent which may not be without use. He has two studios, one in Rome, the other in Manchester. In August last Mr. Swinnerton sent from Rome a group representing Pharaoh's daughter carrying the infant Moses. It was packed by Antonio Ferroni, who has a reputation for his care. The case containing the group on its arrival in London was examined by custom-house officers, and they found the marble uninjured. Afterwards it was handed over to employees of the London & North-Western Railway in order to be conveyed to Manchester. When Mr. Swinnerton unpacked the group, he found that it was broken in three places, and that a foot of the principal figure was detached from the leg, and had been wrapped up by some one in pieces of rag, and nailed to the side of the case in a clumsy way. He was able to tell from the appearance of the fracture that the breakage had occurred about three days before. Mr. Swinnerton valued the group at £450, but on account of the fracture he was compelled to accept £100 for it. The question to be determined was, whether the accident was caused while the case was in the hands of the railway company or on shipboard. The jury found for Mr. Swinnerton, and awarded him £275 damages, or £70 less than was claimed.—*The Architect*.

DISINFECTANTS.—The Board of Health of the State of Louisiana give, in the "National Board of Health Bulletin," these directions for the disinfection of privies and water-closets:—"For the disinfection of privies, cesspools, water-closets, and vaults use the following: sulphate of iron (green vitriol or copperas), eight pounds; Calvert's carbolic acid, No. 5, one pint; water, four gallons. Dissolve the green vitriol in hot water, and when cool add the carbolic acid. Add one gallon of this mixture to the privy or water-closet to be disinfected, and thereafter one quart every fifth day, or oftener, if any foul smell be evolved from the privy. Lime should not be used in the disinfection of privies, as it decomposes the salts of ammonia. This objection, however, does not apply to the sulphate of lime (plaster of Paris), which may be used with advantage in combination with carbolic acid and copperas. The walls of privies and all unpainted wood-work should be whitewashed. For drains, damp, foul yards, stables, cow-houses, etc., they recommend that fresh-slaked lime, chloride of lime, plaster of Paris, and sulphate of iron should be sprinkled over damp and foul places, drains, and yards. For disinfection of such places a simple solution of sulphate of iron or copperas, in proportion of one and one-half pounds to the gallon, may be used. The copperas solution may be prepared in large quantities for markets, stables, and slaughter-houses, foul yards, drains, and gutters, by hanging a basket containing about seventy pounds of copperas in a barrel of water."

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

- 246,281. HINGE.—Benjamin S. Atwood, South Abington, Mass.
 246,286. DOOR-HANGER.—Caleb Brinton, Chicago, Ill.
 246,293. PIPE-JOINT.—Edouard Cooman and Pierre Dallard, Paris, France.
 246,323. DOOR-SPRING.—Isaac B. Lockwood, Rockford, Ill.
 246,331. DOOR-SPRING.—Francis S. Taggart, Freeport, Ill.
 246,359. ROOFING COMPOSITION.—William B. Allman, Indianapolis, Ind.
 246,368. WOOD-SCREW.—James W. Campbell, Brooklyn, N. Y.
 246,375. FIRE-ESCAPE.—John R. Day, New York, N. Y.
 246,382. RATCHET-DRILL.—Edward G. Felthousen, Buffalo, N. Y.
 246,419. AUTOMATIC SASH-PIVOT.—Thomas J. Morgan, Chicago, Ill.
 246,419. COMBINATION-TOOL.—Othon G. Rombotis, Chicago, Ill.
 246,438. LOCKING-LATCH.—Joseph H. Woolaston and Thomas B. Fridly, New Haven, Conn.
 246,454. TRAP.—Ludwig Brandeis, Brooklyn, N. Y.
 246,457. WATER-FILTER.—Thomas C. Candlish, St. Louis, Mo.
 246,487. WRENCH.—Abraham G. W. Foster, Newnan, Ga.
 246,489. FIRE-HYDRANT.—Allen J. Fuller, Philadelphia, Pa.
 246,513. BIT-BRACE.—Frederick W. Ireland, Buffalo, N. Y.
 246,519. SKETCHING-BLOCK.—Charles R. Lamb, New York, N. Y.
 246,521. SPOVE-PIPE THIMBLE.—Joseph M. Lauby, Brodhead, Wis.
 246,531. GONG-BELL.—Patrick McMahon, New York, N. Y.
 246,542. METALLIC ROOFING-SHINGLE.—Henry S. Northrop, Pittsburgh, Pa.
 9,851. (Reissue.) FLUE-LINING, AND DIE FOR FORMING THE SAME FROM CLAY.—Charles A. Freeman, New Cumberland, W. Va.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS.—Since the last report eighteen permits have been granted, mostly for structures of minor importance. The following have been selected:—

- Thomas Cassard, three-sty brick building, Fayette St., between Caroline and Bond Sts.
 Frank Walpeet & Co., brick warehouse, 173' in depth, fronting on McKim St. and Greenmount Ave., between Madison and Eager Sts.
 H. E. Goethe, two three-sty dwells, 32 Ridgeley St., between Hamburg and Steiress Sts.
 Female House of Refuge, to improve and enlarge building, Carey St., north of Baker St.
 Malcolm Crichton, five-sty warehouse, North St., north of Bath St.
 G. Zimmermann, eight three-sty dwells, John St., between Lee and Decker Sts.
WAREHOUSE.—A five-story basement warehouse, brick, with stone trimmings, is in course of construction on Hanover St., between Pratt and Lombard Sts., for the trustees of the Wilson Sanatorium Fund; cost, \$23,000. Mr. C. E. Cassell, architect; Messrs. Henry Smith & Son, contractors.
STORE.—Messrs. Healey & Eckhardt, builders, are erecting a three-story store and dwelling for Dr. Geo. A. Franes, druggist, on the north-east corner of Gay and Monument Sts.

Boston.

- BUILDING PERMITS.**—Lake St., rear of, near Kendrick St., Ward 25, stone building, 14' and 68' x 210', with one wing 51' x 65', and one 34' x 68'; mason, James Fagan; owner, Right Rev. John J. Williams. This building is to be four stories high. Its purpose is a seminary or college where young men may be educated for the Roman Catholic priesthood.
 Beacon St., No. 366, rear of, brick stable, 17' x 30'; mason, Antoin Xavier; owner, Edwin Morey.
 Hayward Pl., No. 2, four-sty store, 22' 9" x 60' 10"; builder, J. H. Coon.
 Near Prison Point Bridge, one-sty wooden car-house, 40' x 416'; owner, Eastern Railroad Co.; builder, Peter Walling.
 Unnamed Pl., off Regent St., 2 wooden dwells.; George L. Thayer; builder, James W. Lord.
 South St., cor. Hathaway St., two-sty dwell., 36' and 41' x 40'; Wm. Minot, Jr., owner; W. H. Bowker, builder.
 West Third St., No. 337, wooden dwell., 18' x 32'; owner, Hormel Bencks; builder, Wm. T. Eaton.
 Northern Ave., Commonwealth Pl., two-sty flat roof, storage of freight, 200' and 212' x 57' and 616'; owner, New York & New England R. R. Co.
 Wyman Pl., off Centre St., three-sty wooden dwell., 22' x 32'; owner, George Coombs; builder, Frank A. Schell.

AN EXHIBITION

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BUILDING INTELLIGENCE.

Charles St., cor. Unnamed St., building.
 Charles St., near Unnamed St., building.
 Charles St., near Freeman St., building.
 Charles St., cor. Freeman St., building.
 Charles H. Wetmore is owner and builder of each of the above four buildings; they are 26' x 34' each, two-sty, hip roof.
 Breed St., near Ashley Ave. (Orient Heights), two-sty wooden dwell.; owner, Harriet Adams; builder, George W. Adams.
 Unnamed Pl., off Chestnut Ave., 2 two-sty wooden dwells.; owner and builder, S. A. Deshon.
MONTHLY STATEMENT FOR AUGUST.—Brick, 35; wood, 60; alterations, repairs, etc., 240; boilers and engines, 32; heating-apparatus, 65.

Brooklyn.

BUILDING PERMITS.—Grand Ave., n.w. cor. Putnam Ave., 2 two-sty brick and stone stores and dwells.; cost, total, \$9,000; owner, Martin E. Kingman, on premises; builder, O. D. Thompson.
 Marcy Ave., e.s. 250' w. Walton St., one-sty brick foundry; cost, \$2,500; owner, North American Iron Works, 40 Walton St.; architect, W. H. Doughty; builder, Jno. Auer.
 Fulton St., s.e. cor. Grand Ave., 5 four-sty brown-stone stores and flats; cost, \$10,000 and \$13,000; owner, C. L. Donnellon, President St. near Henry; architect, R. Dixon; builder, C. E. Donnellon.
 Broadway, e.s. 36' s. Siegel St., three-sty frame store and tenement; cost, \$7,000; owner, Henry Otto, Boerum and Leonard Sts.; architect, J. Platte; builders, H. Grasman and H. Loeffler.
 South First St., near River, four-sty brick warehouse; cost, \$15,000; owner, etc., Brooklyn S. R. Co.; mason, S. J. Burrows.
 Pulaski St., n.s. 250' w. Marcy Ave., 5 two-sty frame dwells.; cost, each \$3,000; owner and builder, D. Morris, Clifton Pl. near Marcy Ave.; architect, S. Peden, Jr.
 Central Ave., s.w. cor. Forrest St., 2 three-sty brick tenements; cost, \$9,000; owners, S. Liebmann's Sons, Forrest St., cor. Bremen; architect, Th. Engelhardt.
 North Seventh St., s.s. 175' e. Seventh St., one-sty brick factory; cost, \$4,380; owner, A. B. Anschacher, 43 John St., New York; architect, Th. Engelhardt; builders, Benj. Mills and O. H. Doolittle.
 Floyd St., s.s. 175' e. Tompkins Ave., 3 three-sty frame tenements; cost, \$9,000; owner, A. Froehlich, 202 Stockton St.; architect, Th. Engelhardt.
 Boerum St., No. 218, s.s. 100' e. Bushwick Ave., three-sty frame tenement; cost, 3,700; owner, Jos. J. Froehlich, Graham Ave., cor. Stagg St.; architect, Th. Engelhardt.
 Hennes St., No. 184, s.s. 250' e. Lee Ave., three-sty brownstone dwell.; cost, \$8,000; owner, A. Resler; architect, Wm. Armstrong; builder, Thomas Gibbons.
Chicago.
BUILDING PERMITS.—P. Winter, two-sty brick addition, 21' x 75', 905 West Madison St.; cost, \$2,000.
 J. Hickerman, three-sty flats, 22' x 56', 2606 Wallace St.; cost, \$4,300.
 J. H. McAvoy, three-sty brick store, 69' x 90', Cottage Grove Ave. and Twenty-fifth St.; cost, \$26,000.
 Angela O'Riley, two-sty brick dwell., 21' x 45', Dearborn and Twenty-ninth Sts.; cost, \$2,200.
 Wm. Van Arman, three-sty brick dwell., 40' x 60', 2015 Prairie Ave.; cost, \$33,000.
 C. Palzen, two-sty brick store and dwell., 25' x 72', State and Thirty-seventh Sts.; cost, \$6,000.
 M. Murphy, two-sty brick dwell., 22' x 40', 3250 La Salle St.; cost, \$2,400.
 F. Meyer, four-sty brick factory, 48' x 160', Clinton and Harrison Sts.; cost, \$25,000.
 C. Seipp, ice-house, 20' x 106', Augusta and Paulina Sts.; cost, \$20,000.

BUILDING INTELLIGENCE.

J. F. Lawrence, 2 one-sty brick dwells., 20' x 30', North Ave., near Milwaukee; cost, \$2,000.
 J. Jiram, two-sty brick dwell., 20' x 56', Eighteenth St., near Throop St.; cost, \$3,100.
 H. Sherer, two-sty brick stores and dwells., 40' x 78', State and Fifteenth Sts.; cost, \$6,000.
 D. Larson, two-sty brick dwell., 20' x 60', Newberry Ave., near Wright St.; cost, \$2,500.
 A. Erickson, two-sty brick dwell., 20' x 60', 424 West Eighteenth St.; cost, \$3,800.
 P. Heizman, two-sty brick dwell., 25' x 67', Sixteenth and Seward Sts.; cost, \$4,200.
 J. Hardy, two-sty dwells., 20' x 38', Eighteenth St., near Throop St.; cost, \$2,500.
 P. Woldorf, two-sty brick dwell., 22' x 36', Archer and Wentworth Aves.; cost, \$2,000.
 C. B. & Q. R. R. Co., six-sty brick office-building, 128' x 180', Adams and Franklin Sts.; cost, \$300,000.
 A. G. Dinnen, three-sty brick dwell., 20' x 40', 90 Page St.; cost, \$4,000.
 H. Strong, five-sty brick stores, 60' x 125', Monroe St. and Fifth Ave.; cost, \$80,000.
 M. Field, five-sty brick stores, 41' x 90', Monroe St. and Fifth Ave.; cost, \$30,000.
 C. Furst, five-sty brick stores, 54' x 160', 197 Adams St.; cost, \$55,000.
 J. W. Plows, one-sty brick building, 66' x 126', Pine and Oak Sts.; cost, \$40,000.
 J. Len, three-sty flats, 22' x 60', 237 Wells St.; cost, \$6,500.
 J. A. Owens, two-sty brick dwell., 29' x 60', Colblentz St., near Oakly St.; cost, \$3,500.
 J. Jackson, three-sty brick flats, 30' x 40', Fifteenth St., near Ada St.; cost, \$6,000.
 Anna Agoston, two-sty brick dwell., 20' x 56', 696 May St.; cost, \$2,800.
 J. Elzner, additional story, 24' x 116', 223 Kinzie St.; cost, \$3,500.
 Dr. Bogue, three-sty brick dwell., 22' x 40', 5 Washington Pl.; cost, \$8,000.
 R. Kasser, two-sty brick store and dwell., 22' x 36', 920 North Halsted St.; cost, \$2,500.
 A. Kruger, two-sty brick dwell., 21' x 46', 391 Maxwell St.; cost, \$3,500.
 City, three-sty school-house, 75' x 85', Johnson and Wright Sts.; cost, \$40,000.
 G. B. Cuneo, 2 four-sty flats, 50' x 50', 60 North Franklin St.; cost, \$10,000.

Cincinnati.

HOUSE.—Mr. T. T. Haydock is building a fine stone dwelling-house on Walnut Hills; cost, about \$30,000; Jas. W. McLaughlin, architect.

New York.

BUILDING PERMITS.—Worth St., s.w. cor. Mulberry St., six-sty iron and brick store and manufactory; cost, \$25,000; owner and builder, Jas. Cass n, 896 Flushing Ave., Brooklyn; architect, E. Gruwe.
 One Hundred and Twenty-second St., n.s. 100' e. Eighth Ave., 5 four-sty brownstone tenements; cost, each \$14,500; owner, Clara Emrich, 508 East Eighty-ninth St.; architect, J. Brandt; builder, Jos. Emrich.
 Sixty-second St., s.s. 199' 6" e. Second Ave., 5 five-sty brick tenements; cost, each \$7,000; owner, Joseph Redman, Sixtieth St. and Third Ave.; architect, A. B. Ogden; builders, Cook & Higgins and J. C. Umberfield.
 Third Ave., n.w. cor. Ninetieth St., 3 three-sty brownstone tenements; cost, each \$10,000, owner, W. H. Browning, 443 East Seventeenth St.; architect, A. B. Ogden.
 Ninetieth St., n.s. 73' w. Third Ave., 4 four-sty brownstone tenements; cost, each \$10,000; owner,

(Continued on next page.)



THE FARRAGUT MONUMENT, MADISON SQUARE, NEW YORK, N. Y.

AUGUSTUS ST. GAUDENS, SCULPTOR. STANFORD WHITE, ARCHITECT.