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CONTENTS.

AMONG the interesting matters discussed at the late Convention of the American Institute of Architects at Washington was a report of the Committee on Publications, in which occasion was taken to recall, by citations from the records of the Institute, the efforts made in former years to secure the establishment of a first class professional journal, showing the manner in which, although these efforts failed of immediate result, they had served to keep the subject before the minds of those interested, and had contributed to the cordial favor with which the *American Architect* was received by the most dignified professional body on this side of the Atlantic, after its publication had been undertaken by private enterprise, and to the uninterrupted interchange of courtesies and good offices which has since been maintained between them. In the report of the Secretary for Foreign Correspondence was contained a suggestion tending also to illustrate the position which the Institute holds toward the professional community, and the kind of service which it is able to render. According to the Secretary, a custom had prevailed for some years after the Institute was founded of furnishing the younger members and associates who were about to travel abroad with letters of introduction, written with some formality, and addressed to the eminent foreign architects or officers of professional bodies with whom the Institute was in correspondence. Such letters are often of great value to students, opening to them the doors of public and private collections of interesting objects, and obtaining for them access to works in process of construction, and the Secretary expressed his hope that the number of applications for them, which has fallen away to two or three in a year, might again increase to a total more nearly representing the influence of the Institute, and the value which its introduction possesses.

AN announcement, which gave much pleasure to the Convention, was made to the effect that a chapter of the Institute was in process of formation in San Francisco, and some half dozen prominent architects in that city have already applied for election as Fellows. The profession throughout the country is to be congratulated upon this occurrence. The very distance of California from the other centres of architectural practice, the peculiar climate, situation and circumstances of San Francisco, render the coöperation of the members of the profession in that city of singular value to the rest. The strange materials, the *adobe* bricks, the huge timbers of redwood and Oregon pine, the beautiful finishing woods in daily use there are as much objects of curiosity and interest to Eastern architects and builders as the novel modes of building, the provisions against earthquakes, and other minutiæ of San Francisco construction, and an exchange of notes at stated periods would do much to enlarge the ideas of the profession on both slopes of the continent. Some have reproached the Institute, we think unjustly, with being narrow and local, forgetting that the business of its administration must be carried on somewhere, and that if, after New York had been selected as the place preëminently suitable for this purpose, the necessary work has fallen principally into the hands of the New York members, this was due much less to any desire of the profession there to monopolize the offices than to the neglect of those at a distance to fulfill the duties which would gladly have been committed to them. With the accession of a strong San Francisco Chapter, to be followed, we hope, by one in St. Louis, the work and influence of the Institute may and should be soon shared by all parts of the country. Among willing and active members scattered at great distances apart some system of administration by correspondence could soon be devised. All questions of general interest could be quickly communicated to every member by postal cards, as is already done in England, and replies as quickly returned, so that with the least possible trouble and expense every architect in each state could consult with, and in case of need, obtain the support of the organized body of his brethren throughout the country. How powerful this may be has many times been demonstrated, and occasions for exerting it multiply every year. It is quite time that the scattered influence and experience of the profession should find better means of effective concentration, and we trust that the Institute, vivified by the infusion of new blood, is entering upon a most prosperous career.

WE would like to call the special attention of our younger readers to the advertisement of the fifth competition in design, which closes Saturday, January 21. The season is now near at hand when draughtsmen generally find themselves either idle or limited to the least interesting part of routine office work, and we trust that many will take advantage of the opportunity offered for trying their powers in the most beneficial way possible. The period between the completion of the plans for buildings of one season and the commencement of the sketches for those of the next is the best of all times for assistants in offices to undertake designs of their own, which they can then conceive and elaborate with some degree of individuality, instead of finding themselves carried hopelessly away into the style of the office to which they belong, as is generally the case when two or more sets of sketches are carried on by one person at the same time; while the careful criticism to which the drawings are subjected is valuable to their authors in exact proportion to the amount of original thought which they have expended upon them. The architects of a few years hence will need all the skill in design which they possess to compete with the active, enthusiastic, and highly trained young men who annually join the ranks of the profession, and such opportunities as our competitions offer for practice of the most strengthening kind, under the best guidance, are unequalled except in the highest professional schools, and in many important respects are unsurpassed there.

THE coroner's jury in the case of the disaster in Grand Street, New York, by which two houses, through defects in their foundations, fell, burying ten persons in their ruins, have rendered a verdict, censuring the owners of both buildings for neglecting to call the attention of their tenants to the unsafe condition of the walls, and censuring also the former Department of Buildings, under whose control the houses were altered, two years ago, in such a way as to weaken them materially. The present Board of Fire Commissioners, to which is now entrusted the regulation of all building operations, is indirectly charged with a part of the responsibility for the accident, on account of its "highly reprehensible" and illegal mode of procedure in the matter of notifying owners of unsafe structures to put them in repair, and an earnest recommendation is made that the Department of Buildings should again be made separate and independent, under a chief inspector clothed with all the powers necessary for its proper management. The Chief Examiner, Mr. Charles K. Hyde, who was hastily expelled from his office in the first transport of public indignation which followed the dreadful catastrophe, is fully exonerated by the verdict from all responsibility and blame.

WE borrow from *La Semaine des Constructeurs* an interesting account of the details of the system by which the Edison Electric-Light Company intend to deliver, measure, control and protect the electrical currents generated at their principal stations for use in the private buildings of each district which they serve. As the first public display of the apparatus to be used for these purposes was made in Paris at the recent Electrical Exposition, it is not surprising that the first complete de-

scription of them should be found in a Parisian journal; but in view of the rapidity with which the Edison Company is preparing for operations on a large scale in New York every item is of value to readers on this side of the ocean. The principal conductors, or mains, as we may with propriety call them, consist in the Edison system of half-round copper rods, two of which, one for the ascending and the other for the return current, are placed side by side in a cast-iron tube, and this filled with melted gutta-percha. Opposite each house the ascending conductor is divided, and the cut ends bent outward; between them is placed one end of the small house-wire, which is held closely in contact with them by means of a tightening screw, and the other extremity, after the whole lighting system of the building has been supplied, is brought back and secured to the main return conductor in the street. Thus each house is furnished with its own loop of wire, connected at one end with the ascending conductor, and at the other with the return. The attachments are enclosed in cast-iron boxes, interposed between the lengths of pipe at the proper places, and so arranged as to allow access to all the wires. The diameters of these are, of course, carefully adjusted to the currents which they are intended to convey.

Precautionary devices of various kinds are introduced to secure uninterrupted and safe service. At intervals the main conduits pass through valve-boxes, so to speak, each containing a metallic plate which can, in case of accident, be pressed upon the upper surfaces of the ascending and descending conductors, so as to make a complete connection between them. The application of this plate at any place cuts off the current from all points above, but without interrupting the working of the system below it, so that repairs can be made with little annoyance to consumers. The house wires, to guard against the dangerous heating of any portion by a current of excessive intensity, such as may be produced by the sudden extinguishing of a large number of lamps in the neighborhood, are furnished with a link of lead wire, enclosed in a metallic box. The lead being a comparatively poor conductor is more quickly and strongly heated by a current of unusual intensity than any other part of the line, and will be melted before any perceptible warmth can be produced in the adjoining wires, thus effectually cutting off the source of danger. The current is turned on or off as may be required for the lamps by means of keys very similar to those of an ordinary gas fixture; and the quantity of electricity consumed is registered by a meter of much the same appearance as the common gas meter, but differing materially in construction. The principle of this ingenious apparatus depends upon the constant relation between the amount of electricity passed through a solution of a decomposable metallic salt and the measure of decomposition effected. In a solution of sulphate of copper are suspended two plates of metallic copper, connected with the opposite poles of a small wire branching from the large house-wire. While the current passes, the solution is decomposed; metallic copper is deposited on one plate, while the liberated acid attacks the other plate, dissolving it to make good its loss. In this way one increases in weight while the other decreases. The two plates are hung from the arms of a small balance, one side of which descends as the decomposition progresses, while the other rises, the same motion serving also to move the indicating needle of the meter. As soon as the balance sinks to a certain point, it strikes a commutator, which immediately reverses the direction of the current, and the plate which before was wasting away now begins to gain in weight at the expense of the other, and the balance recovers itself, to incline finally toward the opposite side until it again of itself reverses the current. A simple mechanism translates this reciprocating action into a continuous movement of the meter index, and the flow through the small wire is measured with perfect accuracy. Nothing more is necessary than a measurement and record of the proportion between the capacity of the main wire and the small branch to determine at once the whole amount of electricity consumed.

Mr. Siemens, the well-known inventor of the electrical railway motor which is now in successful operation near Berlin, has undertaken a trip to this country in the hope of inducing the directors of the New York elevated railroad to adopt his device for propelling their trains. It is reported that several of them are already favorably impressed with the proposition and a trial will doubtless be made before long to determine the working of the motor on the New York line, which, although unlike Messrs. Siemens and Halske's road in some respects, can, Mr. Siemens thinks, be adapted without difficulty to the electrical system. It is much to be hoped that the experiments will be successful, and that the new source of power will take the place of steam on all the elevated railroads. The saving of annoyance, not only to the occupants of houses along the avenues and streets, but to the passengers in the cars, would be enormous, and if Mr. Siemens's anticipations are realized the companies will secure a considerable economy of expense. Their directors, indeed, appear to have been only waiting for more definite assurances of the practicability of electrical propulsion to take up the subject seriously. One of the relatives of Mr. Cyrus W. Field has within a year or two taken out several patents for improvements in electrical motors, and the experiments of Mr. Edison at Menlo Park have been watched with interest by capitalists, so that if a feasible scheme should be presented, it would without doubt find ready acceptance.

We publish in another place a very interesting paper by Mr. Joseph Thacher Clarke upon the explorations now in progress under his direction at Assos, on behalf of the Archæological Institute of America. Mr. Clarke has for some years been a member of the Boston Society of Architects, and just before his departure on this expedition was elected a Corresponding Member of the American Institute of Architects, and as a mark of regard for his professional brethren was kind enough to prepare the present paper in advance of his regular report, and forward it in season to be read before the recent Convention of the Institute of Architects at Washington, sending at the same time a duplicate to the Archæological Institute as a supplementary report, accompanied with explanatory drawings. By the courtesy of the officers of the Archæological Institute copies of the drawings transmitted to them were sent to Washington, to be used in explaining the text of the account, and to the same courtesy we owe the permission to reproduce two of them, as well as a kind and unreserved consent to our publication of a paper to which, as the first report received from its expedition, the Archæological Institute might reasonably make claim. Of the report itself we need only say that no architect can fail to be greatly attracted by Mr. Clarke's clear and precise description of a building unrivalled in interest by any classic structure outside of Attica. In the temple at Assos the Grecian colonists of the Troad treated the style of a period little known to us, but most important in the history of architecture, with an originality wholly their own, and in studying its remains our pleasure in tracing the early forms of details already familiar in later buildings is heightened by the observation of characteristics peculiar to this example, as, for instance, the sculptured architrave, the only one known in a Doric order; the singular mode of fluting, and many minor features, of which we shall know more hereafter. Most fortunately, many of the fragments of the ruined building have been preserved by being used in the rubble walls of the fortifications near by, so that we may hope for an unusually accurate restoration of what will certainly be regarded in future as one of the most important monuments of Greek antiquity.

The municipality of Venice is at present seriously considering what the world in general is likely to consider almost a sacrilegious proposition, — that the canals, to which the city owes most of its character and beauty, should be filled up and converted into streets. When the suggestion was first made, it was regarded as preposterous, but further consideration has shown the material advantages which the substitution of paved avenues for shallow water-ways would offer to the traffic of the town, and the work of conversion is already begun. For the present, however, only the smaller and less important canals will be filled, but it is much to be feared that the movement, once begun, will not cease until the city is entirely transformed. Already the gondolas, which by their picturesque forms and traditional associations added so much to the romantic charm of Venice, are on the point of being suppressed, at least for public use, to be replaced by small steam-tugs, whose puffs of smoke will make strange discord with the marble and alabaster fronts of the palaces among which they pass; but the Bride of the Sea is no longer contented with her old-fashioned charms, and seeks eagerly to throw them away in exchange for an equal chance with the other Italian communes in the scramble for money and trade which is fast obliterating what remains of quiet beauty in Europe.

ASSOS.[1]

ASSOS, ASIA MINOR, September 20, 1881.

Gentlemen, — It is now several months since excavations were undertaken upon the site of the ancient Assos, by the first classical expedition of the Archæological Institute of America. As anticipated, the results have hitherto been of even greater architectural than sculptural importance, and it is possible that the following brief account of certain aspects presented by the Acropolis and its crowning temple may attract the interest of those members of our profession, — if such indeed there be, — who have not conceived how closely allied in many ways are the endeavors of the two American Institutes — of Architecture and Archæology.

Perhaps the most considerable, at all events the most direct gain expected from the present investigations, will be an increase of our knowledge concerning the historical development of architectural spirits and methods among the Greeks.

The work in hand can be carried out only by those familiar with the modern as well as the ancient practices of building; and, to speak frankly, will be fully comprehensible alone to the cultivated architect and to those few scholars who have mastered the scientific and æsthetic requirements of an art which is proverbially known as a jealous mistress.

The present paper, not intended to trespass greatly upon your time and attention, can touch but lightly upon points which are to be thoroughly published in the reports of the expedition, and, if Fortune will, finally collected in an exhaustive monograph upon Assos and the Southern Troad.

Should it be regretted that the many features still under examination in the extensive town beneath the fortress cannot now be even mentioned, it must be considered that a description of the Agora, with its water-works and conduits, of the gymnasium, the various stoas and colonnades, the theatre, the civic fortifications, with the extended streets of monumental tombs beyond them, the unique remains of the Greek stone bridge over the river, etc., would alone fill a small volume.

Moreover, while digging is being actively carried on at several of the latter sites, and problems concerning their disposition and structure are daily determined, the foundations of the before-mentioned temple have been entirely laid bare, the excavations upon that part of the Acropolis being now restricted to a search for various blocks of the entablature, especially, of course, for the highly important reliefs of the epistyle and metopes.

Towards the close of the tertiary period an extended volcanic upheaval revolutionized the southern coasts of the Troad. The broad range of Ida (which is not, as often supposed, a single mountain) became one of the chief centres of geological interest in Asia Minor.

Successive flows of trachyte, forming dykes and plateaus, covered the original limestone so completely that it is only in small and isolated patches that stratified deposits remain upon the surface to show the former geological condition of the land. Whole villages in this vicinity are built upon crumbling beds of volcanic ash. Thus certain varieties of trachytic rocks form the only available building material, and cleaving naturally into large and regular blocks, have been almost exclusively employed from the earliest times. It is true that in later ages of Greek history, under the successors of Alexander the Great, to whose favor this region owes so great an advance, immense quantities of white marble were brought to the Troad from Thasos and Cyzicos, which islands have ever served the shores of the Eastern Ægean and Marmora as quarries; but while New Troy at the present Hissarlik, Alexandria Troas at Eski-Stamboul, and the later Chrysa at Kinlaclee, show extensive marble remains, at Assos there is surprisingly little limestone, the primitive inhabitants of this city apparently not having imported the material, and the lime-burners, who supplied the mortar lavishly used in building the mediæval fortifications and cisterns, having made too clean a sweep of the later marble structures during the Genoese occupation, which included Assos in the Latin Lesbian Principality. And though firm and plastic clay is provided in abundance by the decomposed feldspar contained in the trachyte, the climate has always been too parched, and the local forests too scant, to supply wood for the extensive firing of brick-kilns. The rock of the Acropolis of Assos itself is one of the varieties most widely employed: immense sarcophagi, cut from its sides, being scattered in every direction to a distance of fifteen miles and more.

The influence of the hard volcanic stone, thus alone supplied by nature, is displayed by the architecture as well as by the topographical location of the wealthy settlements, which, from pre-historic times flourished on the northern coast of the Adramyttian Gulf. This building material not only decided many peculiarities of architectural detail, such for instance as the bold, blunt forms of the temple entablature and its sculptured decoration, but directly affected the general disposition of the city and the arrangement of its chief buildings.

According to the geological investigations of the present expedition, the Acropolis of Assos was one of the most important centres of the tertiary upheaval before-mentioned, being, in fact, the crater of a long extinct volcano.

The isolated peak is one of the most prominent features of all this region, rising steeply to an altitude of nearly eight hundred feet, while situated on a strip of land considerably less than a mile in breadth, between the River Touzla (the Satnióeis of Homer) and the sea.

At about half-height the Acropolis is surrounded upon all sides, save the north, by an irregular plateau, upon which stood the city. On the south the declivity of the former crater is so abrupt, that it is possible to look down at an angle of over twenty degrees, beyond the table-land remaining between the cliff and the sea to the port beneath, into the very holds of the trading vessels of these waters, which lie protected by the remains of a massive ancient mole.

The sloping ground at the base of the Acropolis was carefully terraced by heavy retaining-walls, and bore tier above tier, the streets and public buildings of the upper city. The ascent from these to the summit was effected by a winding road, which doubling upon itself, followed the steps of the southern side, going from the southwest to the east, and thence to the northwest, where the chief gate of the fortress was once situated.

Naturally steep upon all sides, and rendered wholly inaccessible by scarping the natural rock, the summit was inclosed and protected by various ramparts, which now remain in masses of Byzantine, Genoese and Turkish masonry, erected upon Greek and even Cyclopean foundations. It was with truth that Strabo, the only ancient author who has left any description of the city, remarks that nature and art had united to make Assos a stronghold.

Some of the semi-circular towers, which still rise to a height of forty feet or more above the present surface of the ground, abut against the straight walls of the enclosure, being built of small stones and filled with a solid mass of rough rubble and cement. They are evidently of Turkish origin, and appear to have been intended to support pieces of ordnance.

At what period of history this remote fortress was bombarded is not at present evident, but upon one of the blocks of the temple pavement there is the trace of an exploded shell. The last signal struggle known to have affected Assos was before the application of gunpowder to field-arms, namely, the invasion of the Troad by Orkhan and his Emirs, during the third and fourth decades of the fourteenth century.

The summit of the cliff was naturally divided into two distinct steps, more nearly circular in plan than the enclosure of the Athenian acropolis and so eccentrically situated that for a short space upon the east their fortification walls were united.

Upon the lower of these levels, at the extreme north, looking down upon the river and the fertile plains of its valley, there stands an ancient Christian church, now so altered within as to serve for a mosque, there being no necessity for the customary minaret upon so steep an eminence. The great age of the building is attested by an early Byzantine inscription, and it is probably one of the oldest examples of Christian architecture in existence, the only structures which I recall as comparing with it in this respect being the Basilica of the Nativity in Jerusalem and the crypt of St. Clement's in Rome.

But it is less to the church than to the Doric temple which crowned the great natural pedestal that your present attention is invited. This remarkable building has for over forty years presented one of the most perplexing problems of Greek architectural history. It was in 1835 that the facile French architect, Texier, visited Assos, and after a short stay, devoted to the site a section of his elaborate work, the "Description of Asia Minor," giving, with a general map of the city enclosure, plans and restorations of the temple.

Unhappily, as a modern authority has said, Texier possessed in an eminent degree the genius of inexactitude. His measurements, which are given to the smallest fraction of the metric system, are generally incorrect, his reconstructions largely imaginary; and this is notably the case with his publication of the temple, the foundations of which he cannot even have seen. While the remains, as now unearthed, show the orientation of the building to have varied greatly from the east to the south, Texier places it thirty degrees to the north of its true direction. The disposition of the plan given in the fine steel engraving, with its double, dipteral ranges of columns upon the front, and its *epinaos in antis*, was evidently conceived by the ingenious author after his return to Paris.

The width of the stylobate, which is in reality 14.035 metres, is given on the plan as 23, on the elevation as 13 metres. Important members, which never existed, were added to the entablature, being, with unparalleled effrontery, scaled to the millimetre, as if accurately measured. It is needless to multiply illustrations of this manner of reporting scientific investigations. As the "Description of Asia Minor" is the only predecessor, the publication of this temple which is now being prepared may fairly rank as the direct recovery of one of the most important and interesting monuments of the Doric style — that noblest and first-born offspring of Greek architectural genius.

The prospecting trenches sunk upon the Acropolis, the first disturbance of the soil of Assos by excavations, soon struck upon the steps of the building, which were found intact, with the exception of the stylobate upon the fronts. During the ages in which the summit served as the fortress of successive conquerors a bed of soil had accumulated which varied in depth from three to six feet above the original level. This earth was removed by wheelbarrows to a chute upon the eastern side of the cliff, where examination had shown that no remains of antiquity existed upon the native rock. A complex of late and barbarous walls was found to have been built upon the [temple] foundations, and no blocks of the superstructure were there discovered. It was, however, of sufficient interest to watch the plan of the building as it gradually emerged from the débris which had covered it since antiquity.

[1] A paper by Mr. Joseph T. Clarke, Director of the Assos Expedition of the Archæological Institute of America, read before the late Convention of the American Institute of Architects, at Washington, D. C.

To preserve the upper surfaces of the stylobate and pavement, a layer of earth two or three inches thick was left upon them until the completion of the work, — this preventing scratching and chipping by the iron wheels of the barrows. When all was swept, and the blocks carefully washed, the position of eighteen of the flanking columns became evident by the slight marks caused by the weathering of the surface while the shafts were still in place. The site of the cella walls was similarly recognized by delicate incised lines traced by the Greek master-builder upon the foundation stones, to mark the manner in which the first upright blocks were to be laid. The upper surface of the substructure was thus employed by the ancient architect as a drawing-board, upon which the plan was indicated with the utmost precision, a refinement hitherto thought to have been restricted to the marble buildings of Attica. The importance of these lines to the restorer is evident. They display a most remarkable and exceptional feature of the general arrangement,— that the cella was wholly without an epinaos or rear vestibule.

The inner naos was undivided, its walls being carried plainly across the rear, at the same distance from the columns of the western front as upon the sides. The only peripteral temples in which this omission has been observed are those highly archaic monuments of Selinous, usually designated as C, D and S, and the fragmentary remains near Cadacchio, on the island of Corfu.

The temples referred to are always considered to be the most ancient remaining examples of the Doric style, — the rise and early history of which are so important, — and it may be judged what an addition the temple of Assos will thus prove to our knowledge of advancing Greek architecture. The recess of the rear vestibule was generally without any real use, there being no entrance through it to the naos, and was evidently a concession made to the external appearance of the whole edifice at a time when the canonical disposition of the style was still undergoing development.

A further peculiarity, evident from the traces upon the foundations as well as from the displaced capitals, is that the channel arrises of the shaft — *not* the hollows themselves, — were in the axes of the plan, and opposite the faces of the abacus; this inexplicable arrangement being consequentially carried out in all the shafts of the pteroma, but altered in the two columns of the pronaos, where the channels have the usual relation, without doubt the better there to receive the lateral metallic *grille* customarily employed as a barrier.

A full discussion of these points in their bearing upon the advance of the Doric structure would here lead me to too great length; it may suffice to indicate that the true nature of the channeling was not appreciated in remote and provincial Assos, upon the borders of the great Oriental powers of Mesopotamia and Persia, which exercised as marked an artistic as political influence. The optical effect of the channeling upon the Doric shaft, noted perhaps by the architect in more advanced cities of the South and West, was adopted without an adequate understanding of its historic and æsthetic character. The appearance of the arris in the line of axis is unique.

The shaft of only sixteen channels, occurring at Assos, is commonly conceived to be an indication of great age and direct subjection to the Egyptian influence, as in Corinth and one of the beforementioned temples of Selinous, but this peculiarity may also be due, as at Sunion, to the great elevation of the building and its conspicuous situation. The temple was constructed throughout, even to the sculptured members, of the local trachyte, perhaps quarried from the side of the Acropolis itself during the systematic scarping of the southern and western sides.

The rock of the summit was planed, and in several places directly employed as the substructure within the stylobate, the incised lines before referred to being then drawn directly upon it. It was not suffered, however, to form either of the steps, but was here cut away to make place for blocks, which were laid by the help of knobs left as handles upon the outer edge, and not removed from the lower course at the completion of the building; U-shaped grooves were similarly cut upon the ends of the heavy cornice-blocks, to receive the hoisting-ropes, so familiar from the illustrations of Viollet-le-Duc.

To prevent a defacement of the joints by the chipping of the stylobate stones, there were thin and narrow fillets along the angles of contact, and these too still remain, like the similar technical makeshifts upon the floor of the Athenian Propylæa.

The blocks of the steps, some of which measure considerably over ten feet in length, are for the greater part dowelled together with clamps of iron, cast in lead, and this system of bonding was carried out in other parts of the building; notably upon the soffit of the epistyle blocks, and upon the upper surface of the cornice for the terra-cotta gutter.

The interior pavement of the naos is preserved in some vestiges of a late mosaic formed of cubes of black and white marble; and fortunately enough of this is intact to insure its restoration. It presents a border of bands and the broad Greek wave ornament, enclosing a field of diamond pattern.

The drums of the columns were ground one upon another by being turned around a pin of wood which served as a steadying centre. In perfected Doric buildings this pin was enclosed and worked in square boxes of the same material, cemented into the opposite drums by red lead. In Assos the solicitude for accurate juncture had not been carried quite so far, the wooden axis bearing directly upon the stone, in the centre of which, cylindrical, not cubical, holes were cut to receive it.

The epistyle beams, as in the Parthenon, were triple, an exceptional number for so small a construction, — the entire lintel not measuring three feet in thickness. The middle of these beams did not occupy the entire height of the epistyle, the outer blocks being thickened at the top to support the frieze. The thin metopes, plain as well as sculptured, were slid in from above, behind notches cut upon the sides of the triglyphs. The heavy cornice blocks rested directly upon these, without the intervening members published by Texier.

Corner fragments indicate the inclination of the gable, and remains of the terra-cotta roof-tiles show the manner of its construction.

To convey an understanding of the appearance of the edifice is of course impossible without the assistance of drawings, and a further rehearsal of technical details may be spared. The general dimensions and proportions of the temple have a singular resemblance to those of the so-called Theseum in Athens. The total widths of the two plans, for instance, vary by less than a foot; of the pteromas, by but about four inches. The number of columns upon the front and sides, the orientation south of east, and even the exceptional reduction of the steps to two, are in both cases the same.

This curious similarity of the Assos temple to a fane known with reasonable certainty to have been built at a period not much, if at all, anterior to the middle of the fifth century B. C., may be urged as an argument against its great age, but the chief peculiarity which resulted from this system of proportional arrangement, the narrow passage around the cella, has recently been observed in a still more marked degree by the German explorers at Olympia, in the case of the highly archaic Temple of Hera. The innermost of the walls, which have been rebuilt from age to age as enclosures of the summit, was constructed almost entirely of the blocks of the temple peripteros; the greater part of the entablature, especially the cornice, being therein embodied.

Some twenty capitals, thus preserved in thick beds of mortar, are among the finest known specimens of early Greek stone-cutting. Vigorous in outline, of heavy and almost sombre proportions, as befitted the grim volcanic material of which they were formed, they show a delicacy and firmness of cutting unequalled by any of the archaic temples of Sicily and Magna Græcia, which were for the greater part built of a much inferior stone: the coarse and crumbling limestone-tufa, almost universally used in the early ages.

One well-known capital from Assos is preserved in the Louvre, but much finer specimens have come to light during the present excavation.

The drums of the columns were thrown about in every direction at the time when the site was cleared, — many having been rolled to the bottom of the cliff, and shattered by the fall from so great a height. Others, hollowed at one end, have long served the inhabitants of the squalid Turkish huts of Behràm as mortars for pounding wheat and coffee.

The cella wall was probably removed at a still earlier period by builders covetous of its evenly-squared stones. The skeleton of columns and entablatures must have long remained in much the same condition as is now observable in the temples of Segesta and Ægina. It was the upper half of the same rampart that once contained the greater number of the known reliefs which ornamented a section of the epistyle and some of the metopes of the temple.

At the time of the first modern visitors to Assos — that is to say, in the first quarter of the present century, these sculptured blocks lay in confusion upon the southeastern side of the Acropolis. Having attracted the attention of the French Archæological Society, through the accounts of several travellers of that nation, those upon the surface were taken away by a man-of-war in 1838. Old men of the village still remember the position of these stones, and the manner of their removal by the French sailors.

The seventeen fragments now in Paris are among the greatest treasures of the Louvre, and, as is well known, have attracted the constant attention of archæologists and historians of art. Though the Acropolis is but about half cleared, seven additional pieces of these sculptures have been discovered during the past two months, five of which are of considerable size. One is a complete metope, bearing two figures: a man pursuing a woman — a time-honored subject, difficult to individualize. Another is a block of the epistyle, about four feet long, showing a bowman discharging an arrow at a centaur or hind, while behind him advances an attendant with a drinking vessel, in true Mesopotamian fashion. The remainder are couching sphinxes, a torso and heads.

These reliefs are of extreme value as among the few connected works of archaic Greek sculpture, illustrating the gradual Hellenizing of Oriental types and artistic methods. It is largely through them that the temple has attracted an exceptional historic interest.

The expedition, in the words of the President of the Archæological Institute, from the outset did not anticipate such brilliant discoveries, such finds of treasure, as rewarded the excavators of Troy, Cyprus, and Pergamon. The prospect of such novel, and in great measure, chance results has never been entertained, and the attention of the agents has been devoted to less ambitious, but perhaps more legitimate scientific investigations, with a feeling of certainty that important gains to our knowledge of antiquity will continue to accrue from the thorough work now being carried on among the ruins of Assos.

Joseph Thacher Clarke,
Director of the Assos Expedition,
Corresponding Member of the American Institute of Architects.

PICTURE EXHIBITIONS IN PHILADELPHIA. — I.

LAST autumn, as will be remembered, a number of pictures painted by American artists and students residing in Paris were imported by the authorities of the Pennsylvania Academy of Fine Arts, and exhibited in their building in connection with the annual collection of the young Philadelphia Society of Artists. The enterprise has been repeated this year, though under somewhat different circumstances. The Society has parted company with the Academy, and the latter's exhibition has been formed entirely under the auspices of its own directors. Meanwhile the younger organization has opened another — shall I say rival? — collection in new rooms on Chestnut Street. The result is without doubt satisfactory to the public, for there are two galleries open instead of one, and a correspondingly larger number of pictures have been accommodated. It is but justice both to the rank of the Academy and to the intrinsic value of its contents that we should first consider what it has to offer.

As has been said, the exportation of pictures by our men on the other side of the water has been more general than it was a year ago. In London and Munich as well as in Paris, committees were appointed to collect and forward paintings. Many have come from the two last-named places, and a few from London. In them centres the interest of the exhibition. For although all home residents were also invited, the best among them have, as was the case last year, neglected to contribute. There are many poor pictures, of course, the most of them from local painters, but the general average is very good. To inspect this collection is an interesting sequel to a study of the "American Artists'" Exhibition in New York last spring. That was a small and picked collection, including the names of those who are the most highly and singularly endowed among our painters. This is a large and general show, from which most of those men are absent, but where the rank and file of our workmen are present in force, and where many new names mark work most interesting for its promise. If the two exhibitions can be mentally combined the observer may get a good idea of the status of our art as a whole. And it may be called, I think, a status that is intrinsically good, and by comparison with that of some score of years ago, most wonderfully satisfactory. As was said in these columns of the similar collection a year ago: Its great value lies not so much in the actual works it shows as in the progress they prove during recent periods, and the promise they give of ever-widening endeavor and increasing excellence. The most pleasantly prophetic fact is that our students now believe, as the first and fundamental article in their artistic creed, in hard, long-continued study, and the patient acquisition of good technical methods. Deep thought, fervent imagination, lofty beauty, and ideal power are all things to be desired in art — things without which art can never reach its very highest altitude. But they can scarcely come — can never come, indeed, to any good purpose — until our men learn the lesson which they so long neglected or despised, until they learn to *paint well* in the strictest and most professional acceptation of the term. As yet we are glad to hail the evidence of such learning; as yet we should not grumble when good painting contents itself with being such; as yet the fact that American artists use their brushes capably and beautifully need hardly be taken — as it sometimes *is* taken, I am sorry to say — for a text from which with acerbity to preach, and to attempt to teach, the various possible and more or less desirable things they do *not* do. In certain foreign schools perhaps technical accomplishment may be unduly exalted. But it should be remembered that there have been in other days certain schools where little else was aimed at, and that they are still counted among the rarest developments of artistic power the world has shown. And as yet, I repeat, our school is not so old that we need despise its proficiency in fundamental and preparatory things.

The great picture of this present exhibition is undoubtedly Mr. Whistler's portrait of his mother. Its composition, with the simple yet dignified figure posed in profile is familiar from many reproductions. When we see it, therefore, it is not with a sense of novelty, but with a sense of completer revelation, increasing very greatly the admiration we had already felt. Denuded as it is of every atom of sensuous beauty, whether of line or color, it is a strong proof that the "decorative" qualities now so popular are not essential to a beautiful work of art, and it convinces us that among the most essential things are earnestness, sincerity, distinct conceptions and accomplished technical methods. The artist calls it a "harmony in gray and black;" but the greenish tone of the gray prevents the coldness of effect we might have anticipated. The tone of the picture may serve as a lesson towards the definition of that quality. The rendering of character makes it a lesson in the art of portraiture as such, and the sobriety, the almost sombre dignity of the canvas mark it off with a wide division from the superficiality or affectation of much modern work. The picture is not for sale, but is to be returned to England at the close of the exhibition. It is a pity that it cannot be secured for some public museum.

Mr. Bridgman sends us a large canvas showing several figures in an oriental interior that is wonderfully well painted. The breadth, and energy, and strong effects that were noticed in his studies exhibited in New York last winter, and that have hitherto been lacking in his more ambitious pictures, are all present in this one, which has but just been completed, and may be taken as an earnest, therefore, of the method he is likely to follow in the future. Good all through — in composition, line, color and handling — the best part is perhaps the background, where, through an open doorway, we see two figures in a very difficult effect of light. We may hope ere long to see from Mr. Bridgman's brush some complete renderings of the out-door effects he sketches so well, done in the same masterly manner as this interior. Mr. Charles Sprague Pearce is represented by a large academical study of two figures, which is called the Beheading of John the Baptist, but which is in no sense an adequate rendering of the theme. For its technical excellence it was rewarded at the recent *Salon* with an honorable mention. It is very well drawn and very capably modelled in high light. The modelling is so strong, however, and the light so suggestive of artificial illumination, that the figures do not keep their places in the frame. As studio practice work it is admirable, perhaps, but as picture-making, properly so-called, it does not show very sound artistic aims. Mr. Pearce has once done so well, however, — in the painting of his Death of the First-Born, — that we may accept such canvases as this for what they really are — artificial compositions to show his technical accomplishment, and to vociferously claim attention in the crowded *Salon*, where it is sometimes supposed that only startling figures and calcium-light effects can speak with sufficient force. And thus accepting them, we may hope for a day when he will do more purposeful and more artistic work.

The excellence of the two fine landscapes Mr. Picknell sent home last year is by no means repeated in his present contribution, which is commonplace and unattractive, and would hardly attract notice but for the name it bears. Mr. Dana, on the other hand, is represented by two very strong works, one of which, a large moonlight sea-view, seems to me the best thing he has yet produced; bold in treatment, full of action, original in composition, and fine in color in spite of the difficult juxtaposition of the large brown sails of the fishing-boats and the deep blue of the sky. Mr. Frank Boggs, who has already done some very good things, exhibits a large picture of a stranded fishing-boat, remarkable chiefly for the excessively bold and emphatic way in which it has been executed. Mr. Clement Swift shows a coast scene with figures, capably drawn and painted, but hard and rather artificial in effect. Mr. E. L. Weeks steadily improves in his delineation of the Oriental scenes which he prefers. A large canvas showing a market scene with a crowd of little figures is well composed, and much better in color and in handling than his efforts of two or three years back. Mr. Weeks now belongs to the ever-growing band of American painters whose work is so popular in Paris that it is eagerly absorbed by local dealers. We are likely, therefore, to see not more, but fewer of his pictures on our walls in future. Good landscape work, after French models, comes to us from Mr. Donoho, Mr. Pattison, and Mr. Tryon, the latter dating his most recent things, however, from his present home in Hartford. Some delightful studies of the Venice of to-day come from young men who have, I believe, studied in Munich and also in Venice, under Mr. Duveneck. They had already distinguished themselves as etchers, and one is not surprised to meet with such charming things from their hands as those contributed by Mr. Bacher and Mr. Rosenberg. Mr. Crone sends from Munich some very clever studies of heads; Mr. Koehler, the half-length of an old man reading, very good in tone, in handling and in character as well; and Mr. Hammer, some capable bits of *genre* painting. The London contributions are not of much interest when we have once done justice to the Whistler portrait. Mrs. Anna Lea Merritt sends an ideal head called "Luna," weak in sentiment, and very bad and chalky in color. Mr. Hennessy's two pictures, one a large river view, and the other a group of figures in a field, are laboriously studied, but not in any way attractive. In the figure piece, especially, there is a tameness of color and a want of atmosphere that contrasts unfavorably with the work of many of the 'prentice hands in the neighborhood.

Among the pictures signed by quite unfamiliar names and coming from the Parisian schools, I may note those by Mr. Alexander Harrison, which are good in color, delicate, though not over-elaborate in touch and clever in character. Some of them show, moreover, a fresh and genuine fancy. The work of Mr. Birge Harrison is more ambitious but not quite so successful. Bastien-Lepage's First Communion seems to have inspired many artists to attempt a treatment of broad masses of white tones, and to choose moreover, girls at their first communion as supplying these tones in most abundance. Mr. Harrison's little study of such a girl in church is exceedingly clever, but his large canvas with a life-size figure of a young communicant picking flowers in a bright green field is cold and blue in the whites and disagreeable in color throughout, in spite of the good technical work displayed in other ways.

Miss Conant sends a clever little interior with the figures of children feeding pigeons, and Mr. Kenyon Cox a nude study called "Blanc et Rose," which does not charm us as did his exceedingly clever portrait of a girl all in black exhibited last year. From Mr. McEwen, who still works in Munich, we get a couple of the best pictures in the room. They are small studies of girls' figures, very beautifully painted, though in so curious a scheme of color that they do not please the public eye. They are not only beautifully painted, however, as an artist would count such work, but individual in sentiment as well as style; fresh, interesting, refined, original and quite delightful.

Among the most important contributions are two portrait heads by Mr. John Sargent, representing as they do the work of one who is already acknowledged as among the best representatives of the

portrait art in Paris. Working in the style which is chiefly connected in our minds with the name of Carolus Duran, Mr. Sargent's work is no longer that of a pupil but that of an independent and most capable workman. There is no "charm" about the manner of this school. It is bold, decisive, material and very strong. It sets itself straight to the task of representing what it has in view and glosses its work with no tenderness of tone, or beauty of surface. It is so realistic in effect that only those who have some acquaintance with technical methods and difficulties can appreciate the skill which produces the realism with so supreme a disdain for all details and for all imitation narrowly so called. No canvases are more frankly paint and nothing else. Yet while there are some more charming, more refined and more beautiful, there are none which more completely put the actual life and character, and vital energy of the model before our eyes. All the elaboration, all the anxious concern for details of the average portrait painter do not come within a thousand miles of producing so true an effect, so vivid a likeness — not only of the individual in question but of the aspect of humanity in general — as do these broad free strokes, and these apparently unregarded textures of Mr. Sargent. The foregoing list may be said to include, I think, all the pictures sent from abroad that deserve especial comment. There are others which show good points or agreeable promise. And there are a few, of course, which show nothing at all for which we need be thankful. Yet most of the really bad pictures are dated on this side of the water. All home contributions good or bad, however, together with the pictures on view at the other exhibition, must be left for another letter.

M. G. van Rensselaer.

CONTINUOUS GIRDERS.

Girders, resting upon three or more supports are of quite frequent occurrence in building construction, and a great variety of opinions is held as to the relative strength and stiffness of continuous and non-continuous girders; very few persons, probably, having any correct knowledge of the subject. This ignorance of a quite important point in construction is more pardonable than would at first thought be supposed, for the subject of continuous girders has never, to the writer's knowledge, been treated of, in its relation to ordinary building construction.

In almost every building of importance it is necessary to employ girders resting upon piers or columns, placed from eight to fifteen feet apart; and in many cases girders can conveniently be obtained which will span two and even three of the spaces between the piers or columns. When this is the case, the question arises whether it will be better construction to use a long continuous girder, or to have each girder of only one span.

Most architects are probably aware that a girder of two or more spans is stronger and stiffer than a girder of the same section of only one span, but just *how much* stronger and stiffer is a question they are unable to answer. This is the information which it is proposed to furnish in this article.

As it is seldom that a girder of more than three spans is employed in ordinary buildings, we shall limit the present discussion to these two cases. In all structures the first point which should be considered is the resistance required of the supports, and we will first consider the resistance offered by the supports of a continuous girder.

In the following article we shall not go into the mathematical discussion of the subject, but will refer any readers interested in the derivation of the formulæ for continuous girders to an article on that subject, by the writer, in the June, 1881, number of *Van Nostrand's Engineering Magazine.*

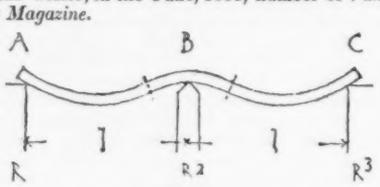


Fig. 1.

SUPPORTING FORCES.

Girders of Two Spans, Loaded at the Centre of each Span. If a girder of two spans, l and l_1 is loaded at the centre of the span l with W lbs., and at the centre of l_1 with W_1 lbs., the reaction of the support R_1 will be represented by the formula:

$$R_1 = \frac{13W - 3W_1}{32}, \tag{1}$$

the reaction of the support R_2 by

$$R_2 = \frac{11}{16}(W + W_1) \tag{2}$$

and the reaction of the support R_3 by the formula:

$$R_3 = \frac{13W_1 - 3W}{32}. \tag{3}$$

If $W = W_1$ then each of the end supports would have to sustain $\frac{5}{16}$ of one of the loads, and the centre support $\frac{11}{16}$ of W. Were the girder cut so as to make two girders of one span each, then the end supports would carry $\frac{1}{2}$ or $\frac{8}{16}W$, and the centre support $\frac{16}{16}W$, hence we see that by having the girder continuous we do not require so much resistance from the end supports, but more from the central support.

Girder of Two Spans, Uniformly Distributed Load over each Span. Load over each span equals w pounds per unit of length. Reaction of left support,

$$R_1 = \frac{w}{2}\left\{ l - \frac{l_1^3 + l^3}{4l\,(l + l_1)} \right\} \tag{4}$$

Reaction of central support,

$$R_2 = w\,(l + l_1) - R_1 - R_3 \tag{5}$$

Reaction of right support,

$$R_3 = \frac{w}{2}\left\{ l_1 - \frac{l_1^3 + l^3}{4l_1\,(l + l_1)} \right\} \tag{6}$$

When both spans are equal to l, the reaction of each end support is $\frac{3}{8}\,w\,l_1$ and of the central support $\frac{5}{4}\,w\,l$; hence the girder, by being continuous, reduces the reaction of the end supports and increases that of the central support by $\frac{1}{4}$ or twenty-five per cent.

Continuous Girder of Three Equal Spans, Concentrated Load of W pounds at Centre of each Span.

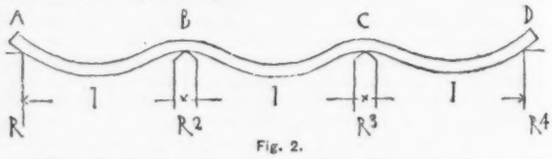


Fig. 2.

Reaction of either abutment, $= R_1 = R_4 = \frac{7}{20}\,W.$ (7)

Reaction of either central support, $= R_2 = R_3 = \frac{23}{20}\,W,$ (8)

or, the reaction of the end supports is lessened $\frac{3}{10}$, and that of the central supports increased $\frac{3}{20}$ of that which they would have been, had three separate girders of the same cross section been used instead of one continuous girder.

Continuous Girder of Three Equal Spans, Uniformly Loaded with w pounds per Unit of Length.

Reaction of either end support, $= R_1 = R_4 = \frac{2}{5}\,w\,l.$ (9)

Reaction of either central support, $= R_2 = R_3 = \frac{11}{10}\,w\,l;$ (10)

hence the reactions of the end supports are $\frac{1}{5}$ less, and of the central supports $\frac{1}{10}$ more than if the girder were not continuous.

Strength of Continuous Girders. Having determined the reaction of the supports, we will now consider the strength of the girder.

The strength of a beam depends upon the material and shape of the beam, and upon the external conditions imposed upon the beam. The latter give rise to the bending moment of the beam, or the amount by which the external forces (such as the load and supporting forces) tend to bend and break the beam.

It is this bending moment which causes the difference in the bearing strength of continuous and non-continuous girders of the same cross-section.

Continuous Girders of Two Spans. When a rectangular beam is at the point of breaking, we have the following conditions:

$$\text{Bending moment} = \frac{\text{Mod. of rupture} \times \text{breadth} \times \text{sq. of depth}}{6}, \tag{11}$$

and that the beam may carry its load with perfect safety we must divide the load by a proper factor of safety.

Hence, if we can determine the bending moment of a beam under any conditions, we can easily determine the required dimensions of the beam from formula (11).

The greatest bending moment for a continuous girder of two spans is almost always over the middle support, and is of the opposite kind to that which tends to break an ordinary beam.

Distributed Load. The greatest bending moment in a continuous girder of two spans, l and l_1, loaded with a uniformly distributed load of w pounds per unit of length, is

$$\text{Bending moment} = \frac{w\,l^3 + w\,l_1^3}{8\,(l + l_1)}. \tag{12}$$

When $l = l_1$ or both spans are equal,

$$\text{Bending moment} = \frac{w\,l^2}{8},$$

which is the same as the bending moment of a beam supported at both ends, and uniformly loaded over its whole length, hence a *continuous girder of two spans uniformly loaded, is no stronger than if non-continuous.*

Concentrated Load. The greatest bending moment in a continuous girder of two equal spans, each of length l, loaded with W pounds at centre of one span, and with W_1 pounds at the centre of the other span, is

$$\text{Bending moment} = \tfrac{3}{32}\,l\,(W + W_1) \tag{13}$$

When $W = W_1$ or the two loads are equal, this becomes

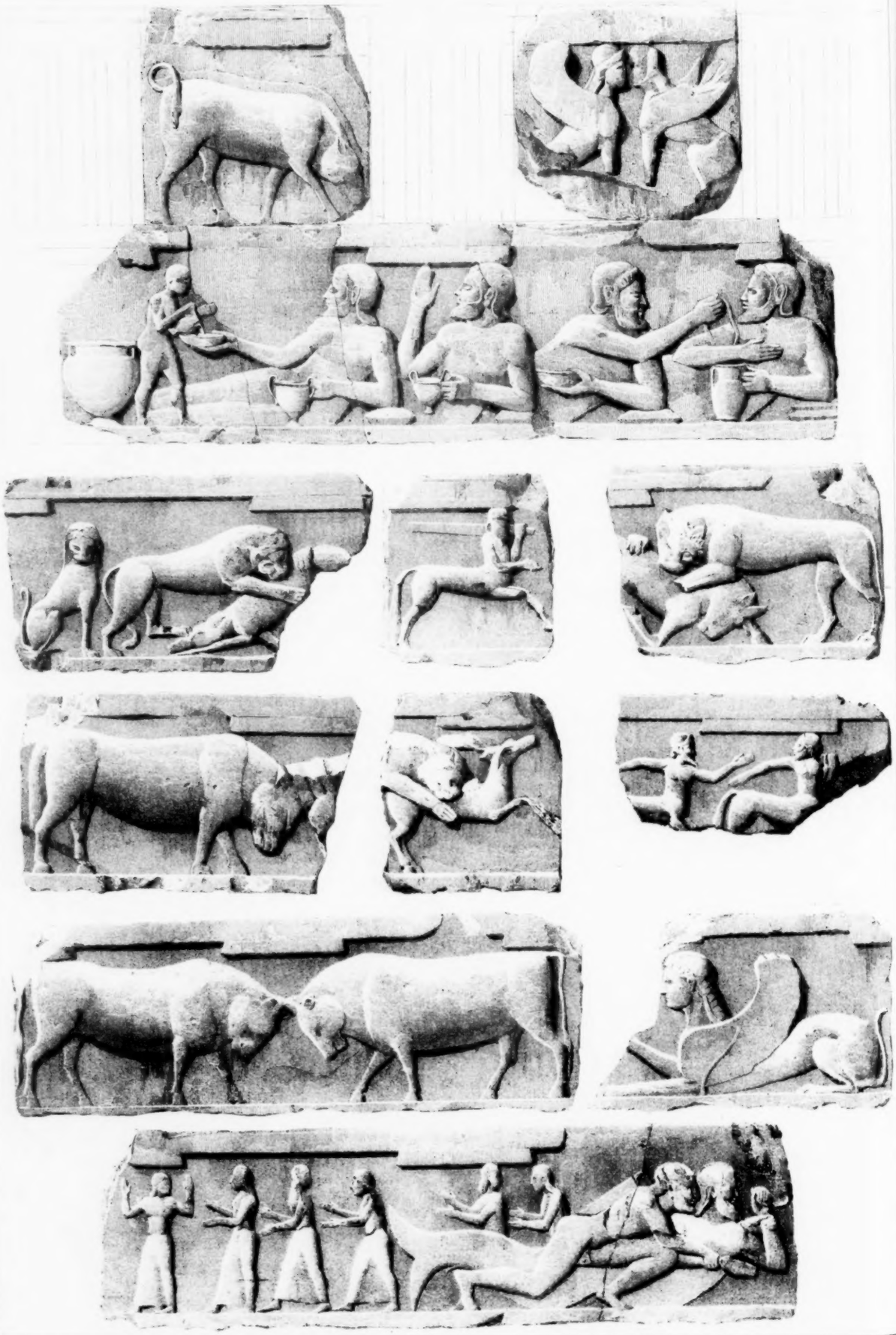
$$\text{Bending moment} = \tfrac{3}{16}\,W\,l,$$

or $\frac{1}{4}$ less than what it would be were the beam cut at the middle support.

Continuous Girder of Three Spans. Distributed Load. The greatest bending moment in a continuous girder of three spans, loaded with a uniformly distributed load of w pounds per unit of length, the length of each end span being l_1 and of the middle span l, is at either of the central supports, and is represented by the formula:

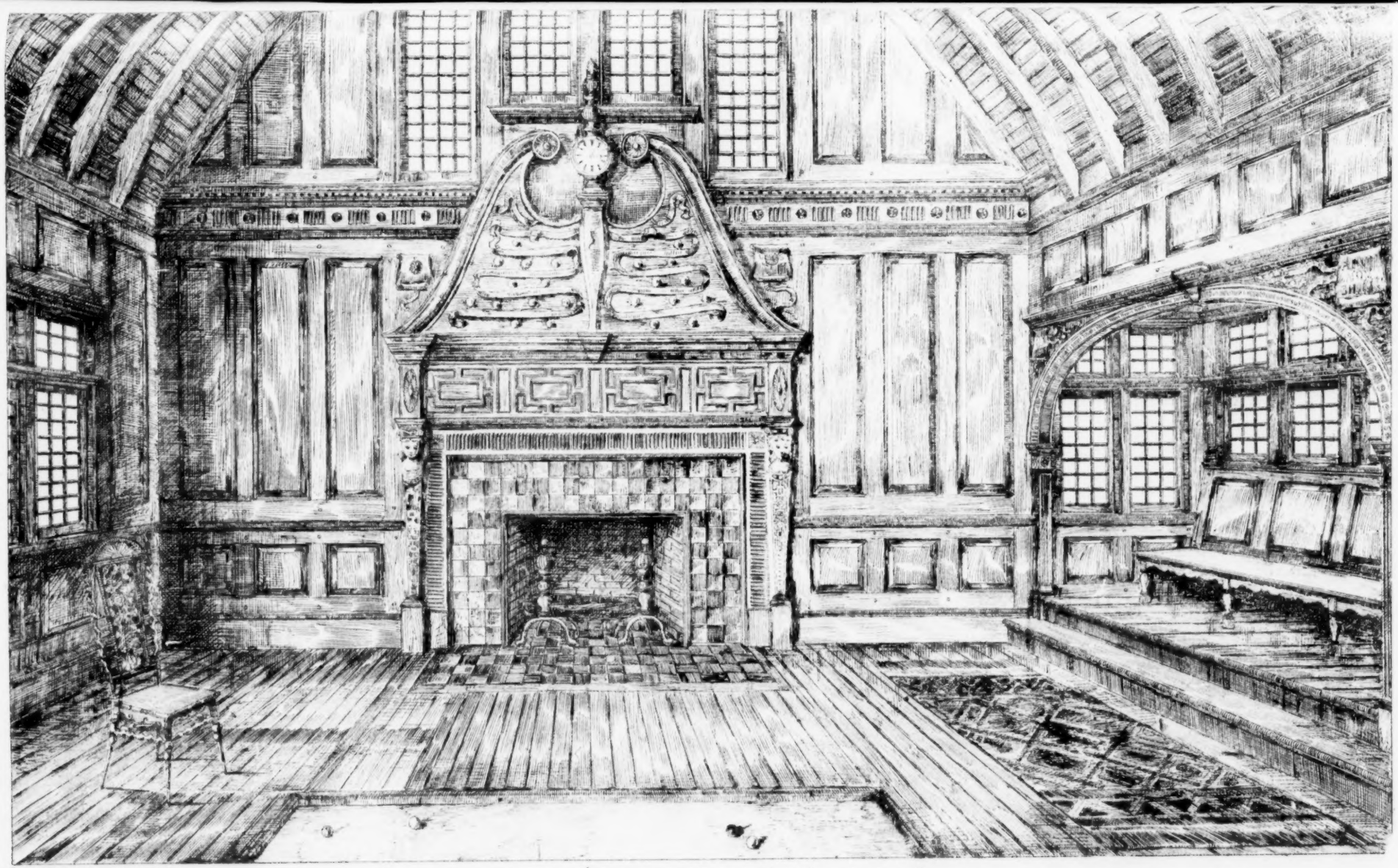
$$\text{Bending moment} = \frac{w\,l^3 + w\,l_1^3}{4\,(3l + 2l_1)}. \tag{14}$$

BAS-RELIEFS FROM THE TEMPLE AT ABSOR



The Heliotype Printing Co., 35 Dorchester Ave., Boston.

No. 511 American Architect and Building News. Dec. 10, 1881



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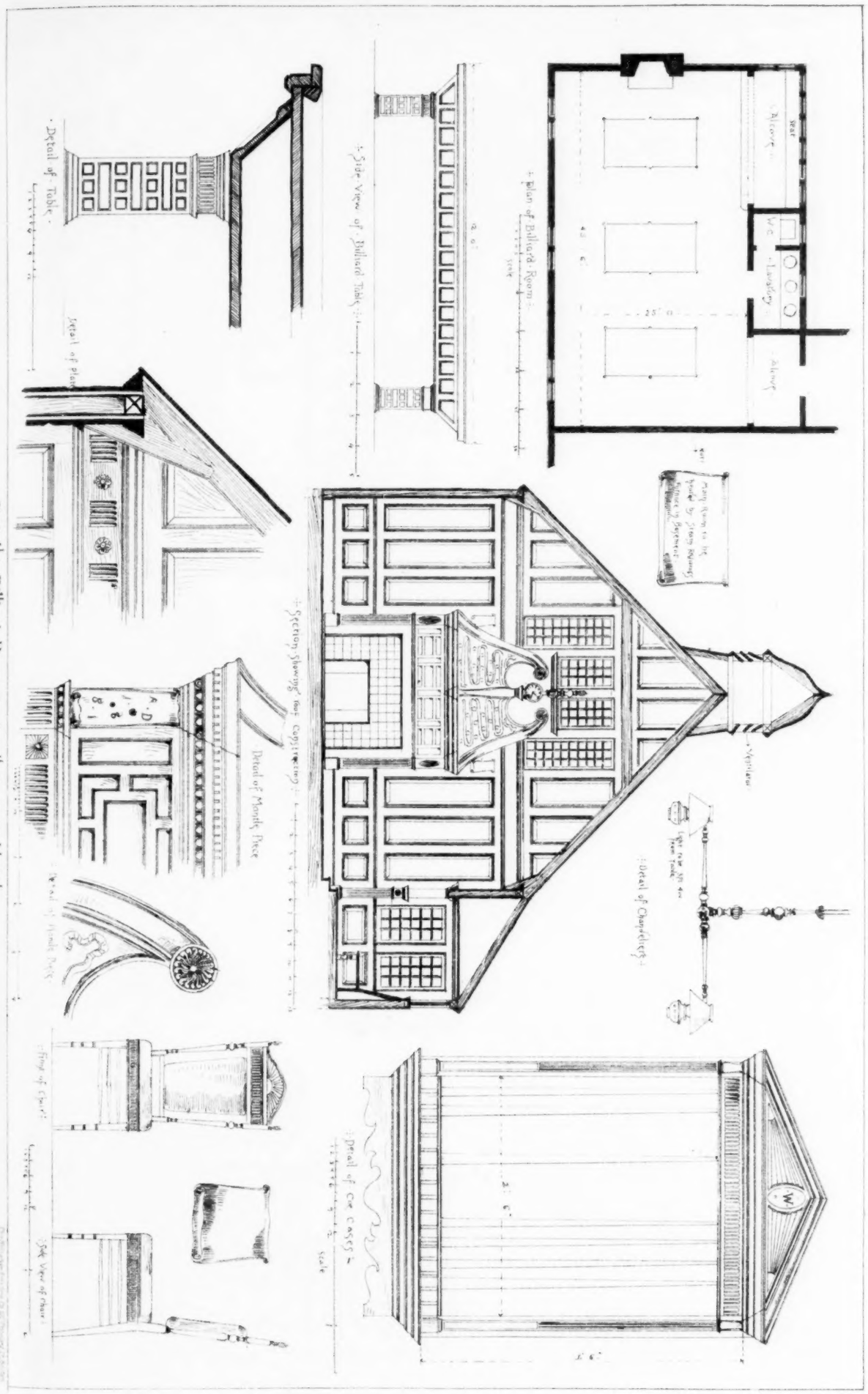

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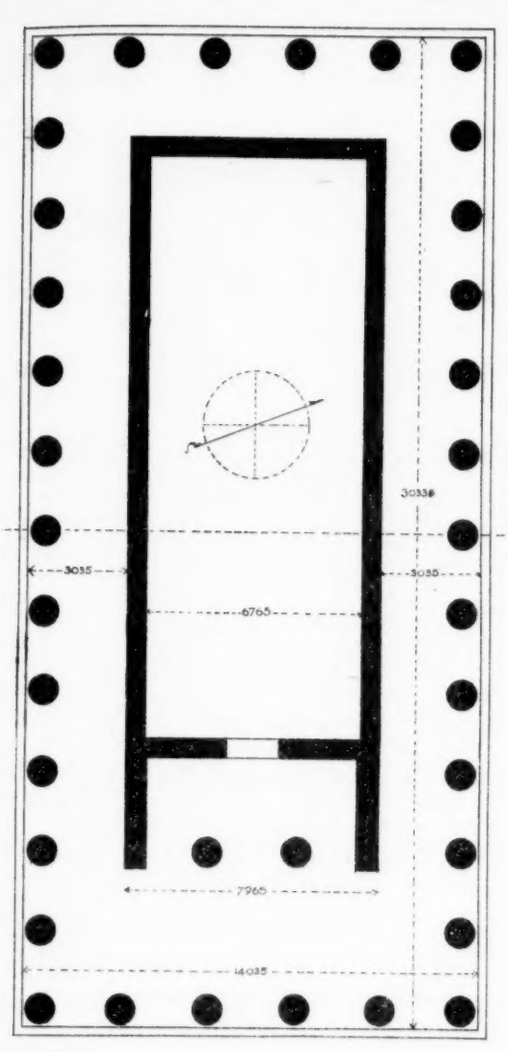
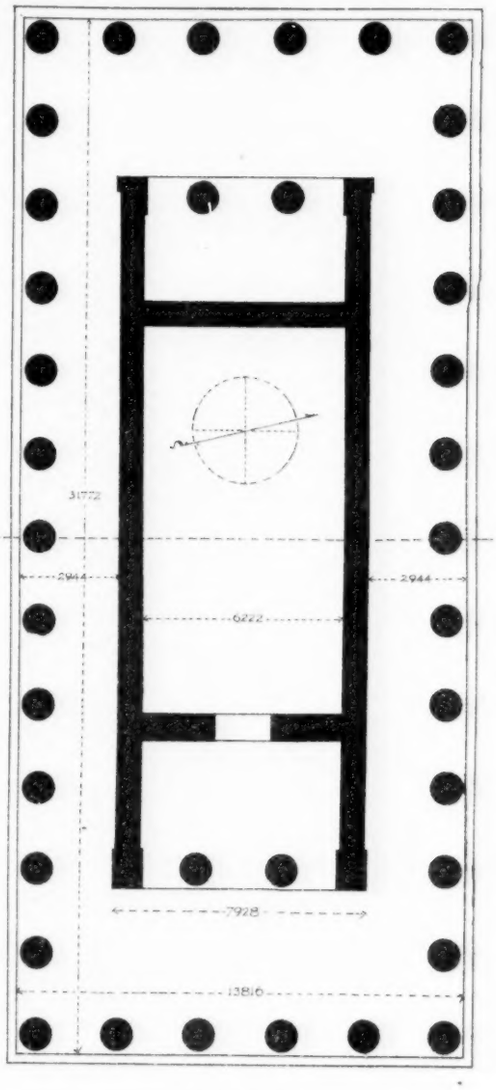


TEMPLE OF ASSOS



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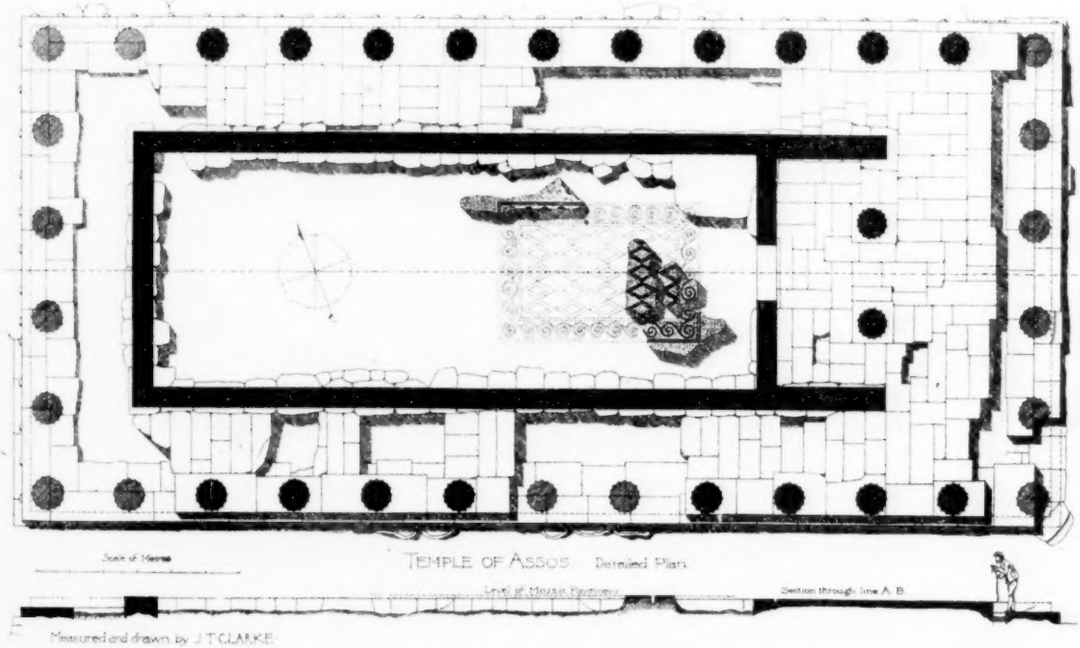

TEMPLE OF ASSOS Detailed Plan

Measured and drawn by J. T. CLARKE

When the three spans are equal this becomes

$$\text{Bending moment} = \frac{w\,l^2}{10}, \qquad (14a)$$

or $\frac{1}{5}$ less than what it would be were the beam not continuous.

Concentrated Loads. The greatest bending moment in a continuous girder of three equal spans, each of a length l, and each loaded at the centre with W pounds, is

$$\text{Bending moment} = \tfrac{3}{20}\ W\,l, \qquad (15)$$

or $\frac{2}{5}$ less than that of a non-continuous girder.

DEFLECTION OF CONTINUOUS GIRDERS.

Continuous Girder of Two Equal Spans. The greatest deflection of a continuous girder of two equal spans, loaded with a uniformly distributed load of w pounds per unit of length, is

$$\text{Def.} = .005416\ \frac{w\,l^4}{E\,I}. \qquad (16)$$

(E denotes modulus of elasticity; I, moment of inertia.)

The deflection of a similar beam supported at both ends and uniformly loaded, is

$$\text{Def.} = .013020\ \frac{w\,l^4}{E\,I};$$

Hence the deflection of the continuous girder is only about $\frac{2}{5}$ that of a non-continuous girder. The greatest deflection in a continuous girder is also not at the centre of either span, but between the centre and the abutments.

The greatest deflection of a continuous girder of two equal spans, loaded at the centre of one span with a load of W pounds, and at the centre of the other span with W_1 pounds, is

for the span with load W,

$$\text{Def.} = \frac{(23\,W - 9\,W_1)\,l^3}{1536\,E\,I}; \qquad (17)$$

for the span with load W_1,

$$\text{Def.} = \frac{(23\,W_1 - 9\,W)\,l^3}{1536\,E\,I}. \qquad (17a)$$

When both spans have the same load,

$$\text{Def.} = \tfrac{7}{768}\ \frac{W\,l^3}{E\,I}. \qquad (17b)$$

The deflection of a beam supported at both ends and loaded at the centre with W pounds, is

$$\text{Def.} = \frac{W\,l^3}{48\,E\,I};$$

or, the deflection of the continuous girder is only $\frac{7}{16}$ of the non-continuous one.

Continuous Girder of Three Equal Spans. Uniformly distributed load of w pounds per unit of length:

$$\text{Deflection at centre of middle span} = .00052\ \frac{w\,l^4}{E\,I}. \qquad (18)$$

$$\text{Greatest deflection in end spans} = .006884\ \frac{w\,l^4}{E\,I}; \qquad (19)$$

or, the greatest deflection in the girder is only about $\frac{1}{2}$ that of a non-continuous girder.

Concentrated load of W pounds at centre of each span:

$$\text{Deflection at centre of middle span} = \frac{1}{480}\ \frac{W\,l^3}{E\,I}. \qquad (20)$$

$$\text{Deflection at centre of end spans} = \frac{11}{960}\ \frac{W\,l^3}{E\,I}, \qquad (21)$$

or only $\frac{11}{20}$ of the non-continuous girder.

Several Observations and Formulæ for Designing Continuous Girders. From the foregoing we can draw many observations and conclusions which will be of great use in deciding whether it will be best in any given case to use a continuous or non-continuous girder.

First, as to the Supports. We see from the formulæ given for the reaction of the supporting forces in the different cases, that in all cases the end supports do not have as much load brought upon them when the girder is continuous as when it is not, but of course the difference must be made up by the other supports. This might often be desirable in buildings where the girders run across the building, the ends resting on the side walls, and the girders being supported at intermediate points by columns or piers. In such a case, by using a continuous girder, part of the load could be taken from the walls and transferred to the columns or piers.

But there is another question to be considered in such a case, and that is vibration. Should the building be a mill or factory in which the girders had to support machines, then any vibration given to the middle span of the beam would be carried to the side walls, if the beam were continuous, while if separate girders were used with their ends an inch or so apart, but little, if any vibration would be carried to the side walls from the middle span.

In all cases of careful construction the supporting forces should be carefully looked after.

Strength. As the relative strength of continuous and non-continuous girders, of the same size and span and loaded in the same way, is as their bending moments, we can easily calculate the strength of a continuous girder knowing the formulæ for its bending moment. From the values given for the bending moments of the various cases considered, we see that the portion of the girder most strained, is that which comes over the middle supports. Also that, except in the single case of a girder of two spans uniformly loaded, the strength of a girder is greater if it is continuous than if it is not. But the gain in strength in some instances is not very great, although it is generally enough to pay for making the girder continuous.

Stiffness. The stiffness of a girder is indirectly proportional to its deflection; that is, the less the deflection under a given load the stiffer the girder.

Now, from the values given for the deflection of continuous girbers, we see that a girder is rendered many times stiffer by being made continuous; and this may be considered as the principal advantage in the use of such girders.

It is often the case in building construction that it is necessary to use beams of much greater strength than is required to carry the superimposed load, because the deflections would be too great if the beam were made smaller. But if we can use continuous girders we may make the beams of just the size required for strength, as the deflections will be lessened, by the fact of the girders being continuous. It should therefore be remembered that where great stiffness is required, continuous beams or girders should be used if possible.

FORMULÆ FOR STRENGTH AND STIFFNESS.

For convenience we will give the proper formulæ for calculating the strength and stiffness of continuous girders of rectangular cross-section. The formulæ for strength are deduced from the formula:

$$\text{Bending moment} = \frac{B \times D^2 \times R}{6};$$

where R is a constant known as the modulus of rupture; and is eigtheen times what is generally known as the co-efficient of strength.

Strength. Continuous girder of two equal spans, loaded uniformly over each span:

$$\text{Breaking weight} = \frac{2 \times B \times D^2 \times A}{L};$$

where B denotes the breadth of the girder, D the depth of the girder, both in inches, and L the length of one span *in feet*. The values of the constant A may be found in most works on the strength of beams. For Yellow Pine 725 lbs., for Spruce 600 lbs., and for White Pine 500 lbs., may be taken as reliable values for A.

Continuous girder of two equal spans, loaded equally at the centre of each span

$$\text{Breaking weight} = \frac{4}{3} \times \frac{B \times D^2 \times A}{L}.$$

Continuous girder of three equal spans, loaded uniformly over each span:

$$\text{Breaking weight} = \frac{5}{2} \times \frac{B \times D^2 \times A}{L}.$$

Continuous girder of three equal spans, loaded equally at the centre of each span:

$$\text{Breaking weight} = \frac{5}{3} \times \frac{B \times D^2 \times A}{L}.$$

Stiffness. The following formulæ gives the loads which the beams will support without deflecting more than *one fortieth* of an inch per foot of span.

Continuous girder of two equal spans, loaded uniformly over each span:

$$\text{Load on one span} = \frac{B \times D^3}{.26 \times L^2 \times e}.$$

Continuous girder of two equal spans, loaded equally at centre of each span:

$$\text{Load on one span} = \frac{16}{7} \cdot \frac{B \times D^3}{L^2 \times e}.$$

Continuous girder of three equal spans, loaded uniformly over each span:

$$\text{Load on one span} = \frac{B \times D^3}{.33 \times L^2 \times e}.$$

Continuous girders of three equal spans, loaded equally at the centre of each span:

$$\text{Load on one span} = \frac{20}{11} \cdot \frac{B \times D^3}{L^2 \times e}.$$

The value of the constant E is 17280, divided by the modulus of elasticity, and for the three woods most commonly used as beams, the following values may be taken, —

Yellow pine .0125; white pine .0138; spruce .0128.

The formulæ given for the reactions of the supports, and for the deflections of continuous girders with concentrated loads, were verified by the writer by means of careful experiments on small steel bars. The other formulæ have been verified by comparison with other authorities, where it was possible to do so; though one or two of the cases given, the writer has never seen discussed in any work on the subject.

F. E. KIDDER, B. C. E.

THE ILLUSTRATIONS.

DETAILS OF THE TEMPLE OF ASSOS.

WE reproduce from Texier's *Expédition en Asie Mineure* several engravings of the sculptured fragments of the friezes which are mentioned by Mr. Clarke as being in the collections of the Louvre.

PLAN OF THE TEMPLE OF ASSOS. MEASURED AND DRAWN BY MR. J. T. CLARKE AND HIS ASSISTANTS.

COMPETITIVE DESIGN FOR THE BILLIARD-ROOM OF A COUNTRY HOTEL.

We reproduce this week, without prejudice to the decision of the judges who are now examining the drawings, one of the designs submitted in our fourth competition in interior decoration.

OPENING ADDRESS BEFORE THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.[1]

We all know how much it pleases some of our critics to assert that the objects of this Corporation are selfish first of all, and devoted to the improvement of the art and the science of building only in a very secondary degree. I need hardly waste words upon a refutation of such statements. I am content to point to the volumes of our Transactions for the most complete answer to them, as well as to the experience of those who have served on our Council from time to time. The real object of the Institute of British Architects is very different; we exist not only because of but for our art. It is not because we are architects that we band ourselves together in selfish opposition to the interests of the world, but rather that the interests of the outside world and of the profession may be harmonized and proved to be identical; and equally that our well-loved art may be more studied, more admired, better understood, and more widely practised, not only by ourselves but by the public outside our ranks. The real interests of the public and of ourselves are identical. . . .

Naturally our work divides itself into that which relates to the scientific, and that which is concerned with the artistic side of our art. I think there has of late years been rather a tendency to devote more time to the former than to the latter; but the art of building, the art of draining and the like are exact, and do not admit of perpetual discussion. The development of attention to the study of novelty in construction is not always for the advantage of good building. Half the inventors, whose circulars cover our tables every morning, claim as the chief merit of their inventions that they are cheap, and I would that occasionally they convinced us that they were equally lasting. You will pardon me, I am sure, for frankly speaking my mind on an occasion such as this. I maintain that British architects are honorably distinguished for the way in which, as a rule, they deal with all those questions of new forms of construction, of water-supply, of drainage, and of the general conditions on which comfort and convenience in our houses depend. English comfort is a proverbial expression almost all over the world, and our architects are fairly entitled to a large share of the credit of its creation.

I wish it were quite possible to make the same assertion with regard to our artistic successes. It strikes me more strongly, the more I think of it, that we cannot quite escape some responsibility for the bad work which is done by builders without our aid. How is it, one may fairly be asked, that, with an ever-increasing body of architects, educated and trained more and more carefully, the vernacular architecture of the country becomes worse and worse every day? The vernacular architecture of a country is that which the carpenter, the bricklayer, the mason, the smith or the plasterer does if left wholly to himself. We all know that the time was when little even of this work was wholly contemptible; take even the last century, and in such work one sees a simplicity and restraint in design, and an absence of vulgar display, which make one feel a charm in work most of which certainly never passed through an architect's office. Go from the house built in the suburb of an English country town in 1750, to one of the houses which rise in countless numbers on all hands now, and your verdict, as architects and as artists, must always, I fear, be given in favor of the former. Compare the two, and you will find that the taste of the eighteenth-century builder was for simple and good work before ornamental, so that he seldom came to the latter at all; whilst the taste of the nineteenth-century builder is to do everything for display, sacrificing the money which might have made his work at least substantial to an investment in so-called ornaments to the show fronts only of his house, which are costly to put up, costly to keep in repair, and hideous in their ghastly unfitness for their place. They have some "compo" keystones, ornamental railings and balconies, a few lumps of terra-cotta, elegant cornices and window-dressings, and highly suggestive chimney-pots; and for the sake of these the house has walls and floors so thin that every sound can be heard throughout, and so weak that in a heavy gale you rock in your bed. For all this of course we are only indirectly responsible. It must be admitted that too many, if not all, of us, think too much of the fronts of our buildings, and so have practically brought up a whole generation of builders and workmen to believe firmly that all buildings ought to have a show front; we so often sacrifice solidity to the pleasure of creating what we call ornament, that we have led them naturally to assume that ornament is an object by itself to be clapped on to a building at all hazards, and even at the sacrifice of solidity. I should much like to see your attention more and more turned to this large and serious question; it deserves discussion and action, for depend upon it some screws must be very loose indeed in our system if all our work is so wholly outside the world as not to influence the vernacular architecture of the people for good. My only suggestion at present is that our duty is to show by example that simple building may be quite as good as extravagant building, that the essence of all good architecture is that it should be solid and lasting before it tries to be ornamental, that ornament is a feature which grows out of utility, and cannot be applied to a building like a loose-fitting garment, to cover defects or distract attention from parts which are not supposed to be seen. It is unworthy of architects to build what is in its very nature ephemeral, and I wish heartily that before all questions of style this vital one of solidity were always present to us when we are making our plans. Depend upon it the builders who have been trained by architects who never build what is not solidly and well constructed are much more likely to build for themselves in the same spirit and way, than they ever are if they have been otherwise taught. And after all it is the work done by builders without the intervention of an architect that we principally see wherever we move in this ever-increasing city, and in others similarly conditioned. It is work which it ill becomes us to treat as non-existing; it is, on the contrary, one of the very first necessities of the day that we should, in some practical way, deal with it.

There is another question to which the one just mentioned naturally leads, and this has to do with the extent to which we may be able to affect, in the interests of our art, the future architectural arrangement of the streets and buildings throughout our great cities. To state the case in this way is perhaps in fact to answer it, as far as relates to direct interference with, or influence over, what is done by municipal authorities; though as our Institute boasts properly that it is a British, and not only a London institution, our object ought always to be to keep this fact well before us, and to act even out of London whenever the importance of the case demands it. In 1876 the late Mr. Wyatt, in the course of a discussion on Mr. Eastlake's interesting Paper on the Work and History of the Institute, told us that the author had omitted to mention one proof of the growing influence of the Institute. This he saw in the request, which had just then been made to us, to exercise control over the designs and elevations of buildings in Northumberland Avenue; a request which became, I believe, a law to the extent of making it necessary that all these designs should be "submitted" to the Council of the Royal Institute of British Architects. Well, I know not, gentlemen, what the general feeling on this subject is now. Some I know agreed with the view which I took at the time that the position we were taking was a dangerous one and one that could do no sort of good to our art. The taste of the individual members of a council may be excellent; but there is an unwillingness on the part of a body of men to criticise too severely, or to agree in suggestions as to the alteration of the work of a brother architect. Opinions differ round our own table as to what is best, sometimes even as to what is good, to such an extent as to end in approval being given in a general way to works in which probably every one of the Council in his own heart can see little good. Nor is this all. The elevations alone, which are not complete without plans, are submitted; modifications of a very simple kind alone can be and are advised: the advice is neglected, and the building is after all erected with little, if any, attention to the opinion of the Council of the Institute. In the end, if Northumberland Avenue ever becomes an avenue of buildings, the Institute will have to ask itself whether the control it has exercised has been sufficiently strong, and the result so good, in comparison to that of the streets in which we have not been able to interfere, as to justify Mr. Wyatt's satisfaction. For myself I have no hesitation in saying that it would be better, if we are to have no more power than at present, that we should have less. . . .

Upon the broad question of giving general advice through our Council, I feel sure that the Government, or the governing bodies of our great cities, might well, and with advantage to themselves, consult us from time to time on the preliminaries of great building operations; and I have no sort of doubt that we should always be willing to give the best help in our power. Whether the points to be settled are the best routes for new streets, the best sites for great public buildings, or the best openings for architectural improvements, it would be advantageous to every one if the subject were laid before a committee of experts — such as the Members of Council of this Institute are — for advice and opinion. Take such cases, for instance, as the choice of a site for the New Courts of Justice; or as to the choice among various schemes for the placing of the New Government Offices which are even now required; or as to the conditions on which railways are to be brought into London or across our river, and it is obvious that our opinion might well be asked, and almost certainly be acted on, with advantages to the world and without prejudice to any one. In the last case, for instance, can it be doubted that, if we had been consulted, the House of Commons would ever have allowed the London, Chatham and Dover Railway to erect its bridge across Ludgate Hill, and to erect a second and almost equally ill-placed bridge across the Thames, within a few yards only of another built on wholly different lines? Nor would the South Eastern Railway have been permitted to build the two gigantic and odious sheds on the river-side, which have been the ruin of so much of the beauty of the matchless prospect. Such subjects lead me to say how useful a function this Institute might perform if it could keep a more active surveillance on the mode in which the works of deceased artists are dealt with. I am not among the passionate admirers of such a work as the General Post Office, but at any rate it was a consistent design, carried out in an honest and uniform spirit, and complete in outline and character. New wants have arisen since it was built, Rowland Hill has come and gone, and more and more accommodation is required. But it is almost beyond credence, that some of that increased space should have been obtained by a series of erections on the roof of the original building, hideous in themselves, and wholly careless of the effect produced, or even of having in themselves any architectural character at all higher than that of a third-rate house or workshop. Yet so it is. And perhaps it was because for years the porticos and colonnades of another great public building — the British Museum — were entirely filled with glass

[1] A paper read by Mr. G. E. Street, R. I. B. A.

cases and partitions, without any outcry from the public at such a defacing of a consistent and costly design, that the Government which represented the country was so heedless of the monstrosity of which it was guilty, when it made the additions to the Post-Office. Nor is it out of place here to ask when the front of the Colonial Office in Whitehall is to be finished? Its architect evidently prepared for the erection of two towers or pavilions at the angles of the front. His proposals were not acted on, and there to the present hour stands the building with its two most important angles evidently unfinished. Every day a large proportion of the Members of both Houses of Parliament, and most of the Ministry, pass under the walls of this unfinished front without, I suppose, one thought of the injustice done to the memory and reputation of one of the greatest architects of his time. Surely on such a question as this the Institute of Architects, if no one outside will move, ought to take some action.

Then again I hope we are all agreed that there is no work in which we can as a body do better service to our art, or more certainly show our real sense of its value, than by sturdily opposing all schemes for the destruction of existing works of architectural art, or constructions of historical or archæological interest. We have, as you know, a committee for the conservation of ancient monuments: it is a strongly constituted committee, and its existence cannot be too widely known. There is always work for it to do. Take for example the case of the City churches. It is no exaggeration to say for myself, what I doubt not very many of you feel also, that when I return from some foreign travel, and cross the railway bridge into Cannon Street, I feel a pride in the architectural beauty of the City of London, which is never lessened by contrast with what I have been seeing elsewhere. And to what, may I ask, is the beauty of this view owing? There is a magnificent river and a sublime bridge, but beyond and above these a cluster of towers and steeples, of so much variety of design, so skilfully treated, so picturesque from every point of view, as to afford unending delight. In the year 1800 there were one hundred and seven churches in the City; in the year 1877 only ninety-five remained, and of these there were no less than thirty-one scheduled as "at present" to be pulled down. Only the other day another of Wren's reputed churches, St. Matthew, Friday Street, was said to be condemned, and though the particular case is not a strong one, it seems to me high time that this Institute should strain every nerve in order to save any more such regrettable destruction of the buildings to which London owes much of its pre-eminent beauty. If architects stand by quietly, it may be assumed that there are no artistic objections to such works. We may still permit men to go on in the cheap and easy fashion of making our ancestors' piety and liberality pay for building and endowing churches which we, with all our increased wealth, choose to think we cannot afford to erect; and by the time that all the empty churches (consequent largely on a non-resident clergy) have been removed, and their sites sold for counting-houses, shops, banks, and what not, men will awake to the discovery that the architectural beauty of the City is a thing of the past, and that the loss is irremediable. At the West End I hope the same words of warning are not required. We have been appealed to in reference to a rumor that St. Margaret's, Westminster, was to be taken away. This is a constantly recurring rumor. The penny-a-liners probably think that every one wishes it removed. They forget that it has just been refitted at great cost, that it is a building full of architectural and historical interest; and they are not aware that the builders of our great churches and cathedrals, being artists, had never any objections to the erection of small buildings near to, or in contact with, larger ones, to which they gave infinitely more value and scale than they otherwise possessed. I am glad to be able to assure you, however, in this case, on the best authority, that there is no foundation whatever for the rumor. It is remarkable to notice how much is lost on all sides for want of some active hands to save threatened works of art. We look round on the Paris, the London, the Florence, the Cairo, the Venice of our youth, and find that on all sides work has been destroyed, apparently mainly for the sake of change, for the loss of which no new building will ever atone. In London there is the well-known case of the colonnade of Burlington House taken away upon the understanding that it should be rebuilt, but lying in a mouldy heap somewhere on the other side of the river. In some similar limbo, I suppose, are the stones of Temple Bar, for the re-erection of which, in some spot not far from its old place, such, for instance, as an entrance to Temple Gardens, one would imagine that funds might without difficulty have been found. Farther to the west is an even more interesting work — the Water Gate, at Buckingham Street, Adelphi — treated in an even more ingeniously-spiteful way. For here the lovers of the beautiful have created a garden with lawns and shrubs and winding walks, which one would suppose might have been allowed to undulate as well as to wind. At any rate even now the level of the garden might be lowered for some distance, on either side and in front of the gateway, and Inigo Jones's work might again be seen in its integrity, instead of being earthed-up to nearly half its height, and of having its archway used as a receptacle for rubbish, and the decay of its old stone-work hastened as much as possible by piles of damp earth and plants carefully placed against it by the landscape gardener. And, to conclude, there is the case of a church in Edinburgh, for taking down and re-building which, on a new site, stone for stone, a railway company were bound to, and did, provide the funds. Here again the stones remain in a heap, and the Corporation, unless they are much traduced, have kept the money for their own municipal purposes.

I might easily multiply examples of the same kind. They all seem to point in the same direction; to the necessity in such a country as ours for the creation of a Government Department of the Fine Arts, whose office should be not only to give order to our magnificent but often confused and inaccessible collections, but to take care that our national buildings and our historical monuments are classified and preserved as far as possible from further damage either at the hands of time and weather, or at the equally destructive hands of those who (as in the case of the Post-Office) have no hesitation in wholly destroying the architectural character of a great public building. I believe that the appointment of such a ministry might be followed very soon among other things by an addition to our museums, which has often been urged strongly— but hitherto unsuccessfully— of a museum of casts. Every one admits the advantage to students of art of such a museum. Berlin has shown us the way, and the expense could not be so great as to be a difficulty in the way of so rich a country as this is. Moreover it seems to be a necessary complement to the other collections which have been accumulated within the present century, as affording the very best means of educating the eyes of a people who are undoubtedly holding their own against foreigners in all artistic matters far better than they did before such museums were first of all formed. . . .

The architectural publications of the year do not appear to be numerous, and I cannot say how much I regret this. Nothing in my opinion tends more to raise our art than some attention among us to the literary illustrations of architectural history and style, in which so many architects have in past times distinguished themselves. We have examples, in the case of some of our oldest members, which may well be commended to the notice of their juniors; for nothing, let me assure them, so certainly gives young men their first footing on the ladder which leads to fame and success. Our old librarian, Mr. Dollman, has shown us how valuable a work it is possible to produce in his monograph of St. Mary-Overie's Church, as to which I have already had the pleasure of expressing my opinion here. The Society of Dilettanti has published another part of the antiquities of Ionia, in which, seeing that Mr. Newton, Mr. Watkiss Lloyd, Mr. Fergusson and Mr. Pullan, have combined their forces, we need not doubt the result. The magnificent government work, the *Monumentos Arquitectonicos de España*, is still going on, and we are looking forward to the early publication of Herr Richter's promised edition of Leonardo's Treatise on Painting — a work which will have almost as much attraction for architects as for painters, for among the many hitherto unpublished drawings which will be contained in it, many, I understand, are architectural designs. . . .

The most serious matter before us, next year, is the first obligatory examination for admission to the privilege of membership. It would be strange indeed, if, in a land of freedom such as ours, there had been but one opinion as to the wisdom of the proposal, but it would be almost equally strange if, in a land of order such as ours fortunately is also, the examinations were not carried out with due zeal and thoroughness by your executive. Some of us may think that old times were not so very bad, and that want of some small preliminary technical culture and education did not prevent many of our British architects from being really great men. But these are not the sort of men who will be affected by our examination, the object of which is rather to raise the general standard of education, and so to keep out of the Institute those who are wholly incompetent, than any vain hope of suddenly creating an unlimited supply of admirable artists. We must not raise our expectations too high, or we shall certainly be disappointed. At the same time I feel very decidedly that it is the duty of the Institute to take care that the examination is a *bonâ fide* one, involving careful preparation on the part of the candidates, and a real acquaintance with at least the groundwork of an artistic and a professional knowledge. It is obvious that there will be no difficulty in testing satisfactorily the ability of all who come to be examined in many of those branches of our work in which every one who intends to act as an architect ought to be well grounded. The power of drawing, accurately and intelligibly, plans for buildings which will stand when built, is a *sine quâ non;* and there is much work of this sort as to which we shall have no difficulty in framing sufficient tests. The far more real difficulty is in an examination into the capacity of candidates as artists; and here I feel that it will not be desirable to make the test very difficult, for I know well under what difficulties students often labor. As a visitor and teacher for some years in the Schools of the Royal Academy, where, probably owing to the examination at admission, the ability of the students is above the average, I have to see with constant regret a singular want of acquaintance with the first principles of architectural design, and with the rudiments of architectural detail, which mark the work of many students. But I hope all here will agree with me that it would be a fatal mistake to make the artistic part of our obligatory examination so very easy and rudimentary as to allow even the most ignorant of our candidates scraping through. The examination once instituted must be a real one, in the sense of meaning that the candidate has at least reached some fixed standard — even if a rather low one — of efficiency all round. My own opinion is that such a standard should, as far as possible, be so settled at first as to remain permanently the same. We are not likely, so far as I can judge, to have a better prepared class five years hence than we have now. All the necessary means of educa

tion exist now, and have long existed. The system of pupilage, which enables men to learn exactly how those who have succeeded in making their mark are in the habit of working, is no doubt the strong point of our English system; and this can be supplemented by work in London under the professors at King's College and University College, and both in London and the provinces under the Government teachers. Then there is the Architectural School of the Royal Academy, presided over by an active Fellow of our Institute, and where the students have the advantage — as from the crowded state of the school there can be no doubt they feel it — of the personal teaching and direction of most of the architect-members of the Academy in succession. Finally, there are the inducements held out, both here, and at the Royal Academy, to the more able and earnest art-students, in the shape of prizes more or less attractive, and only to be gained by those who have achieved considerable artistic excellence. . . .

The Institute having taken this examination in hand, we must all do our best to insure its success, and in one respect many of us can do more perhaps than we do. It is the master who does bad or inferior work, who ruins the prospects of those whose education he has undertaken, and the better the master's work the better will be the prospect of those who have been trained to look up to him. I think I may dare to say in reference to our English School of Architecture that it has, in some respects, made marked progress within the recollection of most of us. No school, I believe, has advanced more in draughtsmanship, whilst the study of ancient examples at the fountain head has become universal among all those who have any enthusiasm or ambition. The individuality of the artist, which is the special mark of English art, is stamped as strongly on our architecture as it is upon the sister art of painting, and I trust that we here shall always steer clear of any attempt to follow foreign systems in this respect. I heard, only a short time ago, the lively expressions of regret of a great German authority, that their governmental system of teaching deprived them of the enviable independence and originality which struck him so much in our English system of architectural training.

Let me now say a few words to those who at present do not see their way to joining the ranks of this Institute. They are of two classes — the old and the young: of the former, it would be idle to shut our eyes to the fact that some very eminent names do not appear in the list of our members. Whatever the cause of their absence, I cannot say how much I regret it, and how heartily I wish it were possible to induce some, if not all, of them to give up their self-imposed isolation. I know that we see it asserted from time to time that this Institute concerns itself with nothing but questions of professional practice, professional etiquette, professional payments — that its whole concern is with the professional as opposed to the artistic part of our necessarily two-sided life. Well, gentlemen, I can only say that from first to last I have spent a good deal of time at your meetings and at your Council table, and my experience is not quite so dreary as these statements would, if they were justified by facts, make it. But those who think that less than the right amount of interest and time is given to artistic questions should, by joining us, strengthen the hands of those — among whom they may count me — who more or less agree with them. No one is more loyal than I am in every respect to that Academy of the Fine Arts to which it is my fortune to belong. Were this Institute in the least degree hostile to it I certainly should not have the honor of occupying this chair. But I hold that it is impossible for an instant to contend that all the artists in our profession are to rest quiescent outside, because some half-dozen seats in that body are reserved for a few fortunate architects. It was a wise and noble act, when the Royal Academy was founded, to make its constitution what it is, and to combine within its ranks representatives of all the arts. But our art requires much more than this, and I for one feel that we cannot too much interest ourselves in the work of this Institute, in order above all things that the position of our art as an art may more and more be recognized.

One of the aims of this Institute is to regulate — so far as it tries to do, and that is not very far — professional practice by discipline, which being suited for gentlemen is suited for artists; and those who do not belong to us do most undoubtedly, whether they like it, or allow it or not, reap advantages from our existence by their side. If the Institute were even remotely like a trades-union, then no appeal should come from me to these outside brethren, but knowing what its worth is I do not choose to lose this opportunity of appealing to them to join us.

The younger Society is very differently situated. The Architectural Association is, in so many respects, working in a groove which runs parallel to our own, that I can never avoid feeling that some means might and ought to be devised for enabling that active body to join us. I feel that there is so much that is admirable in the self-constituted system of education carried out by its members, in the energy with which they pursue their work, and in the high excellence of very much of it, that I rather grudge their securing all the energy of the young for an Institution with which we have nought to do. Surely some plan might be devised by which our juniors might, under their own government, be training themselves until they gradually fall into their places among us, instead of as now finding themselves often obliged to belong to two Societies where one should suffice. The young men want self-government; but I, who am no longer a young man, do not hesitate to say that this Institute suffers much and seriously by their practical abstinence from our meetings, our society and our work. And if it were possible — and it does not seem to me to be impossible — I should above all things like to see their connection with us established, together with full liberty of self-government as to all those educational arrangements which they at present appear to manage so admirably and to prize so much. I believe that few of us grow much better artists as we grow older. A man's best work is generally done between the age of twenty and forty, and we should all gain very much if our younger friends would occasionally read papers and join in discussions with us older men. What chance there may be of doing anything in this direction I know not; but nothing would give me more pleasure, during my time of office, than having to assist in any such fusion of the two bodies as may be found practicable. . . .

We have gone on far too long, enduring the existence of bad building on all sides, shutting our eyes to it, declaring it to be none of ours, and that we can accept none of the responsibility for it. Believe me, we are deluding ourselves. If the architects are now more numerous, more united and much more powerful than ever they were before, to what purpose is their unity and power if they cannot persuade those who build badly to build better? The fault I fear is with us. We hear architects of position plume themselves on being "practical" men; we see them indulge in so-called practical discussions, whilst they earnestly deplore the over-great attention which others would fain see bestowed on what they call merely artistic questions. So much is said about practice and practical matters that by degrees they cease to realize that the business they are pursuing ought primarily to be regarded as an art pure and simple; and thus, looking first of all at the lower side of their art, they end by ignoring wholly the higher side. Do not mistake me. In our art the best artist is the most practical man. There is the highest art in the best disposition of a ground plan. There is equal art in the best construction applied to a scientifically-devised plan, and in the same way there is the highest art in so disposing the plan that the arrangement shall be convenient for the purpose and yet admit of well-balanced masses in the elevation, and well-arranged outlines and skylines. Beauty of detail is inferior in artistic importance to these qualities, but essential of course to a perfect work. I plead that, if we all in due order took this really practical view of the requirements of our art, all our buildings would begin by being well-planned, would next be soundly built, with elevations meant to bear inspection wherever seen. There would be no sham fronts, no false use of materials, or deceits as to construction; and if our nine hundred architect-members were all building in this way, depend upon it the day would not be far distant when good building would be so much the fashion, that the builder, unassisted by an architect, would not care to do such vile work as now he almost always aims at, and succeeds in doing. The conclusion to which I have come, after many years' experience, is that the honest, well-constructed building never excites contempt. We may regret that it has no style, but if it have the qualities just named it may be said to have the first elements of style in itself, and can dispense with anything adventitious. That fashions in art come and go, most of us have already seen evidences; but really good work is never out of fashion, whatever its style. One revolution we have seen accomplished under our very eyes. We have lived in the days of compo, we are now living in an age of brick. We have seen the world outside us converted from the use of a bad and mean material to that of a good and honest one; and I am sanguine enough to believe in the possibility of such a change, in other respects, as may make all building throughout England more tolerable, because more honest and less vulgar, than it now is. If I did not think this a matter which ought to be taken to heart by every one of us, I should not venture so frankly to state my strong opinions. I hope that I shall not find myself without very general support, and that in due time our own consistent determination never to build anything which is not solidly and well constructed, with the best art we can bestow, will not only make men honor us for our work but anxious above all things, consciously or unconsciously, to build and work in the same way. Certain it is that, when we have accomplished this, we shall have just reached the point which throughout the world every good school of architecture seems to have reached long before its best period.

OFFICERS OF THE AMERICAN INSTITUTE OF ARCHITECTS.

The following officers were elected at the late annual convention of the American Institute of Architects: President, T. U. Walter, Philadelphia; Treasurer, O. P. Hatfield, New York; Secretary, A. J. Bloor, New York; members of Board of Trustees, Messrs. H. M. Congden, E. E. Littell, J. C. Cady, and Napoleon LeBrun, all of New York, together with the principal officers of the Institute; Committee on Publication, Messrs. A. J. Bloor, New York; H. H. Holly, New York; T. M. Clark, Boston; John McArthur, Philadelphia; members of Committee on Education, Messrs. W. R. Ware, New York; N. Clifford Ricker, Champaign, Ill.; Henry Van Brunt, Boston; Alfred Stone, Providence; and W. A. Potter, New York.

HEATING GAS DISTRIBUTION IN ST. LOUIS.

At the intersection of Clark and Tayon avenues, St. Louis, two square brick buildings of little apparent significance have been erected during the past few months. One of the buildings, situated on the northwest corner of the above thoroughfares, is evidently intended for an office. The adjoining structure, however, is constructed in a manner that immediately claims the attention of a close observer. It is a small, unpretentious building, measuring only 29 x 41 feet, ground measurement, with an altitude of thirty-five feet. The roof is of iron, with a rectangular opening on the ridge, surmounted by an iron ventilator. The basement is deeper than ordinary, and through the lower windows glimpses are gained of massive cylinders, connected by a bewildering array of immense tubes with a number of upright boilers. Their purpose cannot be explained by any of the well-known principles of mechanics, as the complicated arrangements conform to no acknowledged mechanism seen in operation in that city. Inquiry divulged the fact that the building was the central establishment and headquarters of the St. Louis Heat and Power Supply Company, a close corporation, in which the stockholders are members of the firm

of Shickle, Harrison & Co. and Eastern capitalists interested in the introduction of a patent for distributing hydrogen gas for heating and power purposes. The gas is manufactured under the Low process, which has been successfully applied in Yonkers and Winchester, N. Y. Mr. John Atkinson, late engineer and superintendent of the St. Louis Gas Company, is in charge of the works, and from him a reporter obtained the following information: The works are the largest and most extensive in the country, and when in operation will have a capacity of 300,000 cubic feet a day. The gas is not adapted for illumination, and will only be supplied to tenants requiring it in place of coal for heating, steam generation and running gas engines. It will be formed under pressure and at a cost of $1.50 per 1000 cubic feet. The process of its manufacture can be briefly illustrated as follows: Anthracite coal is fed to an upright generator, where it is worked up to a white heat by the agency of a blower, which is driven at a high rate of speed by a 50-horse-power engine. As soon as the coal arrives at the proper heat, superheated steam is admitted, and, impelled by the pressure of the blast, passes through the furnace and thence through superheating chambers and carbureters. In the passage the generated gas is washed, and after passing through a series of tile pipes is returned to the condenser ready for distribution to the consumer. The surplus supply is conducted to a gas-holder in the yard which has a capacity for storing 30,000 cubic feet. The power required in manufacturing the gas is supplied by a 60-horse-power boiler and an ordinary engine of the same power. After operations begin the steam engine will be supplemented by a gas motor. Connection will be made with manufactories through ordinary 15-inch iron pipes, which will be laid underground in the same manner as gas-pipes. For private houses and hotels, where the gas will be used as fuel, smaller mains will be employed. The condensation is so small that it is not considered necessary to encase the pipes in asphaltam, cement or any other non-conducting material, and it is claimed that an efficient service will be obtained by these means. The company at present only contemplate supplying gas in their immediate vicinity, and will under no consideration extend their system so as to reduce the supply to tenants. They propose to build additional depots in the manufacturing districts as soon as they have practically demonstrated the feasibility of their plans. The erection of the works have been retarded by the freight blockade, which detained a quantity of machinery, but if nothing unforseen occurs an experimental test will be made next month. Pipe-laying will be begun this fall, and if the winter is favorable gas will be let into the system of tubes early in the spring. Applications for supplies are already in excess of the capacity of the company to meet.

DRY-ROT.

ST. PAUL, MINN.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Is there anything which will prevent dry-rot in the timbers of a building? If so, will you inform me through the columns of the *American Architect and Building News* as soon as possible? Yours respectfully, A SUBSCRIBER.

[Thorough ventilation of the timbers, particularly of the ends, will prevent dry-rot. Creosoted, kyanized, or burnettized lumber is proof against it. — EDS. AMERICAN ARCHITECT.

NOTES AND CLIPPINGS.

HARTFORD'S SOLDIERS' MONUMENT.—The city of Hartford has decided to erect a monument to the soldiers and sailors of the late war and has voted $60,000 for the purpose, and appointed committees to select a site and secure plans.

PRESERVATION OF WOOD. — A new wood-preserving process has been invented in France by M. Jacques. He first impregnates the timber thoroughly with a simple solution of soap, mixed with an acid — preferably phenic acid. This causes the fermentation, in a few days, within the wood, of a fatty acid, which is insoluble in water, and impregnates the remotest fibres. The reaction of the acid on the soap does not take place until a portion of the water has evaporated. It is claimed that more perfect impregnation can be had in this way than with creosote, and there is no danger of the washing out of the preservative from the exposed surfaces, as when sulphate of copper is used. The government commission on technical railroad operation in France is said to favor this process. — *The Metal Worker.*

THE CINCINNATI MUSEUM OF FINE ARTS. — The project of the new Art Museum Building is still fermenting in the hands of the building committee, Messrs. Samuel C. Tatum, Julius Dexter, and John Carlisle. The money subscribed ($300,000) has all been paid in and put out at interest on call loans. The city has given a site in Eden Park, which has been surveyed, but now there seems to be a hitch between the building committee and the Board of Public Works, hinging upon the point as to the number of days the Museum shall be open to the public free of charge. The city authorities say it shall be three days each week, but the committee say that that is a matter which should be left to the future to determine; that they do not wish to hamper their successors in office by any arbitrary laws; that some revenue has to be raised in order to pay the running expenses of the building, and at present they see no other method than by charging a small admittance fee; and so the matter stands, the committee saying that they will take no positive steps towards the erection of the building until every difficulty has been removed. In the mean time, temporary quarters are to be opened in the Music Hall, where such collections as have already been made will be on exhibition.

SUBTERRANEAN HEAT. — Following are the temperatures of the ground in the Forman shaft, from the surface to the depth of 2100 feet, as ascertained by drilling holes not less than three feet into the rock, and inserting a Negretti & Zambra slow-acting thermometer (of the pattern adopted by the Underground Temperature Committee of the British Association, and standardized at Kent) into the hole, closing the hole with clay and leaving the thermometer for twelve hours; not less than three holes being tried at each point: —

Depth. Feet.	Temperature. Degrees.	Depth. Feet.	Temperature. Degrees.	Depth. Feet.	Temperature. Degrees.
100	50½	800	76½	1500	101
200	55	900	78	1600	103
300	62	1000	81½	1700	104½
400	60	1100	84	1800	105½
500	68	1200	89½	1900	106
600	71½	1300	91½	2000	111
700	74½	1400	96½	2100	119½

It will be seen by the above that, although there is on the whole a steady increase of temperature as depth is attained, the increase of temperature is not regular. For instance, the rock at the 400 is 2 degrees cooler than at the 300 level; between the 400 and 500 levels there is a difference of 8 degrees, while in other places an additional depth of 100 feet shows but a slight increase in the temperature. Thus at the 1800 level the temperature is 105 1-2 degrees, while at the 1900 it is but 106 degrees, an increase of but one-half a degree. This difference is undoubtedly owing to the character of the rock at the points where the holes were made; therefore it would be of great interest to have, in connection with the temperature, a description of the rock; not only the kind of rock, but also the nature of the same, whether carrying much lime, gypsum or iron pyrites. It would probably be shown that where there was much lime there would be an increase of heat not warranted by the increased depth, and the reverse where lime was absent. — *Iron Age.*

RECLAIMING FLORIDA LAND. — The Florida land reclamation which was inaugurated under the auspices of Philadelphia capitalists, under the name of the Atlantic and Gulf Coast Canal and Okeechobee Land Company, is being pushed forward. A steamer is working at the head of the Caloosahatchee River, opening a channel from Lake Flirt to Lake Hichpochee. A dredge-boat of the improved Menge pattern is rapidly approaching completion at Cedar Keys. It will have a capacity of over 4,000 cubic yards in twenty-four hours (equal to a canal 22 feet wide by 6 feet deep, and 800 feet in length), and will at one handling deposit the material excavated at a convenient distance from the sides of the canal. It is expected that this boat will be actively engaged on the upper Caloosahatchee in the early part of December. A dredge of greater excavating capacity, on the Allen system, is now building on the Kissimee River, and will be in operation before the first of the year. It has been specially designed for this company, and will be efficient and economical in service. It will commence work by cutting from Lake Okeechobee out to tide-water. The work of improving these rich alluvial lands will be rapidly prosecuted, and additional dredges and labor-saving appliances furnished as required, in order that the company may at an early day receive a portion of the lands naturally accruing from this enterprise. The Okeechobee Company has purchased from the Florida Land and Improvement Company 200,000 acres of land, with the right of selection of the same in forty-acre tracts to the extent of 25,000 acres, in each of the counties of Orange, Volusia, Sumter, Hernando, Hillsborough, Polk, Manatee, and Munroe, comprising the choice lands of the "Hamilton Lisston purchase of 4,000,000 acres." The lands of the Disston purchase were selected most carefully, and can be settled on at once. The 200,000 acres will be divided among the subscribers to the present issue of stock, giving 40 acres of land to each subscriber for ten shares, with the right of selection to the extent of 25,000 acres, in each of the counties above-named. — *Philadelphia Record.*

A HOUSE BUILT OF STOLEN LUMBER. — A warrant was issued on Saturday evening for a man named James Baker, who was employed as engineer at the planing-mill of Rosenberry Brothers, on Marcy Street. The charge against Baker is a pretty heavy one, being a system of thefts from the mill-yards and elsewhere, covering a period of several months at least, and from which enough material was obtained to erect for himself a dwelling-house on Hickory Street. The manœuvring required to do this, to say nothing of the actual work, would in itself be no small job, but it is claimed that everything, from lumber, doors, sash and window frames, to the tar-paper used on the roof, was obtained in the same way, and even the tools used in the construction of the house were carried off from a man working in the Union Pacific shops. Some one gave Baker a "point" on his danger on Saturday, and, consequently, when he saw the officers approaching the planing-mill on Saturday evening he fled in such haste that he did not stop to shut down the engine. Finding that the man had made his escape, the officers went to his house, and a search being made, a nail-keg of carpenter's tools and a roll of tarred cloth were brought away, the former being since identified by the owner, who had a private brand on them, and carried the branding-iron with him. Baker had not been found up to yesterday. The house will be torn down at once by the owners of the material. — *Omaha Bee.*

INTERNATIONAL COMPETITION FOR A MONUMENT TO ALEXANDER II. — A communication has been received by the Secretary of State from the Russian Minister at Washington, to the effect that a committee has been appointed at Moscow to erect a monument to the memory of the late Emperor, Alexander II, in the inclosure of the Kremlin. Foreign as well as Russian artists may submit designs. The committee has forwarded plans and specifications to the Department of State.

TO REMOVE RUSTED BOLTS. — To remove bolts that have rusted in, without breaking them, the most effectual remedy known is the liberal application of petroleum. Care must be taken that the rusted parts are reached by it, and some time must be allowed to give it a chance to soften the layer of rust before any attempts are made to remove the bolt. — *The Metal Worker.*

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.*]

250,047. Bit-stock. — Quimby S. Backus, Holyoke, Mass.

250,061. Spirit-Level. — George Egart, Mooleyville, Ky.

250,067. Heating-Stove. — Justin R. Graves, Sioux Falls, Dak.

250,080. Spirit-Level. — Frederic Kraengel, Buffalo, N. Y.

250,091. Suspension-Clevis for Elevators. — Charles M. Mallory, Toledo, O.

250,122. Mortar for Laying Brick, etc. — William Arrouquier and Thomas Barrett, Worcester, Mass.

250,137. Tie for Supporting Header-Joists. — Benjamin F. Ellis, San Francisco, Cal.

250,174. Lumber-Trimming Machine. — W. B. Swartwout, Three Rivers, Mich.

250,186. Bit-Stock. — Loring J. Baker, Boston, Mass.

250,187. Spike. — Joshua B. Barnes, Fort Wayne, Ind.

250,188. Lifting-Jack. — John C. Beard, Newtonville, Ind.

250,191. Sawing-Machine. — David Berry, Bolinas, Cal.

250,196. Curtain-Fixture. — William A. Bowyer, Alliance, O.

250,217. Saw-Handle. — Andrew J. Doane, Indianapolis, Ind.

250,244. Spring Curtain-Roller. — Benjamin I. Hicks, Brooklyn, N. Y.

250,252. Door-Hanger. — Samuel Ide, Medina, N. Y.

250,257. Composition for Artificial Wood Ornaments. — Otto O. Karsch, New York, N. Y.

250,293. Earth-Augers. — Wm. J. Sherman, St. Augustine, Fla.

250,312. Travelling Crane. — John Walker, Indianapolis, Ind.

SUMMARY OF THE WEEK.

Baltimore.

Building Permits. — Since our last report eighteen permits have been granted, of which the more important are as follows: —

Henry Pfeil, 2 two-st'y brick buildings, n e cor. Ostend st. and Burgunder Alley.

Henry Pfeil and Son, two-st'y brick stable, Wilmer Alley, bet. Lanvale and Townsend Sts.

Adams White Lead Co., brick building, 10' x 51', s e cor. Eutaw and Cross Sts.

Hannis Distillery Co., one-st'y brick warehouse, s e cor. Russell and Ostend Sts.

Jno. Burger, two-st'y brick stable, 15' x 40', Dallas St., bet. Lancaster and Thames Sts.

Jno. Kunkel, three st'y brick building, 30' x 90', Lee St., bet. Light and Charles Sts.

Baltimore and Ohio R. R. Co., one-st'y brick building, 24' x 32', No. 10 Poppleton St., s of Pratt St.

Jno. F. Rossiter, two-st'y brick building, Montgomery St., between Jackson and Covington Sts.

Jas. Metiiinis, two-st'y brick stable, s e cor. Plowman and Front Sts.

Solomon Corner, three-st'y brick building, n e cor. Calvert and Biddle Sts.

Boston.

Building Permits. — *Wood. — Elm St.*, near Ford St., for Andrew Crow, dwell., 18' x 22'; Thomas Yeomans, builder.

Clarence St., Nos. 30 and 32, near Dudley St., for Benj. F. Bean, 2 two-st'y and mansard dwells., 19' x 42'; Benj. F. Bean, builder.

Woodward Ave., Nos. 29 and 31, near Dudley St., for Benj. F. Bean, 2 two-st'y and mansard dwells., 19' x 42'; Benj. F. Bean, builder.

East Third St., near L St., for Alfred Rogers, stable, 26' x 36'.

Brick. — No permits for brick buildings have been issued during the past week.

November Report. — The following permits were issued at the office of Inspector of Buildings during the month of November: brick, 18; wood, 75; repairs, etc., 213; boilers and engines, 42; heating apparatus, 115.

Storage Warehouse. — A four-st'y brick building, measuring 80' x 160', is soon to be built on Commercial, cor Richmond St., for the Quincy Market Cold Storage Corporation. Chase's system of refrigeration is to be used, and some 10,000 tons of ice will be stored in the upper story for cooling purposes. The ground has been excavated and piles will be driven at once; estimated cost, $80,000; Wm. G. Preston, of Boston, architect.

Sewer Connections. — No more permits to connect drains with sewers will be given after Dec. 10, 1881, until spring.

Pumping Station. — New buildings will be put up at the pumping station at Dorchester Bay. They will be of granite, covering an area of 24,000', and costing $176,000.

Brooklyn.

Building Permits. — *Lafayette Ave.*, s s, 100' w Nostrand Ave., 3 two-st'y brick dwells.; cost, $3,000; owner, A. Miller, 373 Decatur St.; architect, T. Miller.

Stuyvesant Ave., n e cor. Monroe St., three-st'y brick store and dwell.; cost, $8,000; owner, L. F. McGarry, 583 Monroe St.; architect and builder, John McGarry.

Elizabeth St., s s, 200' e Dwight St, one-st'y brick shop; cost, $5,000; owner, The Cramp Dry Dock Co., 18 William St., New York; architects and builders, S. E. Simpson & Co.

Suydam St., n s, 118' w Bushwick Boulevard, two-st'y frame stable; cost, $2,000; owner, John D. Froehlich, Suydam St., cor. Bushwick Boulevard; architect, J. Platte; builders, W. Dafeldecker, and R. B. Ferguson.

Bushwick Ave., or Boulevard, w s, 80' n Suydam St., 2 two and a half-st'y frame dwells.; cost, $2,900; owner, architect and builder, same as last.

Scholes St., n s, 20' e Bushwick Ave., three-st'y frame ice-house; cost, 11,000; owners, Ochs & Lehnert, on premises; architect, J. Platte; builders, Henry Grasman and Joseph Frisse.

Troutman St. No. 185, two-st'y frame dwell.; cost, $2,450; owner, Frederick Wolf, 183 Troutman St.; builder, Henry Loeffler.

Jefferson St., n s, 35' e Bedford Ave., 5 three-sty brownstone flats; cost, each, $8,000; owner and builder, A. G. Van Wagner, 548 Lexington Ave.; architects, Parfitt Bros.

Van Buren St., s s, 57' 9" w Throop Ave., 5 two-st'y brownstone dwells.; cost, each, $4,000; owner and builder, C. Isbill, 479 Herkimer St.

Washington Ave., Atlantic Ave., 4 four-st'y brownstone dwells.; cost, each, $8,700; owner and builder, T. A. Remsen, 44 Madison St.

Walton St., Nos. 36 and 38, s s 125 e Marcy Ave., four st'y brick factory; cost, each, $3,000; owner, North American Iron Works, 40 and 42 Walton St.; builders, J. Auer and J. Schneider.

Spencer St., e s, 125' s Myrtle Ave., three st'y brick mill; owner, James Darragh, Willoughby Ave., near Tompkins Ave.; architect, M. J. Morrill; builders, C. Cameron and Thos. E. Greenland.

Chicago.

Calumet Club, n e cor. Michigan Ave. and Twentieth St., 82' 6" x 140', four-st'y, is to be built of brick. The general type of the design is that of the front chateau of the early Renaissance. In the exterior design carved terra-cotta is used with some freedom and it is enriched with bands and string-courses. The main entrance is on Twentieth St. The entire work of erecting, decorating, and furnishing the building, which it is estimated will cost $2 0,0 0, is under the supervision of Burnham & Root, architects.

House. — E. B. Sheldon, three-st'y brick dwell., 78' x 90', Lincoln Ave., near Wisconsin St.; cost, $20,000; Burling & Whitehouse, architects; Louis Weich, builder.

Building Permits. — E. B. Sheldon, three-st'y brick dwell., 78' x 90', Lincoln Ave., near Wisconsin St.; cost, $20,000.

L. T. Sumner, two-st'y brick dwell., 24' x 47', 3856 Dearborn Ave.; cost, $3,300.

J. L. Campbell, 8 two-st'y brick dwells., DeKalb St., near Polk St., 32' x 168'; cost, $18,000.

H. L. Austwick, two-st'y brick dwell., 23' x 44', De Kalb St., near Polk St.; cost, $3,300.

C. Reesin, two-st'y brick dwell., 22' x 54', 127 Tremont St.; cost, $4,000.

Fred Henckel, three-st'y and basement brick store and dwell., 20' x 70', 316 West Randolph St.; cost, $5,000; J. Paul Huber, architect; Wildner & Frank, builders.

F. D. Reynolds, 2 two-st'y brick dwells., 40' x 50', 3843 Langley Ave.; cost, $7,000.

John Mountain, three-st'y brick flat, 22' x 66', 226 Sedgwick St.; cost, $7,500.

J. G. Earle, 8 two-st'y and basement brick dwells., 38' x 120', 287 Thirty-seventh St.; cost, $1 ,000.

B. Grossman, 3 two-st'y and basement brick stores and flats, 3726 to 3732 Cottage Grove Ave.; cost, $10,500.

Lutheran Trinity Congregational School, two-st'y brick school-house, 25' x 85', 3044 Lyman St.; cost, $4,200.

W. Brooks, three-st'y brick dwell., 21' x 56', 777 Larrabee St.; cost, $4,500.

Geo. Reeger, two-st'y and basement brick dwell., 20' x 34', 752 Hinman St.; cost, $2,000.

Eich Bros., 10 two-st'y brick dwells., 46' x 163', Monroe St., near Campbell Ave.; cost, $30,000.

W. F. Whitehouse, five-st'y and basement brick store, 41' x 145', Adams St., near Fifth Ave.; cost, $35,000; Burling & Whitehouse, architects; C. G. Mullen & Co., builders.

C. Steltz, two-st'y brick dwell., 24' x 60', 199 Lincoln Ave.; cost, $5,000.

Laflin, Van Higgins & Co., four-st'y brick store, 40' x 71', 71 and 73 Randolph St.; cost, $10,000.

A. Bauman, two-st'y brick dwell., 20' x 50', 58 High St.; cost, $2,700.

H. Channon, one-st'y brick ice-house, 28' x 128', Goose Island; cost, $1,500.

M. Murphy, two-st'y and basement brick stable, 75' x 100', Pacific Ave., near Harrison St.; cost, $12,000.

New York.

Building Permits. — *One Hundred and Twenty-fourth St.*, s s, 300' e Eighth Ave., 3 four-st'y brownstone flats; cost, each, $15,000; owner and builder, James Gault, 210 West Fifty-third St.; architect, J. H. Valentine.

Seventy-fourth St., n s, 100' e Fifth Ave., four-st'y brick and stone dwell.; cost, $40,000; owner, Wm. H. Van Antwerp, 15 East Fourteenth St.; architect, W. H. Cauvet; mason, Joseph Smith.

East One Hundred and Nineteenth St., No. 511, four-st'y brownstone flat; cost, $15,000; owner, Charles P. Twigg, 310 East One Hundred and Twenty-first St.; architect, R. Rosenstock.

One Hundred and Twenty-ninth St., s s, 400' e Eighth Ave., 4 three st'y brownstone dwells.; cost, each, $15,000; owner and architect, same as last.

New Pier 56 North River, one-st'y wood and iron freight-shed; cost, $25,000; owner, Simpson & Spence, 80 Broad St.; builder, D. McCarthy.

Seventy-fifth St., s s, 150' w Fourth Ave., 4 four-st'y Connecticut brownstone dwells.; cost, each, $22,000; owner, Terence Farley, 165 East Sixty-first St.; architects, Thom & Wilson.

West St., w s, Piers 20 and 21, North River between Reade and Duane Sts., one-st'y frame and iron freight shed; owner, New York, Lake Erie & Western Railroad Co., 21 Courtlandt St.; builders, J. H. Euler & Bro.

Seventy-eighth St., n s, 250' w First Ave., four-st'y brick tenement; cost, $15,000; owner, Ferdinand Hemmerling, 1205 Lexington Ave.; architect, John Brandt.

Fortieth St., n s, 225' w Tenth Ave., three-st'y brick stable; cost, $5,000; owner, David Stevenson, Jr., Tenth Ave., cor. Thirty-eighth St.; architect, H. J. Dudley, builder, Sam'l Lowden.

Alterations. — *East Seventy-eighth St., No. 138*, raised one-st'y, also four-st'y brick extension, interior alterations, etc.; cost, $10,000; owner, Hester A. Cowing, on premises; architect, A. B. Ogden.

West Twenty-third St., No. 16, one-st'y brick extension, interior and front alteration; cost, $10,000; owner, John L. Cavanagh, 1107 Broadway; architect, A. Craig.

Thirteenth St., s s, 180 e Eleventh Ave, one-st'y brick extension; cost, $10,000; owner, Cornelius H. Delameter, foot West Thirteenth St.; architect, G. H. Reynolds.

One Hundred and Eleventh St., n s, 125' w Madison Ave, one-st'y brick extension; cost, $3,500; owner and builder, Thos. F. Treacy, 88 East One Hundred and Eleventh St.; architect, R. Rosenstock.

Apartment-House. — The Charlick property in Thirty-fourth St., is about to be improved by the erection of eight-st'y flats; costing about $200,000.; Mr. Horace G. Knapp is the architect.

House. — Dr. Robert M. Reynolds is having designs prepared for residence, to be built on Ninety-Third St., between Eighth and Ninth Aves. The building will be 22' x 56'; cost, $15,000; H. G. Knapp is the architect.

Stores. — No. 23 Great Jones St., formerly the old Spanish Hotel is to be transformed into a brick front store, the size is 25' x 95'; owner, Jas. M. Shanahan; architect, J. Gandolfo.

On the south side Broadway, between Houston and Bleecker St., an iron front Store, 50' x 200', six st'y, basement and sub-cellar; to cost $100,000; is to be erected from designs of Messrs. H. J. Schwarzmann & Co.

Factory on Sixty-third St., between Second and Third Ave., a cigar factory, 5 ' x 90', six-st'y and basement, brick front; to cost $30,00 , is to be erected for Belvin & Sieber, from designs of H. J. Schwarzmann & Co.

Stables. — Mr. J. Gandolfo has prepared plans for a stable No. 115 West Fifty second St., 25' x 90', two-st'y high, to be built of Phila. brick with bluestone finish.

Storage Warehouse. — The new Morrell storage warehouses are to be built from designs of Mr. M. C. Merritt.

Philadelphia.

Building Permits. — *Edmund St.*, n of Orthodox St., 2 two-st'y dwells., 16' x 40'; W. Keas, contractor.

Orchard St., n of Tacony St., 6 two-st'y dwells., 15' x 40'; G. F. Gibson, Jr., contractor.

Columbia Ave. and Sydenham St., three-st'y carpet-cleaning building, 30' x 70'; D. M. Blyler, contractor.

Brown St., Nos. 1317 and 1319, six-st'y storehouse, 36' x 125'; L. Koder, contractor.

Kensington Ave., s of Lehigh Ave., 6 three-st'y dwells., 16' x 42'; W. D. Carter, contractor.

Twenty-first St., between Brown and Parrish Sts., 10 three-st'y dwells., 17' x 54'; Jas. Craven.

Trenton Ave., s of Orthodox St., three-st'y dwell. and brick building, 16' x 38'; Jane Darreff, owner.

Fifth St., n of Cumberland St., one-st'y marble-shop, 16' x 120'; J. W. Silvis, owner.

Fairhill St., s of Cambria St., two-st'y dwell. and two-st'y stable; W. Tecklenberg, contractor.

Railroad Station, M'y'k, front house, 30' x 100'; Reading R. R. Co., owners.

Lehigh Ave. and Fairhill St., three-st'y dwell., 20' x 56'; Jacob Farber, contractor.

Passyunk Ave., No. 1012, one-st'y boiler-house, 18' x 44'; B. H. Bartol, owner.

Brooks Ave., between Fifty-fourth and Fifty-fifth Sts., two-st'y factory, 35' x 87'; Geo. Brooks & Son, owners.

Reese and Huntingdon Sts., four-st'y factory and engine-house, 45' x 128', and 26' x 48'; R. J. Whiteside & Sons, contractors.

North Twenty-second St., No. 134, two-st'y factory rebuilding, 60' x 75'; F. Hall, contractor.

York and Ontario Sts., 11 dwells., 15' x 49'; James E. Cooper, owner.

North Broad St., Nos. 242 and 244, two-st'y addition to storehouse, 75' x 90'; Percival Roberts, Pencoyd Iron Works.

Randolph St., No. 1716, four-st'y addition to factory, 23' x 30'; R. S. Forder & Son.

Kensington Ave. and Adams St., alteration of factory to 2 stores; Thos. McCracken, owner.

Church. — The friends of the late President of the Pennsylvania R. R. Co. have determined to erect a memorial church, to be called the "Thomas A. Scott Memorial Church." It is proposed to raise $50,000 to build it. The church is to be mainly for the use and benefit of the employees of the Pennsylvania R. R. Co.

Factory. — It is the intention of Messrs. W. H. and G. W. Allen to build a five-st'y factory-building on Race St., w of Fourth St., to be of brick and iron; the building to be used for light manufacturing purposes.

Church. — The corner-stone of the new Swedenborgian Church, at the n e cor. of Twenty-second and Chestnut Sts., was laid Nov. 24. The building will be 64' x 92', it will be built of brownstone; the total cost, exclusive of furniture, will be about $32,000.

St. Louis.

Building Permits. — Forty-four permits have been issued since our last report, nine of which are for