

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. LX.

Copyright, 1898, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.

No. 172.

Entered at the Post-Office at Boston as second-class matter.

JUNE 11, 1898.



SUMMARY:—

The Thirty-second Annual Convention of the American Institute of Architects. — The Story of the Octagon House. — The Extension of the Boston Fire Limits. — The End of the Hoisting-Engineers' Strike in New York. — The Accident to Mr. Tobias New. — The International Public Art Congress in Brussels. — The Questions to be considered. — The Candidates for M. Ginain's Seat in the Academy. — Test of Explosives for Coal Mines. — The Steam-making Value of American Coals. — The Largest Hotel in the World.	81
SOME INSTANCES OF PILES AND PILE-DRIVING, NEW AND OLD.—I.	83
LETTER FROM PARIS.	85
CARBOLINEUM: A WOOD-PRESERVER.	87

ILLUSTRATIONS:—

Doorway of the Masonic Temple, Detroit, Mich. — Statue of Abraham de Peyster, New York, N. Y. — Statue of Bartolomeo Colleoni, Venice, Italy. — Details of the Same.	
Granard Presbyterian Church, Putney. — Löwenbräukeller in München.	
Additional: Staircase and Staircase Hall: Schloss, Brühl-on-the-Rhine, Prussia: Two Plates. — Half-timbered Houses, Goslar, Prussia. — Corner of Mount and South Audley Streets, London, Eng. — No. 26 Park Lane, London, Eng. — Portico of the Same.	87
NOTES AND CLIPPINGS.	88

THE Thirty-second Annual Convention of the American Institute of Architects is to be held in Washington, D. C., on Tuesday, Wednesday and Thursday, November 1, 2 and 3. The season is particularly favorable, as outside building operations, which are, in our Northern States, generally in a state of feverish hurry in October, when every day before the hard frosts come is of the utmost importance, are nearly suspended a month later; and the place is still more favorable, as every one wishes to visit Washington occasionally; so that a very full attendance is to be expected, and it is the more desirable that there should be such a full attendance, as the formal opening will be made of the permanent headquarters of the Institute, which have been established at the "Octagon House." This journal has for many years earnestly advocated the establishment of the Institute in suitable quarters at Washington, as an efficient means for bringing it into suitable relations with the Government, and it is with much satisfaction that we welcome the announcement that the Directors have felt justified in taking this important step. The growth of the Institute has been very rapid within the past few years; its management has been wise and dignified, as well as efficient; and it is quite ready, as the representative of the profession of architecture in America, and the best authority in the country in regard to one of the greatest of the arts, to domiciliate itself beside the greatest American patron of architecture and the arts; and a large assemblage of members of the Institute at the opening of the new rooms may do much to make the occasion impressive and important. As might be expected at a Washington Convention, an unusual number of valuable papers will be read. Mr. Fernow, Chief of the Division of Forestry, will treat of the Government Timber Tests; Professor Merrill, of the National Museum, on Building Stones; Dr. Cyrus Adler, of the Smithsonian Institution, on the Jewish People in Architectural History, and Professor Sabine, of Harvard University, on Acoustics. Arrangements have been made for accommodating members at the Arlington for four dollars a day, and rooms and board can be had at private houses, and small hotels, which are very numerous in Washington, at a dollar and a half a day and upward. The Local Committee of Arrangements, which consists of Messrs. Glenn Brown, Robert Stead and Edward Donn, Jr., all of Washington, will, undoubtedly, answer all inquiries. If a full attendance can be promised, it is believed that a reduction in railroad rates to one fare and one-third for the round trip can be arranged.

PROBABLY most architects who have visited Washington remember the Octagon House, the new home of the Institute, which, under this name, or that of the "Tayloe Mansion," has long been an object of professional interest as a fine specimen of that type of the so-called Colonial architecture characteristic of Virginia and Maryland. President Madison occu-

piated the house after the Executive Mansion was burned by the British in 1812, and, although rather neglected, it has long been, to the eye of the architect, a beautiful and interesting object, not only from its detail, but on account of its unusually well-studied plan. Under the care of a committee of the Institute, the old mansion is now being put in thorough order, and will give the Institute a charming and convenient home at the National Capital.

THE Boston Board of Aldermen has, we are glad to say, gone so far as to hold a public hearing on the subject of extending the present limits within which no wooden building can be erected. The Board of Fire Underwriters was represented at the hearing, of course in advocacy of such extension, but the most forcible arguments were those presented by the Fire Commissioner, Mr. Russell, and Building Commissioner Damrell, both of whom strongly urged an extension of the limits, so as to include a large part, if not the whole, of South Boston, a large part of East Boston, and the thickly-settled portions of Dorchester and Roxbury; and by representatives of the Boston Society of Architects, who thought that still more sweeping provisions were desirable, and, particularly, that the size of wooden buildings outside of the limits should be restricted. By such a provision as this last, the erection of the huge wooden apartment-houses, which menace with destruction whole districts in the suburban wards, would be prevented; and it certainly seems reasonable to consider that when a neighborhood becomes so closely settled that there is a demand for apartment-houses, it is time to put a check upon the most dangerous sorts of wooden construction. However, as one of the architects present at the meeting observed, the cost of brick dwelling-houses is now not much greater than that of wooden ones, so that there would be no serious hardship in extending the fire-limits to include the whole area of the city, and the advantages of doing so would be incalculable. In fact, Commissioner Damrell acknowledged that it would not surprise him to see the whole of Charlestown, which is covered with a mixture of wooden and brick buildings, such as will soon cover Roxbury and Dorchester, swept by a great conflagration; and the time to prevent such conflagrations in Dorchester, South and East Boston, Roxbury and Jamaica Plain is now, when the complete prohibition of wooden building may still give a tolerably substantial character to these districts, taken as a whole. A few years from now it will be too late, for the wooden houses which are being run up by hundreds all through these wards will give to them a preponderance of inflammability which it will take centuries of time, many conflagrations like the Boston fire of 1872, and the sacrifice of millions upon millions of property, to correct.

THE Hoisting-Engineers' strike in New York has ended as suddenly as it began. The owners of the hoisting-engines presented to their men the attractive prospect of a five-year agreement, for wages of five dollars a day, on condition of secession from the Board of Walking-Delegates, and a promise to abstain from participation in sympathetic strikes; and the men were sensible enough to accept the terms. Notice of withdrawal from the Board of Walking-Delegates was given by the Hoisting-Engineers' Union, in accordance with the agreement, and the Board, which had ordered sympathetic strikes, for the engineers' benefit, on seventy-five buildings, and threatened to strike fifty additional ones, immediately gave permission to the "sympathizers" to go back to their work; and they are now, we trust, earning their living in peace. Meanwhile, a severe blow must have been given by the agreement to the tyrannical power of the Walking-Delegates, and building-contractors and the public may congratulate themselves on the prospect of a return of common-sense to the counsels of unions. No one has any objection to Walking-Delegates, personally, or to a reasonable association of workmen in defence of their own interests; but the Board has exercised too tyrannical an authority over the building interests of New York, and employers and men alike will gain by having its arrogance curbed.

MANY architects will be pained to hear of the accident to Mr. Tobias New, the well-known manufacturer of waterproofing materials in New York, and one of the pioneers in the science of protecting basements below the water-line.

It is supposed that vapor from the coal-tar used in manufacturing in the building occupied by Mr. New accumulated in some way, so as to form an explosive mixture with the air, and that a spark ignited it, blowing off the roof, and tearing out a portion of the side wall, besides destroying the machinery. Mr. New, himself, was terribly scalded, and will, it is feared, lose his sight.

AN International Congress, under the auspices of the Belgian "Œuvre Nationale," for the consideration of matters relating to public art, is to be held in Brussels next September, opening on the twenty-fourth and continuing four days. All Governments, municipalities, administrative bodies, and artistic or learned societies, as well as artists and amateurs generally, are invited to take part in the Congress, which is very appropriately held in the country which has done most to cultivate public interest in public art. The topics proposed for discussion are: public art from the legislative point of view; public art from the social point of view, and public art from the technical point of view. There is much to be said on the subject in all these relations, and all persons who have special knowledge, or ideas of value in the matter, are invited to address the Congress, or to send papers; and the papers and discussions will be printed in the journal *L'Art Public*, the organ of the Œuvre Nationale. Those who would like to take part in the Congress, or are willing to help in paying its necessary expenses, are requested to inscribe themselves as members, paying the small fee of ten francs, which is reduced to five francs for ladies. Those who care only for the reports of the proceedings may obtain them by sending five francs as subscription to *L'Art Public* for the year. Subscribing members receive the reports gratuitously. Membership inscriptions and the accompanying fees must be sent before July 1st to the Secretary-General of the International Congress, Hôtel Ravenstein, Brussels, Belgium; and subscriptions to the journal may be sent to the same address. Papers to be read must be in the hands of the Secretary by August 15th, and should not be too long to be read in fifteen minutes, this being the limit for all addresses. The President of the Congress is M. Beernaert, President of the Belgian Chamber of Representatives, and most of the provincial Governors, and the burgomasters of the principal towns, are members of the Executive Committee.

AMONG the matters which the Brussels Public Art Congress will consider are several matters of great interest to the profession. The questions of the advantages and disadvantages of competitions for dividing public work among artists, and of the best mode of organizing competitions, if these are desirable, are to be taken up; and a special investigation is devoted to Prizes of Rome, and their adaptation to the present needs of art. Both in the social and legislative sections the important subject of signs and posters is considered, with a view to the best means of suppressing vicious and ugly displays, as well as of encouraging those of real artistic value. In the technical section, a great deal of time is to be devoted to the proper mode of laying out new quarters of towns or cities, and of providing or choosing locations for monuments of architecture or sculpture, or important structures of any kind. The papers on this subject will, it is hoped, be fully illustrated by models and plans, and we trust that, among other experts, Professor Henrici, of Aachen, will be induced to avail himself of the opportunity for giving to his views on city-street planning, which are at present little known beyond a limited professional circle, a publicity more nearly proportional to their merit.

NINE candidates have proposed themselves, or have been proposed, for the seat in the French Academy left vacant by the death of M. Ginain. These are, MM. Guadet, Moyaux, Dutert, Scellier de Gisors, Sedille, Bernier, Laloux, Girault and Rouyer. It is a curious illustration of the fact that the winning of the Prize of Rome is an almost indispensable preliminary to professional distinction in France that six out of the nine were, in their time, holders of the prize; one was six times a "logiste," and won the second grand prize, as well as the Rougevin and Leclère prizes; and another was twice "logiste," and a winner of two *Salon* medals; only one having no School honors to boast of. This last, however, is M. Paul Sedille, a man of great ability and distinction, who won in 1876 the medal of the Société Centrale, besides medals

at the Expositions of 1878 and 1889, and has been for some time an Honorary Member of the Royal Institute of British Architects.

SOME interesting experiments have been made in Germany on explosives for coal mines, and have been referred to in *La Génie Civil*. A recent series of trials shows the effect of six of the newer explosives, when fired in air containing different proportions of coal-dust and carburetted hydrogen. Two of the explosives contained nitro-glycerine, while, in the other four, nitrate of ammonia was the explosive ingredient; and, curiously enough, one of the nitro-glycerine compounds was the most dangerous of those tested, while the other was by far the safest. The first substance to be tried was "dynamite-gelatine," containing sixty-five parts of explosive gelatine, made by dissolving gun-cotton in nitro-glycerine; twenty-six parts of saltpetre, and a little sawdust. A charge of ten grammes of this exploded a mixture of air with nine per cent of carburetted hydrogen. The four next tests were made on "safety powder," "dahmenite," "westphalite" and "roburite," all composed of about ninety parts of nitrate of ammonia, to three or four of bichromate or permanganate of potash, and a little organic matter. The safest of them proved to be roburite, of which a charge of two hundred and fifty grammes was required for igniting air with nine per cent of carburetted hydrogen. The last trial was with "coal carbonite," composed of twenty-five parts of nitro-glycerine, thirty-four parts of saltpetre, and thirty-eight parts of rye flour, with a little impurity. Six hundred grammes of this were fired in a nine-per-cent mixture of gas and air without exploding it.

THE Boston Mutual Boiler Insurance Company have issued a report on the steam-making value of coals, which has a certain interest for architects, particularly for those who have important mercantile buildings to design. Practically, the tests show that the main factor in the efficiency of coal is the amount of stone and dirt mixed with it. Samples of coal, as delivered by the dealers, have shown proportions of earthy and stony matter varying from one and one-half to forty-six per cent; and it does not require great intellectual power to infer that the latter sort is less valuable for steam-making than the former. Moreover, as it costs just as much to shovel dirt into the furnaces as it does to feed them with coal, and all that is shovelled in has to be shovelled out again, with the ashes, and removed, often at great expense, it would seem to be very much for the interest of the consumer of coal to see that he gets a well-cleaned article. Taking, however, the principal sorts of coal burned in the Eastern States, and averaging a considerable number of tests, the consulting engineer of the Company, Mr. R. S. Hale, finds that, taking Cumberland coal as the standard, and rating its evaporative power at one hundred, Pocahontas coal has an evaporative power of one hundred and two; Clearfield, Wyoming, New River and Lykens Valley are rated at ninety-seven or ninety-eight; Schuylkill at ninety-five; Lehigh at ninety-three, and Nova Scotia at eighty-five. The average percentage of ash was least in the New River coal, being only five and one-half per cent; while Cumberland and Pocahontas had seven and one-half per cent; Clearfield and Nova Scotia ten, and the others from fifteen to eighteen per cent; the anthracites being, as a rule, much less clean, as found in the market, than the soft coals, such as the Pocahontas, which has shown, in a test, only one and one-half per cent of ash. Subtracting, however, the ash, so as to compare results for the combustible portion of the coal, there is little difference in heating-power between the various sorts, the Nova Scotia, which is the lowest on the list, rating only a trifle below Lehigh, and but about ten per cent below Cumberland and Pocahontas, which are the highest, and are rated the same.

LA CONSTRUCTION MODERNE says that the Sultan has nearly completed the largest hotel in the world, at Mecca. This establishment is to lodge six thousand pilgrims at once, with, presumably, their camels and other beasts of burden, and promises to be one of the most picturesque places to stay at in the world, although, of course, infidel dogs are not allowed to approach it. According to the same authority, the largest dwelling house in existence is in Vienna, where there is an apartment-house with fifteen hundred rooms in it, occupied by more than three thousand people. This building has thirty-two staircases, thirteen interior courts, and eight hundred and fifty windows on the street.

SOME INSTANCES OF PILES AND PILE-DRIVING, NEW AND OLD.¹—I.

IT is the aim of this paper to present facts rather than theories, and to give the experiments themselves rather than a discussion of the formulae which have somehow managed to cluster around them.

In 1879 I made my first attempts, in company with a fellow student, F. B. Knapp (M. Bost. Soc.). The experiments were made on a small scale, and deserve mention only from the generally unsatisfactory nature of the results and from our perhaps hasty conclusion that the simplest formula was liable to be the best.

Since that time I have held official relations with not a few piles of larger growth in various parts of the country. The fact of having made some tests within the last year for the Boston Transit Commission, near Haymarket Square, under direction of H. A. Carson, chief engineer, was the immediate cause of this paper.

On account of the upward pressure of the tide-water upon the submerged station areas of the subway as designed at that time, this pressure being transferred by means of the concrete invert to the coned pile-heads, it was desirable to know something of the safe upward force, as well as the safe downward force, that could be applied to a pile. Sixteen spruce piles were driven 2½ feet centres in a pit about 24 feet deep, penetrating into the clay from 11 to 34 feet, the successive sets and falls for every 10 blows being taken. The Cavanaugh Extension-Rail Pile-Driver was used with 1,710-pound hammer. Speaking generally, we got about ¼-inch set for 11-feet drop, or 18,800-feet pounds, without deduction for overhaul of rope.

The effect of a rest over Sunday was shown by giving the piles 5 blows Monday morning and observing the set. The average was then compared with the average of the 10 taken previously. This is perhaps not so satisfactory as a single blow in each case would have been. The effect of rest is particularly noticeable in the case of piles when driven with bark on, the bark apparently easing the pile as it went down, owing, perhaps, to the lubricating action of

PLANS SHOWING ORDER IN WHICH PILES WERE DRIVEN.

10	8	7	1
11	9	6	5
13	12	15	4
2	14	16	3

Piles spaced 2 feet 6 inches between centres.
Nos. 1, 9, 10, 13, 14, 15, bark on.
Nos. 2 to 8, 11, 12 and 16, bark off.

water following down with greater freedom, or to the sliding of the pile inside the bark.

The successive sets for each 10 blows for each pile were plotted and show clearly that in the case of some piles the work of the hammer was to push away the material ahead of the point rather than to overcome the friction of the sides. The increase of this side friction over Sunday confirms this view.

So far as our knowledge of the locality goes, the clay gets no softer at the greater depths.

Grade of surface, E. 118.0.

Grade final cut-off or soft clay, E. 93.79.

Grade hard blue clay about 120 pounds per cubic foot, E. 90.

All piles cut off square on point.

Earth around piles rose about 6 inches during the driving.

No brooming of heads occurred.²

The piles were sawed off 2½ feet above final cut-off. An I-beam 15 feet long was then arranged as a lever, pivoted on a pair of angles riveted together, with loose plates to adjust the height underneath, then fastened down to the adjoining piles by ¾-inch wire rope with two loops spliced, and loaded at the free end with about 6 tons of steel shapes, handy by. An upward pull of 10 or 12 tons was first tried on piles 3, 16, 14 and 2. Failing to start either one of these, we proceeded as indicated in the table. Nos. 4 and 5, 6 and 15, 9 and 12 were tested together in pairs. The only pile which moved of the six was No. 6, which had only 11 feet penetration, the top 4 feet being in softer clay. It settled 1.4 inches under a load of 38 tons and stopped. Estimated skin friction 3,500 pounds per square foot in hard clay. No further settlement was observed for three hours, pile 15 meanwhile withstanding an upward pull of 31 tons with 16 feet penetration.

¹A paper by Horace J. Howe, member Boston Society of Civil Engineers, and read before the society, March 30, 1898.

²See experiments by Don J. Whittemore, American Society Civil Engineers, 1880.

Of course, tests on single piles should be taken for what they are worth. It does not follow that a cluster would be of equal efficiency, on the average, to the results shown.

Pile No.	Length, ft.	Diameter Butt, ins.	Diameter Point, ins.	El. of Pt. before Driving, ft.	Fall, Last Ten Blows, ft.	Set, Last Ten Blows, ins.	Average Set, ins.	Fall, Five Blows, ft.	Set, Five Blows, ins.	Average Set, ins.	El. of Pt. after Driving, ft.	Penetration, ft.	REMARKS.	Up Tons.	Down Tons.	Notes.
1	41.5	11½	6	93.5	9	7	0.7	11	3	0.6	65.9	27.6	Driven 12.9 feet, May 21, 1897, 10.30 A. M.	Bark on.		No movement of this Pile, or of No. 5 from same loading.
2	32.0	12	8	94.0	13	4	0.4	"	Not taken.	0.4	66.9	27.1	Continued May 22, 8.30 A. M.	Bark on.		
3	41.0	12	6	93.6	8	5	0.5	"	2	0.4	59.9	33.7	May 21, P. M.	Bark off.		
4	38.6	12	7	93.7	8	4	0.4	"	1½	0.38	62.6	31.1	Began 4.30 P. M., May 21.	"	30.6	
5	35.0	12	7½	94.0	11	5	0.5	"	1 Blow = 0.50	0.50	64.4	29.6	Continued 7 A. M., May 22.	"		
6	30.0	12	8	93.4	10	7	0.7	"	3½	0.7	82.3	11.1	Began 7.30 A. M., May 22.	"	36.8	Settled 1.4. (See No. 15.)
7	30.0	11	9	93.5	9	5	0.5	"	3	0.6	81.0	12.5	" 10 A. M., May 22.	"	38.0	
8	25.0	12	8½	93.8	9	5½	0.55	"	2½	0.53	78.8	15.0	" 1 P. M., May 22.	"		
9	25.0	12	8½	94.0	12	11	1.10	"	1½	0.35	76.1	17.9	" 2 P. M., May 22.	Bark on.	31.0	At this strain Pile head No. 12 pulled off. Same loading.
10	25.0	12	8	94.0	12	9½	0.95	"	2½	0.43	76.8	17.2	" 3 P. M., May 22.	"		
11	25.0	11	7	93.9	9	5½	0.55	"	2½	0.53	76.9	17.0	" 4 P. M., May 22.	Bark off.		
12	25.0	12	8	94.0	10½	4	0.4	"	1	0.2	76.3	17.7	" 7 A. M., May 24.	"	25.0	At this strain Pile head pulled off. (See No. 9.)
13	25.2	12	8½	94.2	10	5	0.5	"	2½	0.48	77.7	16.5	" 8 A. M., May 24.	Bark on.		
14	25.7	12	9	94.1	11½	6½	0.65	"	2½	0.55	74.5	19.6	" 9 A. M., May 24.	"		
15	25.0	12	9½	94.1	8	4	0.4	"	1½	0.30	78.2	15.9	" 9.30 A. M., May 24.	"		
16	25.0	12	10½	94.3	11	6	0.6	"	2½	0.45	74.8	19.5	" 10.15 A. M., May 24.	Bark off.	31.0	No movement of this Pile, but No. 6 settled from same loading.

PILE TESTS, BOSTON TRANSIT COMMISSION, NEAR HAYMARKET SQUARE.
After Piles had been in Ground 25 hours.

The test on piles 9 and 12 failed on account of pulling off the head of No. 12.

It is to be regretted that the test on Nos. 4 and 5 could not have been carried to the ultimate load, which would have been 50 or 60 tons, in my judgment, — not an easy load to handle.

The purpose of the test, however, had been accomplished. Tests finished June 7, 1897, Mr. H. R. Kimball, assistant engineer.

In applying any formula dependent upon the set of pile, due to a certain fall of hammer, a correction for overhaul of line from drum to hammer should be made of from 8 to 10 per cent upwards, this correction being subtracted from the weight of the hammer.

I have observed instances elsewhere where the engine was at some distance and working diagonally to the driver, with ropes, leaders, etc., new, where this correction averaged 50 per cent for 10 cuts of the hammer line, using successive sets as a basis for comparison.

The history of piles and pile-driving is interesting and instructive. If we do not consider what has been done in the past, as suggested by Sir Christopher in the text, it might well be said of us:—

"The pile by the river's brim
A wooden pile was to him,
And it was nothing more."

To this end I beg leave to call your attention to the following authorities as I consider them:—

SIR CHRISTOPHER WREN.

First, Sir Christopher himself is quoted (Davy, 1841) as saying that the piling when properly employed will outlast the durability of the superstructure itself. And he built St. Paul's and fifty churches besides.

PERRONET.

Coming down to the eighteenth century, the noted French constructor, Perronet, gives definite instructions regarding pile-driving. He said that a pile can support a load of 25 tons as soon as it refuses to move more than $\frac{3}{8}$ inch under 30 blows of a monkey weighing 1,190 pounds falling 4 feet, or under 10 blows of the same monkey falling 12 feet. At Neuilly, however, Perronet placed a load of 51 tons on piles 13 inches square, but driving the pile till it refused to move more than $\frac{3}{8}$ inch under 25 blows of a monkey of same weight falling 4 $\frac{1}{2}$ feet; but such a load was unusual.

At Bordeaux the driving was stopped when the pile did not go down more than $\frac{3}{8}$ inch under 10 blows of a monkey weighing 1,100 pounds falling about 15 feet. But one of the piers settled considerably, the load on a pile being 22 tons, whereas, at Rouen, by insisting on Perronet's rule, no settlement occurred.

In this connection it is stated that M. Sazilly concluded from experiments made at the Orleans Viaduct that piles might support, with security, a load of 40 tons when they refuse to move more than $\frac{1}{2}$ inch under 10 blows of a monkey weighing 1,500 pounds falling 13 feet.

While these results seem large, it is to be noticed that the piles were 13 inches square, as stated.

LONDON BRIDGES.

A word here as to the London bridges, so instructive on account of their failures. In general, trouble came when piles fell short of reaching stiff blue clay and were too heavily loaded.

Old London Bridge was commenced in 1176 and finished about 1209. The piers rested on piles driven only around the outside of the pier, so placed as to carry the whole weight. They were of elm, and at the expiration of 600 years, on being drawn up, showed no material decay. A part of this bridge fell about 1281, and the whole structure was removed to give place to the new bridge in 1825. This gives us a clue to the age of the game we see the children play, familiar to all: "London Bridge is falling down," etc.

Old Westminster Bridge (1738-49) failed,—piles in one pier only.

Black Friar's Bridge (1760-71) failed also,—45 piles in each caisson. Rebuilt and completed 1869.

Waterloo Bridge (1809-17) failed,—68 tons per pile.

New London Bridge (1825-1831) has settled about a foot down stream in places,—80 tons per pile, or 5 tons per square foot of entire area of the pier.

New Westminster Bridge, begun in 1858, on the contrary, has not settled with 12 tons per pile (test of 60 tons) and 2 tons per square foot of foundation. Elm piles 32 feet long are driven 18 to 20 feet into the blue London clay.

New Tower Bridge, completed 1894,—caissons about 21 feet into the bed of the river.

PRACTICE IN HOLLAND.

Turning to Holland, we find the engineers using the following formula (Mason's) at the beginning of this century:—

$$L = F \frac{W^2 h}{S(W+P)}$$

and also another modification similar to Sanders's formula.

In Holland the greater part of important engineering structures have to be built on piles which never reach rock; at the best, only a stratum of coarse sand or gravel, and often not even this, in which case the pile is supported by the friction and adhesion of the sur-

rounding soil. R. Haagsma (*Engineering*, 1892) also states that the factor 6 was applied to the above formula generally. He proposes a new one, which he claims is more correct in theory:—

$$L = F \frac{h_1 - h_2}{S_1 - S_2} \cdot \frac{W^2}{W+P}$$

Where h = fall.

W = weight of hammer.

P = weight of pile.

S = set.

L = safe load.

F = factor-of-safety.

Certainly the Dutch have had a long experience with bearing-piles. The original site of the City of Amsterdam was a salt marsh requiring piles 50 to 60 feet long. After passing through a mixture of peat and sand of little consistency, at a depth of about 40 feet they enter a bed of firm clay. The tops are sawed level and covered with thick plank, on which the masonry is constructed. Though some of the houses have declined from the perpendicular, they are considered to be quite secure against falling.

The Palace was built in 1648. The natural ground is below the level of the ocean.

St. Petersburg is also founded on piles,—sometimes several tiers of them. Venice also. But data are wanting regarding both cities.

PRESERVATION UNDER WATER.

Before leaving the continent, however, mention might be made of a remarkable example of preservation of piles under water, in the bridge built by the Roman Emperor Trajan, over the Danube. Cressy (*Encyclopædia of Civil Engineering*) states that a pile examined in the last century "was found petrified. This, however, was not the case for more than the thickness of $\frac{3}{4}$ inch, beyond which the timber was not in any way changed from its ordinary character." That is during 17 centuries.

ROYAL BORDER BRIDGE.

We come next to the Royal Border Bridge over the Tweed, formally opened by the Queen and Prince Albert, 1850, when Her Majesty was pleased to name it. Mr. George B. Bruce, Chief Engineer, says in a paper to the Institution of Civil Engineers:—

"It is very difficult to lay down any general laws with regard to piling. The strata through which a pile has to pass may in one case offer little resistance; yet other strata bearing the same name and apparently of the same character will offer great resistance and be very difficult to penetrate. Thus, though borings are exceedingly valuable, and afford great satisfaction to the engineer, inasmuch as he feels he is not working altogether in the dark, yet they cannot always be depended upon. Nothing can make him feel quite sure but actual trial, by driving a long pile as far as it can be got into the site of the pier.

"It is the common practice, when laying down in design the lengths of the piles, for carrying a bridge or other work, to show them to be driven 3 or 4 feet into gravel, provided it is conveniently situated; but, according to the experience gained in this work with Nasmyth's piling machine, even strong gravel does not present any great resistance to the motion of piles pitched 3 or 4 feet from each other, unless the gravel is lying on a sub-stratum harder than itself.

"Thus in some instances piles were driven down 30 feet below the bed of the river, and in strong gravel went at the rate of 1 inch by 3 blows, the strata under the gravel being soft; whereas when the gravel was on rock they did not penetrate more than 1 inch by 200 blows. The bearing-piles of this bridge carry each about 70 tons. The standard of intensity which was fixed for the driving of these piles was 1 inch by 150 blows at the end of the driving; but in two of the piers the driving did not average more than 1 inch by 20 blows of 1,700-pound hammer falling 16 feet.

"This, though practice has proved it to be sufficient, is considered too easy [!] driving to be trusted with such a load, if circumstances admit of their being driven harder. They were driven from 30 to 40 feet into gravel and sand, which latter was in some cases wet.

"The greatest length of bearing-piles driven in one day of 10 hours was 189 feet; but the average driving was not more than 50 feet, making the average cost of manual labor 7 1-2 pence per lineal foot. Total cost Royal Border Bridge, £120,000; composed of 28 semicircular arches, 61 feet 6 inches span; height above river, maximum, 126 feet."

JOHN C. TRAUTWINE.

John C. Trautwine (*Journal Franklin Institute*, 1842) gives various results and designs and argues in favor of piles for what he calls "railroad superstructure."

The Nasmyth steam hammer was invented in 1839, and first used in harbor works, 1845. This seems to have given an impetus to pile-driving in England and in this country.

(To be continued.)

RODIN'S STATUE OF BALZAC.—The Société des Gens de Lettres has decided to refuse the much-talked-of statue of Balzac ordered by it and exhibited by Rodin in this year's *Salon*. It has passed a resolution protesting against the model that M. Rodin exhibits at the *Salon*, in which it "refuses to recognize a statue of Balzac." It is possible that the famous sculptor may bring suit against the society to compel it to accept his work, or he may accept the offer for it made by M. Auguste Pellerin, a wealthy amateur.—*N. Y. Tribune*.



THE SALON.—THE EXHIBITS OF THE SOCIÉTÉ DES ARTISTES FRANÇAIS.

HERE they are—the Société des Artistes Français (formerly of the Champs Elysées) and the Société Nationale des Beaux-Arts (formerly of the Champ de Mars) brought together under the one roof of the Machinery Gallery and presenting the semblance of a single *salon*. One has to pass through only a single turnstile, and for the modest sum of a single franc one can examine 3,391 paintings and 1,068 pieces of sculpture, without counting drawings, water-colors, pastels and objects of art. It must be granted that this is not expensive. The two *salons* occupy the whole ground-floor of the nave of the Machinery Gallery; the paintings are placed on either hand of the length of the nave, leaving between them a large space which forms a garden for the exhibition of sculpture. The Société des Artistes Français occupies about two-thirds of the building, the other third being reserved for the Société Nationale. The two rivals are separated one from another only by the grand buffet-restaurant—the neutral ground where their partisans meet one another with glass and fork in hand. The public passes from one to the other scarcely conscious of change. In spite of this, the two societies remain distinct and have their individual catalogues and a scheme of decoration which is peculiar to each. In both directions the result is very successful, perhaps a little better on the side of the Société Nationale in that which concerns the gallery of paintings; but the general effect of the garden of sculpture is very attractive, and from the moment of entry one is charmed by the beautiful perspective of this nave filled with works of art arranged with great taste. This first impression is changed to a certain disquiet when one thinks of the goodly number of canvases amongst which it will be necessary to make a choice. Formerly, when the two *salons* were separated, the effect was not quite the same; one did not take in at a glance the immense surface occupied by the artists. To-day, when they are all brought together, one must not lose his head, but must organize in the most practical manner possible his scheme of examination. In this first notice we shall review the twenty-nine rooms devoted to the Société des Artistes Français. We shall find enough here, and can reserve for the next visit the eighteen rooms occupied by the Société Nationale des Beaux-Arts and all the sculpture, amongst which we shall find some very interesting work.

The Société des Artistes Français has given a special position to a very important piece of work by M. Cormon, who exhibits in a special room all the decorative paintings intended for the new Museum of Natural History, at Paris. While these form a decoration, they also are a very instructive review of human life from its beginning. The work consists of a great ceiling and ten panels. The ceiling shows us the immense procession of the races of man losing itself in the infinite distance in grayish and delicate nebulousness. In the foreground is primitive man, behind him the Aryan races are led on to civilization and light by Greece: the composition is fine in movement. This ceiling is the only allegorical portion of the work. The ten panels which accompany it contain the history and the development of humanity from the time of primitive man downwards. They are very highly studied and form very interesting documents, having their places already assigned them in the Museum. Amongst these ten panels, that one is notable which is consecrated to the epoch of polished stone and the dolmens. It represents the little workshop of a potter, and in the background the funeral of a chieftain. Another, a scene from the Age of Bronze, "The Agriculturists," in which bread is being distributed to the field-laborers, should be noted because of the charming manner in which primitive life has been recalled. These decorations do great honor to M. Cormon, who at the same time exhibits studies and sketches which show the experimentation of a painstaking artist.

There are several other good decorative paintings, I mean canvases truly decorative, composed for a definite position, and not mere pictures which, in spite of their intrinsic value, have none of the qualities demanded by decoration. M. Rochegrosse, who exhibited nothing last year, to-day takes his revenge with a very pretty decoration for the library staircase at the new Sorbonne, entitled "The Song of the Muses awakens the Human Soul." In the most luminous portion of the canvas, 'mid wild surroundings, the Muses advance; the Muse of Music, in front of her companions, arouses to the sound of her lyre men and women of the primitive type who seem to emerge from their torpor and gaze upon the passing Muses with an air of astonishment. A pretty, nude figure occupies the centre of the composition, and starts up surprised and charmed by the songs so novel to her.

M. Sinibaldi this year finishes the decoration of the Salle des Commissions du Ministère du Commerce et de l'Industrie. Having shown us "Commerce" last year, he now exhibits "Industry," to whom Science and the Arts offer their discoveries. The composition

is conceived in the same feeling as that of '97, and with it will have perfect accord so far as conception and color are concerned. It is, perhaps, to be regretted that the *parti*, the decorative idea, should be so largely identical. As in the panel representing "Commerce," so this which represents "Industry," shows a port of debarkation above which float in space the figures that symbolize Science and the Arts: standing, clothed like a common blacksmith, Industry gazes on them as they approach. In the foreground laborers are at work, indifferent to this scene in which symbolism is mixed with reality in a most ingenious fashion.

The ordinary formula of ceiling decoration—nude or draped women capering about over the clouds in the company of genii and loves, or simple flowers—is conscientiously followed by MM. Marioton and Simonidy, who can be cited, if not for their originality, at least for the grace and elegance of their compositions. M. Gervais, who also exhibits a ceiling, has not known how to escape the cloud-surrounded female, but he is less banal and there is a certain amount of expression in his nudities, which are modelled in the most charming fashion. It is called "les Pommes." The man, who has accepted the apple from Eve, does not wear an air of great satisfaction; he doubtless already recognizes the inconvenience that will follow his act and his expression is a grieving one. On the other side, Venus, smiling and seductive, accepts the apple which Paris offers her.

Is it really right to call the painting prepared for the Hôtel de Ville by M. J. P. Laurens decorative painting? Evidently not, but it is a good historical painting, representing the arrest of Broussel, who brought about the "day of the barricades" at Paris in 1648. The composition recalls that of the "Arrest of the Princes of Condé," by Paul Delaroche. Broussel, arrested, is descending the staircase of his house; he is surrounded by halberdiers and preceded by the lieutenant who has arrested him. The latter occupies the centre of the painting, upon which he stands out strong and dark, and this is a mistake. In the painting of Paul Delaroche, the eye was drawn very frankly to the principal personage, the Prince of Condé. In the work of M. J. P. Laurens, Broussel does not concentrate on himself the observer's interest; at the first glance one only sees this tall lieutenant, or black *commissaire*. The other personages are well grouped on the staircase, at the top of which are weeping females whom Broussel seems to try to calm with a look.

M. Henri Martin makes a specialty of apparitions which appear to troubadours, clad in red, in the midst of pine woods. This year his troubadours, in a vision which is very luminous, perceive Clémence Isaire hanging between the pine trunks; in the distance there are some nice effects of light that are really very delicate, and M. Henri Martin has somewhat attenuated his tiresome practice of little touches and hatchings. This canvas is intended for the Capitol at Toulouse, for which also M. Destrem exhibits two decorative panels which will be, perhaps, well enough in place, and which are treated in tones discreetly warm, as is befitting a southern home.

Beside these decorative paintings there should be mentioned the great composition of M. Henri Danger, styled "The Great Workmen of Arbitration and Peace." This immense painting has been conceived and ordered by M. Ansbert-Labbé, member of the Société Française pour l'Arbitrage entre Nations, and it has for its aim the recalling of all the efforts that have been made through all time and in all countries to resolve by arbitration quarrels which arise between different peoples. This work is dedicated to Russia in glorification of that grand arbiter, the Emperor Alexander III. He occupies the centre of the composition. About him, in a temple as yet unfinished, are grouped in a semicircle all the personages who have been able to contribute to the idea of arbitration, from Buddha and Confucius downwards. Fortunately all are not shown, but we can pick out Plato, Leo X, Henry IV, Sully, Fénelon, Carnot, Leo XIII, etc. As you see, it is a great apotheosis, which demands an enormous amount of talent to arrive at even a cold and photographic effect, and this is all that M. Danger has succeeded in creating.

In the same way, it is rather a painting than a decoration which M. Girardet intends for the Grand Hall of Council at Neuchâtel. His "Defence of the Bridge at Thielle" is a good museum picture, an honest page of history, but uniform in tone and lacking in values.

M. Collin is more of a decorator. His panel for the Salon of the new Opéra Comique, called "The Harmonies of Nature inspire the Composer," is a sweet and harmonious painting. The Harmonies, personified by two winged figures, are singing in the ears of a composer robed in white and quite as diaphanous as his inspirers. The scene takes place in a garden bathed in mist, which envelops the canvas in a pale light.

For some time, religious or mystic composition seems to have tempted all our artists. This year the exhibition contains several canvases interesting as paintings, but which most often lack both feeling and emotion. Such, for example, is M. Aubert Joseph's "Last Supper," which contains execution of a noble quality. Christ, standing, holds in His raised hand the glass of wine, and seems to pronounce the sacred words "This is My Blood"; His disciples are leaving the table and kneeling before Him, while Judas, standing behind a column, hides his face with an expression which is the best thing in the painting, itself very well composed but quite without any religious inspiration.

The "Mary Magdalene" of M. Devambez is also, as a composition, a fine piece of work. This artist has very ably expressed the

feeling of the notorious sinner when first she sees and hears Jesus. The latter, on a staircase, in full light, in a crooked street, is surrounded by a crowd of wretches seeking comfort and whose rags contrast with the rich clothing of Mary Magdalene as she kneels at one side in a half light which seems to emanate from Jesus. M. Devambez, who is a young artist, evinces by this work a talent that is full of promise. Among the painters who have attempted religious subjects may also be mentioned M. Bourgonnier, who exhibits a "Christ"; M. Flandrin, whose "Calling of St. John and the Return from Calvary" is a good church picture, and M. Henner. The latter, always much admired, exhibits "The Levite, Ephraim, and his Dead Wife," conceived in the feeling common to all his works. Whatever may be the subject treated by M. Henner, there is always the human body modelled in that peculiarly wan fashion which this artist never abandons and which has its attractiveness. But on reflection one can regret this process which, each year becoming more simplified, finally becomes nothing more than an able sketch wherein the drawing becomes more and more vague. This year this criticism is justified by the really exaggerated abandonment of drawing and line. The head of the Levite is made by a few brush strokes; the draperies which suffice him for clothes are not modelled, and seem only agreeable touches of color in contiguity to the white flesh tones. M. Henner also exhibits a portrait of a young girl in black which is very attractive.

A very pretty composition, very graceful and delicate, signed Paul Leroy, obtains a deserved success. It is called "The Bath," and represents young girls on the brink of a clear river. The flesh, both blonde and brunette, is rendered with adorable freshness; in the foreground, a young girl with charming movement is stripping herself and casting aside her drapery, of a delicate rose tone which harmonizes perfectly with her white flesh.

Amid the nudities, sufficiently numerous at this exhibition, there are a few that are attractive without being merely affected. Those by M. Bouguereau are always exasperating in their perfection and brilliancy; it is porcelain-ware that he paints, not life. If an artist cannot paint the truth, he should at least succeed in arousing in us a sensation of some kind or another, and this is what M. Bouguereau is incapable of doing, while it is this power which M. Clairin possesses, whose "Grande Vague" attracts us by its strange and supernatural power. The naked figure, coiled with sea-weed rolled about its body, is backed up against a torrent whose huge waves drag it along in their whirlings. The subject is very interesting and decorative.

Before attacking the long list (although, perforce, incomplete) of artists who have undertaken to attract our attention, we must assign a place absolutely apart to a master of the French school who every year secures our admiration and maintains our glory. I mean M. Roybet. Here are no mere "processes"; here is no longer search for originality by means of complications or extraordinary simplifications; here are no violent contrasts which produce those too-easy effects; here are no "trucs" (to use a slang but expressive word). M. Roybet is a great painter, powerful, vigorous and conscientious. His works can rival the most beautiful, and his canvases will always remain a glorious manifestation of the art of our epoch. His "Lesson in Astronomy" is a marvellous painting. Standing before a globe which he points to with his finger, the astronomer is speaking to a group of hearers, ranged about him and clad in picturesque fashion: large mantles and ruffs, hats with broad brims, lend to this painting an air of oddity which its real value could well do without. The fact is that M. Roybet took his models from amongst our artists and all these personages are so many living portraits. So here we can recognize MM. Jules Lefebvre, J. P. Laurens, Bouchor, Guillemet, Cormon, etc.

By the side of M. Roybet must be placed M. Benjamin Constant, whose portraits are admirable. Chief among these this year are those of M. Hanotaux, minister and member of the Académie Française. There are many other very good portraits, but to name them all would be impossible. Still, we should cite MM. Bonnat, Baschet, Humbert, Morot, and Chartran as worthily representing the French school. I ought to speak now of a large number of interesting works, but, to avoid lengthening this article, I am obliged to limit myself to a few; but I am unwilling to omit M. Fantin-Latour, that artist so full of delicacy and fine perception, so in love with the female figure, which he renders in such admirable and seductive fashion. His vaporous modelling recalls that of Diaz, and his charming nudities evoke the graceful and joyous visions of Fragonard. His little canvas titled "Le Lever" might be signed by the *galant* painter of the eighteenth century.

M. Gabriel Ferrier also likes pretty women, for those that he paints are always young, smiling and fresh — too fresh; but this defect will diminish as time goes by, which will surely lower the fires of his palette, and even then there will still be enough to leave M. Gabriel Ferrier a brilliant painter. He exhibits this year two canvases — "Hour of Youth" and "Thoughts of Love" — whose rendering corresponds with these charming titles.

I should much like to speak about the *genre* subjects, which are very well represented this year. People may say that this is not grand art, and that may be true, but it is an art which demands intelligence, and when the intelligence is fine and the taste good, when observation is mingled with it, one may experience a most poignant satisfaction. Observation is a quality which in the highest degree is possessed by M. Jean Geoffroy, who to the very bottom

analyzes the soul of his children. With astounding exactitude, he seizes upon all their expressions, their joys, their griefs, their astonishments, their disquietudes. All this little world lives under the palette of M. Geoffroy naturally and without "pose." The "Dame School" (an order from the State) shows us a crowd of little brats about the wash-basins, whose threatened use inspires them with very different feelings. It is all very amusing and very knowing, but wholly unlabored and without pretence, and it is this characteristic which distinguishes M. Geoffroy from M. Lobrichon, whose adorable babies are rather studied and composed than natural. They seem to have been posed for their pictures, while those of M. Geoffroy are snap-shots full of feeling.

Feeling is one of the most charming qualities of M. Émile Adan's palette. "The Reader" is a young girl on a terrace, reading by the side of an aged lady. "The First Lesson" shows a Sister of Charity sitting in a garden near a little girl, and these two little paintings create an impression, the first of melancholy, and the second of absolutely enchanting calm. M. Gelhay seems to imitate the style of M. Adan: his "Coin de Province," where a young girl is reading in a secluded alley, expresses this same emotion of melancholy quite simply obtained. M. Beyle tries to force this feeling without being quite able to accomplish his end: the star of a country circus is going to partake of her first Communion, and the contrast between the shelters of the circus troop and the band of communicants, conducted by the sisters, yields an easy effect that is quite lacking in sentiment. We find it again, however, in a very good painting by M. Schuler — "A Visit to the Convent" — which shows an old pupil who is making a visit to the sisters who brought her up. In the parlor, bare and clean, the sisters surround the young girl, asking questions and altogether happy at seeing her again, and she, all smiles, is also happy at finding herself once more in the pure and calm atmosphere of the convent.

The *genre* paintings devoted to gay and brilliant costumes, with lords and marquises, luxurious draperies, worldly cardinals, paintings which, to be effective, demand only a careful and intelligent execution, are defended with much talent by MM. Alonso-Perez, Adrien Moreau, Outin and Brunery, this latter devoting himself in especial to high-living cardinals: the ones who, at the end of a good feast, have summoned the *chef* to drink to his good health are very amusing, but the one who in the midst of a pasture is hanging to a tree so that he may escape a bull who most unfortunately has interrupted his studies is merely caricature. The intelligence of M. Outin is of finer quality, and he exhibits a milliner's workroom in the time of the Directory which is very interesting and very delicately treated.

For lack of space I must refrain from mentioning all the good landscapists, yet I must mention M. Gagliardini, a virtuoso in rendering the sunny effects of the South, and also M. Guignon, whose "Cloud," black, above a field of grain whose golden spears still reflect the sunlight, chronicles a very curious effect of light and atmosphere just before a storm.

After having mentioned the Oriental studies by M. Bompard and the marines by MM. Allan, Broutelle, Demont Breton and Ravaut, I will finish by the military subjects. Amongst these, the canvas ordered of M. Detaille by the State is particularly remarked. It represents the Emperor and Empress of Russia and the President of the Republic returning to the station after the review in the plain of Chalons, October 9, 1896. The presidential landau passes between lines of cuirassiers and dragoons, while the standards droop in salute before the Emperor of Russia. The scene is fine, but M. Detaille, in order to be true to the souvenir of this glorious but rainy day, has darkened his canvas under a cloudy sky timidly lighted by a few rays of the setting sun which fortunately cast a little light over the important personages. But for this, this painting of M. Detaille's, which thrills with military feeling, is worthy of the patriotic and artistic success which it has won for him.

M. Tinayre exhibits two large military paintings which would have been much better had they been smaller. They show two episodes in our campaign in Madagascar. In one, the leader of a baggage-train falls dead on the road, deep with dust, and burned up by the sun. In the other a column is marching over the arid mountain-path of a dry and desolate country-side. Yet, in both of these paintings there are good qualities and a certain sense of dramatic feeling.

I will also mention the very good paintings of MM. Grolleron, Marchand, LeDru, Boutigny, Fouqueray, Delahaye, Berne-Bellecour and François Flameng. The latter demands recognition in a painting of the "Battle of Waterloo," of most extraordinary animation. Horses and men, crazed with excitement, trample one another in the midst of cannon and the dead and dying. It is superb.

From the many names which I still find in my notes without being able to speak of them can be inferred the considerable amount of talent that has been shown at this *Salon* of the Société des Artistes Français; and now shall we find as much, and as many, in the exhibit of the Société Nationale des Beaux-Arts?

LONDON THE HARDWOOD MARKET. — London is the hardwood market of the world. American buyers of Mexican woods go to London to make their purchases instead of Mexico. The woods are shipped to London and then back to the United States, for the reason that London is the exchange market of the world. — *Manufacturers' Gazette*.

CARBOLINEUM: A WOOD-PRESERVER.¹

THE ideal wood-preserver must be one which combines the efficiency of the chlorides with the permanency and efficiency of the dead oil creosote process, in a form readily absorbed by the wood, without the aid of cumbersome machinery or expensive pressure appliances, and which can be successfully applied to the lumber anywhere by unskilled workmen.

This ideal in a wood-preservative was very nearly attained in 1870 by R. Avenarius, an officer in the Prussian army, in his efforts to produce a compound which would preserve from decay the vineyard stakes in the valley of the Rhine. To this preparation was given the name "Carbolineum," which has since become known as a successful wood-preserver in all parts of the world. In 1887 the following report was made by the United States Department of Agriculture regarding this first product:—

"According to F. Engle, government surveyor of buildings (Germany), painting wood with Carbolineum as a protection against the weather and rot gives favorable results. The Imperial Government surveyor of buildings also confirms this statement in a certificate under date of January 19, 1885, in which he states that on the imperial roads woodwork used in underground construction during the years from 1870 to 1885, when painted with Carbolineum, had no decay up to date of certificate. For the sake of experiment two pieces of pine wood, taken from the same plank, were thus treated: the first was painted with Carbolineum, while the second was left in its natural state, and both placed in the ground under the same conditions. At the end of three years the painted specimen was found to exhibit no signs of decay, but the unpainted one was in a rotten state.

"The district surveyor of buildings inclines very favorably to the use of Carbolineum on buildings in the water, and on sluice-gates, dam-barriers, piles, posts, especially when the wood is kept wet or dry, or by turns wet and dry. It is found that Carbolineum is cheaper than the semi-fluid tar. For an area of 6 square metres, 1 kilogram of Carbolineum is ordinarily used; and its superiority over tar is shown by the fact that even the largest manufacturers, where tar is a by-product and the use of which costs nothing, are coming to use Carbolineum.

"It is best and most advantageous to paint with hot Carbolineum, for in this state it is more fluid than when unboiled, and for this reason penetrates into all cracks and openings, at the same time dissolving any rosin or oil present; it also disinfects more energetically in a warm state than in a cold one. In warm weather, and on wood when the surface is not buried in the earth, it is only necessary to give a thicker coating of the unheated oil, especially as it can be repeated after a while. Wood that is not completely air-dried must always be treated with hot Carbolineum. All the wooden parts of bridges that are exposed to change of wet and dry, as well as their gravel-covered layer of planks, are painted with two coats of hot Carbolineum."

Since the date of this report very valuable improvements have been made and patented by the original inventor, which brings "Carbolineum Avenarius" fully up to the requirements, above stated, of an ideal wood-preserver. The basis of the compound is the best and purest heavy coal-tar oils, or "dead oil," to which are added other powerful antiseptics, including that most powerful of all, chlorine, which induces such chemical changes in the crystallizable constituents of the dead oil as greatly to add both to its efficiency and penetrability, making the liquid self-impregnating and dispensing with the expense of a plant and machinery and transportation of the lumber.



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

DOORWAY OF THE MASONIC TEMPLE, DETROIT, MICH. MESSRS. MASON & RICE, ARCHITECTS, DETROIT, MICH.

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

STATUE OF ABRAHAM DE PEYSTER, NEW YORK, N. Y. MR. GEORGE S. BISSELL, SCULPTOR, NEW YORK, N. Y.

THIS statue, erected on the Bowling Green, was cast in Paris in 1896, and bears the following inscription on its polished red granite pedestal:—

ABRAHAM DE PEYSTER.
1685, ALDERMAN; 1691-'95, MAYOR; 1701, COMPTROLLER;
AND 1708, RECEIVER GENERAL OF THE PORT, OF NEW YORK;
1698, MEMBER OF EARL BELLOMONT'S COUNCIL;
1698, ASSOCIATE JUDGE OF THE SUPREME COURT;
1700, COLONEL COMMAND'G REG'T OF MILITIA OR CITY TRAINED BANDS;
1701, CHIEF JUSTICE;

¹ Extract from a paper C. S. McKinney read before the Engineering Association of the South and published in the *Papers of the Association*.

1701, PRESIDENT OF THE KING'S COUNCIL, AND, THUS, ACTING GOVERNOR OF THE PROVINCE OF NEW YORK;
1706-1721, TREASURER OF THE PROVINCES OF NEW YORK AND NEW JERSEY;
BORN 8TH JULY, 1657—DIED 2ND AUGUST, 1728.

JOHANNES, COL. ABRAHAM DE PEYSTER'S FATHER,
WAS BURGOMASTER 1673, ALDERMAN 1666-'9, AND 1673-'6,
AND DEPUTY MAYOR, N. Y., 1677;
JOHANNES, JR., HIS SON, ALDERMAN 1700-'10, MAYOR 1698.

ERECTED BY
JOHN WATTS DE PEYSTER;
SEVENTH GENERATION IN DIRECT DESCENT;
RESIDENT OF, AND SIXTH BORN, IN
FIRST WARD, CITY OF NEW YORK.

STATUE OF BARTOLOMEO COLLEONI, VENICE, ITALY. MEASURED AND DRAWN BY MR. WILL S. ALDRICH, TWELFTH HOLDER OF THE ROTCH TRAVELLING-SCHOLARSHIP, BOSTON, MASS.

DETAILS OF THE SAME.

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

GRANARD PRESBYTERIAN CHURCH, PUTNEY. MESSRS. J. C. T. MURRAY AND C. E. MALLOWS, ASSOCIATED ARCHITECTS.

THIS plate is copied from the *Builder*.

LÖWENBRÄUKELLER IN MÜNCHEN. ERWEITERUNGSBAU VON PROFESSOR FRIEDRICH VON THIERSCH DASELBST.

THIS plate is copied from *Architektonische Rundschau*.

[Additional Illustrations in the International Edition.]

STAIRCASE AND STAIRCASE HALL: SCHLOSS, BRÜHL-ON-THE-RHINE, PRUSSIA: TWO PLATES.

[Gelatine Prints.]

SCHLOSS BRÜHL is considered one of the most notable of princely seats in Germany. It rises upon the ruins of an older castle which in 1689, during internecine strife, had been destroyed by the troops of the Bishop of Münster. In 1715, Joseph Clemens, Elector of Cologne, who, after spending, together with his brother, Max Emanuel, Duke of Bavaria, twelve years in exile in France and the Low Countries, returned home in 1714, was planning to rebuild the castle. In that year he sent to Robert de Cotte, an architect he had met at the French Court, a sketch of the ground-plan of the new palace, directing him to design the façades and interior decorations for the same. Before the work was begun, however, the Elector died, leaving to his nephew, Clemens August, who succeeded him in the Electorate, the task of executing de Cotte's plans. Work was begun in 1725. About the year 1740, Balthasar Neumann, the architect of the Archiepiscopal palace at Würzburg, who has been mentioned before in these columns as one of the leading German masters of the Rococo period, took charge of the work. There can be little doubt that Neumann was the designer of the splendid staircase shown in our plate which forms the principal attraction of the building. For the detailing of the stucco-decorations, François Cuvillies, who, during his lifetime, was the artistic adviser of the Elector of Cologne, is probably entitled to special credit. The grand central trophy on the wall, facing the lower flight of the three-armed stairway, was done in stucco by M. Brüllie in 1765. Upon an obelisk-shaped pedestal, flanked by two seated figures, representing "Peace" and the "Fine-Arts," respectively, stands, under suitable draperies, the bust of Clemens August, Elector and Archbishop of Cologne, the patron of the arts (+ 1761). As a foil to the pedestal serve the emblems of ecclesiastical and mundane dignity and power. Coupled columns with Corinthianesque capitals rise on each side of the trophy, supporting an entablature, over which are seen sitting statues of "Faith" and "Justice," excellent specimens of decorative sculpture, their faces turned towards the Elector's coat-of-arms, which is surrounded by standards and spears, and surmounted by the electoral hat. To the left of the escutcheon the genius of "Renown" is seen, pointing with one hand to the electoral emblems, and holding a trumpet to his lips with the other. The side portions of the main wall contain doors, with prettily sculptured cherubs in semicircular panels above them, and over the cornice, in rich stuccoed frames, are portraits of various Electors. The ceiling, supported by ten couples of hermæ, has a large oval opening in its centre, surrounded by a dainty forged grille. Through this opening the grand ceiling, painted in 1731 by Nicolaus Stuber, is seen with astonishing effect. This painting represents the victory of good principle over bad, the blessings of peace, and the growth of art and science.

Of especial charm, too, is the wrought-iron work in the stair-railings and banisters, and still more the great lantern suspended from the middle of the ceiling. As regards the coloring of this beautiful interior, it may be mentioned that the columns of reddish stucco-marble stand out prominently upon a background of white, which forms an agreeable contrast with the gray-veined stucco of the panels and friezes, the whole breathing an air of joyousness and gayety, not incompatible with the seriousness and solemnity of the architectural forms of this remarkable staircase.

HALF-TIMBERED HOUSES, GOSLAR, PRUSSIA.

[Gelatin Print.]

GOSLAR, the one-time free imperial city, situated on the northern slope of the Harz Mountains, is one of the oldest German towns. Her origin is lost in legendary darkness. From old documents we know that, in A. D. 922, an enlargement of the royal residence took place, by order of King Henry I (918-936), who had extensive hunting grounds in that vicinity. His successors retained a distinct preference for the beautiful spot. Emperor Henry III (1039-1056) here erected a cathedral and convent, and built the famous imperial palace (Kaiserhaus), in the Romanesque style, which has quite recently been restored to its old-time splendor and decorated with large mural paintings on historical subjects.

The old town is still rich in buildings dating from the time of its ancient prosperity. Among these not the least attractive are the numerous private dwelling-houses in half-timbered construction with plenty of carved woodwork. The two shown in our plate are fairly representative specimens of the dwellings of the well-to-do citizens' class of the prosperous mining town, about the end of the sixteenth century. From the legend carved over the doorway, we see that the house to the right was built A. D. 1592, and similarly, the one to the left, A. D. 1606. The large shop-windows and entrance-door in the latter house, with their framework, are, of course, of modern origin. Noticeable is the peculiar way the roofing-slate is put on, a way so often seen by the traveller in Germany.

CORNER OF MOUNT AND SOUTH AUDLEY STREETS, LONDON, ENG.
MR. A. J. BOLTON, ARCHITECT.

NO. 26 PARK LANE, LONDON, ENG. MESSRS. BALFOUR & TURNER,
ARCHITECTS.

PORTICO OF THE SAME.



THE PENNSYLVANIA STATE-HOUSE. — Speaking of the projected State-house at Harrisburg, Pa., the *London Architect* uses these words: "That extraordinary building by itself will be almost enough to deter the English people from an alliance with the United States." In the Utopia to come perhaps a course in "Statecraft" may have to be included in the curriculum of our architectural schools.

OYSTER-SHELL WINDOWS AT MANILA. — A unique feature of all homes and offices in Manila is the use of tiny square panes of translucent oyster-shells instead of glass. A window six feet long and four feet wide will contain 260 of these oyster-shell panes. They temper the fierce glare of the sun in the buildings, and in a country where many people go blind from the constant sunshine this is a precaution to be taken. — *Boston Transcript*.

ARTISTIC COPYRIGHT. — In the discussion of the paper by M. Harmand on "Artistic Copyright" questions were asked the lecturer as to "whether he was aware that one firm of architects in the country did go so far as to patent one of their designs, and whether he had made any inquiries as to their care in taking out that patent, as to whether it was satisfactory to them, or whether it had any effect in any way upon other architects." To this Messrs. Flockton, Gibbs & Flockton of Sheffield have replied as follows: "We believe we are the only firm in the country who have patented a design, and that probably therefore the questions refer to us; and the Institute having so lately discussed the subject, it may interest readers to hear our replies, viz: We protected our design as a 'plan,' not as an 'artistic design,' and that it has not yet been directly infringed is due either to the care with which the patent was prepared, or to the worthlessness of the subject of it; that the latter is not the case we infer from the fact that nearly the whole of the municipal buildings since designed have partially adopted the separation of departments, that the separation of departments has been wholly adopted in a polytechnic institution, and the building in wings with a central hall and staircase has been adopted in a public hospital. In further reply, the patent has not been satisfactory to us, inasmuch as it has not benefited us, and has, we believe, deterred other architects from adopting the plan in its entirety. Remembering that at the time of taking out the patent we were recommended by the Council of the Institute not to do so, but to follow the honorable tradition of the medical profession, we are pleased to find that the kindred subject of 'Artistic Copyright' has been thought of sufficient importance to be the subject of a paper read before the Institute." — *Journal of the R. I. B. A.*

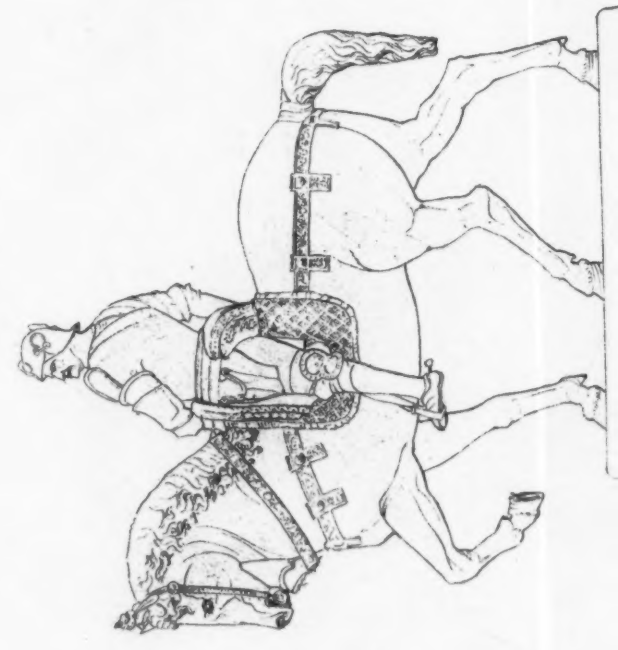
TO UNCOVER THE BURIED CITIES OF THE GILA. — The Bureau of Ethnology is planning an enterprise that is expected to yield results quite unprecedented in the history of American archaeological research. It is nothing less than the digging-up of the buried cities of the Gila valley in Arizona, where, as has long been known, there was anciently a great population. Through causes wholly unknown, the people who built these towns disappeared or perished, leaving behind them plentiful evidences of a high civilization in the shape of irrigating works on a vast scale and some remains of buildings of great size. The period of their occupancy of the region can only be guessed at, but the best possible reasons exist for supposing that it was at least 1,000 years ago; it may have been 2,000 years or more. — *Washington Correspondence St Louis Globe-Democrat*.

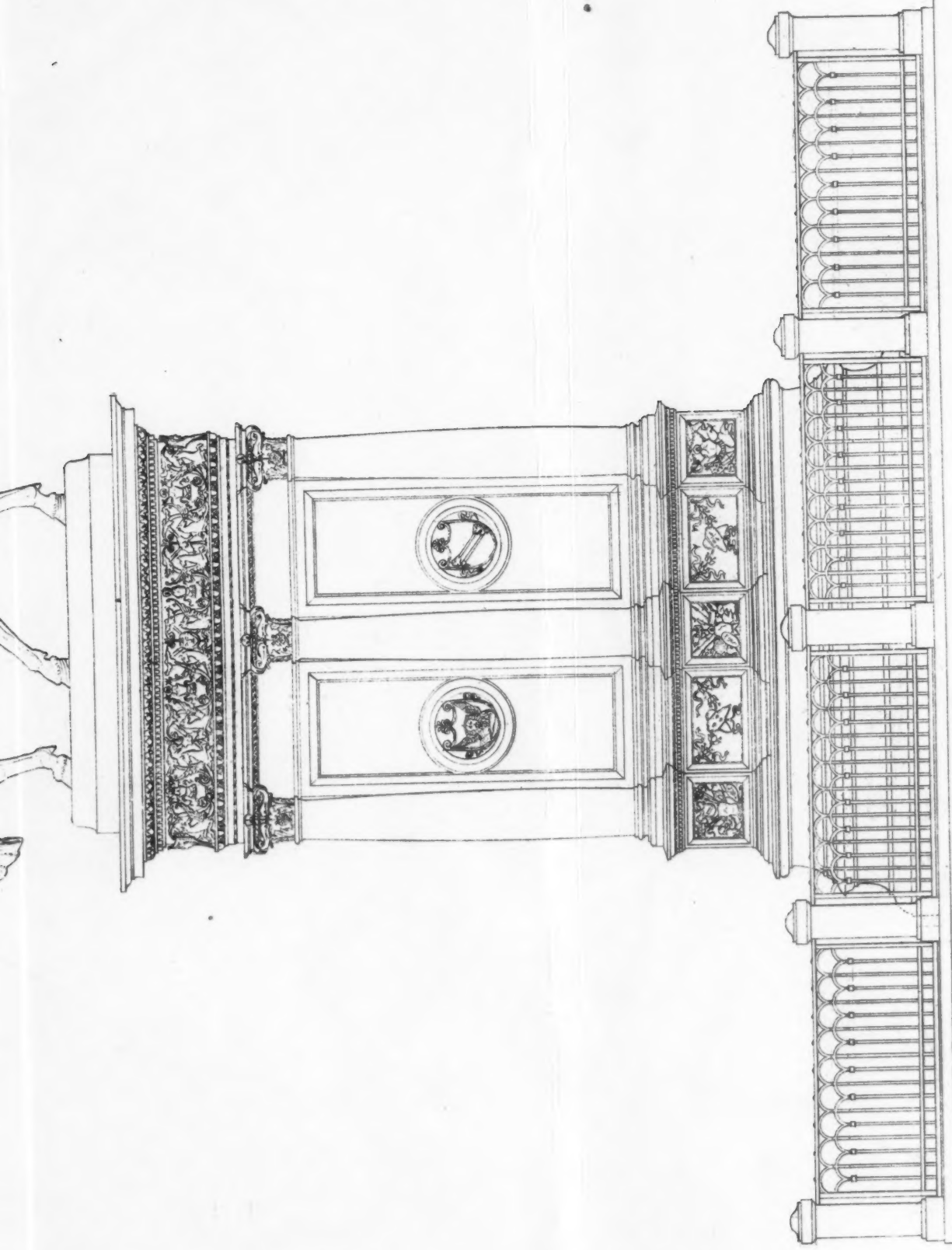
THE DUKE OF CLARENCE'S TOMB. — The monument which has been erected by the Prince and Princess of Wales to the memory of the Duke of Clarence and Avondale, in the Albert Chapel at Windsor Castle, has just been completed. It was designed and executed by Mr. Alfred Gilbert, R. A. The sarcophagus of Mexican onyx, which stands in the middle of the chapel, has now been surmounted by a group of statuary wrought in bronze, aluminium and marble. A recumbent statue representing the Duke of Clarence attired in the uniform of his regiment, the 10th Hussars, and lying in the folds of the Garter robe, reposes upon the gun-metal bier. The military embroidery upon the collar and the cuffs and the aiguillettes are gilded, and the head and hands are sculptured in white marble. In the Prince's right hand is a drawn sword, and round the blade is a spray of olive leaves, the end resting upon an open gilt-edge Bible. The left hand will clasp a crucifix. The lining of the robe is composed of aluminium, and an angelic figure, also cast in aluminium, and holding a gilt corona twined with light foliage, kneels at the head, and near the feet will presently be placed a figure representative of "Love Mourning." The body of the tomb is protected by a bronze railing. This is divided into twelve panels, which are adorned with gilt-winged angels supporting statuettes. Alternating with these, and affixed to the grille pillars, are the escutcheons of various royal houses, and whose armorial bearings are enameled in gold and colors upon silver shields, while beneath are representations of the Orders of Knighthood connected with them. — *Building News*.

THE BACTERIOLOGICAL TREATMENT OF SEWAGE. — An exceedingly important paper relating to the treatment of sewage was read before the recent meeting of the Society of Chemical Industry by Mr. W. J. Dibdin and Mr. G. Thudicum. It is now well recognized that the most efficient method of rendering innocuous ordinary domestic sewage is to rely, not on chemical treatment, but on the natural purification effected by putrefactive and nitrifying bacteria, which in the end entirely destroy the offensive organic matter contained in the crude sewage. It has, however, been suggested that these agencies would prove much less effective in dealing with the sewage from large manufacturing towns, which is often heavily charged with trade refuse. At Sutton, where the sewage is practically entirely domestic, though very strong, the bacteriological method of purification has been in successful operation for eighteen months, but it by no means followed that equally successful results would be obtained with the sewage from such a town as Leeds, where the waste liquors from the tanneries, galvanizing works, copper-precipitation works, and much shoddy waste all passed into the main sewers. However, a bacteria bed was made up at the Knostrop Works in October last. The material used was coke, the upper layer of the bed consisting of a depth of 4 feet 6 inches of coarse coke, while the lower bed, 5 feet thick, was of finer material. The sewage passed through amounted to 200,000 gallons per day. During the first three months the sewage was passed on to the bed direct, with the result that a quantity of fibrous material, mainly wool waste, accumulated on the surface of the bed. This did not appear to affect the character of the final effluent, but did reduce the water capacity of the bed. Seven weeks were required to bring the bed into proper working condition, but following this the oxidizing action became so powerful that the ferrous salts in the crude sewage were often found in the ferric state in the effluent. This latter is so pure that fish live in it. At Maidstone similar experimental works have been undertaken. Here the trade refuse comes from breweries and tanneries, and, so far, very promising results have been obtained in laboratory experiments with the crude sewage from this town. At West Bromwich the experimental filters have also proved satisfactory, though here the sewage is largely charged with waste pickle liquors from galvanizing works. The worst raw sewage in the country is supposed to be that from Yeovil, where the manufacture of glove leather forms the principal industry. In addition to particularly noxious organic matter, this sewage contains arsenic, which is largely employed in the preparatory treatment of the leather. Here the septic-tank system has been instituted, the crude sewage being kept for some hours in a closed tank, where the anaerobic bacteria bring into solution a very large proportion of the solid matters originally suspended in the liquid. This done, the sewage is next passed through filter beds, where the process of purification is completed by the oxidization of the organic matter. Messrs. Dibdin and Thudicum have also experimented directly on trade effluents before the latter have been mixed with domestic sewage. Good results have been obtained in all cases, except in that of gas-works liquors, which needed dilution before being passed into the bacteria beds. — *Engineering*.

A NOVELTY IN BELLS. — Herr Appunn, of Hanau, has invented a bell of a new shape, which is said to have a very deep tone, and to be as powerful as considerably heavier bells of the form at present in vogue. The shape is peculiar, being hemispherical, while the metal is uniform in thickness except near the "sound bow" (or the thickened tip which the clapper strikes). From the edge to some little distance above the sound bow the metal is very thick, and then alters suddenly to the uniform thickness which it has for the rest of the bell. — *Invention*.

MONUMENT TO BARTOLOMEO COLLEONI.
VENICE - SEPTEMBER 29 - 1896.

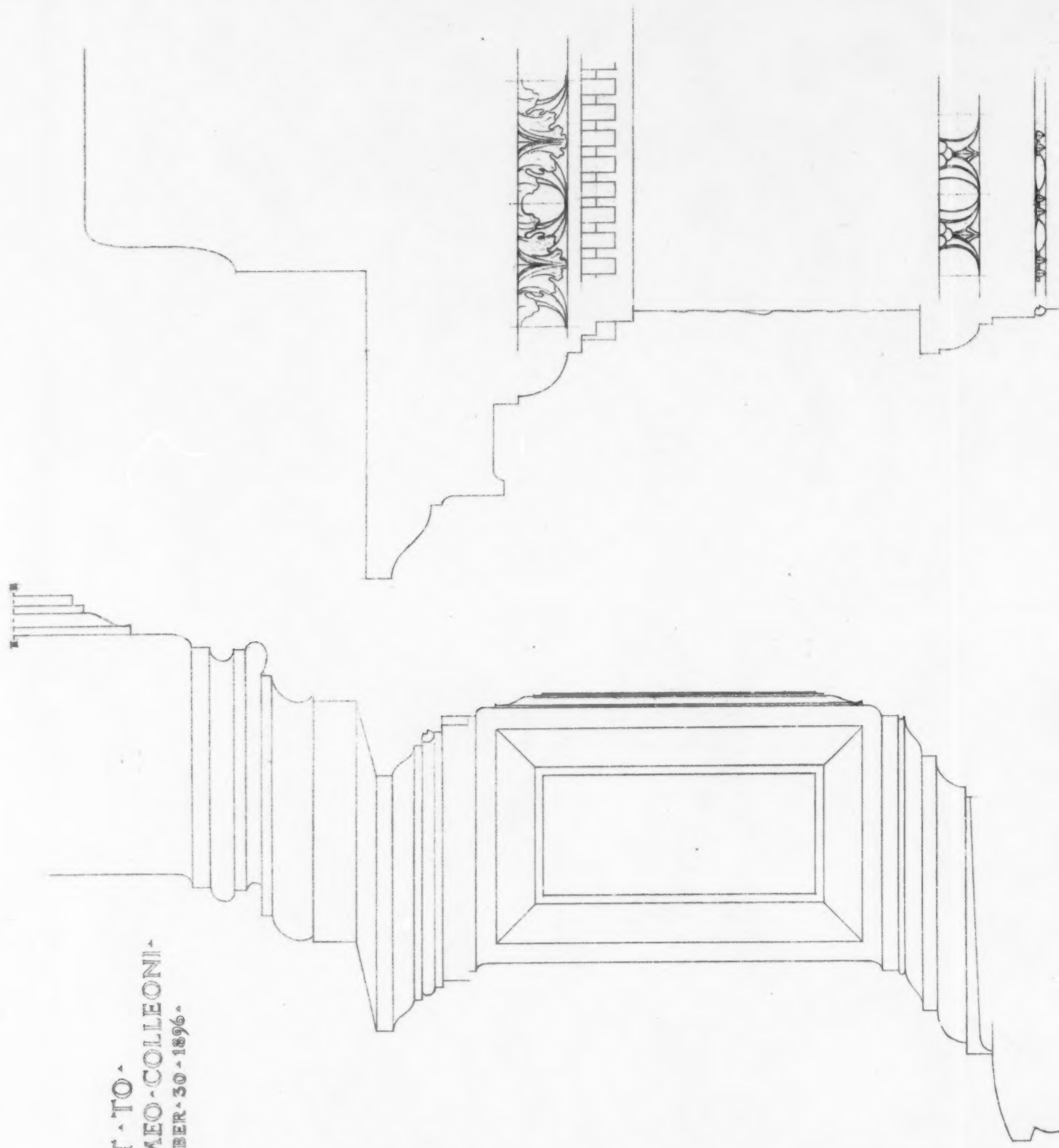


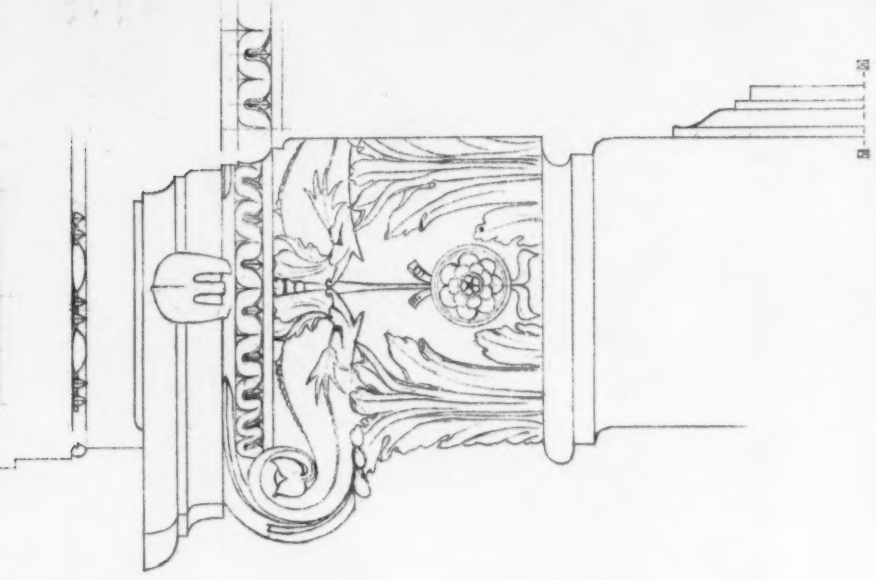


MEASURED AND DRAWN BY WILL S. ALDRICH.

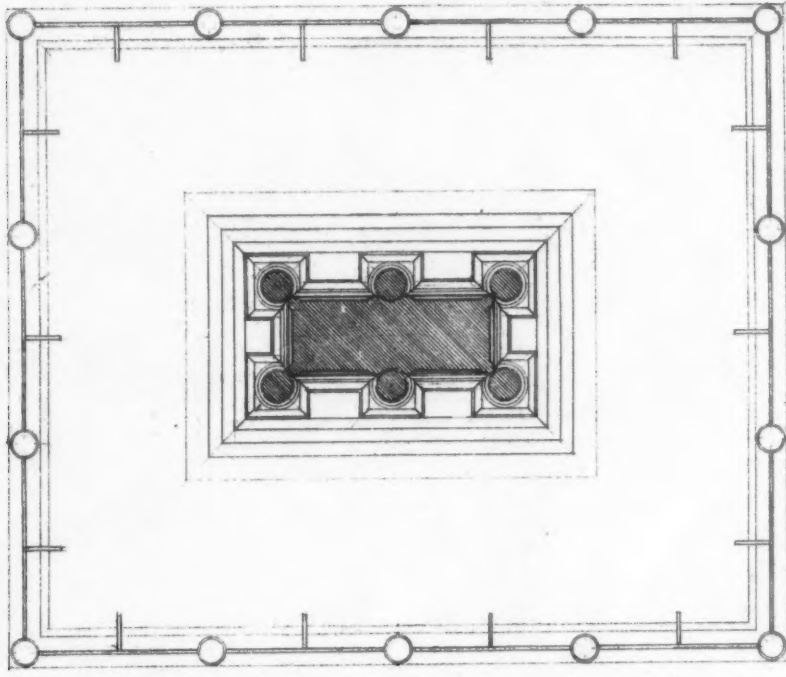
SCULPTURE BY J. B. WATSON.

MONUMENT TO
BARTOLOMEO COLLEONI
VENICE - SEPTEMBER 30 - 1896

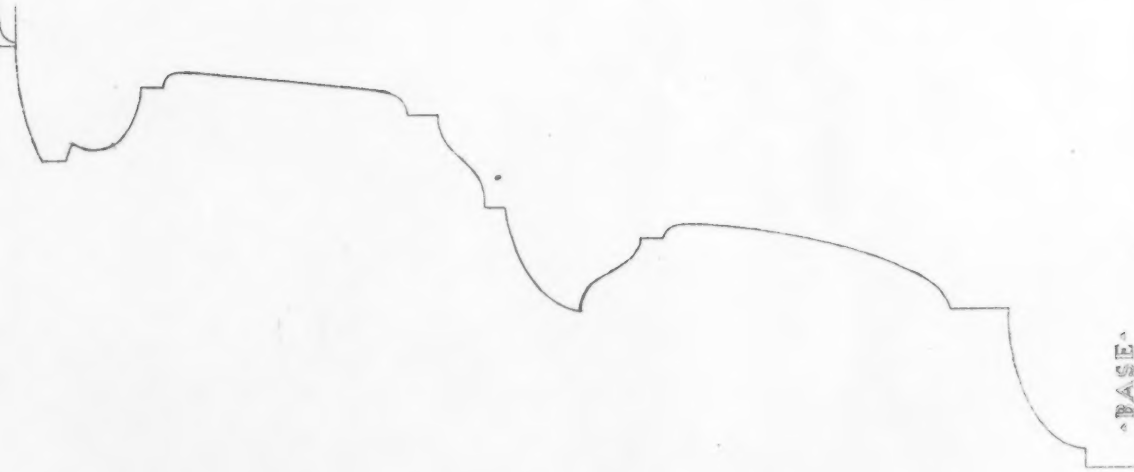




• CORNICE •



• PLAN •



• BASE •

MEASURED AND DRAWN BY WILL S. ALDRICH.

ALL RIGHTS RESERVED BY COPYRIGHT



ROYAL STAIRCASE: PALAZZO FARNESE, CAPRAROLA, ITALY.



ABRAHAM DE PEYSTER, BOWLING GREEN, NEW YORK, N. Y.
GEORGE S. BISSELL, SCULPTOR