

LIBRARY OF CONGRESS
COPYRIGHT
OCT 12 1891
WASHINGTON.

PRICE 15 CENTS

552 212

OCTOBER 10, 1891.

THE
AMERICAN ARCHITECT
AND BUILDING NEWS

VOL. XXXIV

* REGULAR EDITION *

NO. 824.



ARCHITECTURE

ENGINEERING

DECORATION

TICKNOR & COMPANY

CONSTRUCTION

BOSTON MASS.

CONTENTS.

EDITORIAL SUMMARY.
LIBRARIES.—1.
LETTER FROM LONDON.
THE TEMPLE OF THESEUS.
ENGLISH AND FRENCH CATHEDRALS.
STEAM AND HEATED AIR, A NEW MOTIVE POWER.
THE MANAGEMENT OF AN ARCHITECT'S OFFICE.—IV.
THEATRICAL ARCHITECTURE.—1.
BOOKS AND PAPERS.
COMMUNICATIONS.
NOTES AND CLIPPINGS.
TRADE SURVEYS.

ILLUSTRATIONS

HOUSE AT MONTCLAIR, N. J.
[Gelatine Print issued with the International and Imperial Editions only.]
COMPETITIVE DESIGN FOR MOUNT VERNON CHURCH, BOSTON, MASS.

APARTMENT-HOUSE, BOSTON, MASS.
CAPITALS FROM THE CLOISTER AT MOISSAC, FRANCE.
SIX HEXASTYLE PORTICOS.
DESIGN FOR A HOUSE.

Additional Illustrations in the International Edition.

SIXTEENTH-CENTURY CARVED DOORS.
[Photogravure.]
HOUSE IN THE AUGUSTENSTRASSE, VIENNA, AUSTRIA.
[Gelatine Print.]
HOUSE ON SCHWARZEMBERG PLATZ, VIENNA, AUSTRIA.
[Gelatine Print.]
WORKS IN METAL.
DESIGN FOR CHALICE VEIL.
NEW TOWER, ST. CLEMENTS, BOURNEMOUTH, ENG.
NEW PREMISES FOR MESSRS. BOLDING & SON, LONDON, ENG.



THE SANITAS TRAPS AND CLOSETS

Are the SIMPLEST, CHEAPEST and most SCIENTIFIC APPLIANCES in the market.

These Specialties have the approval and endorsement of Architects, Builders, Engineers, Superintendents, Plumbers and Medical Authorities, and their acceptance by the owner of the building is assured if he is made to realize the saving affected by their use.

In one building a Chicago Architect saved his client two thousand dollars by using the SANITAS Traps instead of the ordinary S. Trap.

We shall be glad to correspond with parties not already familiar with the merits of these goods.

SMITH & ANTHONY STOVE CO.,

BOSTON,

Makers and Proprietors of SANITAS Appliances.

54 Gold Street, New York.

219 Lake Street, Chicago.



STANLEY BROS., NUNEATON, ENGLAND.



MANUFACTURERS OF

Red, Brown and Blue Roofing and Ridge Tiles; Ornamental Red Cresting and Finials; Red and Buff Ornamental Terra-Cotta, String-Course, Etc.; White Glazed Bricks and Sinks; Superior Blue, Red, Buff, Black and Chocolate Quarries (especially suitable for Churches, Entrance Halls, Conservatories, etc.).

Makers of Buff and Enamelled Malt-kiln Tiles (as supplied to most of the principal maltings in Great Britain). New Illustrated Catalogue containing more than 1,000 designs, on application.

AGENTS WANTED FOR THE UNITED STATES.

Architecture Under Nationalism,

BY

J. PICKERING PUTNAM.

1 vol., 12mo., boards, - - - 25 cents.

[FROM THE BOSTON HERALD.]

The results reached by Mr. Putnam are astonishing. He considers the probable status of the important art he practices under conditions that would assure a freedom from the rush and worry involving the architect of to-day and presenting other important aspects of nationalism with admirable clearness. His treatment of the various kinds of waste make highly interesting reading.

Sold by Booksellers. Sent, postpaid, on receipt of price, by the Publishers,

Ticknor & Co., Boston.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XXXIV.

Copyright, 1891, by TICKNOR & COMPANY, Boston, Mass.

No. 824.

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

OCTOBER 10, 1891.



SUMMARY:—

The Examination for the <i>American Architect</i> Travelling-Scholarship.—The Course of Instruction at the Brooklyn Institute.—Characteristics of Good Slates.—A new System of Centering for Arches of Wide Span.—A Warning to Architects who use Tiled Roofs.—Formula for making Hectographs.—The New Paris Metropolitan Railway.—The Character of Modern Architectural Carving.	17
LIBRARIES.—I.	19
LETTER FROM LONDON.	21
THE TEMPLE OF THESEUS.	23
ENGLISH AND FRENCH CATHEDRALS.	25
A NEW MOTIVE POWER.—HEATED AIR AND STEAM.	27
THE MANAGEMENT OF AN ARCHITECT'S OFFICE.—IV.	27
THEATRICAL ARCHITECTURE.—I.	29
BOOKS AND PAPERS.	30
ILLUSTRATIONS:—	
Residence of Col. William Fellows, Montclair, N. J.—Unsuccessful Competitive Design for Mount Vernon Church, Boston, Mass.—Apartment-house, Boston, Mass.—Capitals from the Cloister at Moissac, France.—Six Hexastyle Porticos.—Design for a House.	
Additional: Sixteenth-Century Carved-Doors.—House in the Augustenstrasse, Vienna, Austria.—House on Schwarzenberg Platz, Vienna, Austria.—Works in Metal.—Design for Chalice Veil.—New Tower, St. Clement's, Bournemouth, Eng.—New Premises, London, Eng.	31
COMMUNICATION:—	
To Protect Armor from Rust.	31
NOTES AND CLIPPINGS.	31
TRADE SURVEYS.	32

WHERE can but a few weeks intervene between this date and the time when we must announce the date for holding the examination to select the holder of the *American Architect* Travelling-Scholarship for the year 1892, and yet our record shows the names of but two would-be contestants who have stated their intention of taking part in the examination. This is another rather impressive reminder of the lack of enthusiasm which possesses, or rather does not possess, the draughtsmen of the present day, who take up the profession as a business and not as an art.

THE Department of Architecture of the Brooklyn Institute, as we have already mentioned, proposes to furnish instruction in technical subjects to draughtsmen and students, and has entered upon its work with a winter course, which is to begin Tuesday, October 27, and continue twenty-four weeks. The sessions will be from 7.30 to 10 o'clock, on Tuesday, Thursday and Friday evenings. On Tuesday evenings the instruction will be in free-hand drawing in its various branches, and will include drawing from the cast, drawing of ornament, shading in pencil, pen-and-ink, sepia and India ink. On Thursday evenings the instruction will be in water-color painting, and the more technical parts of drawing, including perspective, shades and shadows, descriptive geometry and stereometry. On Friday evenings there will be instruction in algebra and geometry for the first hour, and the remainder of the time will be devoted to lectures, by architects and others, on technical topics. The instruction in drawing is not elementary, but is intended for those who have had considerable experience as draughtsmen. The courses in algebra and geometry are optional. All the courses are given in the rooms of the Brooklyn Art Association, 174 Montague Street, one block from the City Hall. The tuition fee is ten dollars, one-half payable on admission, and the balance January 1, 1892. Students should understand that this small fee does not by any means cover the cost of the instruction given, and that the remainder is furnished by generous friends of the profession and of the young; and, in order that the advantages offered may not be wasted on the idle and indifferent, no student will be received who does not intend to be regular in attendance. Those who wish to know more of this excellent scheme of instruction for draughtsmen, should address Professor Franklin W. Hooper, 502 Fulton Street, Brooklyn; and applications for admission may be sent either to Professor Hooper, or to Mr. Louis De Coppet Berg, 111 Broadway, New York.

LA SEMAINE DES CONSTRUCTEURS

says that a contractor was sued last year, in Vienna, for having, among other things, covered a block of houses with slates of bad quality. The courts appointed a distinguished chemist, as expert, to examine the slate, and in his report some observations were made in regard to tests of the quality of slate, which have a general interest for architects and builders. One observation, which is, we think, new, is that nearly all slates show fine lines, all running in the same direction, parallel to the planes of stratification. On examining the surface of a slate closely, at a certain angle with the light, these lines can be seen; and, in good slate, they should run parallel with the long side of the slate. If their direction is parallel with the short side, the slate will be likely to break across, whatever may be its quality in other respects. Of the tests commonly employed by builders, those by sound, and by dipping in water, are both good, although incomplete. The test of weight, sometimes used, is worthless, as heavy slates are by no means always good; but if two slates, when struck together, give out a clear, ringing sound, they are likely to be strong and non-absorbent. If a slate, after standing for some hours partly immersed in a pail of water, shows the line of moisture only a small fraction of an inch above the surface of the water, the slate is non-absorbent, and probably good, while a slate in which the water rises by capillary attraction an inch or more should be rejected. Not all non-absorbent slates are, however, good. Certain sorts, which appear of excellent quality, slowly decompose under the action of the air. These sorts can be detected by soaking in sulphuric acid, which slowly corrodes the objectionable kinds, while those fitted for use in building resist its action indefinitely. Slates containing lime or iron pyrites also crumble in the air. These can be distinguished by pulverizing a piece, and exposing a portion of the powder to the action of muriatic acid, while the rest is heated in a glass tube. If the slate contains lime, the powder in the acid will effervesce strongly; if it contains iron pyrites, the portion of the powder heated will give off fumes of sulphurous acid, easily recognized by its smell.

M. TARAVANT, an architect of Morlaix, in Brittany, is writing a series of articles in *La Construction Moderne* on the construction of arches of wide span, by means of a new system of centering which he describes. In his introduction, he calls attention to what is undoubtedly true, that the wider an arch is, the stronger it is, if the foundations are secure. It is evident, to any one accustomed to masonry, that a viaduct consisting of a series of arches of small span, supported on high piers, will be more likely to shake and disintegrate than one consisting of a single wide arch, springing directly from the rock abutments at each side, without intermediate piers of compressible stonework; and the experience of two thousand years shows that, of the Roman aqueducts and similar works, those having arches of the widest span have been the ones which have descended to us in good condition; while, where arcades of this sort have fallen, examination shows that the failure has almost always been in the foundation, and not in the arch itself. There is no doubt that our future railway bridges will be mostly of stone, and the problem of spans of two or three hundred feet is sure to present itself soon, so that all information on the subject is of importance. Hitherto, very few stone arches have been built of more than two hundred feet span. There is, we believe, but one in this country, the "Cabin John Bridge," at Georgetown, D. C., which carries the aqueduct supplying the city of Washington with water. The span of this is two hundred and twenty feet, and it seems likely to last for at least a thousand years; and, as Mr. Taravant says, there need be no pressure in such an arch, or even in one of three hundred, or five hundred feet span, exceeding that which rock abutments, or voussoirs of good stone, can sustain indefinitely. The main difficulty about their construction is in the arrangement of the centering. With a very wide arch of masonry, the weight to be sustained by the wood centering before the arch becomes self-supporting, on the setting of the keystones, is enormous, and the false works must be very well designed, and strongly built, in consequence; while it is often inconvenient and expensive to get proper footings for the false works in the bottom of the valley to be crossed. What M. Taravant may

have to propose, for overcoming this difficulty, remains to be seen, but it will do no harm, meanwhile, for other ingenious persons to apply themselves to the question, and they may be sure that there will, sooner or later, be a use for satisfactory devices for meeting such requirements.

ANOTHER warning to architects is to be found in a story related in the *Schweizerische Bauzeitung*. A school-house, lately completed near Leipsic, was roofed with "Falzziegeln," or large tiles, having the edges turned alternately up and down, so as to lock over each other. Tiles of this sort form a light, cheap and durable roof, and are very much used all over Europe, besides being exported by millions to South America. In this instance, the tile-roofing leaked in rain-storms, and, after vain efforts to keep it tight by putting the lock-joints, with a sort of cement employed for the purpose, experts were employed by the town authorities to determine whose fault it was that the roof would not keep out the water, and who should be made to pay the damages. The experts decided that the contractor could not be made to pay, as the tiles were of good quality, and well put on, and that the responsibility must fall on the architect, who had designed his roof without sufficient pitch to carry the water away. It is true that the pitch of the roof was one-fifth to one-sixth of the span, and that the text-books say that a pitch of one-eighth to one-tenth is permissible with such tiles, but the experts concluded that one-fifth pitch was not sufficient to keep water from penetrating such roofing, and that the architect ought to have known this, no matter what the text-books said.

THE French Ministry of Public Instruction has issued a circular, giving directions for making hectographs, which it regards as the most useful of the duplicating devices in common use. According to the circular, 100 parts of ordinary glue should be mixed with 500 parts of glycerine, 25 parts sulphate of baryta, or kaolin, and 375 parts water. These are to be stirred together, with gentle heat, until the glue is dissolved, and the paste may be cast into a flat cake, or poured into a flat tin box, and allowed to solidify there, as is, perhaps, the most convenient practice. Nothing more is necessary but to prepare a suitable ink, which may be made with a concentrated solution of aniline purple. The drawing or writing, made with this ink on ordinary paper, is to be pressed, with the ink side down, on the surface of the cake, and left there for about two minutes. It is then to be taken off, and sheets of white paper placed successively on the cake, brought in contact with it by brushing over with the hand, or a roller, and then removed, when each will be found to be impressed with a duplicate of the original document. About fifty good copies may be taken in this way from a single transfer to the cake. When all the copies desired have been made, the cake should be immediately washed off with water, to which a few drops of muriatic acid have been added, and the surface dried with blotting-paper. It will be remembered that Messrs. Burnham & Root, of Chicago, have found this process useful for multiplying working-drawings of their buildings. The plans are drawn, figured and tinted with aniline solutions of various colors, and then impressed on a large hectograph cake, from which additional copies are taken in any number desired. These copies are far superior to blue prints, as they are perfect to the smallest detail of color, as well as line, and they are taken in a fraction of the time, while no intermediate tracing process is necessary to prepare a drawing which can be blue-printed.

THE final step seems to have been taken in the adoption of a plan for the new Paris Metropolitan Railway, the Municipal Council having decided, by a vote of sixty to nine, to accept a project prepared by a committee of its own members. A year or so ago, several plans were submitted to the Council by engineers, and it was then voted to adopt a plan prepared by M. Eiffel, which consisted, in brief, of a line partly elevated, and partly subterranean, passing under the Grand Boulevards to the Arc de l'Etoile, and then back, under the Rue de Rivoli, to the neighborhood of the Hôtel de Ville, then crossing the Seine, to reach the Orleans railway station, and immediately back again to the Place de la Bastille, and thence to the starting-point in the Boulevards. M. Eiffel proposed to connect by branches with all the railway lines entering the city, and laid out also a second local circuit, confined to the district south of the Seine, and connecting with the first

circuit at the Orleans station. The southern circuit, however, was simply a suggestion, and was shown on his plan as a "deferred line," the portion to be built at present consisting only of the first circuit. The two systems together would supply Paris with very complete accommodations, but at a great expense, while the first system alone seemed, on further consideration, inadequate; and the adoption of the Eiffel plan was suspended until a committee could further investigate the matter. After about a year's work, the committee reported, not long ago, in favor of a modified plan, by which the main system formed nearly a circle, in place of M. Eiffel's elongated loop, passing like his, near the Grand Boulevards, on the north, to the Arc de l'Etoile, but crossing the river near the Champ de Mars, instead of returning by the Rue de Rivoli, and continuing by the Montparnasse station to the Orleans station, there, like M. Eiffel's route, to re-cross the river and rejoin the northern line. This circuit evidently accommodated the inhabitants of the region south of the Seine much better than M. Eiffel's plan, which left them to be served by a "deferred line," but it did not give, like his, direct access to the very busy region about the Tuileries and the Louvre, so that the committee supplemented it by a transverse line, forming nearly a diameter of the circle, passing from north to south near the Palais Royal and crossing the river near the Louvre. This portion of the plan has now been modified, by making the transverse line, on the south side of the Seine, after passing through the Boulevard Saint-Michel, deviate far to the eastward, so as to connect with the main circuit near the Jardin des Plantes, and then, crossing the river, pass west again, by the Hôtel de Ville, to the Boulevard de Sebastopol, through which it runs in a straight line, nearly northward, to the Strasbourg railway station; and, with this change, it is now finally adopted. Like M. Eiffel's road, that of the Municipal Council is partly above ground and partly below, and, unlike his, it runs directly to every railway station in the city. What further steps will be needed, before the execution of the plan can be begun, we do not know, but it seems probable that the Government engineers will have to criticise it before the State will confirm its acceptance.

MR. BARTLETT, the well-known sculptor, writes us to say that when the new building on Federal Street, in Boston, now occupied by the Boston Terra-cotta Company, was erected, he modelled several portrait busts of the workmen employed there, which were burned, and placed in the building. It is possible there may be other similar cases; if so, we should be glad to hear of them. It is not often that an accomplished professional sculptor, like Mr. Bartlett, has anything to do with a building, and what we wish to see encouraged is a disposition on the part of the ordinary stone-carvers to try their hand at portraits, or even caricatures, provided they have some life and spirit to them. We used to be told, by Mr. Ruskin and others, that the carving of Classical details destroyed the artistic capacity of those who did the work; but the Classical details are, at least, in themselves beautiful, and the carving of them could not possibly have a worse effect on the mind than the execution of the limp, sprawling, spiky *soi-disant* "Romanesque" detail with which a good many of our modern buildings are supposed to be ornamented. It is true that some of these details are copied, more or less accurately, from Revoil, and are regarded as correct examples of the style, but the copying itself is objectionable. Certainly the real Romanesque work was not copied. Nothing in architecture, not even the best Gothic work, is so full of invention and variety as the Romanesque sculpture. The people who did it so despised copying and repetition that they hardly made two corbels in a cornice alike, still less two capitals, or two arch rings, and if we wish to emulate the Romanesque buildings, we must make the sculptured ornament as interesting as that of the Romanesque period, and by the same means, that of sending the carvers to study nature. With the foundation, in knowledge of what has been done, which we now possess, our architectural sculpture might be made very interesting and beautiful if the architects and the sculptors could coöperate with each other, and understand each other, better than they now do; and we hope that, before long, some chance may bring a bright young architect, and a clever stone-carver, together, to see what they can do in concert to produce a building more beautiful than any yet erected in this country.

LIBRARIES.¹—I.

Renaissance Cupboard. From Havard's "Dictionnaire de l'Ameublement."

THE term library is sometimes applied to a building for housing books, sometimes to a piece of furniture designed for their reception, and sometimes to the collection of books itself. As regards architecture, we may say with Count de Laborde "The signification of the term Library indicates the natural destination of the structure, it is the abode of books."²

Antiquity.—As soon as mankind had learned to express their thoughts by means of conventional signs, they felt that in order to leave a permanent record of the important events of their political, religious or private life, they must take measures to pre-

serve the objects on which the facts constituting their history were chronicled. In primitive times stone or sheets of metal engraved with the burin were employed for this purpose; then the skins of animals, palm leaves, lime-tree bark, papyrus, linen coated with varnish and, at last, paper came into use. Alterations of course had to be made in the libraries as the objects which they were designed to contain changed in material, form and dimensions; but we have no precise data on the disposition of libraries in ancient times.

Following tradition, the first library was probably that formed by the ancient Egyptian king Osymandias (?) who collected in his palace a considerable number of manuscripts written in Samaritan (ancient Hebrew) characters. Over the door of this library was inscribed the legend "the dispensary of the soul."³ There was doubtless also another library in the Ramesseum of Thebes. According to Champollion *le Jeune*,⁴ it "occupied the rear part of the building and was closed by a door adorned with sculptures in an incomparably lower and more delicate relief than all the other pictures of the edifice, and preserving a very white and thick coating applied to linen, which differs from the coating of the pictures merely colored in the ordinary fashion; the low reliefs of the door show, as should be the case, no trace of the coloring which is to be seen everywhere else. It is evident that they are half effaced simply because they have been scraped to remove the gilding." This description would convey the impression that the interior of the library was richly decorated. MM. Perrot and Chipiez are less confident on this point, as may be judged from the following extract: "The Ramesseum certainly seems to be the monument which Diodorus describes as the tomb of Osymandias, a name whose origin has not yet been satisfactorily explained. It was Champollion who revived the true designation of the edifice. This monument of Rameses was surrounded by constructions in brick of a peculiar kind. If it really contained a library, possibly the buildings may have included, in addition to the apartments for the priests attached to the service of the temple, a complete series of rooms for the reception and instruction of students."⁵

At a later date Ptolemy Soter founded an important library at Alexandria, which embraced as many as seven hundred thousand volumes. The building was situated in the quarter

of the city called the Bruchium. Ptolemy Philadelphus deposited there the Greek translation of the Hebrew scriptures known as the Septuagint. All the books which entered Egypt were seized by order of the Ptolemies and placed in the museum where they were faithfully transcribed by copyists; the originals were kept in the library, while the copies were delivered to the owners. Soon after, Euergetes II established a supplementary library in the Serapeum. The original and larger collection was burned when Cæsar took possession of Alexandria; to the second was added the library of the kings of Pergamum.

This last library was partially burned at the capture of the city and Mark Antony presented a large portion of the remainder to Cleopatra. (Pliny). Some volumes, however, were left at Pergamum, for Strabo speaks of the library as though it was still in existence under Tiberius.

In 390 A. D. Theophilus, patriarch of Alexandria, wishing to eradicate idolatry from the Egyptian capitol, obtained an edict from the emperor Theodosius empowering him to demolish all the heathen temples. The Serapeum was not spared and most of the books preserved there were destroyed. But this library was reestablished in the sixth century and was finally burned by the Arabs when they took Alexandria in 641.

Judea.—The Hebrews received their first book from Moses, who had the commandments of God graven in stone and enclosed in a sacred ark; this table formed the foundation of the Hebrew religion. The writings of Moses and Joshua and the early prophets were afterwards engraved also; these were placed in a retired part of the temple under the protection of the high priest. But when Jerusalem was taken by the Babylonians, the temple and library were both burned, and it was not until the return from the Babylonish captivity that Nehemiah collected anew the books of Moses and those of the kings and prophets. On the borders of the tribe of Judah there was a city named Kirjath-sepher, that is to say, "city of book."⁶ Every synagogue had its collection of sacred books, as there was one in the temple itself.⁷

Chaldea and Assyria.—At this period, in Chaldea and Assyria, countries bordering on Judea, the public records were preserved on tin or lead plates, or on slabs of clay which were baked. In Persia, yearly records were written out by order of the king; the law compelled every family to lodge in the archives a history of their ancestors.⁸ The library of Susa is said to have been very rich in archives of this kind. Assurbanipal collected in his palace at Nineveh, a considerable number of clay tablets, on which he had caused to be transcribed old texts written many centuries before at Ur of the Chaldees.

According to Eusebius, the Phœnicians had fine collections of books.

China.—A Chinese Emperor named Che Hwang-te, who lived about two hundred years before Christ, ordered all the books in the Celestial Empire to be destroyed, with the exception of treatises on medicine, agriculture and divination. A woman rescued the teachings of Confucius and several other philosophers, by hanging the walls of her dwelling with their books. The successor of Che Hwang-te, having been informed of this fact, carefully collected the works that had thus escaped destruction.⁹

Greece.—The Greeks at first employed lead and bronze for their inscriptions; they also wrote on brick; it is not until after the introduction of the Phœnician alphabet into Greece (1519 B. C.) that the existence of libraries may be recognized. Polycrates of Samos and Pisistrates of Athens, were the first to gather together in a place specially designed for the purpose, works intended to be preserved. Then Euripides, Euclid, Nicocrates and Aristotle possessed interesting libraries; this last was taken into Egypt. The library of Pisistratus was carried away into Persia by Xerxes; it was subsequently restored to Athens by Selencus Nicator, where it fell a prey to Sulla; but the emperor Hadrian had it reestablished at Athens. There is said to have been a valuable collection of books upon medicine at Cnidus. Perseus, king of Macedonia, had a fine library in his palace, which Æmilius Paulus carried off to Rome.

¹ From the French of Emile Camut, in Planat's *Encyclopédie de l'Architecture et de la Construction*.

² *Essai sur la construction des bibliothèques*, Paris, 1845.

³ Diodorus Siculus, I, 49.

⁴ *Monuments de l'Égypte et de la Nubie*, Vol. I.

⁵ *Histoire de l'Art dans l'antiquité*.

⁶ Joshua, xv, 15.

⁷ St. Luke iv, 16 and 17; Acts iv, 21.

⁸ Ctesias.

⁹ At the present time the library of Mount Ligumen and that of the temple of Venchung have some celebrity. There are other collections of books in the capital and the large provincial cities. In Japan there is a library in the temple of Xara at Narad.

Italy.—The Etruscans and the Aborigines of Sicily covered their pottery with inscriptions. After the fall of Carthage, the Romans presented to the family of Regulus all the books found in that city. It was at this time that they began to translate the works of the principal Greek poets into Latin, and it was likewise from the Greeks that they borrowed the idea of libraries.

We have already stated that Æmilius Paulus carried the library of Perseus to Rome; this was the first important collection of books that the Romans possessed. When Athens fell into their hands Sulla seized the library of a certain Apellicon,¹ and less than twenty years afterward, Lucullus picked up a great number of books in Asia.² Cicero and his friend Pomponius Atticus collected fine libraries and their example was followed by other men of letters. These were all absolutely private collections; the vast galleries where Lucullus kept his books were the first libraries to be thrown open to the outside world.

Julius Cæsar then conceived the idea of establishing a genuine Greek and Latin public library; he had gone so far as to entrust Varro with the task of collecting and arranging the books when the project was cut short by his death. His friend Asinius Pollio, took up the idea and carried it into execution by founding a public library in the *Atrium libertatis*, on Mount Aventine.

In the year of Rome 721, at the time of the erection of the Porticus Octaviæ, Augustus built a library which he likewise dedicated to his sister. It was connected with the portico, and comprised a Greek and a Latin department. It was burned in the year 833 of the city.³ Augustus constructed a second public library at the same time that he reared the temple and Atrium of Apollo Palatinus.⁴ It was maintained until the sixth century when it was burned by Pope Gregory the Great.

There were libraries also at the Capitol, in the Temple of Peace, and in the palace of Tiberius. The first was burned under Domitian; that in the Temple of Peace was collected by Vespasian and was destroyed by a conflagration during the reign of Commodus, while the last perished by fire in the reign of Titus. But the most celebrated of all the Roman libraries was the Ulpian, which was founded by Trajan and which Diocletian annexed to his baths. The Tabularium may also be considered as a library; for it was in this large edifice at one end of the Forum, back of the Temple of Concord, that the tables of the laws and the archives of the Republic were deposited.

The public libraries were in charge of a conservator-in-chief, chiefs of departments and guards. All menial services were performed by public slaves. The buildings were ordinarily set toward the east; the interior disposition exhibited rows of cases running along the walls and divided into a certain number of compartments, separated by shelves and vertical divisions; each division was numbered. Often, also, there were additional presses facing both ways down the centre of the library, around which people could circulate.⁵ These presses were called *armaria* and *loculamenta*, to designate open cases reaching the entire height of the room, etc. The compartments were from three feet to three and a half feet long, and were about six feet high; the volumes were put in horizontally, with the edge exposed, in which was the "pittacium," or index card inscribed with the name of the book.

Different terms were applied to the books; a "volumen" was a work made of a certain number of bands of papyrus glued together and rolled around a cylinder; a "codex" was a blank book made for writing and composed of leaves of parchment or papyrus separated by wood covered with wax, and bound together like our books; a "libellus" was a small codex. Pamphlets in separate leaves were laid flat side by side, on shelves inclined toward the gallery so as to expose one of the small sides to view; the title could be read on the edge of the shelf.

All the public libraries served as meeting places for philosophical and literary discussions; especially was this true of those established in the *thermæ*. They were luxuriously decorated; that of Asinius Pollio was adorned with brass, silver and even gold busts of the illustrious men of all countries.

The main gallery of the Palatine library was one hundred and

seventy feet long, one hundred and twelve broad, and more than fifty high. It was covered with barrel-vaulting ornamented with paintings and sculptures. At the end of the gallery there was a colossal brass statue of Augustus representing him as Apollo. The side galleries, reserved for the public, were paved with green marble.

We have already said that the Romans possessed numerous private libraries; these were as handsomely furnished as those found in public edifices; the cases were of cedar wood inlaid with ivory. The spaces not occupied by the cases were adorned with ivory plaques and variously colored glass. An ingenious disposition for a private library is described by Pliny the Younger in the sketch of his Laurentian villa: "At the angle there is an apse-shaped room the windows of which admit the sun at every successive stage of its journey. A cupboard has been inserted in the wall which serves me as a library and which contains, not the books that one reads once, but those which one re-reads constantly."⁶

In some of the houses of Herculaneum libraries have been discovered nearly intact. One of these apartments is so narrow that a person can touch the opposite walls by stretching out his arms.

In early Christian times bigoted followers of the new faith sometimes undertook to destroy all books except the Gospels, the new and the old Testaments and the Acts of the martyrs. Saint Jerome and Saint George, bishop of Alexandria, were opposed to such outrages. Saint Pamphilus is said to have founded the library of Cæsarea, though this is likewise attributed by some to Julius Africanus. Later the collection was enlarged by Eusebius; it was afterward dispersed, but was reformed by Saint Gregory of Nazianzus.

At the time of the persecutions of Diocletian, almost all the libraries found in the churches were scattered. The emperor Jovian (363) destroyed the library of Antioch, which had been founded by Julian. Under Roman rule the books in the temples of Nineveh and Sinope were transported to Edessa; the works written in Syriac formed the first division of the library, those in Greek formed the second. When Constantine the Great transferred the seat of the Roman Empire to Constantinople, he constructed a library there, in which he gathered together a splendid collection of books. In 727 A. D. Leo the Isaurian set fire to it. Basil the Macedonian and the Comneni (ninth and eleventh centuries) collected some books in the convents on the islands of the Archipelago and on Mount Athos. Constantine Porphyrogenitus founded a new public library at Constantinople. At the time of the capture of Constantinople by the Turks, the library was not destroyed, but it was afterward dispersed by Amurath IV.

The Greek Christians likewise established libraries in their monasteries; it is probable that the nucleus of these collections was formed from the old library of the emperors. We must also call attention to the libraries in the convents on the Isle of Patmos.

In consequence of the religious troubles which desolated Greece, many of the educated Greeks took refuge at Bagdad and it was not long before the Arabs themselves became the protectors of letters. Haroun al Raschid and his son collected a magnificent library in their palace at Bagdad. The libraries of Fez, Morocco, Gaza and Damascus were also famous at this period.⁷

In Spain, the libraries of Arias Montanus, Antonius Augustus and Michael Tomasius were also renowned. To Ferdinand Nonius, who first taught Greek in Spain, is attributed the honor of founding the great library of Salamanca. Under Moorish domination the library of Cordova attracted men of letters.

[To be continued.]

RAIN-MAKING.—Prof. Rossiter W. Raymond says, in the *Engineering and Mining Journal*, that "the appropriation made by Congress for rain-making was first ordered to be expended by Mr. B. E. Fernow, Chief of the Forestry Division of the Department of Agriculture; that Mr. Fernow declined to expend it, and, in his annual report, gave conclusive reasons for regarding the proposed experiments as a waste of public money; that the appropriation was thereupon increased, and put into the hands of the ex-Commissioner of Patents; and, finally, that there is a United States patent covering the process which General Dyrenforth has been advertising at the public expense."

¹ See the restoration of the Laurentian villa by M. Jules Bouchet.

² Strabo, XIII.

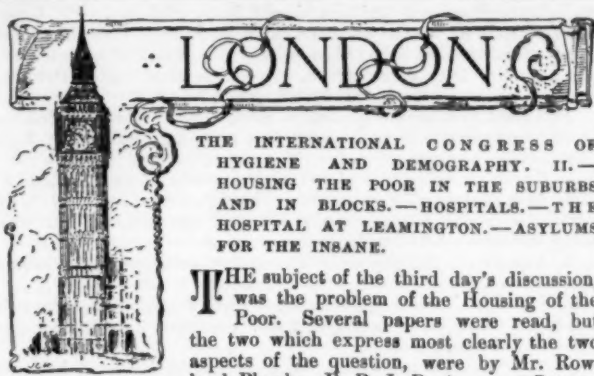
³ Plutarch, 42.

⁴ See the restoration of the Portico of Octavia by M. Duban, and that by M. Pascal at the library of the Beaux-Arts.

⁵ See the restoration of M. Pascal and that of M. Deffrance at the Ecole des Beaux-Arts.

⁶ Vitruvius, VI, 7, VII, Præf. 7; Pliny, II, 17, 8—Consult "Lettre XC de Rome au siècle d'Auguste," by E. Dezobry, and the "Dictionnaire des antiquités" of Rich.

⁷ The library of the Seraglio, founded in the eighteenth century, is exclusively reserved for the service of the imperial household; but several libraries still exist at Constantinople. The Koptic convents in Egypt possess a few libraries.



THE INTERNATIONAL CONGRESS OF
HYGIENE AND DEMOGRAPHY. II.—
HOUSING THE POOR IN THE SUBURBS
AND IN BLOCKS.—HOSPITALS.—THE
HOSPITAL AT LEAMINGTON.—ASYLUMS
FOR THE INSANE.

THE subject of the third day's discussion, was the problem of the Housing of the Poor. Several papers were read, but the two which express most clearly the two aspects of the question, were by Mr. Rowland Plumbe, F. R. I. B. A., on "Cottage Homes for the Industrial Classes in the neighborhood of Large Cities," and by Doctor Sykes, medical officer of health for St. Pancras, on "Block Dwellings for the Industrial Classes."

These two papers are good examples of the two views that are generally taken as affording an indication of the solution of the housing problems.

"What is the good," says the advocate of suburban housing, "of endeavoring to re-herd the people again upon areas you have cleared and so to a great extent reproducing the insanitary conditions you are endeavoring to remedy? It is against all sanitary and economical principles to crowd human beings into small plots of land which it is impossible, from their position, to satisfactorily ventilate and which are much more useful and suitable for the erection of factories and workshops. In the suburbs the diminished cost of the land and the great available area, will enable you to provide really healthy houses, well ventilated, well lighted, bright and cheerful, each house self-contained with its own private garden. Life amid such surroundings will surely be more attractive to the workingman and more beneficial to the health of his wife and children than in crowded, dark and dingy blocks of dwellings packed closely together in back streets of a town."

"Yes," replies the holder of the opposite view "we do not doubt that the air and the surroundings of the suburb are more beneficial to the health, especially of growing children, than those of the town; but the disadvantages of distance make themselves very appreciably felt in the expenditure of time, energy and money on travelling, the relaxation of family ties, and the curtailment of home life, the husband and other members of the family taking meals away from home, the frequent loss of work if the exigencies of occupation require the worker to be at short call, the long absence in occupations entailing exceptionally early or late hours, the increased expenditure in the family marketing, the extra cost, etc., if other members of the family besides the husband work away from home; and other disadvantages. Therefore block-dwellings in town are a necessity and we should recognize this fact and devote our energies to the better construction and arrangement of town dwellings." There is, no doubt, much to be said on both sides. Unquestionably life in the suburbs is healthier and more satisfactory in theory than town life, but it hardly works in practice. The railway companies are far from ready to offer facilities for really cheap travelling, and even if they do workingmen grudge very much the hour or so they have to spend in travelling in order to reach home. Besides there are a large number of occupations which absolutely require a man to live close to his work. It will be interesting, however, to examine briefly the papers of each speaker and learn what they have to tell us from their experience in working in their respective spheres.

Mr. Rowland Plumbe after stating his ideal of what a suburban industrial village should be, went on to describe a work of this nature which he had executed in the north of London. "The estate, having an area of 100 acres, is called Noel Park, and is situated at Wood-Green, a suburb in the northeastern district, about ten minutes walk from the Hornsey and Wood Green Stations on the Great Northern Railway, Green Lanes and Noel Park Station on the Great Eastern Railway is actually on the estate, and tramways run along the main road on which it is situate. The site has a very gentle slope towards Tottenham; the soil is the usual dense clay found in the outlying parts of London on the north side of the river, and which is always much improved by road-making, planting, paving and draining.

"The main avenue is 60' wide, other avenues are 50' wide, and the cross streets 40' wide. As the houses are built the roads are completely made up, channelled and curbed, and the footways are entirely paved with York stone, and planted at regular intervals (mostly with plane trees). At present it is contemplated to provide a large open space as a recreation-ground.

"In laying out the estate, all the houses are well set back from the road and the corner houses are specially designed and planned. There will be about 2,600 houses on the estate, mostly of five different classes varying from first-class houses on plots 16' x 85' with a floor-area of 1,065' on both floors, containing two sitting-rooms, kitchen, wash-house and four bedrooms and letting at 11s. 6d. per week, including rates and taxes, to fifth-class houses on plots 13' x 60' with a floor-area of 470', containing front living room with kitchen and small wash-house, with two bedrooms on first floor and letting at 6s. per week, including rates and taxes.

"The general requirements of the inhabitants have been studied. Already the estate has been formed into a separate parish, and a church has been built holding 850 on the ground-floor, with mission-hall, parish-rooms, and all the usual church societies. Building sites have been offered for churches of other denominations; a fine board-school has also been built; various social clubs already exist, as also cricket, football and other clubs; space is reserved for a public hall should it ever be required, and every facility will also be given for the erection of Polytechnics and other buildings for technical education; also for free libraries, swimming-baths, and other similar buildings, whenever the authorities are ready to put the various Acts of Parliament providing these buildings into operation.

"The estate is occupied by young-married people, a few retired tradesmen with moderate incomes, travellers, warehousemen and clerks, railway employés, tradesmen's assistants of all kinds, artisans of all classes, cabmen, letter-carriers, laborers, policemen, pensioners, etc. The inhabitants are healthy, and but few complaints are made. The death-rate on the estates from January to end of June last was about 14.41 per thousand, as compared with a death-rate in the general district of about 15.25 per thousand.

"In regard to general statistics, it may be interesting to know that an average of about twenty-five houses per acre are built upon the estates, including space for roads, and that the population is at the rate of about seven people per house, so that when it is completed it will contain a population of about 17,500. There will then be over five miles of roads and streets formed. The outlay, including the land, up to the present time has been about 460,000l., and the net income is now about 21,000l., so that the estate (though only about half-developed) already pays over 4½ per cent."

Doctor Sykes's paper was of a different character, and dealt more with general principles than a particular case. He considered that the healthiest condition of construction was that in which through ventilation or perfilation was obtained and said that blocks might be so constructed as to reproduce one of the bad features of back-to-back houses. It was highly desirable, almost necessary, that a street should run between every alternate row of blocks, and blocks should be limited to a height of from 40' to 60'. He objected to out-buildings, towers, or projections as impediments to light and air.

Orientation was an important point, the least obstruction to the sun's rays being presented by buildings running north and south. Various suggestions with regard to the relative proportion of the space between the blocks to their height had been made, but anything less than a width equal to the height of the building above ground level would be unacceptable to hygienists.

"The reckless manner," said Doctor Sykes, "in which at the present moment blocks of dwellings are being erected with an utter disregard for this provision of light and air calls most earnestly for legislative restrictions in the construction of this class of buildings. The growing antipathy of philanthropists to block-dwellings is greatly justified by the dread of the ultimate effects of the total absence of any restrictions as to this class of buildings erected on old sites. The crusade against insanitary dwellings, without adequate restrictions upon the buildings that will replace them, may make the last state worse than the first.

"Apart from the influences of town life, is there any reason to suppose that block-dwellings are, *per se*, unhealthy? Residential flats are not held to be less healthy than self-contained houses. Provided that the proportion of open to covered space is adequate to permit of proper access of sunshine and daylight, of sufficient aëration and perfilation, increased height of building can scarcely cause any direct injury to health. On the other hand, the conditions of life are dissimilar in cottages and in blocks in important respects.

"In block-dwellings, the families, and especially the children, are brought into closer and more frequent contact, and the sanitary arrangements are under more constant supervision. The effects of these conditions upon the mortality, as compared with London generally, have been most ably demonstrated in a paper upon the vital statistics of block-dwellings read before the Royal Statistical Society in February of this year by Doctor Newsholme. He showed that, notwithstanding that the age-distribution of population in Peabody buildings was much less favorable to a low mortality than in London as a whole, the death-rate was 2 per 1,000 lower, and that the birth-rate was much higher, and the infantile mortality much lower than in all London. But that the death-rate of children between one and five years of age was higher, and was caused by scarlet fever, diphtheria and still more largely by whooping-cough and measles, diseases to which children are so prone, and which are communicated mainly by direct infection. In this respect the social condition induced by block-dwellings resembles schools, and is equally remediable. Another point elucidated was the influence exerted by the greater supervision of sanitary arrangements, in the fact that the death-rate from typhoid or enteric fever was one-half that for all London, and it is well recognized that this disease is the best test of sanitary conditions available."

These two clever papers seem to show us two things. (1) That it is possible to form suburban industrial villages with a very fair prospect of success. (2) That the greater portion, however, of the industrial population of London desire to live in the town and that such desire can be satisfactorily met if an efficient control, carrying into effect certain recognized principles, be exercised over the construction and administration of the block-dwellings.

This view was taken by the meeting, who after a long discussion passed the following resolution:

"That special legislation for the control of the construction of block-dwellings for the industrial classes in cities is requisite."

It is to be hoped that steps will be taken to bring this resolution before the notice of the Government, as it is the only way in which the problem can be satisfactorily solved.

On the fourth day of the Congress, the architectural section turned its attention to Hospitals and Asylums.

Three papers were devoted to hospitals. Doctor Thorne-Thorne of the Medical Department of the Local Government Board dealt with the question of Isolation Hospitals. He said that isolation hospitals should be of such an extent as to enable sanitary authorities to deal with two infectious diseases at the same time for both sexes. The site should be large enough to accommodate twenty beds per acre without counting the space necessary for recreation. A zone of not less than 40' of unoccupied space should surround the hospital. Each patient should have at least 2,000 cubic feet of air, and should be allowed not less than 12' of lineal wall-space, nor 144 square feet of floor-space. The laundry should be distant not less than 40' and should be isolated. Hospitals of this nature should be made as attractive as possible as it was difficult to carry out the compulsory clauses, or to force people to go to a hospital.

The Rev. C. E. Few, Vicar of Seal, read a somewhat impractical paper in which he advocated the construction of temporary local isolation Hospitals as opposed to central hospitals.

The most useful paper came from Mr. Keith D. Young, F. R. I. B. A., who described a hospital which he had recently built at Leamington. The buildings accommodate 22 persons, one to every 2,000 of population, and consist of four detached blocks (1) the administration block (2) the isolation block (3) the ward block (4) the laundry block.

The administrative block is two stories high, the remainder being one story. The general rooms are on the ground-floor. These include sitting-room for matrons and nurses, room for medical officers, linen-room and the usual offices. On the upper floor are the bedrooms and a bath-room.

The isolation block is in duplicate, half for each sex and is divided into equal parts by a central wall. Each half contains a large ward for three beds, two small wards for one bed each, nurse's duty-room, five water-closets and slop-sink. The rooms communicate by an open veranda. The wards are 12' high with an allowance of 216 square feet of floor-space and 2,592 cubic feet per bed. One square foot of window-surface is provided for every 65' of cubic-space.

The ward-block has allotted 156' of floor-space and 2,082' of cubic-space to each bed, and 1' of window-surface to every 60' of cubic space. The building is entered at the centre from an open porch in which are two doors, one giving access to the entrance-lobby the other being an outer door to the bath-room. "The object of the latter is to enable a patient, on being discharged, to leave the building directly from the bath-room. The bath-room thus becomes a discharging-room; not, perhaps," said Mr. Young, "an ideally perfect arrangement, but certainly a better one than if the patient had to enter the ward after his final bath." Between the wards is the nurses' duty-room.

The windows of the wards form the principal means of ventilation. They are divided into two parts by a transom, which is fixed about 1' 6" down from the head of the frame. Below the transom are ordinary double-hung sashes, provided with a deep bottom rail and a sill-board which permits of the lower sash being raised and a current of air admitted in a vertical direction between the two sashes, at the same time preventing free access of air at the sill-level. Above the transom is a "hopper-light," hung on hinges at the bottom to fall inwards and provided with glazed cheeks at the side to prevent down draughts. The wards are artificially ventilated in addition to the window-ventilation, and an opening is made at the floor-level behind each bed.

The walls of the ward are lined to a height of 5' with tinted glazed bricks, above which they are plastered and distempered. The floors are laid with 3" yellow deal, ploughed and tongued. The vertical angles of the walls, the horizontal angles at the junction of floors and walls, and walls and ceilings are all rounded, as also are all the angles of door-panels and windows.

The cost of the hospital, including land, buildings and furniture was about £9,350. To meet this outlay loans were obtained from the Loan Commissioners, at 3½ per cent, repayable in thirty years. The interest and repayment of principal amounts to an annual sum of £630, which is met by a rate equal to 7-16 of a penny in the pound.

I have given this paper more in detail than the others, not so much as describing a particular hospital, as evidently the most recent opinions as to the construction in detail of a small hospital of this nature.

There were two papers read on Asylums, the first by Dr. Richard Greene, F. R. C. P., Ed., Medical Superintendent Berrywood Asylum, Northampton, and the second by Mr. O. F. Hine, F. R. I. B. A. The papers, however, travelled so much over the same ground, that I propose to combine them and simply describe what these gentlemen considered an ideal arrangement for an asylum, without reiterating their individual opinions, except in certain instances.

The site, then, for an ideal asylum should be on high ground, on a gravel soil, if possible. If the building has to stand on clay, careful

and thorough subsoil drainage should be carried out. Dr. Greene asserted that the insane are more liable to tubercle than the general population, and that it had been proved that subsoil drainage lessens the mortality from consumption. A gentle slope facing the south was the right position for an asylum.

The block system was quoted as being almost invariably followed in the construction of asylums of 500 beds and upwards. These blocks could be arranged in five chief ways:

1. Placed on either side of a straight corridor of communication.
2. Arranged *en échelon* on either side of a corridor, bent in the centre, with the administrative block at the junction, the whole being in shape somewhat like a broad arrow.
3. Attached to the free sides of corridors arranged in the form of the letter H.
4. Arranged in rectangular form, the important blocks facing due south, the other blocks facing east and west, and the administrative block only facing north.
5. Arranged on the outer edge of a corridor in the horse-shoe form.

Another form of recent adoption in America was mentioned.

This comprised a number of entirely detached blocks, placed more or less distant from the central or main building, practically forming a number of villas, wherein the segregation of patients could be easily effected.

The main principle of arrangement once determined, the chief care should be to arrange the wards in the best positions for aspect, light and air, and within easy reach of the administrative centre.

An asylum, it was agreed, should not exceed two stories in height, indeed, Dr. Greene felt convinced that a one-story building would really prove the most efficacious. It was pointed out that the accommodations in many of our public asylums exceeded 1,600, but this was considered excessive and 800 was cited as the maximum accommodation that should be allotted to a single asylum. In all ordinary asylums space should be provided for the following:

- (1) Sick and infirm, including a small ward for newly-admitted patients.
- (2) Acute or refractory cases.
- (3) Epileptics.
- (4) Quiet and working patients.

The infirmary wards generally accommodate one-fourth the total number of patients, exceeding by one-third the superficial area and cubic contents of wards occupied by healthier patients. The wards generally should be constructed similarly to hospital wards.

Next to the infirmaries should come either the ward for acute cases or that for epileptics. In a small asylum the latter must be on the ground-floor, and the former over, but in any case, epileptics should be housed day and night, on the ground-floor. Their wards should be bright and roomy, the day-rooms rectangular, without breaks or obstructions, behind which the patient might get lost sight of while in a fit. There is little use in subdividing these rooms as these patients are generally quiet, and in their healthier moments are more rational and appreciative of surrounding advantages than other classes of patients. The dormitory should be large enough to hold fully five-sixths of the patients in the ward, the remainder sleeping in single rooms, which, unlike other wards, should open out of the dormitory.

The ward for acute cases should be made sound-proof, to prevent the disturbance of patients in rooms above or below. This ward is best broken up by dividing the day-rooms into several smaller rooms by partitions partially glazed, to permit of efficient control. The single rooms accommodating one-third of the whole number of patients should open out of the day-rooms.

The wards for quiet or working patients should be very simple and consist of large day-rooms, with associated dormitories of proportionate size on the upper floor.

There is much diversity of opinion as to the number of separate single rooms in an asylum. Generally with numerous moderate-sized dormitories, one single room to every five patients should suffice, distributed as follows:

- Acute and refractory cases, one room to three patients.
- Epileptics, one to five or six.
- Infirm, one to six or seven.
- Quiet working, one to ten.

On the construction of the doors, the authorities differed. Doctor Greene thought that the upper panels of the doors should be of strong plate-glass and the lower panels of open ironwork, fitted in some cases with light wooden shutters, while Mr. Hine objected to inspection holes or shutters as suggestive of espionage, except in epileptic wards where a narrow panel must be left open to permit an attendant to hear a patient in a fit. He preferred a silent lock in general cases, actuated by the handle.

In the construction of wards and staircases, careful thought should be given to fire and means of protection and escape provided. The stairs should be of ample width and easy of ascent.

The administrative block should be centrally situated, and should comprise

- (1) A large hall for recreation.
- (2) Kitchen, with sculleries, larder, etc.
- (3) A general or steward's store.
- (4) The laundry buildings.
- (5) Committee-rooms, waiting-rooms, etc.

The superintendent's house, generally incorporated with the administrative block should, Mr. Hine thought, be entirely detached.

The best place for the chapel, he considered, was outside the main building, with a connecting corridor for use in wet weather, but in addition, outside entrances. He also felt it to be most desirable to provide

- (1) Separate block for nurses and attendants.
- (2) Dispensary and operating-room.
- (3) Workshops and, in country asylums, farm buildings.
- (4) An isolation hospital.
- (5) Mortuaries for both sexes.

The ventilation arrangements were described at length, but these did not appear to have anything peculiar to an asylum.

With this paper, I close the report of the Congress. It has been a matter of great difficulty to condense sufficiently the various interesting papers which were read before the Architectural Section and I cannot touch the other sections, though most useful papers were read, particularly to the sections of Engineering and State Hygiene. There were a large number of excursions and visits made by the members of the Congress and several supplemental meetings were held on subjects not directly connected with the Congress.

Altogether the Congress was generally considered to have been the most successful ever held and to have marked an epoch in the developments of Hygiene and Sanitary Science.

THE TEMPLE OF THESEUS.



Doorway on the Rue Lesueur, Paris. M. Gaillard, Architect. From *La Construction Moderne*.

THE recently-issued work of an accomplished lady, Miss Jane Harrison, on the "*Mythology and Monuments of Athens*,"¹ gives full notices of the very latest excavations and explorations, and also of the most recent theories based upon them—theories which, as the most recent, have the usual fortune of being accepted for the time as final and conclusive. Among such theories, the most unhesitating claim is put forward for a new assignment of the noble monument which has been so long known as the Temple of Theseus—the Theseum, founded for the reception of the reputed bones of the national hero when brought from Seyros to Athens by Cimon, son of Miltiades, B. C. 468. We are now warned authoritatively that this is an error: it is a Temple of Hephestus, only known, like many others, by a casual mention by the traveller, Pausanias. I would not willingly think so. The imagination, at least, is engaged by a poetical propriety, a moral fitness, in the wonderful

preservation of a monument which symbolized to Athens the work of the founder of that greatness to which all the civilized world remains indebted. The Athenians took delight in ascribing to Theseus the origin of their democratical institutions. What was certainly to be ascribed to some statesman of energy and genius, as Thucydides justly recognizes, was that harmonized union of the independent districts of Attica by participation in a concentrated government at Athens, which enabled the country to hold head against either Bœotia or Sparta, and ultimately to assume the leading control of Hellas. It is well, however, to beware of the bias of a primary repugnance; sentiment must give way against irrefragable evidence, if such there be. A few sentences should suffice to set our minds at ease upon this point.

Plutarch, who was well-acquainted with Athens and its monuments, agrees with Euripides that in the monuments dedicated to Theseus a certain partnership was conceded to Hercules, and the exploits of the pair are found to constitute exclusively and in most fairly balanced proportion the sculptural decoration of this temple. It is tempting to conjecture that the parallelism of the achievements of Theseus with the labors of Hercules was prompted by the desire of the Athenians to have a hero of their own—a worthy rival of the demigod whose glories pertained more peculiarly to their usual rivals or enemies. Be that as it may, Plutarch further tells us that the Theseum was in the midst of the city, near the *agora* and near

the gymnasium of Ptolemy, as Pausanias also places it. The circuit of the *agora* being necessarily extensive, and in any case undefined, helps us no way. Where, then, on the plan—or, rather, the area of Athens, for plan we have not—may we set down this gymnasium? Where, indeed? We have no more help for this than for the sites of structures so important and renowned as the Stoa Poecile and the Stoa Basilica, which were also close to the *agora*. The attempt to fix a definite site for the Theseum by the order in which Pausanias introduces it, without note of distance or direction from other monuments, is futile; it is useless pretending to know more than is to be known.

In one enumeration he starts from the Stoa Basilica, and, without mention of the *agora*, takes one monument after another till he reaches the statues of the tyrannicides, and seems to go on to the one known and remote site of the Odeum. Then, reverting to a second start from the Stoa Basilica, he notices the Hermes Agoraios, which was in the midst of the *agora*, the Poecile Stoa, which we also know was in it, and then the gymnasium of Ptolemy, not far from the *agora*, and close to the Theseum, which appears from Thucydides to have composed a considerable precinct. Should the site of the gymnasium of Ptolemy be ever identified by ruins and inscriptions, the discussion may be reopened; in the meantime, the presumption remains in favor of the existing temple being the Theseum of Cimon.

It is announced as a further discovery that Stuart was wrong in stating that the temple had only two steps: "As a matter-of-fact, it is said, it is built on three steps, though the lowest one is of porous stone, the two upper of Pentelic marble." Precisely so; and it was by this difference of material that Stuart assigned the lower step to the substructure, of which he found on one side six courses exposed. We shall see that this common-sense view is confirmed by the analyses of the proportions of the temple. Stuart does not "go on to explain that this was a custom with a temple that was only a herœon, not a temple of the gods." He expresses a simple conjecture: "This circumstance probably denotes that it was an herœon."

There is nothing in the arguments put forward for the late date of the Theseum which are based on such notions as that the omission of guttæ below the short, sculptured frieze of the cella was an improvement on the "senseless" introduction of them below the Panathenaic frieze. It may be observed, also, that no evidence is before the world for the asserted departure in the Sunium Temple from the Doric rule of closer spacing of the columns by the angles.

Let us give our attention, however, to the architecture of the temple as it is happily preserved for us. We shall find that within its limits it illustrates and adheres to the same principles of Athenian architecture which rule in the Parthenon. My general exposition of these will be found in Mr. Penrose's last edition of his book under that title, an enforced outline only, and packed away, it must be said, somewhat ignominiously in an appendix. It is based upon the exact measurements of his invaluable survey of the Parthenon, undertaken by him and employed successfully to elucidate the important but subordinate subject of corrective curvature. More liberal opportunity of illustration was afforded in the magnificent work on the Temple at Bassæ by that fine artist, the late Professor Cockerell.

When we attempt to recover the scheme of proportions which is embodied in the temple as we have it before us in completion, it must be borne in mind that we cannot proceed deductively from one stage to another, as if following the exact process of the architect when at work on his design. Such an assumption would involve injustice, as obliging us to ascribe the happy conciliation of numerous proportions not to deliberate adjustment, but to fortuitous coincidence. But, in fact, where one arrangement proves to fall in as if spontaneously with another, we are bound to consider that the second was probably not unconsidered in the adoption of the first, and a third, also, may have been taken into account. When a truly complex design is in progress, after the first stage of accepting the inevitable and indispensable, nothing is settled until, if not all, at least a great deal of much else, is settled. The most promising distribution—in proportion as in plotting—must have been entertained only provisionally until its capability was approved of promoting other desirable combinations.

The Theseum agrees with the Parthenon in the general character of Doric style and treatment, but is hexastyle instead of octastyle, and is much smaller, having a breadth of only 45 feet, as against 100, and a length which only exceeds the breadth of that temple by one or two feet. It follows the same prevalent but not universal rule of having on the flank double the number of columns of the front plus one; thus 13 to the Parthenon 17.

Instructed by many precedents, we look for a proportion of low numbers between the length and breadth on plan. In the case of the Parthenon, the columniations—the spaces from centre to centre of adjacent columns—are 7 front to 16 flank, an oblong which is easily adjusted by equal increment to the accurate proportion of 4:9 on the top step or proper stylobate. But when the 6 columniations by 13 of the Theseum are to be dealt with, no equal addition to the unequal sides, which does not extend beyond the limit of the stylobate, will accommodate a proportion of 4:9 or any other of the desired simplicity, unless the columns are to be spaced differently on front and flank. This expedient is found resorted to in some earlier temples, but was renounced as style became refined,

¹ Macmillan & Co. London and New York.

The full increment to length and breadth of the second step gives 9:4::106.708 flank:47.426 for the front, to compare with the measured 47.459. The architect thus secured the same simple proportion as in the Parthenon, only taken on the lowest step, instead of on the upper.

In the consideration of the diameter to be assigned to the columns on a stylobate of these dimensions, the points which would have to be kept in mind are chiefly three:

Grandeur and dignity of expression are promoted by relatively close spacing of columns, but require to be sustained by certain absolute magnitude. The smaller Theseum, therefore, would appropriately be characterized by greater lightness and openness of proportion.

Then the adoption of the relative proportion between column and intercolumn which obtains in the Parthenon, and allows these an interval of eight feet, would be liable to reduce the interval inconveniently for passageway in the smaller structure. In the Theseum, the more open spacing relatively to diameter of the column allows only 5.134 feet, which is almost the least admissible; in the Temple at Bassæ it is reduced to 4.92.

Lastly, the diameter of the column cannot be decided independently of the consideration of what is the utmost height that can be allowed for it, and this is of necessity dependent on the proportionate height which is approved of for the façade.

We find that, whether primarily or as a result of trials, a height from base to apex of pediment was adopted which compares with the breadth on the top step in the simple ratio of 3:4.

4:3::45.011:33.756 (cf. measured height 33.797).

This is the same proportion which is found in the hexastyle at Bassæ where the steps are three, and in the western front of the Propylæa where there are four.

The height of the front thus obtained has to be distributed among pediment, entablature, column and steps.

The height of the steps is given within a moderate fraction, and that required for the pediment is also limited by the norm of the slope about six in twenty-five, which obtains in all the Athenian pediments. The remainder is divisible between column and entablature.

But it was a principle with the Athenian architect to effect a super-particular ratio—(a proportion having a difference of unity between its terms—as 1:2—7:8 and so forth)—between the column and the joint horizontal,—the complement of the height of the front, and to assign the superiority to the column. This was a correction of the heavy effect of earlier façades like that of the Æginetan Temple, in which the column had less than half the height of the full front. This was the more discordant from the balance being necessarily reversed on the flanks in favor of the column by the absence of the pediment. The problem was, therefore, presented to select the ratio, which, in a particular case, conduced to harmony by accommodating other favorable combinations.

In effect, the ratio adopted in the Theseum is 5:4. In the hexastyle at Bassæ, of which the front has nearly the same dimensions, the height of the column is only 7, to compare with complementary height, 6.

This agrees with the closer spacing of the columns. In the still closer order of the Parthenon the ratio approaches still nearer to equality, being exactly as 10 to 9.

The full height of the front of the Theseum, 33.756, is thus divided between column 18.775 ($\frac{5}{8}$) and complement 15.020 ($\frac{3}{8}$).

Deducting from the latter dimension 2.332 for the steps, and 6.352 which was demanded for the pediment, 6.336 remains for the entablature.

But in this temple the entablature received an increment on flank, by the corona of the raking cornice of the pediment being returned along it from end to end ($6.336 \div 0.710 = 7.046$); add to this the height of the steps (3.332) and we have a flank complement which compares with the vertical member in the simple ratio 1:2.

Height of column $18.688 \div 2 = 9.344$ as against 9.378 measured. It may be observed that the height of the steps is $\frac{1}{2}$ of this flank entablature.

The principles which the Athenian architect thus employed with precise numerical adjustment, are founded in nature, and equally applicable to the design of modern buildings. An obvious example is the determination of the comparative sum of window-openings and blank wall-space in the front of a mansion, taken upon a horizontal and then upon a vertical line. The Reform Club and the Athenæum present a contrast in the direction of the two extremes. In the Athenæum the larger proportion of window-space harmonizes with the frankness of its ample balcony. The architect of the Reform Club was possessed by the dignity of a Roman palace of much larger size, and the predominance of wall-space over the pinched windows,—of solids over voids, suggests, especially taken with the beehive-like entrance, less concern for outlook on the part of the members than for keeping them well shut in.

Again, in respect of vertical comparisons, and still to take our examples from club-houses: the sense of proportion is offended in the case of some of the most sumptuous, by the mass of unperforated space above the upper windows. This, no doubt, is due to the motive of masking an upper floor, of which the meanness, if exposed, would detract from dignity, and which can be lighted by skylights unseen from below. The advantage, however, is obtained at the serious expense of deadness and top-heaviness. Custom has made us accept without murmur, without observation, the vast dead roofs of the cathedrals surmounting walls, which are glazed almost as openly as

a lantern,—but to the sensitive of proportion they are a grievance none the less.

To return to the Theseum:—of course, the height of the column could not be finally adopted by the architect without consideration of suitability to a diameter which should be consistent at once with convenience and appropriate dignity.

The proportion adopted gives a height which is just five times the breadth of its ordinary abacus ($18.688 \div 5 = 3.738$ Cf. 3.740). This is also the case at Bassæ; in the Parthenon it applies to the angle columns of the east front. In the Parthenon, again, the abacus of this front is one-fifteenth of the 100 Greek feet of the top step. In the Theseum, one-twelfth of a smaller breadth of step gives appropriately to the lighter style a relatively shorter abacus; $45.011 \div 12 = 3.750$ measured 3.740, the Ordinary Eastern F. C. C. The angle columns have the broader abacus 3.825 to agree with the normal Doric enhancement in diameter of those columns.

The abacus therefore is $\frac{1}{2}$ of the top step in front; the height of the column equals $\frac{5}{2}$; the complement makes up $\frac{1}{2}$; the full height of the façade being in consequence $\frac{7}{2}$.

No accurate dimensions are furnished of the lower diameter of the peristyle columns, which are much damaged at this part, nor indeed of the upper which are only measured between the flutes; but it seems to have been similar in proportion to the opisthodomus column measured by Jenkins and Stuart. Of this the abacus 3.633, the lower diameter 3.300 and upper diameter 2.541 have the proportions of 10, 9 and 7.

The subdivision of the entablature appears to have proceeded by assigning $\frac{1}{4}$ of the height at command to the cornice and dividing the remainder as was customary, almost equally between frieze and architrave—that is, giving $\frac{1}{4}$ to each. The architrave therefore, would compare with the contrasted joint frieze and cornice, in the simple ratio of 3:4, approximately.

$6.336 \div 7 = 0.905$ (Cornice as measured 0.885.)

$0.905 \times 3 = 2.715$ (Frieze as measured 2.710—Architrave 2.741.)

Here, as in other examples, the height of the architrave exceeds very slightly the upper diameter of the column.

The height of the capital of the Theseum column is determined like that of the Parthenon by the ratio 4:9. But whereas in the Parthenon the larger term is the upper diameter of the angle column, in the present case it is the breadth of the abacus. This brings out a more quadrate effect in harmony with the more quadrate proportion of the front of the temple.

The height of the capital 1.658 is divided among necking, echinus and abacus in the proportions of 5, 6 and 7.

A Doric portico, like any other, required the column at the angle to range with the angle of the entablature which again had to be terminated by a triglyph. But the centre line of this triglyph was of necessity thrown considerably outward beyond the axis of the column to which its traditional character of end of a beam could not but refer it. The intermediate columns could be made to range evenly under the successively alternate triglyphs, but with the necessary consequence of forcing a contraction upon the columniation of the angle. This consequence was accepted by the Doric architect, and even enhanced by the somewhat increased diameter of the column by the angle, by which he seems to keep the anomaly in countenance, as if insisting on a purpose and value in the buttress-like close order at the angle of the building. But at the same time the irregularity was carefully relieved. The exact measurements which we have of the Parthenon enable us to observe how differences were eased. The metope by the angle is made somewhat wider than others so as to throw the next intermediate triglyph clear of the column, and then the diminution in width of the next three helps to bring successive triglyphs not exactly but more nearly into the axial coincidence with the columns below, which is finally effected in the case of the central pair.

The symmetry which the Greek architects so constantly contrived between the height of the columns and a marked division of their ordination on plan, was not wanting in the Theseum. It is found in the dimension from the centre of the second column to the farther margin of the fourth—embracing thus two complete columniations and a semi-diameter of a column. In the Parthenon three columns of the peristyle are included in a square.

The walls of the cella are so far set in that they do not range with the second columns of the front, and the interval from the peristyle to column to cella wall exceeds the ordinary intercolumn as 7 to 6. It is divided into a central apartment or naos with a pronaos and posticum, both distyle in antis; but the sculptured frieze of the pronaos is continued to the lateral peristyle column and thus in a manner marks the Eastern portico as a transverse apartment. The depths of the portico and pronaos exceeds those assigned to the posticum and its portico which fall intermediately into moderate gradation with the spacing of the ambulatory and peristyle.

The plan of the naos so far as dimensions are given approaches so nearly to a double square (1:2) that we need not hesitate to accept it.

Whether it was by accident or by management, recognized or unrecognized, the dimension from the lowest step on front to the cella wall exactly agrees with the height of the temple, and the height to the horizontal cornice in front exactly measures the extent from the lowest step to the cella wall on the west.

It is tempting to conjecture what may have been the complete proportions of the naos, on the assumption that they were subject to

the principle of determination by ratios of low numbers. The breadth must have been about 20.4. To take this for height also would give an interior of a double cube but make the naos lower than the pronaos, which is impossible. The next ratios in order of simplicity, $\frac{3}{2}$ and $\frac{4}{3}$ would give heights impossible by excess, but the ratio 4:5 which gives 25.5 exactly agrees with the utmost space available and the section of the Propylæa teaches us how chary was the Greek architect of not availing himself of every utmost inch.

W. WATKISS LLOYD.

ENGLISH AND FRENCH CATHEDRALS.



XVI Century Choir. From Havard's "Dictionnaire de l'Ameublement."

THE visitor to the cathedrals of England and France is apt to be most impressed, apart from the superlative grandeur of the architecture, with the marked difference in the people who frequent them either at the stated services or for meditation or prayer. In England large congregations are generally to be depended on, especially in the larger cities; in London huge assemblages crowd the three choral services at St. Paul's and Westminster Abbey. To the American accustomed to small churches in which nearly every one can see the minister and readily hear all parts of the service, the vast size of these buildings and the congregations is overwhelming. In St. Paul's it is almost impossible to hear a spoken word, either of the services or of the sermon, beyond the area covered by the dome; yet it is not unfrequent for the nave to be crowded through its entire length, though to the majority of those present the service is inaudible save such parts as are intoned or sung.

Such a spectacle is an impressive illustration of the admirable qualities of patience possessed by the English people. The audiences at St. Paul's are far from being exclusively English, but are largely made up of Americans. Englishmen from out of town form also an important part

of the congregation, and many are strangers to whom St. Paul's would be of interest were there nothing to see but the walls of the building itself. It is not unfair, therefore, to attribute much of the orderly behavior of English congregations under apparently most unfavorable conditions to the traditions of the edifice, and the associations which are so largely the common property of all English-speaking people. These elements are unknown in our spick-and-span new churches that have been built by contract under our very eyes, and so they form a feature of English religious life to which we are unaccustomed.

Admirable as English congregations are as models of behavior, there are some features of the service which are more open to criticism. If one had but the smallest acquaintance with ecclesiastical and architectural history it would seem strangely out of place to find the choir-stalls, originally intended for the exclusive use of the clergy, appropriated to the laity and occupied as regular places during service. No desecration of the sacred edifice is accomplished by this means, but it would be more in keeping with the proprieties to argue from a sentimental standpoint alone, that the portion of the building set apart for the clergy from time immemorial should still be held for them. Doubtless the vast size of the English choirs, most of them being too large for the present needs of the altar service, has had much to do with throwing open this part of the cathedral to the laity, and thus bringing them in a measure into closer connection with the services than they could otherwise have. The portion of the choir furthest from the altar being used by the clergy and choristers, it follows that the larger part of the congregation is often between the clergy and the altar, instead of the clergy being nearest the altar.

The choir-screens have not been without their influence in causing this arrangement. In some of the cathedrals, as at Gloucester and Canterbury and Westminster Abbey, they are solid stone structures built straight across the nave, practically shutting it off from the altar. The lateral walls of the screens are sometimes more open than at the end, and thus the congregation naturally gathers near the centre of the building.

No true Englishman, with his love for the past and his belief in the value of precedent and tradition, would tolerate even the thought of removing these screens, but they deprive the church of much of its dignity as a building, and rob it of a large part of its value as a place where multitudes may enjoy the benefits of its sacred worship. There is a very marked contrast between the churches with the solid screens and those in which they are of open-work, as at Worcester, or where they are altogether wanting, as at St. Paul's. In

both, one of the chief beauties is the vast nave where one can obtain from the extreme west end an unobstructed view of the altar placed at the extreme east end. They seem almost unlimited in size and able to accommodate an indefinite number of people. One realizes here, if nowhere else, that a church is not a building capable of holding a few hundreds only, but a great temple where all may come and where there is always room.

There is doubtless a point beyond which increased size in a church is undesirable. It is not unreasonable to insist that every one shall have at least a reasonable chance of hearing and seeing, if not an absolute certainty of so doing, and it must be admitted that in many of the great churches these conditions are altogether wanting for a large part of the congregation. As has already been intimated, St. Paul's is bad in this respect; when the priest stands at the altar as he does in the communion service, he is separated from the congregation by a great space, and his voice is all but inaudible save to those within the choir, or possibly just without it. It is impossible to enjoy a service conducted from such a position, and even when intoned, the difficulty of hearing is a serious impediment to the comfort of the people.

It may not be in accordance with the usage of canon laws to argue for any ecclesiastical adjunct on æsthetic grounds, but it must be admitted that whatever the cathedrals lose for hearing spoken words and for seeing, they more than make up with the superior advantages they offer for the rendering of music and for the holding of great and important functions. Allowing even for the large body of choristers, which is much greater than usual in this country, the musical effects obtained in the cathedrals are far in advance of anything to be heard in the smaller churches of England or of America. The best of boys' voices are apt to be sharp and shrill, more so than women's voices, but in the huge spaces of the cathedrals this sharpness is entirely lost and the voices acquire a softness and purity of tone that is only here to be found in its perfect state. This modification of the voice is to be sometimes noted in spoken words. One of the most impressive moments I ever remember were passed in Worcester Cathedral. I happened there one morning early, and seated myself just inside the entrance near the western end. The vast nave never seemed more imposing, and the solemnity of the spot was enhanced by the soft, mellowed tones of a priest reading the communion service in a chapel behind the high altar. Out of sight and so far off that no word was distinguishable, it was still possible to recognize the portions of the service by the modulations of the voice.

However admirably adapted to sacred service the English cathedrals may be, and however well their service may be conducted on Sundays and festivals, they assume newer and stranger aspects on other days. On week-days the English cathedral becomes a show-place, an object of interest to the foreign and native traveller, a place where a young man and maiden may wander undisturbed within certain limitations. Voices are hushed and hats raised, and the behavior of the people is decorous in the extreme, but notwithstanding this and the sacred associations, an English cathedral on week-days is more a museum than a church.

First of all there are the guides. Guides are the most serious drawbacks the studious visitor has to contend with in visiting the English cathedrals. Their main object in life is the extraction of fees, and, after this, the hurrying of people through the finest monuments erected by English-speaking people. Between the practical carrying out of these ideas the visitor has a sorry time of it. If one had never heard of a cathedral and was not in the least familiar with its history, the information offered by these individuals would not be wholly valueless; but with a guide-book and the privilege of examining as one pleases, more can be learned in an hour than from several days' harangues from officious guides who will point with pride to a beautiful, carved-oak tomb-canopy that has been painted white to resemble stone, or expatiate on the beauties of a new lecturn that has been put in at a cost of £250, and then wonder why you are not interested.

Imagine your first meeting with a guide. You approach a cathedral in an impressionable state of mind, well calculated to enjoy the architectural and historical wonders contained in the magnificent building before you. You enter; the interior impresses you more than the exterior; you prepare yourself for a period of novel intellectual enjoyment. Presently you discover that the whole of the eastern part of the church is shut off from the nave by a railing. Different means of access are in vogue in the different cathedrals; perhaps you will be invited to sign your name in a book and then be innocently requested to deposit six pence in a box for the privilege of so doing; perhaps the six pence will be demanded of you, and you are sent along with a body of other tourists who are pressed for time and who do not care for the things you care for. In either case your feelings receive a rude shock and you gradually begin to realize that visiting cathedrals is not all it was imagined.

Bad as it is to be hurried through a great cathedral, to be denied the solitude of your own thoughts, to be prevented from studying in your own way those portions which especially interest you, the most annoying part of the whole thing is the eagerness of the guides for fees. In some cathedrals the visitor is notified by frequent sign-boards that the attendants are positively prohibited from accepting fees; yet it is in these very buildings they are most expected, most broadly hinted for, most generally given. One does not object to giving fees for services if they are not asked for too often, but it is

especially vexatious to find servants of the house of God soliciting alms they are not only not entitled to, but which they are positively forbidden to receive by their employers. It is difficult to imagine sometimes that the very authorities who issue the edicts against such gifts do not know thoroughly well that they are given.

Of all places in England, Westminster Abbey is almost the most disappointing. You enter by the transept door, in accordance with the singular English fondness for having the chief entrance on the side of a church, instead of on the front or west end, and pass through rows of marble statues of all sorts and conditions of men, statues placed so close to one another that each seems jealous of his neighbor and to regard him as an intruder. One realizes now, if never before, how very dreadful a marble statue can be, and how thoroughly appalling an avenue of them becomes, especially when the human figures are in association with angels and symbolic personifications that sprawl and lie about in every conceivable posture. One sees more sprawling angels in Westminster Abbey than in any other place in the world, though they are to be found in St. Paul's and a small and choice collection is in the Guildhall. In the Abbey they flourish in an apparently natural state, and the general effect is very wonderful. This, of course, is a characteristic of English art and has nothing to do with the ecclesiastical functions of the building, but it is so pronounced a feature that in noting the peculiar points of English churches it cannot be passed over.

Both St. Paul's and the Abbey are great show-places, their location in London naturally rendering them accessible to a great number of people. At all hours in St. Paul's, visitors are tramping through the sacred edifice, even during service time. At Westminster the crowds are oppressive and the place is more like a museum than a church, an effect that is heightened by the almost innumerable monuments. But it is not the crowds at the Abbey that seem the most out of place. You enter the portion containing the shrine of Edward the Confessor, now sadly out of repair and totally out of keeping with the royal relics it covers. The floor worn with the feet of countless multitudes to whom this spot was once dowered with the most sacred traditions, is covered with a coarse common carpet. Royal tombs crowd the enclosure and the whole place is one that is intimately connected with the many of England's former rulers. It is not unnatural to expect that of all parts of the Abbey this would be preserved with the greatest care and that here, if anywhere, the greatest decorum would be observed. An old man sells guide-books on one side and uses the tomb of Henry III as a counter or shelf on which to display his wares. The lower part of the tomb he uses as a closet in which he puts such articles of clothing or other objects as he may need during his daily occupation. Truly, liberalism, republicanism, call it what you will, has made wonderful advances in England when such a spectacle is permitted within the walls of its Walhalla. It may be readily supposed that if the atmosphere of what may certainly be termed the most exclusive and sacred part of the Abbey is not sufficiently inspiring to prohibit the sale of profane goods, that such operations are to be found elsewhere, and as a matter-of-fact one has to moralize on the curious fate that has put the tomb of Mary Queen of Scots on one side of a chapel and that of Elizabeth on the other, amidst the recommendations of guide-books by men who offer them for sale almost on the royal monuments themselves.

I have dwelt more particularly upon the commercial elements of English cathedrals, not from a desire to find fault with insignificant details, nor to find occasion for censure at all costs, but because these things are so utterly opposed to the idea of the proper uses of a church. It is amazing, also, to find the English so erring in this respect, for as a nation they are quick to denounce such practices in other people. There seems to be no reason why a church should not be a church on week-days as well as on Sundays. The sacred character is not one to be put on or off at pleasure, and it is not unreasonable to contend that it is possible to study the architecture and monuments of a building without reducing it to a purely business transaction that has no regard to the true purpose and the use for which the structure was designed.

At first thought, it would seem natural that not only would English cathedrals be better cared for than French ones, but that a more pronounced religious atmosphere would be noted in the former than in the latter. As a matter-of-fact, quite the reverse is true. In a French cathedral one never forgets he is in a church; it never occurs to one that he is in a museum. There are often things to distress and annoy: many of the altars, especially the newer ones, are in execrable taste, poor in design and with tawdry decoration. At Amiens and at Rouen, both in the Cathedral and in St. Ouen, the internal effect of three of the finest churches in Europe is greatly injured by the utter lack of taste and the hopeless want of acquaintance with art displayed in the altars. Unlike English cathedrals, these are extremely numerous in French churches, each bay of the aisles having its own chapel, and, in consequence, its own altar. There is an abundant opportunity for the exercise of individual taste in altar-designing that the French have not been slow to avail themselves of. By far the worst examples are at Amiens and Rouen, and it is some satisfaction to find that farther south they become less objectionable, though seldom distinguished by any beauty or originality. One of the most satisfactory cathedrals in this respect is Notre Dame, at Paris, where the altars are in admirable taste, and entirely without any objectionable features.

In all the French cathedrals, the non-Romanist is constantly run-

ning against something that is either very bad from an artistic standpoint or repulsive to his religious ideas. The former includes the altars, images and altar decorations; the latter, the adorations paid to certain images and relics, and the poor attempts to gain the favor of the Divine Being through these mediums. Of these only a Romanist is qualified to speak correctly, as he alone would understand their true meaning and use. To the American, however, who is accustomed to the broad, liberal spirit of the Roman Catholic Church, to the absence, at least in the Eastern cities and centres of civilization, of the worst elements; the outright adoration given to images and relics, the dependence placed on the burning of candles and other manifestations of a retarded religious development are appalling. It exhibits Roman Catholicism in its most unfavorable light, and shows what it is in its native atmosphere beyond the reach of the elevating tendency of Western ideas.

You go to Chartres Cathedral, one of the most magnificent and grandest churches in Christendom, a building constructed in the purest art of the Middle Ages, elaborately decorated with some of the finest sculpture that has come down from that period, and adorned with the most perfect painted glass in Europe—in fine, a building that has scarcely a peer among the great churches of Europe for the purity of its art and the perfection with which it has survived the vicissitudes of time, a building in which some of the most important lessons of mediæval art are impressed upon the mind of the spectator, and you will find the greatest reverence paid to the most preposterous black doll, arrayed in fine clothes and placed on a column. Here, surrounded by hundreds of candles and the gifts of the pious, this hideous image receives the adoration of multitudes, and is to-day, without doubt, in the minds of the majority of Roman Catholics, the chief monument that distinguishes the Cathedral of Chartres from the other cathedrals of Europe.

Miraculous images are not rare in the Roman Catholic countries of the Continent; one is continually running across them. They have a most distressing family resemblance, they are very ugly and the dresses with which they are decked deprive them of any dignity they might have as pieces of sculpture. Their great popularity is attested by numerous candles and offerings that are placed before them by the worshippers who crowd the space around them. Doubtless the faithful derive consolation and help from the prayers offered before these images, and the numerous memorial stones attest the efficacy of their intercessions.

This is not the place to criticize Roman Catholic doctrine and belief, nor methods of worship; but whatever opinion may be held on this subject, the visitor to the French cathedrals must be impressed above all things with the fact that they are emphatically churches, that notwithstanding their tawdry decorations, their poor altars, their images and their perfunctory services, they are places which are not only open for worship, but are continually used for that purpose, and, indeed, for no other, for visitors are so few that they make scarcely an impression in these vast interiors. In this respect they offer a striking contrast to English cathedrals, which except at the time of stated services, are almost wholly given up to visitors. At all times in the French cathedrals worshippers will be found, sometimes at favorite altars, sometimes before particular statues. Women, of course, predominate, but it is quite usual to see men as well. Such sights, unfortunately, do not necessarily indicate a high spiritual condition, nor even deep spread religious convictions; but they do show very clearly that the French cathedrals are put to their primitive uses as places of worship to a greater extent than are the cathedrals of England.

These observations are true only so far as the uses of the churches at times other than those set for formal services are concerned. At mass and at vespers the French congregations are very small and they are scarcely more numerous on Sundays than on week-days. Exceptions of course there are, especially in Paris, where strangers are attracted to the churches through the novelty of the services, but so far as my own observation extended, the French make a very poor showing on Sundays as compared with the English. Doubtless the large number of masses celebrated each day in the Roman Catholic cathedrals has much to do with producing this effect, as in a given population, less people would attend each separate mass in France, while in an English church the greater number would attend the chief choral service of the day.

Of the structural differences between English and French cathedrals none is more striking than the absence of the choir-screen. Not more than an iron railing separates the nave from the choir and the former part of the church is used by the congregation. In many cathedrals the sides of the choir are shut off from the aisles by a stone screen broken at points near the altar by doors and open spaces that present a free view of that important part of the church. Sometimes indeed, as at Rheims, the choir is completely surrounded with an open metal railing rendering it wholly visible from every part of the church. Where there is a stone screen the outer wall is usually decorated with sculptured scenes from the Life of Christ, or of some saint, and which not only forms a most effective and beautiful decoration, but serve at the same time to bring important and necessary truth home to the mind of the spectator. No part of a French cathedral is more interesting than these wonderfully sculptured choir-screens and the individual character which they derive from this source, gives them an interest that is far beyond that possessed by most English choir-screens.

No comparison can be made here between the relative diffusion of

religious ideas and thoughts in France and England; but the freedom with which the French throw open their churches, the absence of annoying and solicitous guides, the constant use of the building for purposes of public and private devotion, point an important lesson to those to whose charge has been given the care of the cathedrals of England. At present the latter are a disgrace to English religious culture; it is to be hoped they will not long continue to be so.

BARR FERREE.

A NEW MOTIVE POWER—HEATED AIR AND STEAM.



Knocker from the Palazzo Gozzadini, Bologna, Italy.
From the *Revue générale de l'Architecture*.

It is well known, says the *London Times*, that the practical efficiency of the steam-engine is very far below the standard which theory correctly sets up for it. The mechanical work done by a pound of coal in our best engines—that is, by the conversion of heat into motion—is greatly less than theory tells us it should be. It has been proposed to supersede steam by various gases or to add them to it and use them in a mixed form. Air has found much favor with inventors, and there have been times when the use of combined air and steam appeared to be a practical method of improving the steam engine. But, apart from gas-engines and hot-air engines pure and simple,

down to the present time there has been no record of commercial or even practical success having attended the introduction of air in any way into the steam-engine.

Among others who have taken a deep practical interest in the question of the use of combined air and steam in the engine is Mr. Edward Field, C. E., who has been well known for many years past in connection with the steam-boiler bearing his name. His improvement was a great step in advance in the steam-boiler, but it is probable that it will be found that he has now made a far greater advance in the engine by increasing its efficiency and economy in a very remarkable degree. And what he has really done partakes rather of the nature of a discovery than an invention.

Put in a few plain words, Mr. Field produces the volume of mixed gases under pressure necessary for performing a given amount of work in an engine with the use of only from $12\frac{1}{2}$ to 20 per cent of the quantity of steam which would be used in the same engine to perform the same amount of work. This volume of mixed gases consists of a small volume of steam introduced into a large volume of heated air. Whatever of invention there is in the present connection relates to the apparatus by means of which the discovery is utilized in practice. This apparatus consists of two portions; namely, the experimental, whereby Mr. Field demonstrates the principles of his discovery; and the practical, by which he illustrates the application of those principles in doing work. This apparatus of both kinds we have recently had the opportunity of inspecting and seeing in operation with results which fully support all that Mr. Field claims in respect of the principle. The experimental apparatus consists of two measuring-chambers of different capacities, and a working-cylinder having a weighted piston. In order to prevent condensation or loss of heat a high temperature is maintained in each of the chambers. In order to render the experiments comparative, steam was first admitted to both of the measuring-chambers at a pressure of 60 pounds per square inch. This steam, which represented 20 volumes, was then admitted to the working-cylinder, and it raised the piston with a load of 171 pounds to a height of $5\frac{1}{2}$ inches.

The experiment was repeated, when the piston was only raised $4\frac{1}{2}$ inches. The smaller of the two chambers was then half-filled with steam at 60 pounds pressure, and the larger chamber with heated air at a temperature of 400° Fahrenheit, which is about the temperature required in practice and at atmospheric pressure as shown by the respective gauges. The proportions were two of steam and sixteen of heated air, and upon the admission of the steam to the air the gauges on both chambers instantly showed a pressure of 60 pounds per square inch. Upon the mixture of steam and air being admitted to the cylinder, the weighted piston was rapidly driven up $7\frac{1}{2}$ inches, which was as high as it could reach, and represented the stroke of the piston within the cylinder. Upon the experiment being repeated the weighted piston rose much more rapidly, giving the cylinder cover a violent blow. A number of other experiments were made with similar results, and as a whole clearly demonstrated that the twenty volumes of steam failed to do the work that two volumes

of steam combined with sixteen volumes of heated air did. They further showed that the best results were obtained with these proportions of the two fluids, and these are about the proportions which Mr. Field employs in practice.

It should be observed that in practice the air is heated at little or no cost by the waste heat which in an ordinary engine escapes into the atmosphere.

The principles here involved have been put in practice by Mr. Field in a portable engine, which, however, has several drawbacks in consequence of the mixing-chambers having to be superadded to the existing engine-works. These chambers are mounted on the top of the engine cylinder, and there is a chamber for each end of the cylinder. Each of the chambers in them receives its charge of heated air, into which is delivered a proportionate charge of steam. The mixture is delivered from each chamber alternately to the front and the back end of the cylinder, causing the out-strokes and the in-strokes of the piston in succession. Upon the occasion of our visit the engine was first run with steam alone and without a load. It was then run with combined steam and heated air in about the proportions previously stated.

The conditions under which this run was made were the same as in the previous run, and the same observations were taken. It may be mentioned that the temperature in the air-chamber should not be less than 400° Fahrenheit for the proper development of the advantages of the system. As a matter-of-fact the air temperature during the engine trials was not higher than 300° , but was generally much lower, owing to the draughts and to the inefficient construction of the heating-apparatus. On comparing the results of the two engine runs, made respectively with pure steam and with combined steam and heated air, it was found that there was an absolute gain of 44 per cent in favor of the Field system as against ordinary steam.

The system, as well as the experimental apparatus, has been independently tested by three engineers; namely, Mr. Collett Homersham, C. E.; Mr. D. K. Clark, C. E.; and Mr. Perry F. Nursey, C. E., each of whose reports substantiates this economy and points to still higher results with a larger engine properly and efficiently fitted with the necessary adjuncts for working upon Mr. Field's principle. This, in fact, is what is now being done, and in due course the results will be arrived at and made known. Should they confirm the results already attained—and there does not appear to be any reason why they should not—Mr. Field's discovery cannot fail to produce a complete revolution in motive power. The opinion of the system entertained by Mr. D. K. Clark, whose report has already been referred to, may be gathered by the following extract from that document: "It means an enormous commercial success, if properly manipulated, and under Mr. Field's experienced supervision it seems quite possible that this engine will bring about the same benefit with regard to the economical use of steam as Bessemer's steel gave to its own specific industries."

THE MANAGEMENT OF AN ARCHITECT'S OFFICE.¹—IV.



"Vase d'Hercule." Decoration by Ch. Lemaire for a Sevres Vase. From *La Revue des Arts décoratifs*.

The various printed and other forms in use in the office whose working has been described at length will now be given.

[Form of Proposal.]

NEW YORK, N. Y., May 1, 1891.

MESSRS. JACK & JILL,
211 and 212 Broadway,
New York City.

The undersigned, having carefully examined the site and your drawings, and read the specifications for the new "Evening Post Building" for Mr. H. P. L., at Jane and Stuart Streets, hereby

¹ Continued from No. 821, page 180.

proposes to execute the same in strict conformity thereto, and to your and the Owner's entire satisfaction; carrying on the works in accordance with the directions issued by you from time to time, for the sum of dollars.

Respectfully submitted,

[Notification to Client.]

NEW YORK, N. Y., June 12, 1891.

MR. HUTTON PHELPS LEIGHTON,
New York City,

IN the matter of the proposed [describe work] for your building at [give location], we enclose herewith the proposal of the Contractor to do the said work for the sum of \$— dollars, and request that as soon as you reach a decision thereon, you endorse the same on the proposal and return it to us.

Yours truly, JACK & JILL,
Architects.

[Articles of Agreement.]

ARTICLES of agreement made the twenty-first day of January in the year one thousand eight hundred and ninety-one.

By and between Hutton Phelps Leighton, of the City, County and State of New York, party of the first part (hereinafter designated the Owner), and John Merwin Sanford, of the place aforesaid, party of the second part (hereinafter designated the Contractor).

WITNESSETH that the Contractor, being the said party of the second part, in consideration of the covenants and agreements herein contained on the part of the Owner, being the said party of the first part, does covenant, promise and agree with the said Owner, in manner following, that is to say:

1. The Contractor shall and will well and sufficiently perform and finish in a thoroughly workmanlike manner, under the direction, and to the satisfaction of Jack & Jill, Architects, all the works included in the proposal of the Contractor, dated January 21, 1891, for the complete erection of the new "Evening Post Building" at Stuart and Jane Streets, which proposal is attached hereto, and is incorporated in and made a part of this contract; agreeably to the drawings and specifications made by the said Architects, and signed by the parties hereto (copies of which have been delivered to the Contractor), and to the dimensions and explanations thereon, therein and herein contained, according to the true intent and meaning of said drawings and specifications, and of these presents, including all labor and materials incident thereto, and shall provide all scaffolding, implements and cartage necessary for the due performance of the said work.

2. Should it appear that the work hereby intended to be done, or any of the matters relative thereto, are not sufficiently detailed or explained on the said drawings, or in the said specifications, the Contractor shall apply to the Architects for such further drawings or explanations as may be necessary, and shall conform to the same as part of this contract, so far as they may be consistent with the original drawings, and in event of any doubt or question arising respecting the true meaning of the drawings or specifications, reference shall be made to the Architects, whose decision thereon, shall be final and conclusive. It is mutually understood and agreed that all drawings, plans and specifications are and remain the property of the Architects.

3. Should any alterations be required in the work shown or described by the drawings or specifications, a fair and reasonable valuation of the work added or omitted shall be made by the Architects, and the sum herein agreed to be paid for the work according to the original specifications shall be increased or diminished as the case may be. In case such valuation is not agreed to, the Contractor shall proceed with the alteration, upon the written order of the Architects, and the valuation of the work added or omitted shall be referred to three (3) Arbitrators (no one of whom shall have been personally connected with the work to which these presents refer), to be appointed as follows: one by each of the parties to this contract, and the third by the two thus chosen, the decision of any two of whom shall be final and binding, and each of the parties hereto shall pay one-half of the expense of such reference.

4. The Contractor shall, within twenty-four hours after receiving written notice from the Architects to that effect, proceed to remove from the grounds or building all materials condemned by them, whether worked or unworked, or take down all portions of the work which the Architects shall condemn as unsound or improper, or as in any way failing to conform to the drawings and specifications, and to the conditions of this contract. The Contractor shall cover, protect and exercise due diligence to secure the work from injury, and all damage happening to the same by his neglect shall be made good by him.

5. The Contractor shall permit the Owner and the Architects, and all persons appointed by the Owner or the Architects, to visit and inspect the said work or any part thereof, at all times and places during the progress of the same, and shall provide sufficient, safe and proper facilities for such inspection.

6. The Contractor shall and will proceed with the said work, and every part and detail thereof, in a prompt and diligent manner, and shall and will wholly finish the said work according to the said drawings and specifications, and this contract without any delay for causes within his control, making such progress therein as shall be satisfactory to the said Architects.

7. Should the Contractor be obstructed or delayed in the prosecution or completion of the work by the neglect, delay or default of any other contractor; or by any alteration which may be required in the said work; or by any damage which may happen thereto by fire, or by the unusual action of the elements, or otherwise; or by the abandonment of the work by the employees through no default of the Contractor, then there shall be an allowance of additional time beyond the date set for the completion of the said work; but no such allowance shall be made unless a claim is presented in writing at the time of such obstruction or delay. The Architects shall award and certify the amount of additional time to be allowed, in which case the Contractor shall be released from any claim for damages for the additional time so certified and no more. The Contractor may appeal from such award to arbitrators constituted as provided in Article 3 of this contract, but such appeal must be made in writing to the Architects within 48 hours after notice of such award has been sent to the Contractor.

8. The Contractor shall not let, assign or transfer this contract, or any interest therein, without the written consent of the Architects.

9. The Contractor shall make no claim for additional work unless the same shall be done in pursuance of written order from the Architects, approved by the Owner, and notice of all claims shall be made to the Architects in writing within ten days of the beginning of such work.

10. The Owner agrees to provide all labor and materials not included in this contract in such manner as not to delay the material progress of the work, and in the event of failure so to do, thereby causing loss to the Contractor, agrees that he will reimburse the Contractor for such loss; and the Contractor agrees that if he shall delay the material progress of the work so as to cause any damage for which the Owner shall become liable (as above stated), then he shall make good to the Owner any such damage—over and above any damage for general delay herein otherwise provided; the amount of such loss or damage, in either case, to be fixed and determined by the Architects, or by arbitration as provided in Article 3.

11. The Owner will not, in any manner, be answerable or accountable for any loss or damage that shall or may happen to the said works, or any part or parts thereof respectively, or for any of the materials or other things used and employed in finishing and completing the said works; or for injury to any person or persons, either workmen or the public, or for damage to adjoining property, from any cause which might have been prevented by the Contractor or his workmen, or any one employed by him against all which injuries and damages to persons and property, the Contractor having control over such work must

properly guard against, and must make good all damage from whatever cause, being strictly responsible for the same. Where there are different contractors employed on the works, each shall be responsible to the other for all damage to work, to persons or property, or for loss caused by neglect, by failure to finish work at proper time and preventing each portion of the work being finished by the several contractors at the date named in this contract for completion, or from any other cause; and any contractor suffering damage shall call the attention of the Owner or Architects to the same, for action as laid down in Article No. 3.

12. The Contractor will insure the works to cover his interest in the same from time to time, as required; and for any loss of the Contractor by fire the Owner will not, under any circumstances, be answerable or accountable; but the Owner may protect himself, at his option, by insurance to cover his interest when payments have been made to Contractor.

13. Should the Contractor at any time refuse or neglect to supply a sufficiency of properly skilled workmen, or of materials of the proper quality, or fail in any respect to prosecute the work with promptness and diligence, or fail in the performance of any of the agreements on his part herein contained, such refusal, neglect or failure being certified by the Architects, the Owner shall be at liberty after three days' written notice to the Contractor, to provide any such labor or materials, and to deduct the cost thereof from any money then due or thereafter to become due to the Contractor under this contract; and if the Architects shall certify that such refusal, neglect or failure is sufficient ground for such action, the Owner shall also be at liberty to terminate the employment of the Contractor for the said work, and to enter upon the premises and take possession of all materials thereon, and to employ any other person or persons to finish the work, and to provide the materials therefor; and in case of such discontinuance of the employment of the Contractor he shall not be entitled to receive any further payment under this contract until the said work shall be wholly finished, at which time, if the unpaid balance of the amount to be paid under this contract shall exceed the expense incurred by the Owner in finishing the work, such excess shall be paid by the Owner to the Contractor, but if such expense shall exceed such unpaid balance, the Contractor shall pay the difference to the Owner. The expense incurred by the Owner as herein provided, either for furnishing materials or for finishing the work and any damage incurred through such default, shall be audited and certified by the Architects, whose certificate thereof shall be conclusive upon the parties.

14. And it is hereby mutually agreed between the parties hereto that the sum to be paid by the Owner to the Contractor for said work and materials shall be two hundred and sixty thousand six hundred and ninety-six (\$260,696.00) dollars, subject to additions or deductions on account of alterations as hereinbefore provided, and that such sum shall be paid in current funds by the Owner to the Contractor in installments, as follows:

Monthly, as the work progresses, for 85 per cent of the value of the work done during the preceding month.

The Contractor will present to the Architects, on or before the 5th day of each month, for their certification a detailed statement of the value of the works performed by him during the preceding month.

The Architects will issue their certificate on or before the 15th day of each month for such a proportion of the statement furnished by the Contractor as is in their opinion properly due him for material furnished and labor performed.

On the completion of the work and its acceptance by the Owner and Architects, one-half of the retained percentage will be paid to the Contractor. The final payment to be the balance of the retained percentage.

It being understood that the final payment shall be made within thirty days after this contract is completely finished; provided, that in each of the said cases the Architects shall certify in writing that all the work upon the performance of which the payment is to become due has been done to their satisfaction; and provided further, that before each payment, if required, the Contractor shall give the Architects good and sufficient evidence that the premises are free from all liens and claims chargeable to the said Contractor; and further, that if at any time there shall be any lien or claim for which, if established, the Owner or the said premises might be made liable, and which would be chargeable to the said Contractor, the Owner shall have the right to retain out of any payment then due or thereafter to become due, an amount sufficient to completely indemnify him against such lien or claim, until the same shall be effectually satisfied, discharged or canceled. And should there prove to be any such claim after all payments are made, the Contractor shall refund to the Owner all moneys that the latter may be compelled to pay in discharging any lien on said premises, made obligatory in consequence of the former's default.

15. It is further mutually agreed between the parties hereto that no certificate given or payment made under this contract, except the final certificate or final payment, shall be conclusive evidence of the performance of this contract, either wholly or in part, against any claim of the Owner, and no payment shall be construed to be an acceptance of any defective work.

16. And the said Owner hereby promises and agrees with the said Contractor to employ, and does hereby employ him to provide the materials and to do the said work according to the terms and conditions herein contained and referred to, for the price aforesaid, and hereby contracts to pay the same at the time, in the manner and upon the conditions above set forth.

17. And the said parties for themselves, their heirs, executors, administrators and assigns, do hereby agree to the full performance of the covenants herein contained.

IN WITNESS WHEREOF, the parties to these presents have hereunto set their hands and seals, the day and year first above written.

In presence of,

JOHN JILL, as to a. (a.) HUTTON PHELPS LEIGHTON, L. S.
WILLIAM JACK, as to b. (b.) JOHN MERWIN SANFORD, L. S.

[Endorsement on Back of foregoing Instrument.]

AGREEMENT

FOR

ENTIRE WORK AND MATERIALS,

FOR

NEW "EVENING POST BUILDING,"

Stuart and Jane Streets, New York City.

HUTTON PHELPS LEIGHTON,

New York City.

WITH

JOHN MERWIN SANFORD,

New York City.

Dated, January 21, 1891.

JACK & JILL,

Architects,

211 and 212 Broadway, New York.

[Expense Voucher.]

SUPERINTENDENT'S DISBURSEMENT SLIP.

Client Hutton Phelps Leighton,
 Work House Alteration,
 Location No. 15 West 110th St.

New York, April 3, 1891.

Travelling Expenses, fare and board, etc.....	\$	Cts.
Telegrams, Expressages and Messengers.....		
Sundries.....		
Total.....		.40

Received from Jack & Jill,
 Forty cents..... (40¢ Dollars)
 in full payment of above Disbursement,
 Superintendent's Signature, JOHN B. SMITH.

New York, April 3, 1891.

[Label for Full Size Details.]

Work _____
 Detail of _____
 No. _____ Sent to _____
 For _____

To be returned to the Architects on the completion of the work.

NOTE:

The Profiles Colored with Brush Wash are the only Correct Ones to Follow.

JACK & JILL, Architects,
 211 and 213 Broadway,
 New York City.

Date _____

LICENSE TO USE ARMORIAL BEARINGS.—There is little chance for a revival of interest in heraldry unless the use of a coat-of-arms becomes a luxury that has to be paid for, and therefore it is well to have the law about licensing armorial bearings carried out. But a line should be drawn at bearings which are properly depicted. It could hardly be contemplated by the Legislature that any one wearing a ring with a crest, which may not belong to his or her family, is to be suddenly pulled up and interrogated upon the possession of the authorizing document. This, however, has occurred in Lambeth. An Excise officer called on an auctioneer about his professional license. The gentleman wore a ring which attracted the attention of the exciseman, because there was a lion rampant on it. The auctioneer was asked whether he paid a license for using such armorial bearings, and he replied that he did not, as, having bought the ring with the crest upon it, he had no idea he was doing wrong or that he should have taken out a license through the Excise for wearing it. He was accordingly summoned to the police-court, and the magistrate held that the auctioneer was liable. If he wore armorial bearings or used them he was bound to take out a license. A fine of 1l. was inflicted and 5s. costs. Any one who makes use of a crest which has no association with his family deserves to be well fined by the Herald's College for his presumption, and the case suggests that a revival of the Visitation of Arms has become a necessity. Still, the most zealous herald would not care to meddle with people to the extent that was exhibited in Lambeth. — *The Architect*.

THEATRICAL ARCHITECTURE.¹—I.

Wide XV Century Chair with Cupboard. From Havard's "Dictionnaire de l'Ameublement."

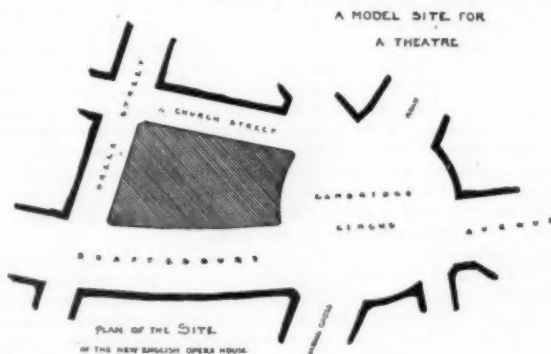
sighting of the auditorium, acoustics, warming, ventilating and lighting must not be overlooked.

Before entering minutely upon the description of the various parts of a theatre, it would be as well to remember that we have but one object in view—to learn how to build a theatre or hall, which will be as safe as human foresight and experience can make it, for the reception of large and packed crowds of people. The two essential points to have ever before us are the means of avoiding fire and the provisions for minimizing the chances of panic. The reason for writing these papers is to show how the safety of the audience depends upon many small and apparently trivial details. I shall not attempt to speak of what I consider a good or bad style for theatre-building, nor of the manner in which they should be decorated, but confine myself to the planning and construction of theatres.

THE SITE AND SURROUNDINGS.

It will be obvious to all that the provision of many exits leading directly into the street will greatly assist the safety of the public frequenting places of amusement. The number of such exits, and their appropriateness, depends upon the site and the surroundings of the building. The best possible site is one bounded by wide streets upon all four sides of the building. Such a site, we find, is enforced in the regulations in vogue in St. Petersburg and in Italy; but in countries where the theatrical manager depends upon his own business capacity and exertions to make his capital, and where he is not assisted by State aid, the price of such a site in a crowded city puts such an acquisition almost beyond his power. Few and far between are the opportunities to obtain such a suitable site in a city like London; the value of ground prohibits it, and it is seldom indeed that, even for love or money, such a plot of ground can be obtained, for it is only when street improvements or extensive alteration or rebuilding of a portion of a town arises that the chance occurs of obtaining an isolated site.

Mr. D'Oily Carte, as well-known in America as in England as one of the most enterprising managers of the day, fully alive to the



importance of a site surrounded by public thoroughfares, seized the opportunity afforded, by the formation of Shaftesbury Avenue

¹ By Ernest A. E. Woodrow, A. R. I. B. A.

and Cambridge Circus and here he has erected the Royal English Opera House, one of the finest, if not the finest theatre of modern times: of this theatre I shall have to speak again.

Another consideration, which brings the choice of site in a town to within very narrow limits, is the locality. Theatres in most cities are grouped within a small area, in the manner of the shops of the various castes and trades in an Indian city—as you find all the copper-smiths and brass-workers in one quarter of Bombay and the tailors in another, so you find all the theatres of importance in London within a radius of one mile. Theatres built outside this radius do not pay, unless indeed they are theatres in large suburbs, which are almost equivalent to provincial houses, and supply the local wants of large outlying districts like Islington, Woolwich, or Whitechapel; but theatres which are built for the production of plays in London must be within reasonable distance of the Strand and Haymarket. Here land is of high price and the most has to be made of the frontages next the street, the consequence is, that in days gone by, too many theatres were erected upon unsuitable sites, where entrances were obtained from the main thoroughfare by long passages to the theatre in the rear, and shops were built on either side of the entrance, in order to obtain as much value out of the ground as possible.

This custom cannot be too strongly deprecated, the theatre becomes hemmed-in behind premises which add greatly to its danger. Should a fire occur in one of these shops, the entrance would become filled with smoke, alarm the audience, and create panic, although the fire might not actually spread to the theatre itself.

Business or trade premises within the same block or containing walls should never be permitted, as the risk from such buildings is as great as from the theatre itself; a theatre must be self-contained.

There is another reason for advocating an isolated site, for, where a building is so situated, external aid, in cases of fire, can be effectively procured, as the municipal fire-brigade, and the fire-escapes can approach from all four sides. Again, the danger of the spread of fire from adjacent buildings is diminished.

The impossibility of always acquiring an isolated plot of ground compels one to consider what is the best that can be done under the circumstances, and I would therefore suggest that no theatre be allowed to be built unless at least two sides front upon public thoroughfares the same being carriage-ways at least forty feet wide, and that the building should have exits for the public leading directly into these streets.

Frequently one or more sides of a theatre is on a narrow court or alley; when this is the case, all the windows overlooking the court or other premises should be protected by iron hoppers, and the doors externally lined with iron, to prevent the spread of fire from opposite houses.

These points must be observed in choosing a site for all classes of theatres, whether opera-house or large variety theatre where ballet and spectacular performances are held, the smaller theatre devoted to drama and burlesque, the music-hall where "sketches" are performed, or the concert-hall where the performance takes place only on a platform. In every kind of building where large numbers of people collect either for recreation, instruction or devotion, there is always an attending source of danger arising from the probability of panic; but in the class with which we are now dealing there is the additional risk of fire, which is greater in the theatre than in the music-hall, and in the music-hall than in the concert-room.

Generally speaking, panic is considered to arise only when there is the presence of fire; but there are many other causes which create a stampede. True, panic, as a rule, follows fire, but it also emanates from numerous other sources. What these causes are must be ascertained before effects can be devised to obviate them. No architect can design a theatre who is not *au fait* in theatrical matters in the minutest detail of theatrical management and theatrical trades. A place for everything, and everything in its place, is the motto to follow in planning buildings for public entertainment.

No building or part of a building not specially constructed for the purpose can ever be fit for a theatre, music-hall or concert-room. Theatres must be constructed with great care and judgment in the choice of materials, and must of necessity be costly buildings, as everything must be "the best of its kind," and of such strength as not only to be able to do the immediate work required, but also to resist any shock or pressure that may be at any time brought to bear upon it. More care in every detail must be shown, surely, in such buildings, where human beings are nightly packed, than in warehouses or factories. Therefore, I have no hesitation in saying that no old buildings, which have been erected for other purposes, will be ever adaptable to the requirements of the theatrical house, where due regard is given to the safety and comfort of the audience, and, where such places exist, they should be instantly closed, as they are only a lasting risk to life and limb.

Where enlargement of theatres is required, adjoining premises are often obtained and thrown into the same "risk" (to use the word in the fireman's sense) by cutting openings in the party-walls. Such additions are frequently used as stores, scene-docks or dressing-rooms. Now, as these additions have the same dangers in them as they had when they were originally constructed (perhaps as a shop or dwelling-house), it only adds to the danger of the theatre to connect such buildings thereto. When greater accommodation is required, special buildings must be erected having regard to the purposes to which they are to be put: for a defective gas-pipe or a

foul flue may at any time start a fire in such an adjunct, and spread to the main building with disastrous consequences. It is such places as this, too, one finds occupied by the caretaker and his family, whose carelessness, in upsetting an oil-lamp, leaving clothes to dry before the fire or dropping lucifer matches about, may cause the loss of hundreds of lives. People should not be allowed to live or sleep in any part of a theatre. I consider it a great and quite unnecessary risk. The fireman or night-watchman should be sufficient protection to the property; but of that I must speak more, hereafter, when dealing with the question of protection from fire.

(To be continued.)

BOOKS AND PAPERS

DOES any one know what colors were most used in colonial times—or rather in "old colonial" days, a really later period—for the exteriors of the better class of buildings? Yellow with white trimmings, most people would answer, for so great is the present vogue of this style that these two colors, really the most used now and in a general way entirely satisfactory as a combination, have come to be accepted as the proper blazonment of the "old colonial" style. Issue has been joined on this point in one of the Hartford daily papers by an architect, who maintains that yellow and white were the colors originally used, on the one hand, and a non-professional of an archaeological turn of mind, on the other, who brings good proof that Venetian red was the color most generally used. We imagine that both are partly right. The old New England farmhouse, coeval with and sometimes older than the more elaborate structures adorned with Classic and pseudo-Classic details, may still be found here and there wearing its coat of red, renewed perhaps but never varied. Venetian red and oil forms a durable coating and a cheap one, and it is probable that in the simple days of the really early times it was most commonly used, perhaps even upon the buildings of more elaborate character of a later day. Indeed, the champion of this sanguinary stain has scraped away the yellow and white from a house which has always appeared so painted, so far back as the memory of man extends, and found beneath it Venetian red and below that the wood. Fairly good proof this, but holding good, we think, only for New England where the strong color gave an air of cheerfulness amid its bleak surroundings which white and yellow could not. But colonial work is not confined to New England, and we fancy that red was less used in the Old Dominion than farther north. In the South, we incline to believe that yellow and white were the normal colors and that the genesis of the combination can be traced to the facile use of the white-wash brush on the early structures both of stone and wood, a little yellow ochre added to the lime-wash securing all the relief from monotony that was desired. The fashion having become fixed in early times and having proved itself agreeable to the eye was probably adopted for the decoration of the real old colonial houses of the South—and later for their imitations of the present day.

This question was suggested by having our attention called to the very great part that color plays in the work executed in this particular style by perceiving how greatly the absence of color in certain views of colonial detail detracted from their proper effect.

In the general views the absence of coloring is not much noticed, but when it comes to a detail where the fragment of interest is swallowed up in a margin of plain "siding" or "clapboarding," one is at once impressed with the great lack of artistic quality that these surfaces present, and they seem to shout aloud for the coloring of which the camera has deprived them.

In fact this act of denudation appears to have been applied to nearly all the subjects. The attractive feature for which each subject was selected is in evidence and in most cases capitally shown, but the "quality" seems to have gone with the disappearance of color and what remains seems often blank and barren of artistic interest. Still this cannot be helped, as color photography can as yet only be partially achieved in the laboratory, and the object of this publication was not, in its first intention, to produce an artistic work so much as to make it one of practical use to practising architects.

In a general way these young men have succeeded well in what they undertook, and their compilation in spite of the restricted field of their operation is reasonably comprehensive and thorough. Fifty plates cannot treat the style exhaustively, of course, and the compilers probably argued that if they could secure their fifty subjects by visiting a few places, there was no need to visit others at an increase in the cost of publication and a gain perhaps merely in the table of contents which would prove that their inspection had covered all the important centres. It is, however, a disappointment not to find any work from Bristol, R. I., where we understand there is a good deal of interesting work, and the single plate secured from Newport is but a poor indication of the amount of interesting material that can be found in the city and still more in the isolated estates scattered over the Island of Rhode Island and the shores of Narragansett Bay, for in spite of the strong sprinkling of Quaker stock that had settled in that favored region, there were many wealthy and ungodly families

¹ "Examples of Domestic Colonial Architecture in New England," compiled, photographed and published by James M. Corner and E. E. Soderholts, Boston Architectural Club, Boston, 1891. 50 plates 11 x 14, in portfolio. Price, \$12.

which had established themselves there and led as ostentatious, careless and joyous lives as potentates on the banks of the James.

The most interesting plates in the series are those which exhibit the doorways, which might fairly be called the feature of this collection, and the thirteen examples shown are so satisfactory that it seems rather odd that the portfolio was not made merely a portfolio of doorways.

The five mantelpieces are less interesting; in fact there are only three of them which are good examples of the delicate possibilities of the style; the others could have been spared in favor of more doors.

As to the staircases, these are things that are rarely satisfactorily shown in a photograph; the hall is generally too narrow to get a fair side view and the rapid recession of the planes renders the front view often very distressing. In spite of these difficulties the nine plates devoted to staircases are unquestionably interesting, particularly the curious spiral stairway in the Coleman House at Greenfield, Mass., dodging out of the way of two slender Ionic columns bearing groined plaster arches. The straight square balusters used in this case are a relief from the twisted balusters, which in these days have rather lost place as an artistic "property" since the invention of that extraordinary lathe which allows them to be manufactured at an incredibly low price.

The collection has one good point, the plates are not lettered, and consequently they can at any time be reclassified should the compilers be encouraged to make other attempts in the same field.

A word of commendation for the simple and judicious page of introductory notes—all that is needed in such a publication—ought not to be omitted.



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

RESIDENCE OF COL. WILLIAM FELLOWS, MONTCLAIR, N. J. MR. F. H. KIMBALL, ARCHITECT, NEW YORK, N. Y.

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

THE material used for the exterior of this residence is in two colors—the body of Gatlawbridge red sandstone, and all cut work, and jambs of windows and doors of the Hummelstown, Pa., brown sandstone. The effect of the whole depends principally on the mass and contrast of color. There is very little elaborate detail. The building stands in the centre of a corner lot bringing each front prominently into view. On all sides stone is used. The roof is covered with brown Spanish glazed tiles. The extreme dimensions of the building are 83' 9" by 73'. Two special features of the exterior are a large carriage-porch at one side of the projecting bay on the front, and on the other is a terrace, partly covered, carried entirely around on the southerly side connecting with a covered terrace on the east side, all built of stone with paved floors. The covered portions are placed to afford cool, shady retreats at any time of the day. The details follow the general character of the style of Francis I. All of the interior arrangements are of the most complete character. The entire first floor was made fireproof with Guastavino arches. The view is from a photograph taken by Mr. Ambrose Fowler.

UNSUCCESSFUL COMPETITIVE DESIGN FOR MOUNT VERNON CHURCH, BOSTON, MASS. MR. O. F. SMITH, ARCHITECT, BOSTON, MASS.

APARTMENT-HOUSE CORNER BEACON ST. AND WEST CHESTER PARK, BOSTON, MASS. MR. O. F. SMITH, ARCHITECT, BOSTON, MASS.

This building, the property of Gamaliel Bradford, Esq., stands on the corner opposite the site of Mount Vernon Church.

CAPITALS FROM THE CLOISTER AT MOISSAC, FRANCE.

OTHER selections have already been published in our issues for November 15 and December 6, 1890.

SIX HEXASTYLE PORTICOS.

SEE article on "The Temple of Theseus," elsewhere in this issue.

DESIGN FOR A HOUSE BY MR. JULIUS BEEKMANN, NEW YORK, N. Y.

[Additional Illustrations in the International Edition.]

SIXTEENTH-CENTURY CARVED-DOORS.

[Photogravure.]

THESE doors form part of the famous Spitzer Collection which, we are pleased to note, there seems to be a determined attempt

making to secure for Chicago, at first as an item in the exhibition of 1893 and finally as a permanent possession of the Art Institute.

HOUSE IN THE AUGUSTENSTRASSE, VIENNA, AUSTRIA. HERR FRANZ NEUMANN, JR., ARCHITECT.

[Gelatine Print.]

HOUSE ON SCHWARZEMBERG PLATZ, VIENNA, AUSTRIA. HERREN SCHLAF & PARTHILA, ARCHITECTS.

[Gelatine Print.]

WORKS IN METAL. THE LATE J. D. SEDDING, ARCHITECT.

DESIGN FOR CHALICE VEIL. THE LATE J. D. SEDDING, ARCHITECT.

NEW TOWER, ST. CLEMENT'S, BOURNEMOUTH. THE LATE J. D. SEDDING, ARCHITECT.

NEW PREMISES FOR MESSRS. BOLDING & SON, LONDON, ENG. MESSRS. WIMPERIS & ARPER, ARCHITECTS.

THE building designed to accommodate the extending business of Messrs. John Bolding & Sons, in Davies Street, Oxford Street, was lately opened. It has been arranged so that all the departments, with one exception, can be engaged under one roof. In that way there is security that the best work will be brought to perfection, as the superintendence can be thorough and comprehensive. Thus the sixth floor is occupied by the marble masons, who prepare the highly-finished lavatories, baths, etc., and the fifth and fourth floors by the engineering department, brass fitting, etc. The ordinary gloomy workshop is transformed into a bright, sunny, airy, comfortable room, that would satisfy an artist. The top floors communicate with show-room basements by means of a large lift. An iron staircase fire-escape is accessible from every floor, and the whole building is fireproof. In the show-rooms all the different patterns of closets, for instance, some hundreds, can be placed side by side, and as the water is connected, a practical illustration of the merits of each is given.



[The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.]

TO PROTECT ARMOR FROM RUST.

YORK, PA., September 24, 1891.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—Can you suggest any anti-corrosive preparation which can easily be applied to polished iron and keep it from rusting, without destroying the polish? I wish to apply it to polished iron armor. Any suggestions will much oblige,

Yours truly,

REINHARDT DEMPWOLF.

[GUNSMITHS and cutlers use a certain mercurial ointment for keeping their wares from rusting. A patented preparation called "Putz-pomade," to be had at house-furnishing stores, is also used for the same purpose.—EDS. AMERICAN ARCHITECT.]



THE FIRST IRON BRIDGE.—At the present day, when we are accustomed to look upon iron as the chief constructive material with which civil engineers and architects all over the world deal, the first iron bridge that was ever built, says the *Baltimore Sun*, is a curious sight. This bridge, the arches of which were made of iron, was called "Ironbridge," and it was erected in 1778. It spans a little river in the County of Salop, on the railroad line from Shrewsbury to Worcester, in England. At the present day the structure is surrounded by a thriving little village, which took its name from the bridge. Several iron-foundries have been established in the neighborhood. The structure was a timid attempt at what has since developed into an extensive industry. There are three supports; two of them are very small and cross a narrow country road, while the third and largest one spans the bed of the river. It is about ninety-six feet long and weighs 378 tons. The braces were cast at Coalbrookdale, every bar being composed of two segments. Stephenson, the great civil engineer, wrote as follows on the construction of this first iron bridge: "When we bear in mind that the manipulation of cast-iron was, at the time of its erection, in its infancy, we cannot help but feel convinced that unblushing audacity alone could conceive of such an enterprise, and the intelligence with which the details are outlined and executed is equal to the boldness of the conception." The bridge is constantly used and is in excellent condition, a fact which disproves all the ominous clamorings of cranks that the pernicious influences of rust will sooner or later bring danger to the iron bridge of to-day.

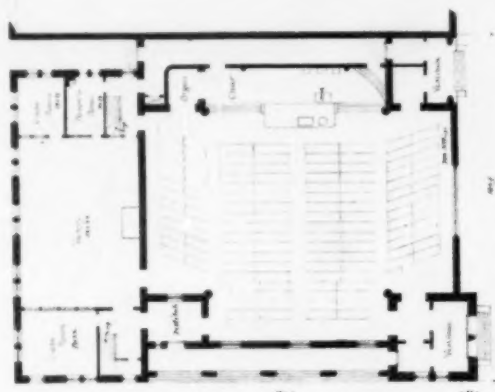
COB WALLS.—The cob walls of the West of England are composed of earth and straw mixed up with water, like mortar, and well beaten and trodden together; the earth nearest at hand is generally used, and the more loamy the more suitable. These mud walls are made two feet thick, and are raised upon a foundation of stonework. The higher the stonework is carried the better, as it secures the cob-work from the moisture of the ground. After a mud wall is raised to a certain height, it is allowed some weeks to settle; this period varies according to the damp or dryness of the atmosphere. The first layer or rise (Devonice raise) is from three to five feet high, the next is not so high, while every succeeding raise is diminished in height as the work advances. The solidity of cob walls depends much on their not being hurried in the process of making, for if hurried they will surely be crippled and swerve from the perpendicular. It is usual to pare down the sides of each successive raise before another is added on it. The cob-parer (the instrument then used) is like a baker's peel—the shovel for removing the bread from the oven. The lintels for the doors, windows, cupboards, or other recesses, are put in as the work advances, bedding them on cross pieces. The walls are carried up solid, and the respective openings are cut out after the work has well settled. In forming these walls one man stands on the wall to receive the cob, which is pitched up to him by another below, the man on the wall arranging and treading it down. Each workman generally uses a common pitchfork. The whole is then covered with thatch. Devonshire thatching is very superior to that in most parts of England. It is done with combed wheat-straw (Devonice reed), which consists of the stiff, unbruised, unbroken stalks, which have been carefully separated by the thrasher from the fodder straw and bound up in large sheaves called nitches. The outer walls are plastered the following spring, and this plaster covered with a white-wash of lime or rough-cast (Devonice slap-dash). These are dangerous processes in the hands of a builder without a cultivated taste, for such a wall, to use the metaphorical language of Loudon, "has no beauty because it has no expression." The white-washing this inexpressive cob pleases the eye of ordinary tourists by the contrast it produces with the surrounding scenery, but it is condemned by the tasteful Gilpin as the most inharmonious of tints and productive of a disagreeable glare. That glare, however, is soon mellowed by the hand of time, and toned down by dirt and damp. The building then appears in most artificial and picturesque keeping. Rough-cast and slap-dash are terms which accurately describe the action and effect. The wall is plastered very smoothly with lime and hair mortar; as fast as this coat is finished a second workman follows with a pail of rough-cast, which he throws on the soft plaster. The materials for rough-cast are composed of fine gravel reduced to a uniform size by sifting or screening, and by washing the earth carefully out. This gravel is then mixed with pure, newly-slaked lime and water, till the whole becomes of the consistence of a semi-fluid; it is then forcibly thrown, splashed, slap-dashed upon the wall with a large trowel. The workman then brushes over the mortar and rough-cast with the lime liquid in the pail, so as to make all, when finished and dry, appear the same color. The building is then complete; this plaster and rough-cast gives the last finishing touch of beauty, the *coup de grâce*, to cob. It is like the sprinkling with confts the sugary chalk plaster of the indigestible twelfth-cake, that confectionery cob. The real worth of cob, however, consists not in these outward charms, but in the intrinsic merits of the facility and cheapness with which it is made. It will cost, speaking roughly, about three times less than stone and five times less than brickwork; it requires, however, considerable time in the construction. A cob house of two stories ought not to be built in less than two years, in order that the work may settle completely. Cob is extremely durable when protected from wet above and below, for, as Hamlet's grave-digger has it, "your water is a sore decayer." This is implied in the Devonshire adage, that "all cob wants a good hat and a good pair of shoes." Instances occur of cob houses built in the time of Elizabeth being found at this day in perfect preservation.—*The Architect*.

TWISTED IRON IN FLOOR CONSTRUCTION.—At the first meeting of the session of the American Society of Civil Engineers on the 2d inst., a paper by Mr. E. L. Ransome on "Concrete Beams Reinforced by Twisted Iron for Floor Construction" was read. The system referred to consisted in embedding twisted bars of iron in the concrete beams, by which it was claimed a very strong floor can be made at small cost. The California Academy of Sciences, San Francisco, has five floors of the museum portion, or about 50,000 square feet, so constructed, and estimated to carry with safety 250 lbs. per square foot. The museum building of the Stanford University at Palo Alto, Cal., is being constructed as a monolithic structure, the foundation, walls, two floors and roof being of concrete and twisted iron. The building is 300 feet by 50 feet, with spans of 45 feet and less. The depth of beams ranges from 7 inches to 45 inches, with floors 3 inches thick. The concrete is of hard trap-rock and Portland cement, in the proportions of 1 to 14 for walls and 1 to 6 for floors. The paper gave rise to considerable discussion, evincing a sceptical feeling as to the advantages claimed. Mr. Seaman thought the twisting would be an injury rather than a gain, and that in case of fire the iron would stretch, and, owing to the difference of expansion of the concrete and iron, the effect of the latter would be lost. A visitor described a system of concrete floor construction in which a network of wires 1 1/2 inches apart was hung from the top of the beams and a flat floor of concrete made, extending a little above the beams and below the bottom of the curve of the of the wires, the thickness being about 4 inches for a span of 6 feet 3 inches. The wires are No. 12 gauge, and those from beam to beam are double. A thin, flat, concrete ceiling protects the lower part of the beams, and the beams are also coated with the concrete mixture. This construction can be built by unskilled labor. Mr. Fouqué thought the use of sawdust in concrete or plaster for fireproofing material to be a mistake, experience on the West Shore R. R. having shown that it is completely destroyed by fire. Gauge mortar on wire-lath gives very satisfactory results, but is expensive.—*The Architect*.

SUGGESTED ABOLITION OF THE DIRECTION DES BEAUX-ARTS.—There is more talk than ever of suppressing the "Direction des Beaux-Arts," the titular head of which department, M. Larroumet, is soon about to resume his former functions as Professor of French Literature at the Sorbonne. The succession to his position is warmly contested, though the office, in fact, has a great many drawbacks, with few compensating advantages. The world of art is not a very easy one to manage, considering the delicate susceptibilities and self-appreciation of artists; the collisions between the administrator and the administrated are frequent and often disagreeable; and a Director of Fine Arts, whatever his merits, generally finds it convenient to retire after two or three years. MM. Chennevière, Guillaume, Paul Mantz, and Kœmpfen succeeded each other rapidly, and M. Charles Blanc's rule of five years is spoken of as a remarkable instance of longevity in the office. Nevertheless, competitors for the honor are not wanting. Among others are named M. Pommeraye, professor at the Conservatoire; M. Roger Ballu, at present an Inspector des Beaux-Arts, and son of the eminent architect of the Hôtel de Ville; and M. Henri Havard, the well-known art-critic. Perhaps the proposed change will be confined to including the functions of the Minister of Fine Arts under those of the Department of Public Instruction, a very wide-spreading department which already includes the duties of Inspection of Fine Arts, the Provincial Museums, the National Museums, the Ecole des Beaux-Arts, the French Academy at Rome, the Conservatoire de Musique, and the similar institutions in the provinces, the national theatres, the surveillance of the other theatres, the Monuments Historiques, and the national manufactures. This is a pretty extensive circle of administration, it will be admitted, and one which gives rise to very large expenditure; the budget for this department for 1892 being estimated at 8,140,955 francs.—*The Builder*.

TRADE SURVEYS

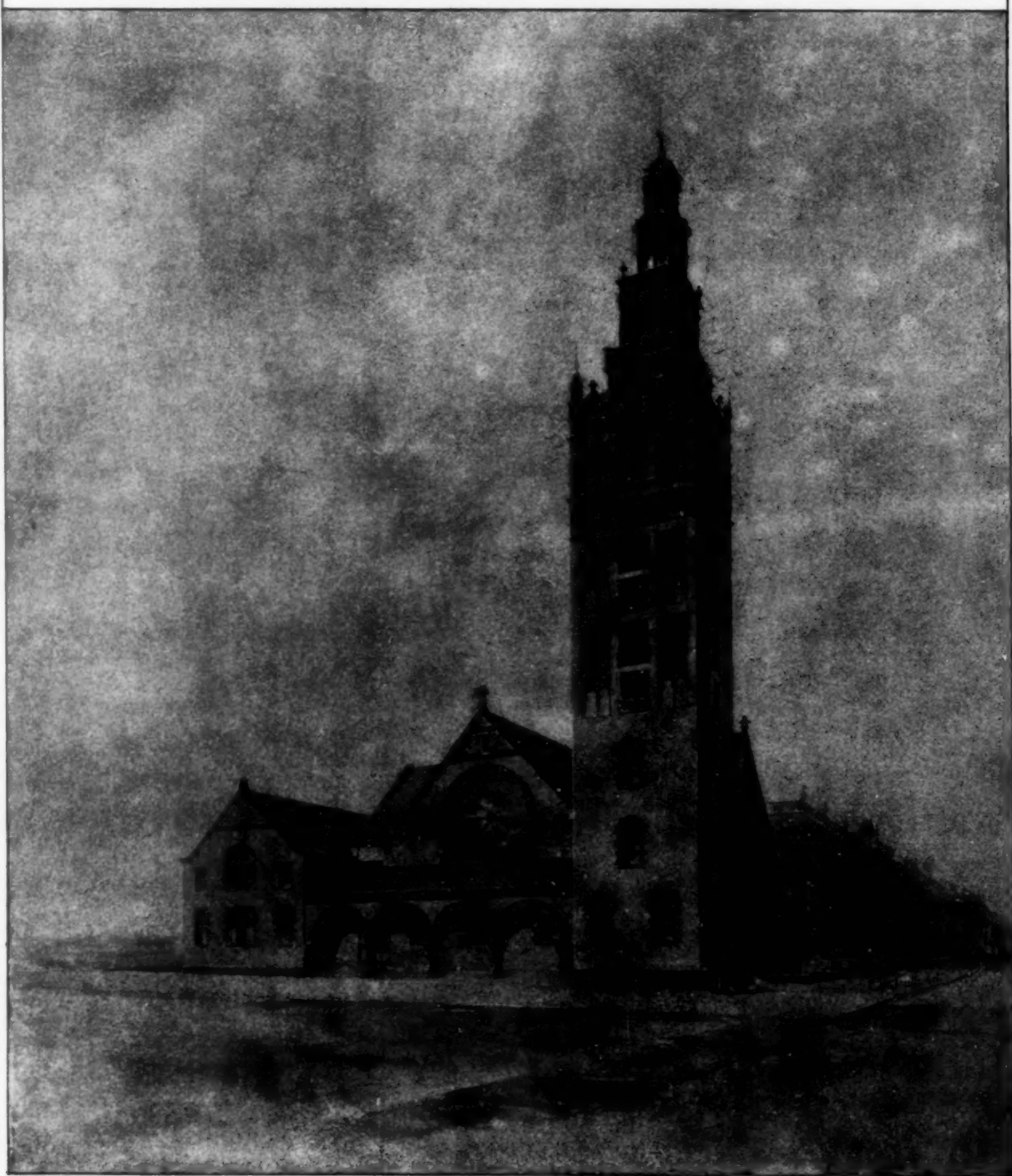
There is so much that is misleading in the commercial and financial newspapers that any attempt to form intelligent opinions or conclusions on the data offered is useless. The few who control stock movements do not tell what they think or know. There is so much random investment, that a record of investments would only go to show the degree of ignorance prevailing. Many millions have been temporarily, at least, lost in the Southern States by ill-advised investments in wild-cat towns and wild-cat industrial enterprises by the score. While there is much wise investing done, there is much that is worse than foolish. The first benefits have been derived by those who sold waste lands at town-lot prices. The next benefits will come to those who buy out the properties of these hopeful investors when they become weary of waiting. There is a remarkable outflow, even now, of savings into new industries and enterprises of one sort or another in the interior States. Building and loan associations led the way, and taught the smaller investors how to invest safely. Since then the area of investments has been enlarging, and at this time, so it is said by officials of savings banks and of financial institutions which handle the savings of the people, that there is more money ready for a good field than there has been since the first of the year. Railway managers are preparing to expend large sums of money in betterments. Promoters of ship and boat building enterprises are prepared to prosecute schemes which have been formulated during the past two years. The spirit of investing is at a high point, and, if there is no setback during the next few months, the outlays during 1892 and 1893 will probably surpass all previous years. Reports from the land offices of Western States and Territories show a rapid taking up of land, and also that irrigation advantages will be extended to an immense acreage during the coming twelve or fifteen months. High-priced Western lands have checked emigration from the older to the newer States, but the plans laid out by capitalists to irrigate large areas will help to break the control of many of those who now possess immense holdings. These are in themselves small matters, but in the aggregate they mean a great deal to the people at large. The most important point is that the cheapening of good land will help to preserve a more even balance between the manufacturing and the agricultural interests. It has been the want of this balance that has caused so many ups and downs. The new agencies, such as cheap railroad travel and enlarged markets, have helped very largely to preserve the economic forces in even balance, which have given the country such permanent prosperity. But during the past two or three years manufacturing-capacity has taken another leap ahead, and, unless this factor is offset by another from the agricultural West, there is danger of a fresh era of depression of greater or less intensity. It is to such trifling causes, such as above referred to, that we have to look for a broadening out of the bases of a greater prosperity. In trade circles, there has been no pronounced change for a week. Gold arrivals on one hand and cereal exports on the other help to strengthen confidence. An immense corn yield and strong prices for cotton are strong supports. Manufacturers are waiting for the first symptom of an actual demand growing out of new conditions. Bankers recognize that, in addition to the greater demand for present requirements, there will be next winter and spring a still heavier demand for money to push new enterprises and enlarge the operations of old ones. Opposed as the banking interests are to a new financial standard, they are sincere enough to recognize the possibility of scarcity of money, which is another name for stringency. They have made no practical suggestion to meet the issue, but from outside sources comes the one made heretofore, of including in the basis of circulation certain kinds of bonds which cannot deteriorate materially in value. In the smaller industries there is the usual activity and steady prices. Woollens, hosiery, knit-goods, etc., are all lower in price. German hosiery manufacturers are now making one more desperate effort to undersell competing American products. Cotton-goods manufacturers are storing stock at about last year's prices. The Southern mills, with few exceptions, are making money, and the real crisis of existence is only now coming to many of those on coarser goods located in disadvantageous localities. Still, there are two or three score of new cotton-mill enterprises under serious consideration. It is not saying too much to declare that the volume of business this coming winter will be in excess of last year, as measured by actual consumptive demand. Every year shows that less is bought for future consumption. The people are learning to rely on immediate production, and business is being established more particularly on this basis.

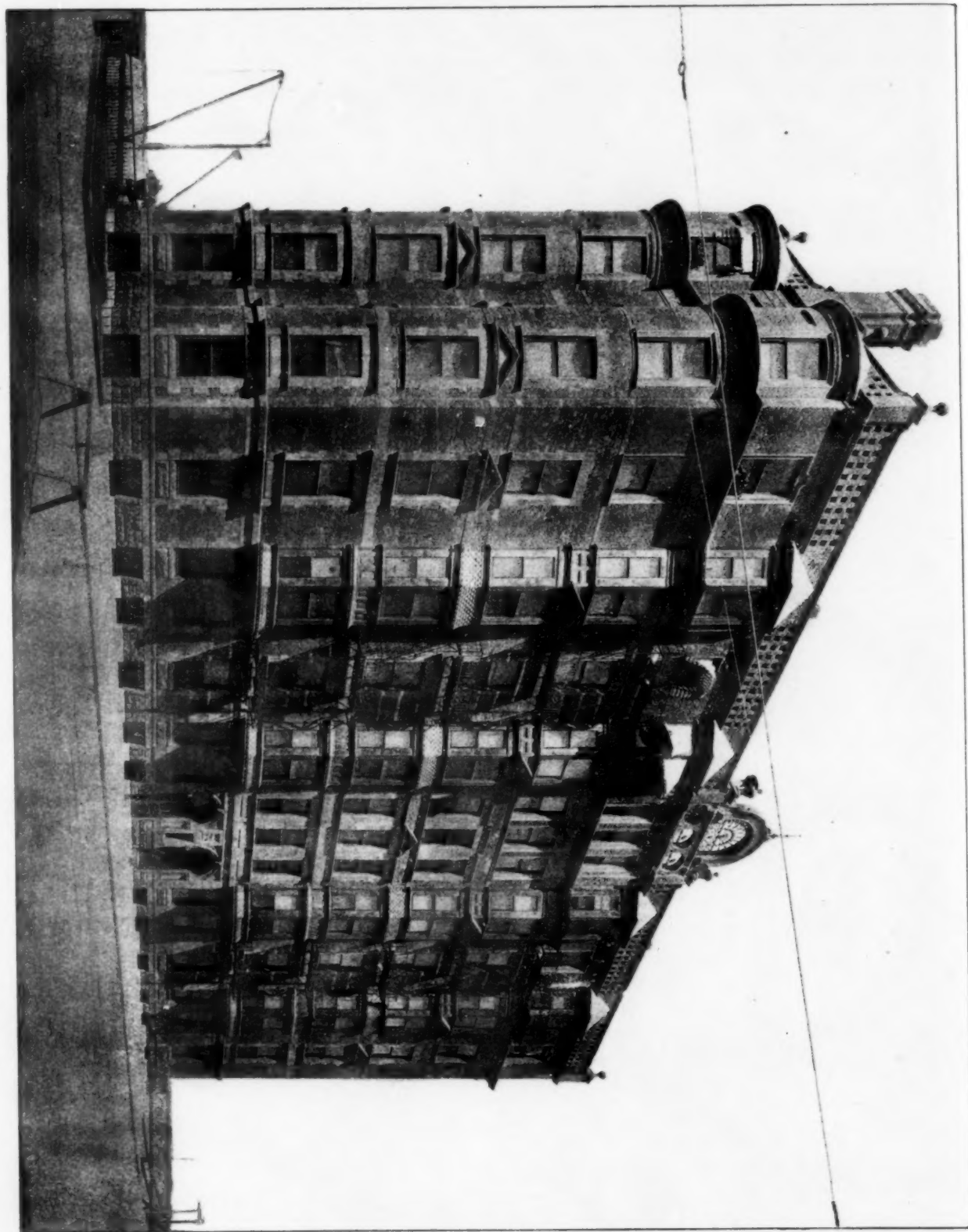


• UNSUCCESSFUL • DESIGN •
FOR • MT. VERNON • CHURCH • BOSTON • MASS •

O. F. SMITH • ARCHT.

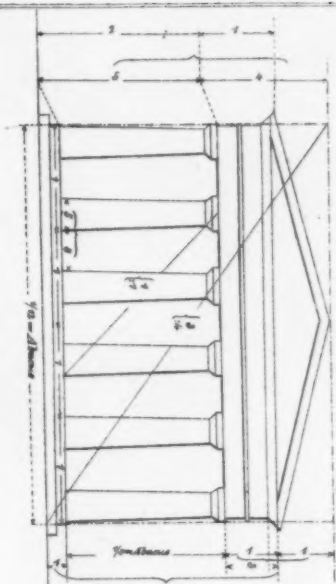
West Church front.





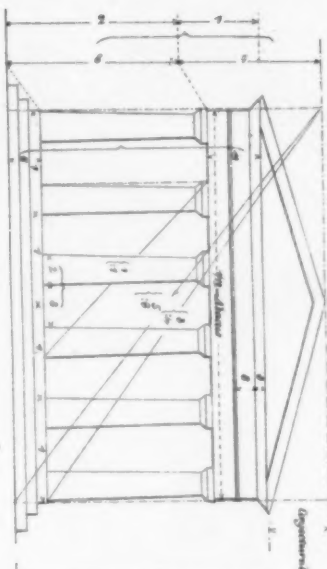
AN APARTMENT HOUSE, W. CHESTER PARK, 5 BEACON ST. BOSTON, MASS.
O. P. SMITH, ARCHT. & CO.

Fig. 1.



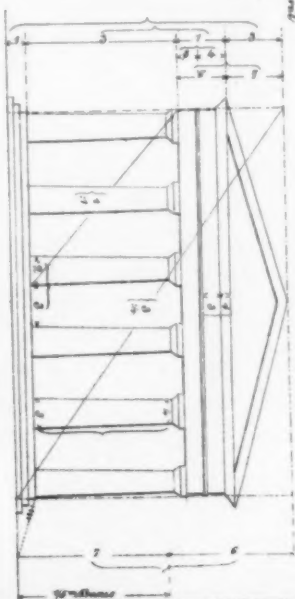
TEMPLE OF THESEUS.

Fig. 2.



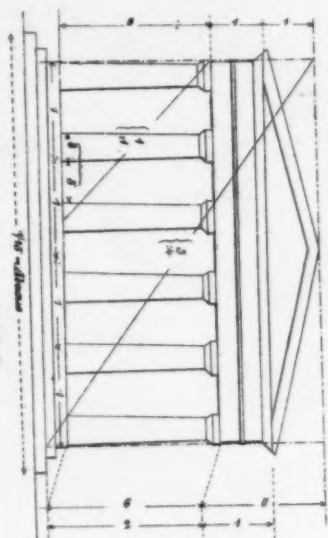
TEMPLE AT SUNIUM.

Fig. 3.



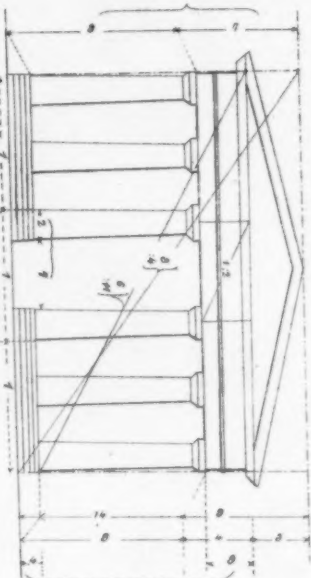
TEMPLE OF APOLLO,
AT BASSAE.

Fig. 4.



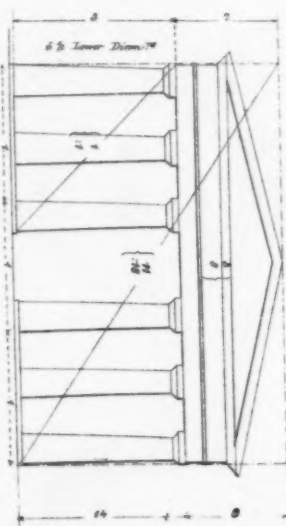
TEMPLE AT NAXOS.

Fig. 5.



PROPYLAEA (WEST FRONT)

Fig. 6.

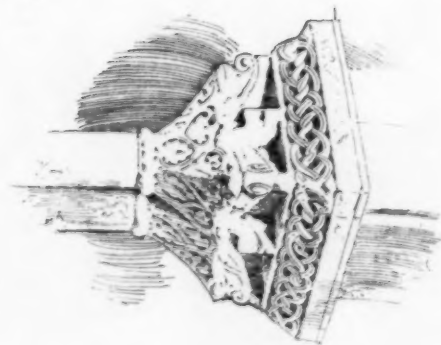
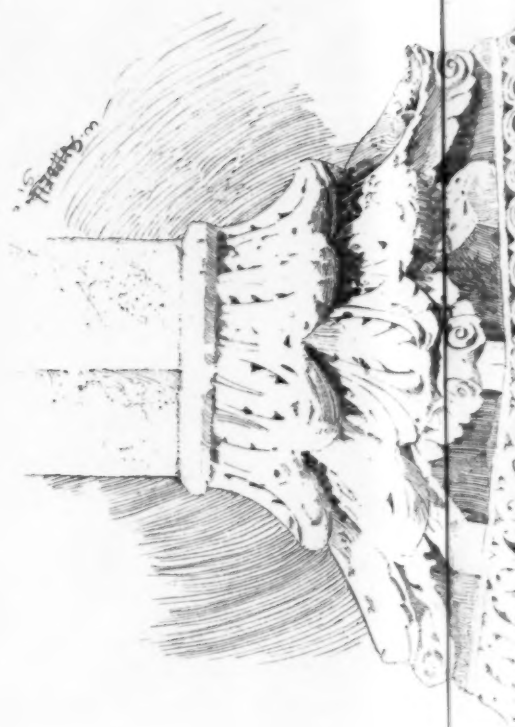
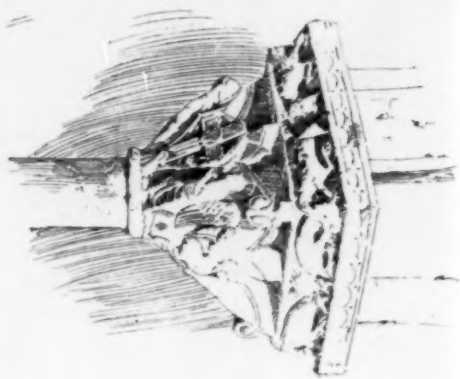


PROPYLAEA (EAST FRONT)

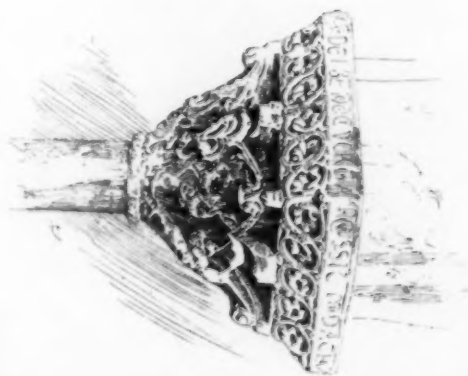
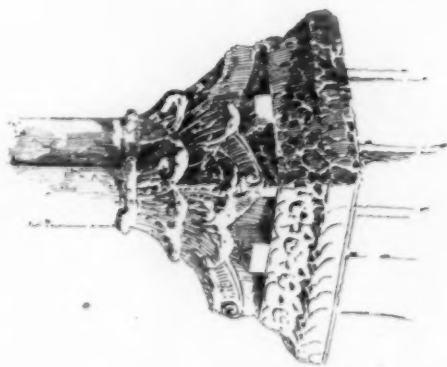
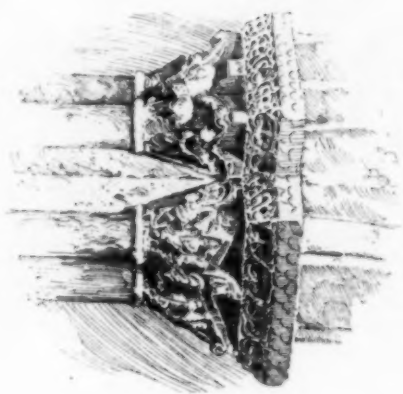
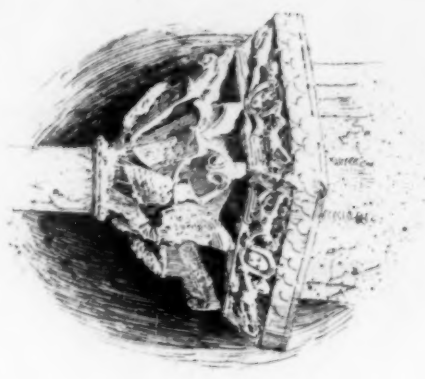
SIX
HEXASTYLE
PORTICOES.



Suggestion for
a Residence



..MOISSAC..
III



No. 524.

McNIEGAN ARCHITECT AND BUILDING DEWS. Oct. 10. 1891.

COPYRIGHT 1891 BY THOMAS & CO.

