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# THE ARCHITECTURAL FORUM

*AN ILLUSTRATED ARCHITECTURAL MONTHLY DEVOTED TO THE ART, SCIENCE, AND BUSINESS OF BUILDING*

NEW YORK ROGERS AND MANSON COMPANY, Publishers BOSTON

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Reproduced from Etchings by George T. Plowman



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VOLUME XXVI NUMBER 1

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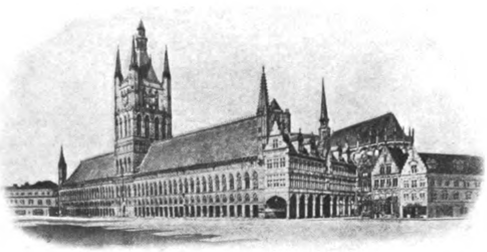

RUINS OF THE CLOTH HALL, OR HALLE AUX DRAPS, AT YPRES, BELGIUM

AFTER AN ETCHING BY GEORGE T. PLOWMAN

*THE Halle aux Draps was, before its destruction, the largest and most important building in Belgian Flanders. Its lower floor was a public market, with a hall above used for large gatherings. It was justly considered one of the finest works of Belgian Gothic architecture. The small illustration shows its appearance before the present war.*

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THE ARCHITECTURAL FORUM
FOR QUARTER CENTURY THE BRICKBUILDER
VOLUME XXVI JANUARY, 1917 NUMBER 1

# The New Zoning Ordinance of New York City

## RESTRICTIONS THAT MARK AMERICA'S GREATEST STEP IN CITY PLANNING ARE NOW IN FULL EFFECT

*By* LOUIS GRAVES

AN old familiar saying is that God made the country and man made the town. Some of the people who have made a study of congestion of population, whose work has taken them to the wretched slums of the cities, would probably amend it and say the devil made the town. At any rate, the job has been badly done, and now civilization must set about to see that it is done better in the future. Haphazard building has been a blow to the health and economic development and beauty of many a community. But it need be so no more. A new way has been pointed out, and the dwellers in cities may take it if they will.

Long ago European communities placed restrictions on building development. A few American cities — Boston, Washington, Los Angeles, and others — have imposed limitations on height and have created residence districts. But on this side of the world it has remained for New York to undertake and carry through to success a thoroughgoing scheme of regulation — a scheme that takes account of the years to come and embodies the principles of that still unfamiliar art-science known as city planning.

Where other cities have laid down comparatively simple rules, fixing height limits in certain broadly defined sections, and drawing lines to separate homes from industry, New York has created what are in effect hundreds of districts, in each of which all buildings erected in the future must be in accordance with regulations based upon three factors: use, height, and area. That is, it has treated its territory street by street and block by block; and in each particular instance it has made its rules conform to present and probable future conditions.

This does not mean that the city, from preference, has laid out residence and business districts in the form of frequently alternating strips. Such a course it has sought to avoid. Wherever possible a large section has been dedicated to buildings of a certain class. Notably is this true in the parts of the city that are not yet built up; and on both sides of Central Park, where the cross streets are lined with homes, residential development over wide areas receives official sanction and protection. But in a town as old and as unevenly built as New York, all the divisions could not be so broadly made. Thus, one sees Washington Square and its purlieus decreed a residential oasis in a desert of trade; and, likewise, lower Park avenue, some of the other streets in the fashionable Murray Hill neighborhood, and blocks south of Central Park, have been saved from the invasion of factories and shops.

Not only in fixing business and residence districts has the city inclined toward flexibility, — toward a recognition of practical considerations,— but also in laying out height districts and in regulating the height, shape, and area of all buildings.

Vast boxlike structures may not rise above a certain height; but a tower, if it occupies only a specified proportion of the area, may go as high as its owner wants to carry it. In an up-town section where the construction of lofts is the logical development, buildings may rise to a height equal to two times the width of the street; but half a mile away on Fifth avenue, where it is imperative that the character of a high-class shopping and hotel neighborhood be maintained, the limit is one and one-quarter, or, on some of the blocks, one and one-half times the width of the street. In a warehouse block the space required to be devoted to yards and courts may be zero; but in a business block perhaps not a hundred yards distant there must be yard and court space adequate to afford plentiful light and air. And so it goes: the requirements show wide variations even within a small area.

This statement of the way the scheme works might carry to the thoughtless the impression of arbitrariness on the part of the city government. But nothing is farther from the fact. The rules were not made by a group of men who gathered around two or three times, listened to a city engineer, pointed to places on a map, and said: "We shall have such-and-such a street for business, and such-and-such a street for homes." On the contrary, the decisions resulted from a painstaking methodical survey by a staff of experts, from a study of the character of buildings on every single block, and the course of development for many years past; and, finally, from consultation with the property owners and residents vitally affected. Every minute the men in charge of the work had in mind the necessity for care and conservatism; for they knew that not only would their recommendations have to stand the test of public opinion, but also, in all probability, the more definite test of a contest in the courts.

THE PLAN OF REGULATION. Though complex in detail, the plan put into effect by the Board of Estimate and Apportionment, New York City's main governing body,

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is simple enough in outline and in the principle it involves. In brief, it seeks to promote the safety, the health, the comfort and convenience, and the general welfare of the population by imposing reasonable restrictions upon the use of private property. To accomplish this, the Board of Estimate's resolution creates (1) use districts, (2) height districts, and (3) area districts.

The use districts are divided into four classes: residence, business, unrestricted, and undetermined. The height districts are divided according to the allowed height on the street line in comparison with the width of the street; they are known as one times, one and one-quarter times, one and one-half times, two times, and two and one-half times districts. The area districts are divided into five classes, A, B, C, D, and E, with varying requirements as to the size of open spaces that must be provided.

Instead of describing in words the numerous districts created, the Board of Estimate simply made the district maps a part of the resolution. These maps are designated as the "Use District Map," the "Height District Map," and the "Area District Map." In each of them are employed symbols to indicate either a lack of any restrictions or the exact kind of restriction imposed upon buildings in every street in the city. Thus, from these maps one may learn at a glance within just what classification any street or any part of a street belongs.

The new regulations do not affect, either as to height or use or area, existing buildings or those for which plans were filed prior to July 25, 1916, provided that the construction of planned buildings shall proceed within a specified time.

That a city grows and changes, and that no hard and fast fixed rules should be laid down to determine the nature of its growth for all time, is a truth that has been thoroughly recognized in New York. Therefore, methods of modifying the present regulations are established. The law pursuant to which the regulations were made directs that citizens may petition for modifications, and that the governing body of the city shall consider and vote upon such requests. Furthermore, authority is given to the Board of Standards and Appeals to vary, in a particular case, any provision "in harmony with its general purpose and intent." The same board is empowered to grant, when circumstances justify, certain exceptions to the use district regulations.

Restrictions in Use. In the streets reserved for residences no kind of business or industry is permitted, but only dwellings, apartment houses, boarding houses, clubs, hotels, and such institutional buildings as churches and hospitals. A garage is permitted if it is on the same plot with the building which it serves. There is nothing in the regulations to keep residences out of business districts; and some industries, if they are not of a specified objectionable kind and do not occupy more than a certain proportion of the floor space of their building, may also be located here. Unrestricted districts are sufficiently described in their name. With regard to undetermined districts, the decision as to the character of buildings to be allowed will be made at some later time.

Generally speaking, no restrictions as to use have been put upon the land along the navigable water front where conditions are favorable to industrial development (the unrestricted area extends back 1,000 feet or more from the water). It is regarded as certain that the segregation of factories will not only improve residential conditions, but also, by the reduction of trucking and the provision of the best transportation and terminal facilities, reduce manufacturing costs. Another beneficial result will be the decreased volume of trucking through streets where children are at play.

The reason that the natural working of economic forces has not sufficed to keep factories away from the shopping and residential districts is that in New York industry takes the form of what is often called "light manufacturing." Plants for the production of locomotives, steel rails, structural steel, and heavy machinery are not numerous in New York compared with the establishments for the making of clothing, confectionery, buttons, millinery and lace, patent medicines, artificial flowers, books and magazines, and other articles that do not have to be fabricated in proximity to extensive water and rail terminals. Almost two-thirds of the 680,000 industrial workers in the city were found by the Commission on Building Districts and Restrictions to be employed in connection with this so-called light manufacturing.

These industries have scattered themselves over the city without regard to any plan whatever. One factory has often sufficed to destroy the residential advantages of an entire block. The extension of the factory zone between the years 1900 and 1915 drove hotels and shops from the part of the city around 23d street, and was about to have a like disastrous effect in the neighborhood of 34th street when the present scheme for regulation came to the rescue. Now protection is afforded to Fifth avenue from 23d street to 59th street, and northward on each side of Central Park where residences predominate; large and adequate areas are still left for factories to the east of Fourth and Park avenues and to the west of Sixth avenue and Broadway.

An illustration of the care taken to avoid causing undue inconvenience is the provision for including in the business districts short stretches at the end of residence blocks, adjacent to the main traffic thoroughfares; in a great number of cases these stretches are already used by tailors, laundrymen, shoemakers, and small tradesmen.

A powerful consideration in determining the limits of the use districts was the necessity of promoting safety to street traffic. In New York most of the children are forced to play on the streets, and in blocks invaded by business the danger of accidents is far greater than it is in the exclusively residential blocks. This was definitely established by the examination of police records and through independent investigations. Not only do children run the risk of being hurt in streets where there is heavy vehicular traffic, but their mental and moral life is shown to be unfavorably affected by proximity to industry and trade. An official of the Children's Court in New York has offered testimony that the lack of opportunity for play is responsible for nearly half of the cases of juvenile delinquencies. Though the city is making every effort to provide playgrounds, there is no chance that there will be enough of these open spots for a long time to come, and so the streets must be made as safe as possible.

Height Limits. As in the segregation of factories, in imposing height limits the city faced the accusation of discriminating in favor of owners who had already improved their property intensively and against owners who

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had not. It was a delicate problem, the solution of which was found in the separation of the city into height districts, the limit being made much more liberal in the sections where skyscrapers already existed than in those where this kind of development had not yet got under way.

In the lower end of Manhattan the street wall may rise to a height of two and one-half times the width of the street, and, for the purposes of this rule, no street is to be counted as less than 50 feet wide. Beyond the limit on the street line the building may go higher if it sets back from the street line 1 foot horizontally for every 5 feet vertically; or it may go higher even on the street line, provided that the part above does not occupy more than a certain proportion of the area of the lot, and is not on the street line for more than a certain proportion of the frontage of the entire building. The effect of this provision is to permit towers of almost any practicable height.

The same principle is applied in all other height districts — two times, one and one-half times, one and one-fourth times, and one times districts — except that as the height limit decreases from class to class there goes an increase in the horizontal setback in the upper portion of the building. This means that the requirements are less severe in the industrial and business sections of the city than in other sections. It is, in a way, a concession to the necessity of not disturbing too radically the conditions that have already prevailed. In the interest of the conservation of real estate values, light and air must be sacrificed, to an extent, in the lower part of Manhattan; but where the land has not been so crowded with skyscrapers the city may, without being charged with confiscatory intentions, apply more rigid restrictions.

In the height limit regulations throughout, precaution is taken not to interfere with architectural treatment. Cornices may extend out from the street walls 5 feet, and "nothing shall prevent the erection, above the height limit, of a parapet wall or cornice solely for ornament and without windows," providing this does not rise more than 5 per cent above the height limit. Church spires and belfries are not subject to any restriction as to height. Again, dormers and head-houses may be erected above the height limit, subject to a limitation upon their aggregate frontage.

AREA DISTRICTS. The purpose underlying the area limitations is to afford sufficient light and air to the occupants of buildings. Except in A districts, which are located along the water front and near railroad terminals, any building that runs 55 feet back from the street, and is back to back with another property, must have a rear yard. The depth and height of the yard must increase with the height of the building; and the same rule applies to courts. There is a multiplicity of detail in the rules and the exceptions thereto governing the height and depth of yards and courts, but every provision points to one object: plentiful light and air.

A CITY CHOKING ITSELF TO DEATH. I have sought, in the preceding paragraphs, to state in condensed form the purpose and the main features of New York's new scheme of building regulation. The student desiring a closer knowledge of its details will necessarily have to go to the text of the resolution and to the reports of the experts who were engaged for three years in performing this intricate task. But I take it that public spirited men and women elsewhere than in New York, who want to see their own cities grow sanely and beautifully, will be less interested in the exact language of the regulations than in a general view of the problem that faced New York, and of the way in which that problem was attacked and solved. For here, truly, lies the real lesson for other communities.

Three years ago New York was aptly described as a great city that was letting itself be choked to death. In the quarter of a century that had passed since the erection of the first lofty steel-frame building on lower Broadway, it had seen these structures grow in both number and size. The first, which had only ten stories, was considered monstrously high, and many engineers and architects said it was dangerous. But it was a pygmy beside those that followed. They went up thirty, forty, fifty stories high. Many of them had no pretense to shapeliness, but were just gigantic boxes with rows and rows of windows all alike, while others approached the sky in the form of towers at once magnificent and graceful. The will of the owner was the only law that governed height and design.

The skyline of Manhattan has become famous the world over, and indeed it is one of the most impressive of all sights. But as the city, seen in profile, grew in picturesqueness and grandeur, the downtown streets were turned into canyons; light and air were shut off from windows, and traffic became more and more congested.

It was not long after skyscrapers appeared in lower Manhattan that they began to scatter all over the island— and even in the boroughs of Brooklyn and the Bronx. They sprang up in the most unexpected places, to the dismay of the owners and lessees of the surrounding plots; in fact, the absence of other high buildings often provided an incentive to the man who wanted to put up one, for it meant that he would have light and air on all sides. These invaders had all the characteristics of parasites and pirates.

Thoughtful citizens who were concerned for the future of New York soon realized that this abnormal development was full of evil promise. Many of them said so; but, as usual, the public as a whole was slow to see. Most New Yorkers seemed to be rather proud of the skyscrapers than otherwise — not proud of the beauty of a few, but of the mere bigness and startling quality of them all. But gradually there came to be more and more talk about the limiting of heights, stimulated by the ever growing number and diffusion of the skyscrapers. Probably it was the erection of loft buildings around 23d street, and the conversion of that district into a manufacturing center, that had most effect upon the public mind. People who had pooh-poohed the warnings of the "alarmists" of a few years past were frightened now by the prospect of factories taking possession of Murray Hill.

THE MOVEMENT'S OFFICIAL CHAMPION. It was in the person of George McAneny, President of the Borough of Manhattan, that the movement for building regulation found its most powerful advocate in official circles. His activity in civic work for many years had given Mr. McAneny a keen appreciation of the harm of unrestricted building; and with the zeal of a citizen who wanted to see New York develop in healthfulness and beauty as well

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as size, he combined the hard common sense that saw in their true light the serious economic aspects of the situation. He was not afraid to face the awful charge of being a "faddist" — a charge that so-called practical politicians, and often business men, bring against any man who proposes something which, however well tried out in other lands, happens to be unfamiliar to them.

By virtue of his office he was a member of the Board of Estimate and Apportionment, the body of eight men who hold the reins of government in New York City. He succeeded in impressing his own convictions upon his associates, and on Feb. 27, 1913, the Board adopted a resolution creating a Heights of Buildings Committee with Mr. McAneny as Chairman; and he, in pursuance of the terms of the resolution, immediately appointed the Heights of Buildings Advisory Commission. There has probably never been any group of citizens formed for such a purpose more deserving of public gratitude for their tireless and thorough work, and certainly in an article of this character they should receive full credit. Therefore I present their names as follows: Edward M. Bassett (Chairman), Edward C. Blum, Edward W. Brown, William H. Chesebrough, William A. Cokeley, Otto M. Eidlitz, Abram I. Elkus, Burt L. Fenner, J. Monroe Hewlett, Robert A. Higbie, C. Grant La Farge, Nelson P. Lewis, George T. Mortimer, Lawson Purdy, Allan Robinson, August F. Schwarzler, Franklin S. Tomlin, Lawrence Veiller, and Gaylord S. White. The expert staff consisted of George B. Ford, Robert H. Whitten, Herbert S. Swann, Frank B. Williams, and A. E. Heffelfinger.

The commission conducted a comprehensive investigation, extending over several months. It sought and obtained advice from owners and managers of buildings, architects and insurance men, fire fighters and fire protection experts, lawyers and physicians, manufacturers and railroad men, and students of conditions in the tenement districts. It had special investigations made in cities of the United States, Canada, and Europe, and held a series of public hearings in City Hall.

The Need of Districting. Now, perhaps the most significant fact about the outcome of the studies of this commission was that they declared that the limitation of heights was only part, and not necessarily the greatest part, of building regulation. They were convinced that no scheme of regulation would really meet the needs of the city except one that was based upon districting as to use, height, and area. So they made most careful inquiry into the practicability of this more ambitious plan, reviewing the efforts of other cities and the attitude of the courts as reflected in numerous decisions.

The result of this particular phase of their work was the drafting of two new sections to be added to the Charter of the City of New York. These sections, known as 242-A and 242-B, were later passed by the Legislature and signed by the Governor. It is not necessary to quote all of their six or seven hundred words. What they accomplish is simply this: They give the Board of Estimate power to regulate the height of buildings, determine the proportion of a lot which must be left open, and "divide the city into districts of such number, shape, and area" as will best carry out the purpose of properly restricting the location of trades and industries. The new law then proceeds to say that the regulations "shall be designed to promote the public health, safety, and general welfare," and provides for public hearings and other formalities.

Their study of the legal questions involved had convinced the members of the commission that New York City could not hope to achieve a thoroughly satisfactory system of building until the enactment of the proposed law. Accordingly the Heights of Building Commission had presented its report, embodying the result of its extensive investigations and had gone out of existence. Within a month after the charter amendment was enacted the Board of Estimate appointed the Commission on Building Districts and Restrictions. This body included, of the former commission, Messrs. Bassett (again Chairman), Blum, Eidlitz, Fenner, Purdy, and Tomlin; and, in addition, James E. Clonin, Edward R. Hardy, Richard W. Lawrence, Alrick H. Man, Alfred E. Marling, J. F. Smith, Walter Stabler, George C. Whipple, and William G. Willcox. Of the former expert staff, Messrs. Ford, Whitten, and Swann remained in service, and there were added John P. Fox, George W. Tuttle, and Edward M. Law.

In many respects the work of the new commission was more engrossing than that of the old, and it touched more nearly the daily life of the average citizen. Before, the benefits to be gained had been easy enough to set forth, but the individual citizen had not seen very clearly what they would have to do with himself and his family; now, on the contrary, the decrees of the new commission would have a vital effect upon the very house he lived in. He could look at a map and find out whether or not he was going to be protected from encroachments by shops and factories; and if he contemplated changing his abode he could look at another section of the same map and tell whether he could safely build a residence in the new place.

Transportation played a big part in the studies of the Districting Commission. It made a "transit time zone map" showing the estimated time from 14th street to every part of the city on the new subways. But this was only one of many: one map showed the distribution of factory employees, both in their working places and in their homes; another showed the assessed land values per front foot; another showed the state of building development at various periods in the history of the city; another showed hills and valleys and other topographical features.

All during its investigation the commission followed the course of the Heights of Building Commission in consulting representatives of professions and trades. It was determined to get the benefit of the community's accumulated knowledge of the whole subject; and when it approached the end of its studies it invited individuals to present their views at public hearings. The remarkable success of the commission in winning to its support the forces of good citizenship, in impressing the public with its sincerity and competence, was proved by the practically unanimous approval that met its recommendations. Not a single organization, and but two or three individuals, objected to the principle of the proposed restrictions; and changes suggested were almost all in the direction of more severe restrictions.

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THE OBSTACLES OF THE LAW. I have spoken of the concern of the Heights of Building Commission about the legal validity of regulation; and the second commission was, if anything, still more careful to guard against difficulties here. It knew that the free use of land had been a sort of tradition in America. Our forefathers did not bring with them across the sea the doctrine of "ancient lights" that has prevailed for centuries in Great Britain; and the phrase frequently heard among the ungodly: "The sky's the limit," has actually described the attitude of a great portion of the public toward building operations.

European precedent could not be expected to mean much in a strictly legal sense, but it could have an indirect effect in its bearing upon the reasonableness of regulation. Our own courts had put the stress upon this question of whether the restrictions were reasonable or not; and every bit of evidence that the proposed law measured up to the rule of reason was valuable whether the evidence came from the Old World or the New. Accordingly, the commission fortified itself with plenty of data from the cities of Europe.

I purposely omitted consideration of the legal aspects of regulation in my brief review of the work of the Heights of Building Commission because it is better to introduce it in connection with a very recent event; and that event is the fulfilment of the expectation of the Districting Commission: the filing of a suit at law involving the constitutionality of the new resolution. It is worth while to review this case not only for its own sake, but because it illustrates remarkably well the character of the work done by the commission.

One Estelle P. Anderson made a contract on July 13, 1916, to sell the premises at 112 West 58th street to Steinway & Sons, piano manufacturers. That was just before the so-called Building Zone Resolution went into effect. When the time came to deliver the deed, Steinway & Sons refused to accept it, on the ground that the owner could not deliver it in the sense of the contract, "free from all encumbrance." They said that the designation of this block in West 58th street as a residence block, which would prevent them from erecting the sort of building they had planned, constituted an encumbrance and relieved them of the obligation to accept and pay for the premises. The owner thereupon brought suit to compel them to carry out the contract: she contends, first, that the resolution is unconstitutional; and, second, that whether it is constitutional or not, it is not an encumbrance. Steinway & Sons, in upholding their contention that it is an encumbrance, are in the position of defending its constitutionality. But the city has also come in as an interested party and is prepared to fight to the last ditch.

Though the particular block in question between Sixth and Seventh avenues was declared reserved for residences, the one to the south in 57th street, the one to the east between Fifth and Sixth avenues, and the one to the west between Seventh avenue and Broadway were all declared business districts. It appears, then, that the stretch between Sixth and Seventh avenues was a sort of residential "pocket." The commission is prepared to prove that it ought to stay such. One of the experts who contributed to the original decision has stated flatly in connection with this suit that "the use districts laid out by the commission on and in the vicinity of 58th street, between Sixth and Seventh avenues, were absolutely justified by the present development and by the prospective future development."

THE RECORD OF OTHER CITIES. The task of the city now is simply to prove the reasonableness of this view. A long array of court decisions upholds building restrictions as a valid exercise of the police power of the State, which one eminent judge has described as "a power incapable of exact definition, but the existence of which is essential to every well ordered government."

Boston supplied one of the most noted cases of building regulation in America when it divided itself into two districts, decreeing a height limit of 125 in one and 80 in the other (with certain exceptions depending upon street widths). This municipal act was attacked in the courts and the case went all the way through to the Supreme Court of the United States. It was triumphantly upheld.

But it was height and not use that was involved in Boston. The action of the Los Angeles city government presents what is perhaps the most striking instance of use district legislation in this country. For that city not only decreed a residential section, but made its decree retroactive, a degree of severity which no other American city has attempted. A person named Hadacheck, who had a brick kiln in the district, protested against being ousted; but the court to which he appealed refused to interfere with the act of the municipal corporation. And the Supreme Court of the United States sustained the ruling, saying: "There must be progress, and if in its march private interests are in the way, they must yield to the good of the community. The logical result of the petitioner's contention would seem to be that a city could not be formed or enlarged against the resistance of an occupant of the ground, and that if it grows at all it can only grow as the environment of the occupations that are usually banished to the purlieus."

This indefinite police power has been haled into court in hundreds of instances; it has been attacked as a tyrant by the persons to whom it caused loss and defended as a benefactor by communities. It has found the judges friends or enemies according as it has proved its intentions and methods good or bad. But the marked tendency has been to assume that the wielder of the police power is in the right; the burden of proof, it appears from the outcome of dozens of suits, is on the man who combats it. Furthermore, the laws laid down by communities in the interest of the general public and against the interest of particular persons or corporations are valid even though not necessary to such vital things as health and safety. Convenience, comfort, and general welfare are objects fully justifying restrictions on property owners. One noted authority has stated that "a police regulation to be legitimate does not have to be absolutely essential to the public welfare, but the exigency to be met must so concern such welfare as to suggest, reasonably, necessity for the legislative remedy. The police power extends to all the public needs and it may be put forth in aid of what is sanctioned by use, or held by prevailing morality or strong and preponderating opinion to be greatly and immediately necessary to the public welfare."

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THE BOGEY OF BEAUTY. There is a touch of the comic in the care which municipalities take to avoid the implication that any of their restrictions are primarily in the interest of beauty. The Districting Commission in New York has been no exception. Though architects are solidly lined up in favor of the regulations, and their support is welcomed, the proponents of the new resolution have zealously made their appeal to the practical common sense of the community and not to the æsthetic sense. Apparently the fear is general that the courts will frown upon a law that has for its excuse the improvement of the appearance of streets or buildings.

Yet there has been evidenced considerable judicial sympathy with legislative attacks on ugliness. When Baltimore had to defend in the courts its ordinance forbidding buildings more than 70 feet high near the Washington Monument, Judge Worthington's opinion contained the declaration that "perhaps the culture and refinement of the people has reached the point where the educational value of the fine arts, as expressed and embodied in architectural symmetry and harmony, is so well recognized as to give sanction, under some circumstances, to the exercise of the police power even for such purposes." And one of the judges passing upon the famous Boston case said that "if the primary and substantive purpose of the legislation is such as justifies the act, considerations of taste and beauty may enter in as auxiliary."

A truly novel view was expressed by the Supreme Court of the Philippines in upholding a statute providing for the removal of billboards that were "objectionable to the sight." Justice Trent, in delivering the opinion, stated flatly that the success of billboard advertising depended not so much upon the use of private property as upon the use of the channels of travel. Suppose, he asked, that an advertiser should paste his bills on the inside instead of the outside of his fence — of what use would they be? The regulation of billboards was not, therefore, the regulation of private property, but of the use of the streets.

All lovers and defenders of the beautiful ought to cherish an affection for this judge because of his following words, which were, in part: "We think it quite demonstrable that sight is as valuable to a human being as any of his other senses, and that the proper ministration to this sense conduces as much to his contentment as the care bestowed upon the senses of hearing or smell, and probably as much as both together. Why, then, should the government not interpose to protect from annoyance this most valuable of men's senses as readily as to protect him from offensive noises and smells?"

Of course, European cities have long regulated building in the interest of beauty. A structure must conform in its general architecture to other structures on the same street. Rigid height limits — far more rigid than we dare to attempt — are enforced for the same reason. The expert whom the Heights of Building Commission sent to Germany told in his report of laws that forbade "painting in harsh colors," and compelled every wall that could be seen from a street to be finished to some degree like a façade. It is a pity that public sentiment in this country did not approve of such restrictions fifty or seventy-five years ago; we are beginning to applaud them now, but meanwhile our cities have grown unevenly and ungracefully.

REGULATION AND THE POCKETBOOK. In New York the Districting Commission and its friends have no difficulty in making out a powerful case when they carry their appeal straight to the pocketbook. For years, as real estate values went down, owners fussed and fidgeted and complained of the conduct of one city administration after another, and could not understand what was happening to them. All the while one of the main causes of their trouble was this same chaotic building which only a few far-sighted men saw in its true light. Only when the evidence had piled up, and what had been plain to the few could no longer escape the view of the many, did the business men of the town rush to the support of the proposed restrictions.

The need that had long appealed to city planners — of providing light and air for the people in working place and home, of guarding against fire, of relieving congestion — became convincing enough when it was shown to coincide with, and not to conflict with, the need of protecting and stabilizing realty values.

"In New York City," said the Districting Commission, "the purely private injury incident to haphazard development has become so serious and widespread as to constitute a great public calamity. Through haphazard construction and invasion by inappropriate uses the capital values of large areas have been greatly impaired. This destruction of capital value, not only in the central commercial and industrial section of Manhattan, but also throughout the residential sections of the five boroughs, has reached huge proportions. It does not stop with the owners in the areas immediately affected, but is reflected in depressed values throughout the city. Market value for investment purposes is always affected by the hazard of the business. Economic depreciation due to unregulated construction and invasion by inappropriate uses has become a hazard that must be considered by every investor in real estate. This extra hazard increases the net earning basis required to induce investment, and consequently lessens capital values throughout the city. Whatever the capitalized amount that may be properly charged to the economic depreciation hazard, it is certainly a huge burden and one that affects not only the individual owners of real estate throughout the city, but the savings and other large lending institutions, the municipal finances, and the general welfare and prosperity of the whole city."

In the greatest city in the New World nothing was done to direct growth, in the interest of beauty, health, and safety, until Mammon cried out in distress. And had it not been for a small group of men blessed with vision, not for years to come would Mammon have known what was hurting him. But it is not particularly profitable to dwell upon the awakenings that had to take place before New York entered upon its new era of building development. The point is that the thing that ought to have been done has been done. City-planning — a term that not long ago was greeted with derision in city councils — has been turned from a dream into a reality. And one of the greatest of all municipal achievements is written down to the credit of New York.

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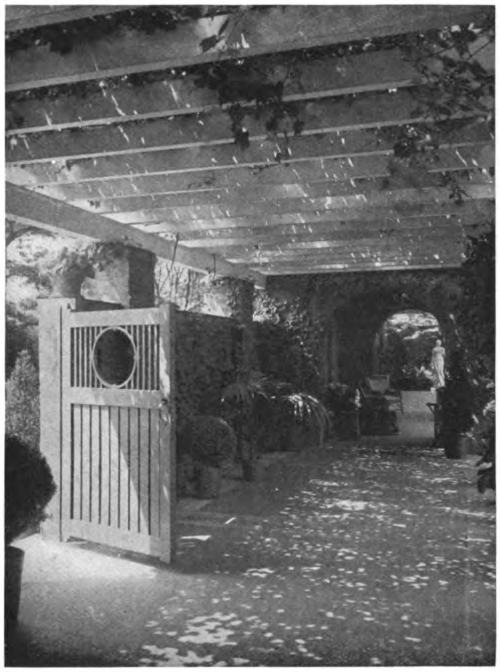
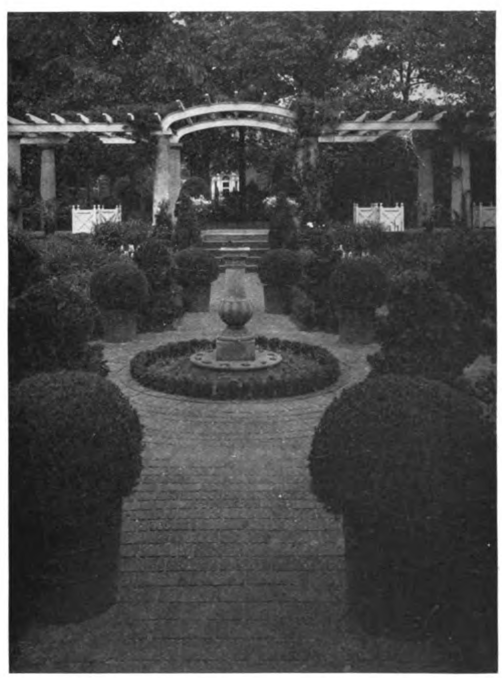
# THE GARDEN OF J. H. POOLE, ESQ., AT DETROIT, MICH.

CHITTENDEN & KOTTING, ARCHITECTS







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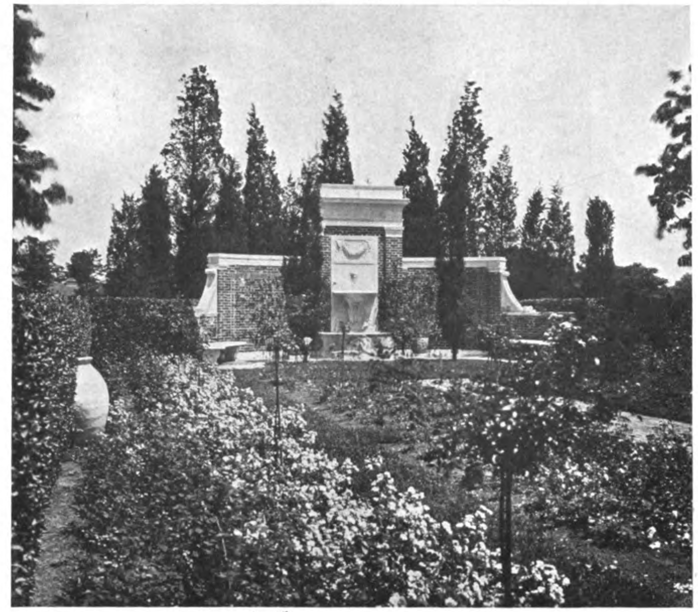

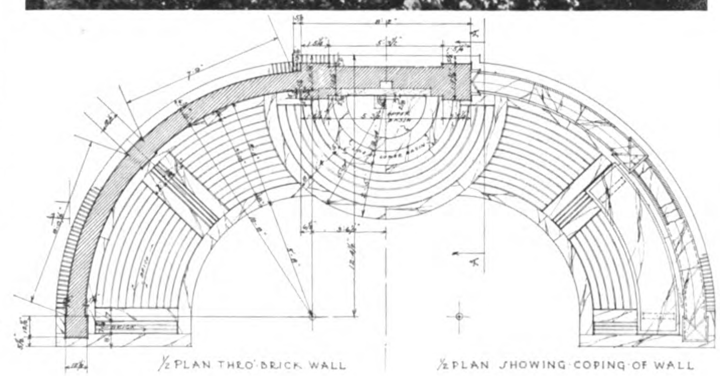


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WALL FOUNTAIN ON ESTATE OF DR. ERNEST FAHNESTOCK, SHREWSBURY, N. J.

LEWIS COLT ALBRO, ARCHITECT

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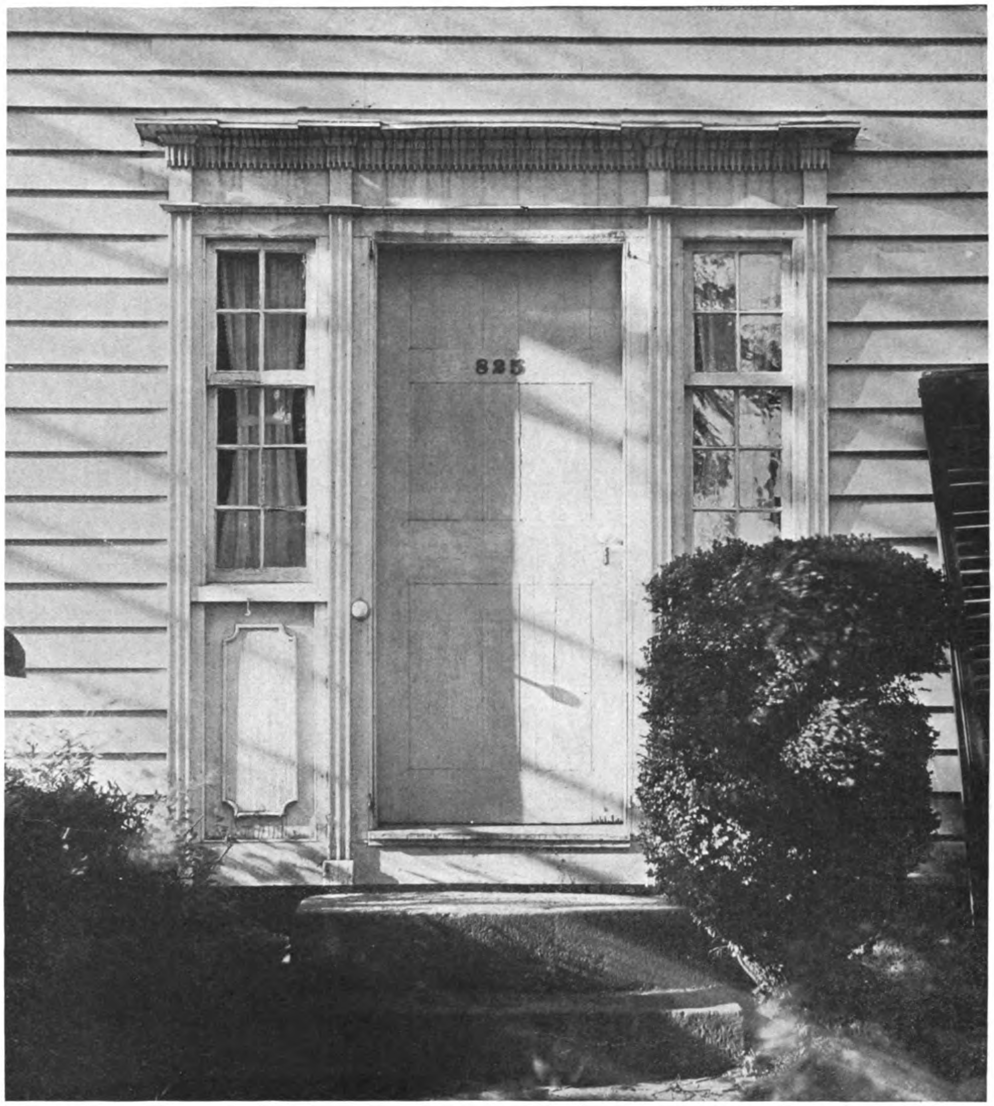
PLATE THIRTY-SIX



*THIS doorway is decidedly original in conception, with no suggestion of any classic model. The mouldings are few and simple, yet the result is full of charm and elegance. The beak moulding, which breaks around the pilasters to form their caps, is most unusual in section. The contour of the top member of the simple cornice is very pleasing, the curve over the doorway proper serving to accent the central part of the motif. An unusual feature in a doorway of this type is the use of double hung sash in the sidelights. The house itself is very simple, having been originally a farmhouse.*

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DOORWAY OF THE HUMISTON HOUSE, HAMDEN, CONN.

Built about 1815

MEASURED DRAWING ON FOLLOWING PAGE



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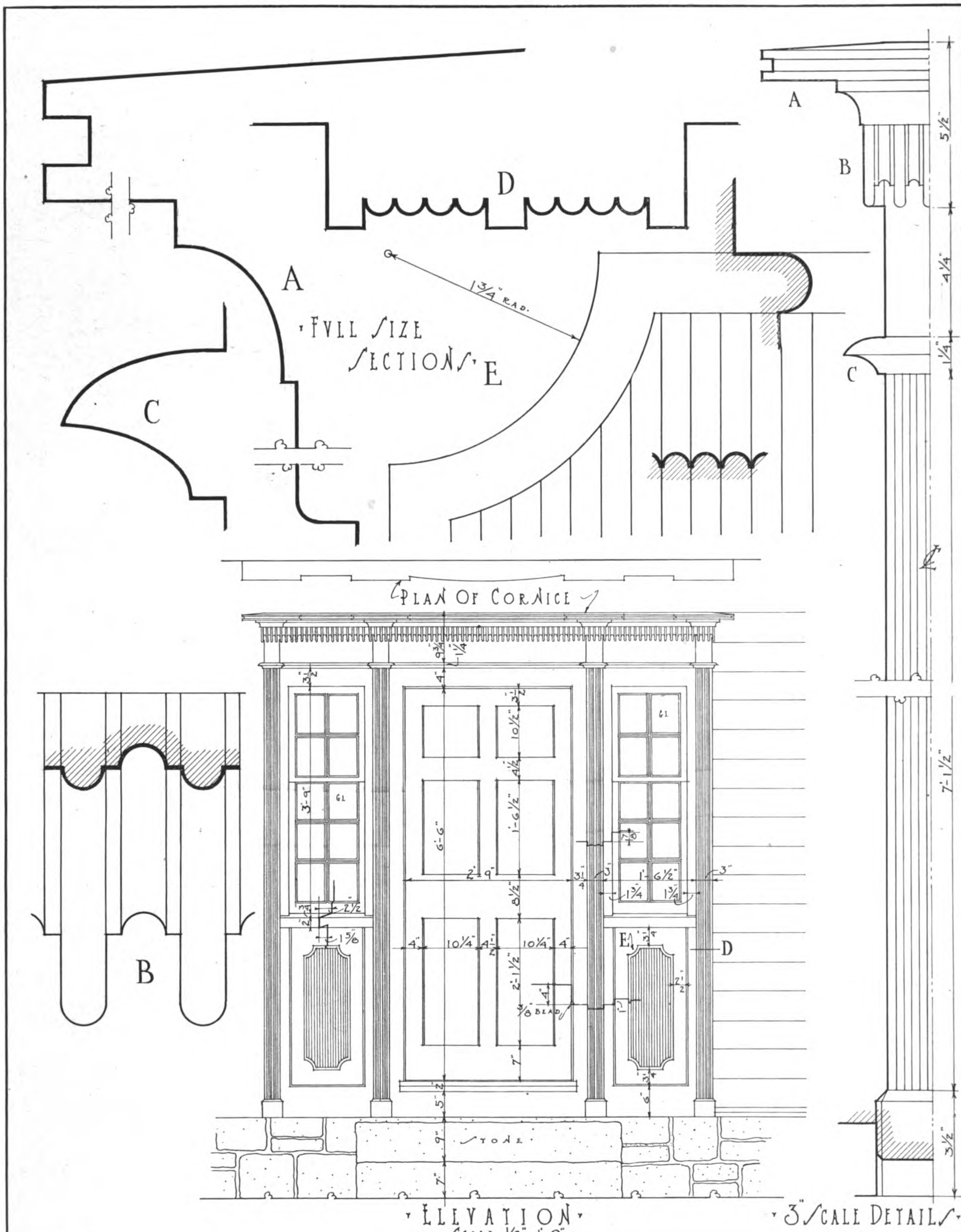


| PLATE 36<br>JANUARY 1917 | HUMISTON HOUSE<br>FRONT ENTRANCE<br>HAMDEN, CONN. BUILT 1815 | MEASURED AND DRAWN BY<br>J. FREDERICK KELLY |
|---|---|---|



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White Lion Hotel, Cobham, Surrey

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# Small English Buildings of the Late Georgian Period

*By* R. RANDAL PHILLIPS

IN the realm of English domestic architecture there are two periods which stand out preëminently, vying with one another in point of charm of effect and suitability of purpose. These two periods are the Tudor and the Georgian. Up and down the country innumerable examples still testify, in the one case, to the traditional skill of builders who were not consciously working toward an artistic result; and, in the other case, to the disciplined talent of architects who added a human touch to classical forms. The term "Georgian" serves well enough to designate the latter type of house, though, strictly speaking, the style antedates the first of those four Georges of Hanoverian descent who occupied the throne of England for nearly a hundred years. For the beginnings of the style we have to go back to the time when Wren and his school were producing a distinctively English phase of classical architecture, deriving a good deal of inspiration from Holland; but when, in the following century, we come within the exact period of the Georges, there is a very marked difference to be seen between the early and the later work — a difference consisting, for the most part, of refinement in proportion and detail. The last and most elegant phase, as expressed in the small brick houses of the period, is the subject of the present article. From 1750 onward to the end of the century English houses acquired a character which, if it was matter of fact as the age itself was matter of fact, was consistently logical and well balanced. There was nothing of fervor or spiritual zeal in eighteenth-century England, and the houses of the period reflect this fact just as much as the literature does. But especially during the Late Georgian period influences were at work which added great refinement and delicate charm to the domestic architecture. In approaching this period it is inevitable that the name of Robert Adam should be mentioned as one who exercised a dominant power on English architecture, stamping it with the mark of scholarly refinement; but, though Adam claims the lion's share of attention, it is well to note that there were other architects who did work of equal and sometimes of greater merit. We know the names of some of these men, such as Thomas Leverton, J. M. Gandy, Thomas Sandby, and William Yenn; but in the case of most of the houses that have come down to us we are unable to discover who the designer was. As a class, these Late Georgian houses stand unrivaled, and in view of the interest which has latterly been given to the architecture of the late eighteenth century and early nineteenth, it is opportune to present the accompanying series of illustrations showing representative examples. We are not now concerned with those large country houses and town mansions which rich clients were able to erect, but with the innumerable small houses which sprung up, especially around the growing towns, to meet the needs of prospering citizens. Most of these houses were built of brick, the brickwork being sometimes left exposed, and sometimes covered with a smooth stucco, which was generally whitened. They bear a strong family likeness one to another, but they are by no means cast in the same mould, offering all sorts of different treatments, both in general design and in detail. But there is this prevailing characteristic about them all,— a studied sense of good proportion and a refinement in design in such features as the doorways, cornices, string-courses, etc. With very few exceptions they are of two stories only, the front being treated as a symmetrical design, with the doorway in the center. The plan was a very simple one, consisting of a central passage with rooms on either side; and though this plan has its defects when applied to-day on restricted frontages, where it is desired to have the largest possible rooms with a minimum of waste space in passageways, there are many points of advantage when no such limitations are imposed; for example, straightforward access is given to all the rooms, the service can be conveniently arranged, and the house can be admirably



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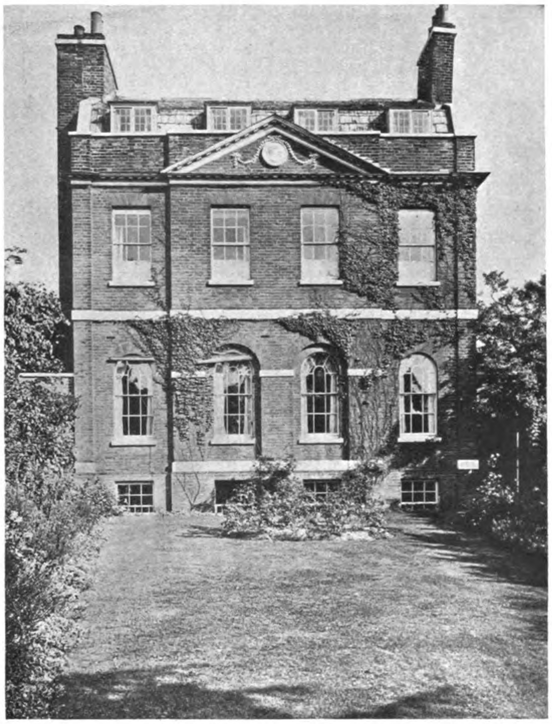

Garden Front of Brown House, Reigate, Surrey

of a disc formed in this way was about four or five feet. Panes were cut out on either side of the center, and this limitation of possible size was a determining factor in the design of the window. The glass was never absolutely flat, but always slightly concave, and the concave side was invariably set outward in the window. The result is that these old windows catch the light and reflect it in a most charming manner, and a house front thus has an interest which is not given by any other sort of glass. The center of the disc, where the iron rod was attached, was only of use for the least important purposes, and on account of its cheapness was largely adopted for the windows of cottages, forming those "bull's eyes" which are sometimes, in an affected manner, repeated to-day.

The roofs of the Late Georgian houses were tiled or slated — more often the latter — and they very rarely had rooms in them. It would be a vast improvement if modern houses followed that model, because when rooms are crowded into steep roofs, in the manner so largely favored by "Garden City" architects, they become intolerably hot in summer and uncomfortably cold in winter; moreover, they are not properly square rooms, but have sloping ceilings that interfere with the head room and render it practically impossible to place furniture in satisfactory positions. The Late Georgian houses were ceiled straight across, and this not only gives rooms of a good shape on the upper floors, but also provides a cushion of air above which counteracts the effects of extreme heat and cold.

In dimensions the rooms were, as a rule, smaller than we like them to-day, but they had very agreeable appoint-

ventilated by simply opening the front door and allowing a current of air to sweep through the passage to the back of the house.

The doorways to these Late Georgian houses display a great variety of treatment, from simple hoods and reeded architraves to pedimented porches supported by pillars; but perhaps none are so attractive as those with trellis porches, these being fashioned of wood, and especially charming in appearance when intertwined with rose or clematis.

The windows are divided by bars of small section and are filled with panes of that glittering crown glass which is so greatly superior in effect to the glass which is manufactured to-day. While referring to this glass we may be permitted the digression of explaining the manner of its manufacture. A blob of molten glass was taken on the end of a long tube and blown out in the form of a globe, which was then pressed upon until it assumed a pumpkin shape. An iron rod was then attached to the globe on the opposite side to the tube, and by a quick turn with a wet stick the glass was cracked around the latter and the tube was withdrawn. The globe, attached to the iron rod, was next spun between the hands in front of the muffle furnace and the centrifugal force burst it open — unrolling it like a flag — so that there was then a disc of glass spinning round on the end of the rod. The disc was gradually withdrawn from the furnace and at the same time the rotation was gradually reduced. When the glass had set, the disc was placed gently down on a bed of sand. The maximum possible size

Doorway, Brown House, Reigate, Surrey

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PAIR OF ROADSIDE HOUSES, COBHAM, SURREY

GARRICK VILLA, HAMPTON-ON-THAMES

EXAMPLES OF THE LATE GEORGIAN PERIOD IN ENGLAND

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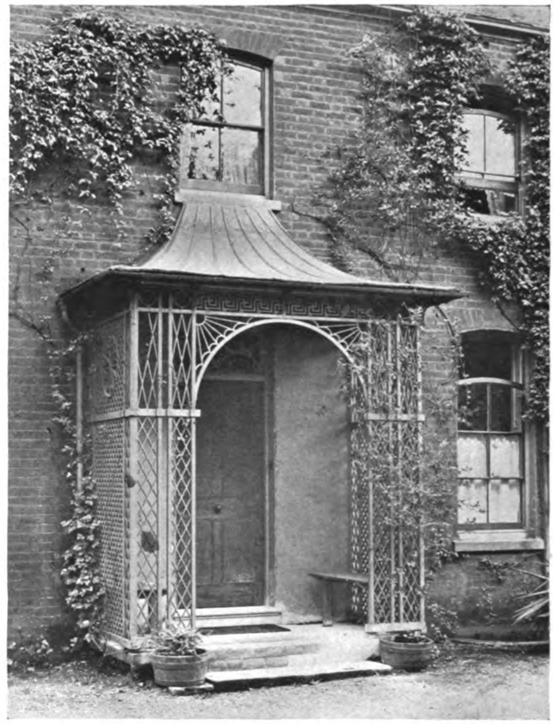
ments, especially simple mantelpieces of marble or wood, well designed and frequently embellished with good ornament, and in some cases the rooms were paneled, though this was not by any means the rule, as the houses were not built for wealthy tenants, and cost was a controlling factor then just as it is now. Unfortunately the interiors are not preserved for us as the exteriors are, for successive alterations have oftentimes robbed them of a good deal of their interest, and in most cases they are filled with furniture which lacks the refined character that distinguished the furniture of the late eighteenth century in England.

These houses, while they belong particularly to the second half of the eighteenth century, cannot be limited to that period, for they were repeated, with slight modifications only, almost for the whole of the first quarter of the nineteenth century, though the freezing manner of the Greek Revival was surely proclaiming their end. But we can at least be thankful that so many still remain, and it is with the object of showing a few representative types that the accompanying illustrations have been gathered together. The following are some detailed notes on the illustrations:

"The Wick," Richmond Hill. This is situated on the top of Richmond Hill and commands a magnificent view of the Thames Valley from its back windows. The front elevation is essentially formal in character, but the light and graceful treatment of the details saves it from any appearance of baldness or heaviness. The removal of the glazing bars from the ground-floor windows is regrettable, and to some extent detracts from the effect as a whole. The design has been attributed to James Paine, but this cannot be determined with certitude.



Porch of House at Kingston-on-Thames

Doctor's House, New Cross, London, S. E.

Strawberry House, The Mall, Chiswick. Apart from being a delightful example of its period, this house suggests *motifs* for modern application: note the treatment of the balcony and the porch, the apt use of ironwork, and the neat design of the window-blind boxes.

White Lion Hotel, Cobham. The long, low lines of the brickwork, with the broad tiled roof and the nestling dormers, together with the large grouped chimney stacks, give an air of generous hospitality to this house, and the treatment of the pedimented central portion, with the slender columns to the porch, adds the necessary touch of distinction to the front. The clever way in which the blank window spaces are introduced on the first floor at either side of the central bay, buttressing it up, as it were, is worth noting.

Pair of Houses at Cobham. The character of the design is one of quiet simplicity. The good effect of the whole is largely due to the proportion of windows to wall space. The windows of each house cluster around the entrance door, serving to emphasize the individual houses while at the same time forming one continuous composition.

Brown House, Reigate. The date of this charming house may be taken as 1784, this date being carved on a stone block in the cellar, and there is evidence to suggest that William Thomas was the architect. The piers at either side of the garden front are derived from early Georgian work, but the delicacy of the cornice is distinctly later

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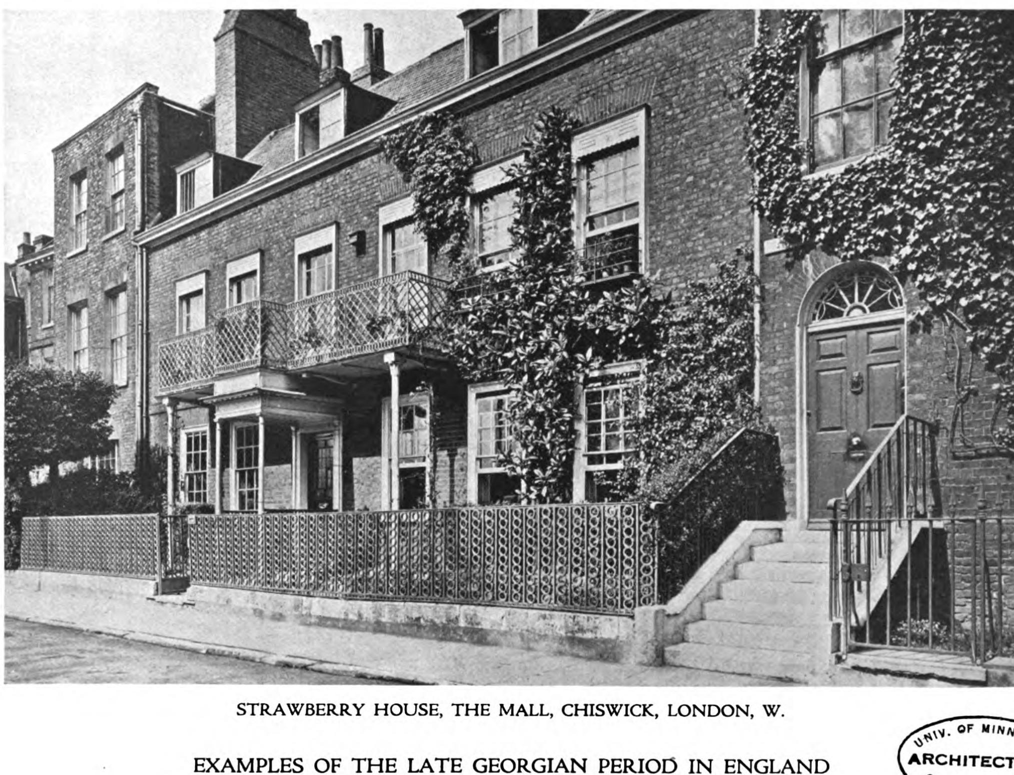
THE WICK, RICHMOND HILL, SURREY



STRAWBERRY HOUSE, THE MALL, CHISWICK, LONDON, W.

EXAMPLES OF THE LATE GEORGIAN PERIOD IN ENGLAND

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Georgian, as, too, are the windows with their thin bars. The porch in itself is a delightful feature. The glowing red of the brickwork, the green of the creeper and of the lawn, and the gray of the slates on the roof make up a beautiful color scheme.

GARRICK VILLA, HAMPTON-ON-THAMES. Since Garrick's time this villa by Robert Adam has suffered much alteration within, but it preserves its exterior form largely intact. Adam's work consisted in giving a new face to an old house, and so well did he carry out the task that there is no suggestion of makeshift about it. The house faces the river at Hampton, its lawn — with a little classical garden-house on it — being separated by a roadway.

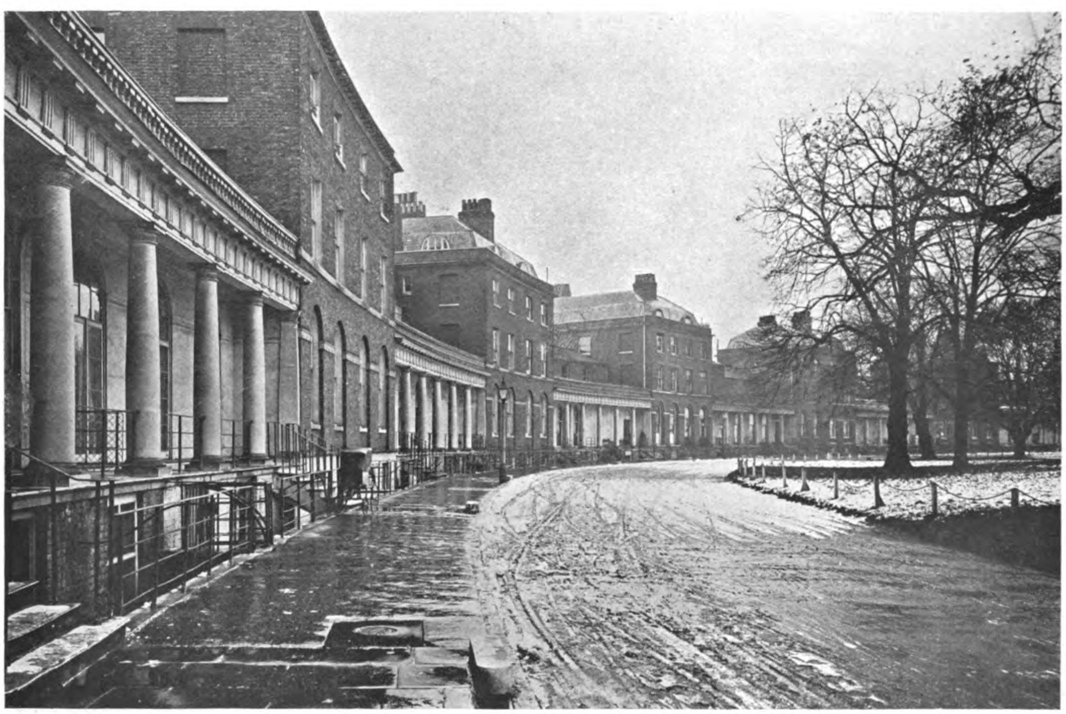
Woodbine Cottage, Petersham, Surrey

DOCTOR'S HOUSE, NEW CROSS. To this little street façade a piquant character is given by the concentration of attention on the first-floor bay window, with figures symbolic of health and strength in niches on either side.

THE PARAGON, BLACKHEATH. The frontage of the Paragon at Blackheath follows the line of the outer walls of the grounds on which formerly stood the mansion built for Sir Godfrey Page. The house was pulled down in the latter years of the eighteenth century, when the present buildings were erected. An architect named Searle appears to have been responsible for the design. The treatment of the different blocks linked up with Doric colonnades is most original, preserving as it does the continuity of the design, whilst indicating the individuality of the separate houses. The detail throughout, though delicate in execution, is extremely masculine and direct in character. Originally the Paragon was built to provide accommodation for naval officers stationed at Greenwich or for others who had retired from the service.

WOODBINE COTTAGE, PETERSHAM. This was built probably between 1780 and 1790. The door, however, is designed in an earlier manner, and may be an old door reused from an earlier building.

PORCH, KINGSTON-ON-THAMES. This is an excellent example of the Late Georgian trellis porch. The delicately reeded uprights and the Greek fret in the frieze are pleasant details in a very happy piece of composition.



The Paragon, Blackheath, London, S. E.

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# The Use of Ceramic Products in the Embellishment of Buildings

*By* CLAUDE BRAGDON

THE production of ceramics, while perhaps the oldest of all the useful arts practised by man, an art with a magnificent history, has at no time fallen into disuse; it seems at present, moreover, to be entering upon a new era. It is more alive to-day, more generally, more skilfully — I wish I might add, more artfully — practised than ever before. Its recent inclusion in university curriculums, on the same plane with the various branches of engineering and architecture, is significant of the recognition it is now beginning to receive. It is therefore of interest to all architects, in view of the increasing importance of ceramics in buildings, to consider the ways in which these materials may best be used.

Looking at the matter in the broadest possible way, it may be said that the building impulse throughout the ages has expressed itself in two fundamentally different types of structure: that in which the architecture — and even the ornament — was one with the engineering; and that in which the two were separable, not in thought alone, but in fact. To the first class belong the architectures of Egypt, of Greece, and Gothic architecture as practised in the north of Europe; to the second belong Roman architecture of the splendid period, Moorish architecture, and Italian Gothic, so called. In the first class the bones of the building were also its flesh; in the second, bones and flesh were in a manner separable, as is proven by the fact that they were separately considered, separately fashioned. Ruined Karnak, the ruined Parthenon, wrecked Rheims, show ornament so integral a part of the construction — etched so deep — that what has survived of the one has survived also of the other; while the ruined Baths of Caracalla, the uncompleted church of S. Petronio in Bologna, and many a stark mosque on many a sandy desert show only stripped skeletons of whose completed glory we can but guess. In them the fabric was a framework for the display of the lapidary or the ceramic art — a garment destroyed, rent, or tattered by time or chance; leaving the bones still strong, but bare.

For brevity let us name that manner of building in which the architecture is the construction, *inherent* architecture, and that manner in which the two elements are separable, *incrusted* architecture. Let us draw no invidious comparisons between the two, but regard each as the adequate expression of an ideal type of beauty; the one masculine, since in the male figure the osseous framework is more easily discernible; the other feminine, because more concealed and overlaid with a cellular tissue of shining, precious materials, on which the disruptive forces of man and nature are more free to act. I need scarcely say that it is with incrusted architecture that we are almost solely concerned in this discussion, for to this class almost all modern buildings perforce belong. It is a necessity dictated by the materials that we have come to employ, and by our methods of construction.

All important modern buildings follow practically one method of construction: a bony framework of steel—or of concrete reinforced by steel — filled in and subdivided by concrete, brick, hollow fire-clay, or some of its substitutes. To a construction of this kind some sort of an outer encasement is not only æsthetically desirable, but practically necessary. It usually takes the form of stone, face-brick, tile, stucco, or some combination of two or more of these materials. Of the two great types of architecture, the incrusted type is therefore imposed by structural necessity.

The enormous importance of ceramics in its relation to architecture thus becomes apparent. They minister to an architectural need instead of gratifying an architectural whim. Ours is a period of incrusted architecture — one which demands the enrichment of surfaces and the encasement, rather than the exposure, of structure. For these purposes there are no materials more apt, more adaptable, more enduring, richer in possibilities, than the products of ceramic art.

These products are easily and inexpensively produced of any desired shape, color, and texture; their hard, dense surface resists the action of the elements, is not readily soiled, and once soiled is easily cleaned; and being fashioned by fire they are fire resistant.

So much, then, for the practical demand, in modern architecture, of the products of ceramic art. The æsthetic demand is not less urgent and is as admirably met.

When, in the sixteenth century, the Renaissance spread from South to North, color was practically eliminated from architecture. The Egyptians had had it, hot and bright as the sun on the desert; we know that the Greeks made their Parian marble glow in rainbow tints; Moorish architecture was nothing if not colorful; and the Venice Ruskin loved was fairly iridescent — a thing of fire opal and pearl. In Italian Renaissance architecture, up to its latest phase, the color element was always present; but it was snuffed out under the leaden colored northern skies. Paris is gray, London is brown, New York is white, and Chicago the color of cinders. We have only to compare them to yellow Rome, red Siena, and pearl tinted Venice to realize how much we have lost in the elimination of color from architecture. And we are coming to realize it. Only remember how important a part color played in the Pan-American Exposition, what increased importance it assumed in the recent San Francisco Exposition, where, wedded to light, it became the dominant note of the whole architectural concert. These great expositions, in which architects and artists are given a free hand, are in the nature of preliminary studies in which these functionaries sketch in transitory form the things they desire to do in more permanent form. They are forecasts of the future — a future which in certain quarters is already beginning to realize itself. It is, therefore, probable that the next development in architectural art will be in this direction — toward color. I can at least give my personal testimony to that effect.

Several years ago, in the Albright Art Gallery in Buffalo — a building of a severely classic type — I noted a single doorway whose white marble architrave had been stained with different colored pigments by Francis Bacon, and it made the rest of the place seem so cold and dull



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that I decided then and there that architecture without the help of polychromy was architecture incomplete.

Mr. Bacon had spent many years studying the remains of Greek architecture in Asia Minor and elsewhere, and he once showed me a fragment of an antefix from the Temple of Assos in which the applied color was still pure and strong. Why should we not also try to introduce color into our buildings, as an added element of interest and charm?

It goes without saying that ceramic products are ideal for this purpose. In them nearly the whole gamut of the spectrum is available to the architect. The colors do not change nor fade, and they possess a beautiful quality. Our craftsmen and manufacturers of face brick, architectural terra cotta, and colored tile, after much costly experimentation, have succeeded in producing these ceramics of a high order of excellence and intrinsic beauty: they can do practically anything demanded of them; but from that quarter where they would reap the greatest commercial advantage — the field of architecture — there is all too little demand. The architect, who should lead, teach, and dictate in this field, is content to learn and follow instead. This has led to an ignominious situation — ignominious, I mean, to the architect. He has come to require of the manufacturer — when he requires anything at all — assistance in the very matter in which he should assist: the determination of color-design. It is no wonder that the results are often bad, and therefore discouraging. The manufacturers of ceramics welcome co-operation and assistance on the part of the architect, with an eagerness which is almost pathetic, on those rare occasions when assistance is offered. Such, at least, has been my own experience.

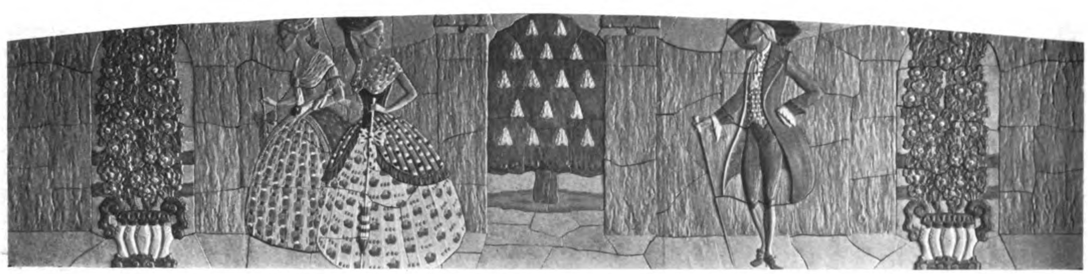
But the architect is not really to blame: the reason for his failure lies deep in his general predicament of having to know a little of everything, and to do a great deal more than he can possibly do well. To cope with this, if his practice warrants the expenditure, he surrounds himself with specialists in various fields, and assigns various departments of his work to them. He cannot be expected to have on this staff a specialist in ceramics, nor can he, with all his manifold activities, be expected to become such a specialist himself. As a result, he is usually content to let color problems alone, for they are merely another complication of his already too complicated life, or he refers them to some one who he thinks ought to know — a manufacturer's designer — and O.K.'s almost anything that may be submitted to him.

This explanation is not offered in apology for the architect's attitude, but in justice to him. Of course the ideal architect would have time for every problem, and solve it supremely well; but the real architect is all too human; there are depressions on his cranium where bumps ought to be; moreover, he wants a little time left to energize in other directions than the practice of his craft.

One of the functions of architecture is to reveal the inherent qualities and beauties of different materials by their appropriate use and tasteful display. An onyx staircase on the one hand and a Portland cement high altar on the other alike violate this function of architecture. Make your high altar of onyx and lapis-lazuli and your staircase of Portland cement, and you have obeyed, not ignored, that beautiful necessity which decrees that precious materials should serve precious uses, and common materials should serve utilitarian ends. Now color is a precious thing, and its highest beauties can only be brought out by contrast with broad, neutral tinted spaces, — that is, by isolation. The interior walls of a medieval cathedral never competed with its windows, and, by the same token, a riot of polychromy all over the side of a building is not as effective, even from a chromatic point of view, as though it were confined, say, to an entrance and a frieze. Gilbert's witty phrase is applicable here:

"Where everybody's somebody, nobody's anybody."

Let us build our walls, then, of stone, or brick, or stucco, for their flat surfaces and neutral tints conduce to that repose so essential to good architectural effect; let us not rest content with this, however, but grant to the eye the delight and contentment which it craves by color and pattern placed at those points to which it is desirable to attract attention, for these things serve the same æsthetic purpose as a tiara on the brow of beauty, or a ring on a delicate white hand. But just as jewelry is best when it is most individual, so the ornament of a building should be in keeping with its general character and complexion. A color scheme should not be chosen at random, but dictated by the prevailing tone and texture of the wall surfaces with which it should harmonize as inevitably as the blossom of a bush with its foliage. This prevailing tone will inevitably be either cold or warm, and the color scheme must just as inevitably be either cold or warm; that is, there must be a preponderance of cold colors over warm, or *vice versa*. Otherwise the eye will suffer just that order of uneasiness which comes from the contemplation of two equal masses, whereas it experiences an undeniable satisfaction in proportionate unequals as the elements of a composition.



Panel Designed by Knud Laub and Franz Helving, Café Savarin, New York. John J. Petit, Architect

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Nothing will take the place of an instinctive color-sense, but even that needs the training of experience, if the field be new, and will be aided by a few general principles of all but universal application.

First of all it should be remembered that the intensity of color should be carefully adjusted to its area. It is dangerous to try to use high, pure colors, unrelieved and uncontrasted, in large masses; but the brightest, strongest colors may be used with impunity in units of sufficiently restricted size. For harmony, as well as richness, the so-called law of complementaries is the best of all guides.

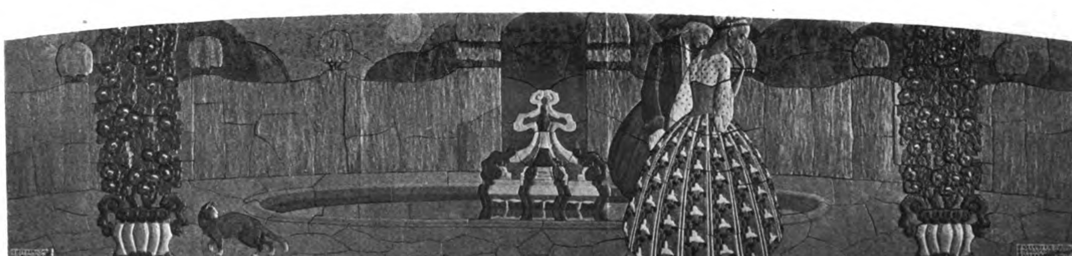
Another important consideration with regard to color dwells in those optical changes effected by distance, and the relative visibility of different colors and combinations of color as the point of sight recedes. In general, they seem to merge into one another, and all the values to lower, but not all equally. Yellow loses itself first, tending toward white; the greens and blues efface themselves next, and the reds last of all. Another curious effect of distance is to disintegrate secondary colors into their primaries and to make the complementaries emerge. A knowledge of these and kindred facts will save the architect from many disappointments and enable him to obtain wonderful chromatic effects by simple means.

Many architects unused to color problems design their ornament with very little thought about the colors which they propose to employ, making it an after-consideration; but the two things should be considered together for the best final effect. Color is capable of making surfaces advance toward or recede from the eye, just as modeling does; and for this reason, if color is used, a great deal of modeling may be dispensed with. If a receding color is used on a recessed plane, it may deepen the plane unduly; while, on the other hand, if a color which refuses to recede, like yellow, for example, is used where depth is wanted, the receding plane and the approaching color neutralize each other, resulting in an effect of flatness not intended. The beginner should not complicate his problem by combining color with high relief modeling, bringing in the element of light and shade. He should leave that for older hands and concern himself rather with flat or nearly flat surfaces, using his modeling much as the worker in *cloisonné* uses his little rims of brass — to limit and define each color within its own allotted area. Then, as he gains experience, he may gradually enrich his pattern by the addition of the element of light and shade.

Now as to certain general considerations in relation to the appropriate and logical use of ceramics in the construction and adornment of buildings, exterior and interior. In our northern latitudes care should be taken that ceramics are not used in places and in ways where the accumulation of snow and ice render the joints subject to alternate freezing and thawing; for in such case, unless the joints are protected, the units will work loose in time. On vertical surfaces such protection is not necessary: the use of ceramics of the finer and more delicate sort should therefore be confined for the most part to such surfaces; for friezes, panels, door and window architraves, and the like. When it is desirable for æsthetic reasons to tie a series of windows together vertically by means of some filling of a material different from that of the body of the wall, colored tiles or brick pattern work lend themselves admirably to the purpose — better than wood, which rots, than iron, which rusts, than bronze, which turns black, and than marble, which soon loses its color and texture in exposed situations of this sort.

On the interior of buildings the most universal use of architectural ceramics is, of course, for floors, and with the non-slip devices of various sorts which have come into the market they are no less good for stairs. There is nothing better for wainscoting, and in fact for any surface whatsoever subject to soil and wear. The one material combines permanent protection and permanent decoration. But with the zeal of the convert, the use of ceramics may be overdone. I recall entire rooms of colored tile — floors, walls, ceilings—which are less successful than if a variety of materials had been employed. It is just such variety, each material treated in a characteristic, and therefore different, way, that gives charm to so many foreign churches and cathedrals: walls of stone, floors of marble, choir-stalls of carved wood, and rood-screen of metal; it is like an orchestra of contrasted instruments as compared with a group of mandolin players or a saxaphone sextette.

Ceramics should never invade the domain of the plasterer, the mural painter, the cabinet maker. They have, as regards architecture, a distinct and honorable function. This function should be recognized, taken advantage of, but never overpassed. They offer opportunities large, but not limitless. They constitute one instrument of the orchestra of which the architect is the conductor, an instrument beautiful in the hands of a master, and doubly beautiful in concert and contrast with those other materials which make that music in three dimensions—architectural art.



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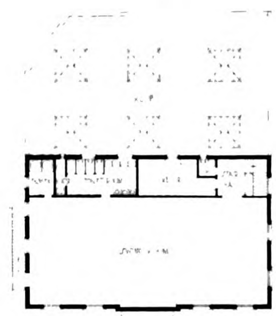
# PRATT STATION POST OFFICE, BROOKLYN, N. Y.

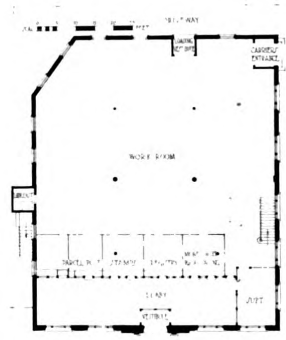
SHAMPAN & SHAMPAN, ARCHITECTS

GENERAL VIEW OF EXTERIOR


DETAIL OF ENTRANCE



SECOND FLOOR PLAN



FIRST FLOOR PLAN



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# Details of Italian Renaissance Architecture

MEASURED DRAWINGS BY MAURICE P. MEADE

IN probably no other architectural style was more attention paid to the perfection of detail than in the Italian Renaissance, and in this series of plates and those to follow a selection of the simpler details, such as architraves, bases, doorways, etc., has been made to illustrate the great care with which these elements were executed.

Church of San Agostino, Rome

The first plate shows a detail of the central doorway to the Church of San Agostino in Rome. The façade of this church is of travertine taken from the Colosseum, and the doorway is of marble. As is true with most of the smaller churches in Rome, it is located on a narrow thoroughfare, but fortunately the architect set the building back from the street and approached the main entrance by a grand flight of stairs extending across the entire width of the façade. The flanking doorways are much simpler in detail and smaller in proportion than the central doorway, but compose well with it.

The architrave shows a distinct variation from the usual in the character of its mouldings. The console, which is richly carved on the face and sides, is also unusual in that it butts the soffit of the horizontal facia to the pediment without the bed mould cap breaking around its top. The church is attributed to Baccio Pontelli and was completed about 1483.

The second plate shows a detail of the doorway to the Church of Santa Maria Novella in Florence, which is attributed to Leon Battista Alberti. As in nearly all doorways of this period, the doors are set into rebated stone jambs without any wood frame.

The third plate is a detail of a doorway to a house in the Via del Gesù, Rome, generally conceded to be one of the most beautiful Renaissance doorways in Rome.


Doorway of House in Via del Gesu, Rome

Doorway of Church of Santa Maria Novella, Florence



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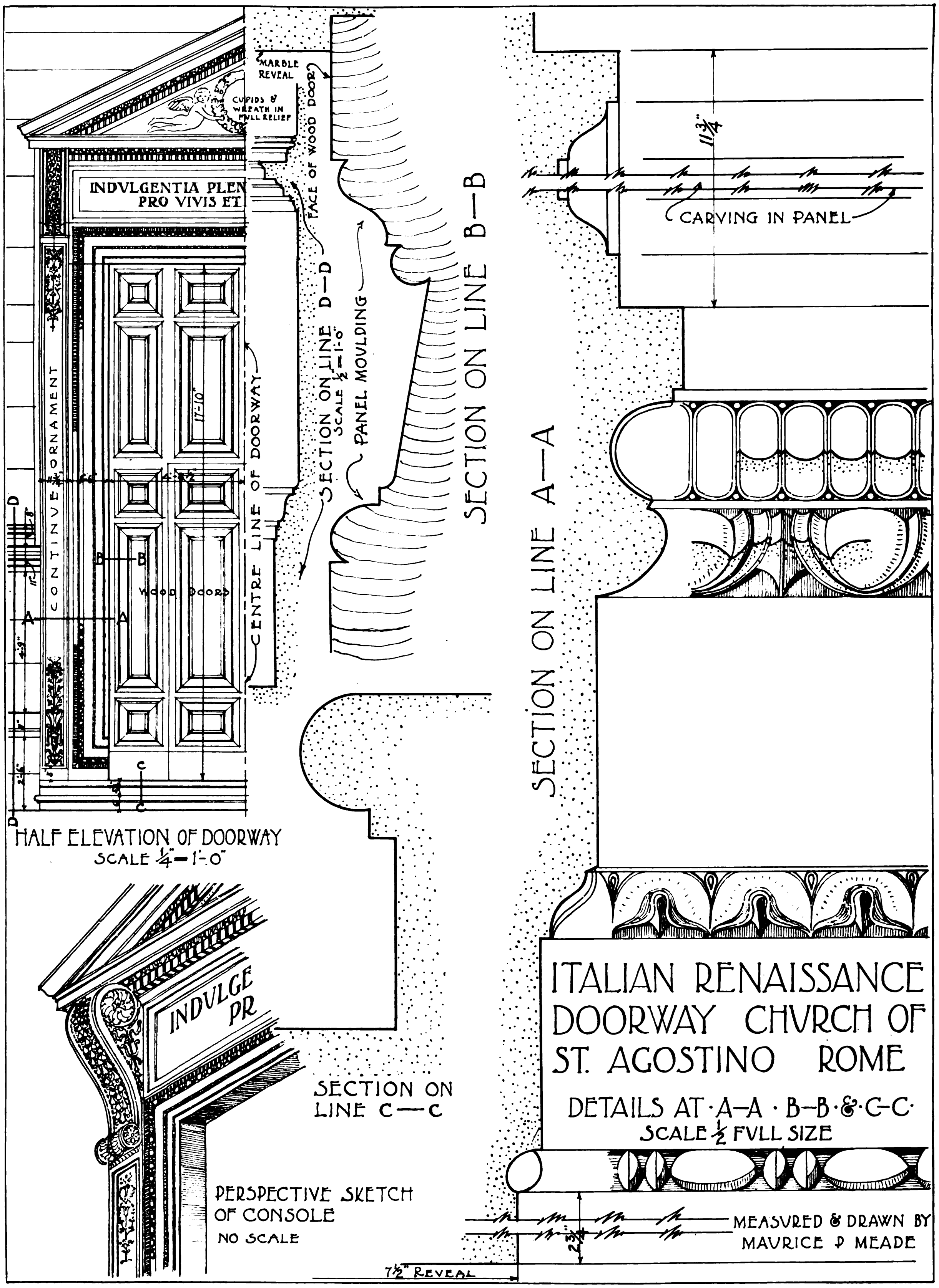




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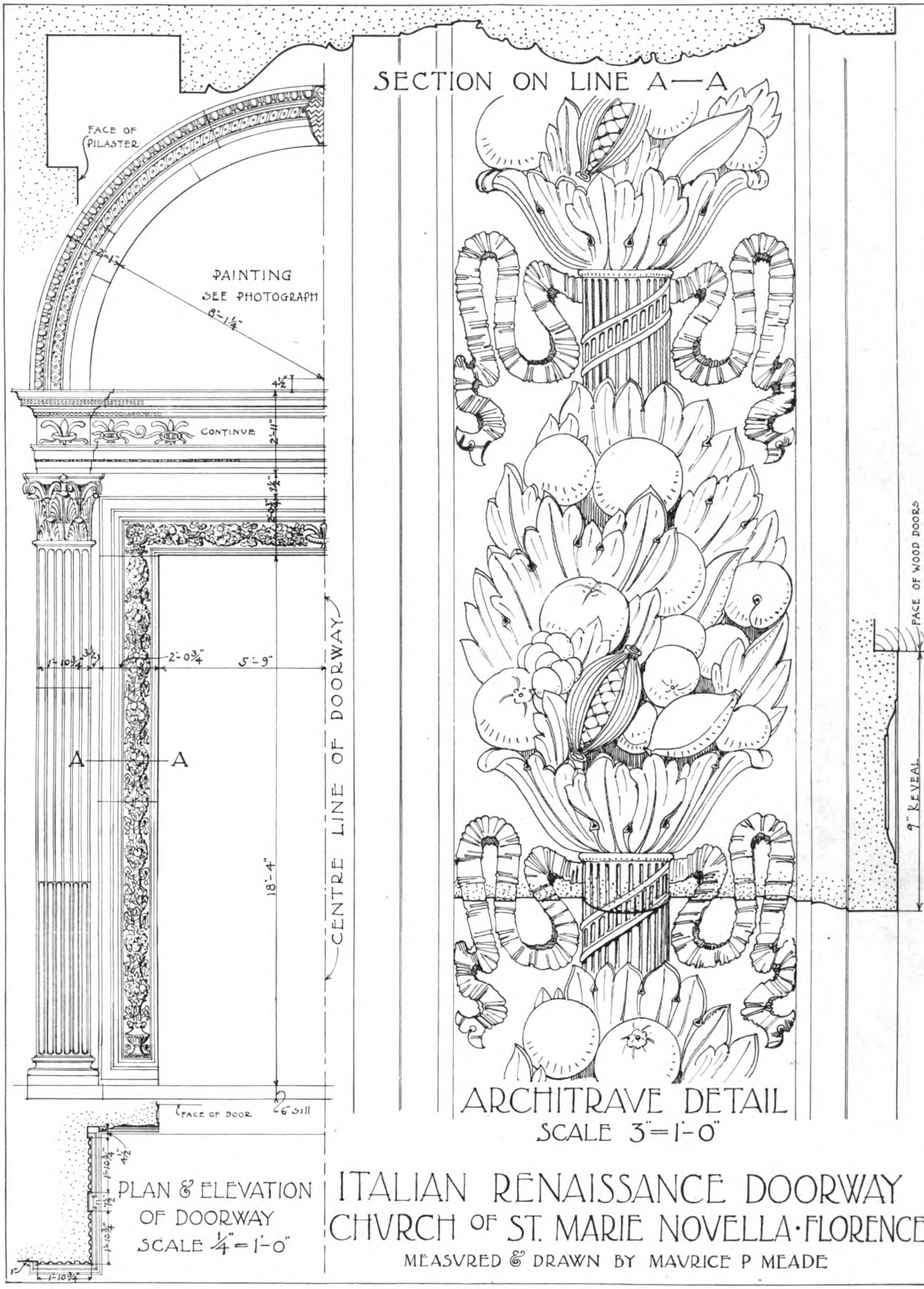


ITALIAN RENAISSANCE DOORWAY
CHURCH OF ST. MARIE NOVELLA · FLORENCE
MEASURED & DRAWN BY MAURICE P MEADE



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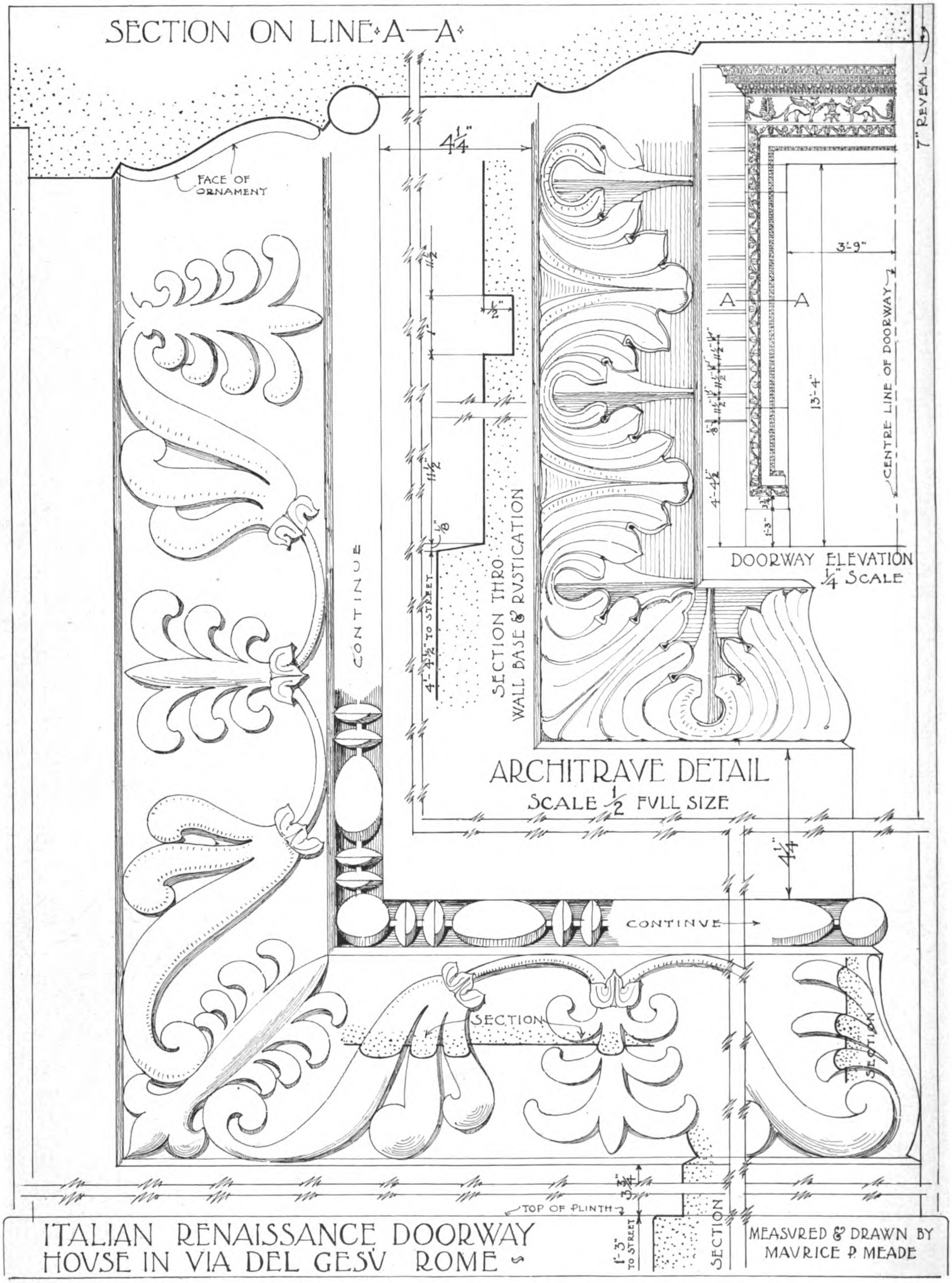


ITALIAN RENAISSANCE DOORWAY
HOUSE IN VIA DEL GESU ROME

MEASURED & DRAWN BY
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# PLATE DESCRIPTION

Taft School, Watertown, Conn. Plates 1–3. The school buildings form a picturesque and imposing group, and their rambling form is strongly reminiscent of the medieval schools of England. The material is brick, with trimmings of concrete stone. The main entrance is under the tower, with an arch leading directly into the lobby from the terrace, and a flight of steps leading down to the lower grade on the other side of the building. The tower is the chief feature of the exterior, dominating the silhouette from most points of view. Many of the other exterior features present considerable interest, notably the grouping of the headmaster's house with the block containing the great hall, with the master's own entrance where the two blocks meet. The interior also possesses many notable features. The tower hall is a spacious room, some 28 feet square, with walls of irregularly surfaced plaster, and stone door and window trim. The ceiling is of plaster with oak beams. On one side is a fireplace in an ingle, and opposite is the door to the main stair hall, from which the dining hall, or refectory, under the study hall, is entered. The study hall is 38 feet wide and 55 feet long, with a coved plaster ceiling divided by bands of ornament. The lower part of the walls is paneled, and at one end is a musicians' gallery. The living room of the master's house is paneled in oak, with book shelves on the wall opposite the windows. The mantel is derived from Elizabethan prototypes. The ceiling beams are of ornamental plaster.

Second Unitarian Church, Brookline, Mass. Plates 4, 5. The new meeting-house of the Second Unitarian Society is located on Beacon street, near Coolidge Corner. Its architecture is derived from the New England Georgian examples, with some suggestions from English work. The building is of red brick, with a portico of Ionic columns. The interior, with its gallery and its white, high backed pews, also recalls the churches of the Revolutionary period, but with some modifications. The chancel steps are of white marble and the floor of black and white mosaic tiles. In the center of the chancel is a marble baptismal font, flanked by the pulpit and reading desk. Behind the latter is the organ, hidden by a screen, and above the minister's room is the gallery for the choir. The walls in the interior are a warm gray, with tan curtains at the windows, and red carpet and cushions in the pews.

Ceramic Engineering Building, University of Illinois, Champaign, Ill. Plates 6, 7. The materials of the building are brick and terra cotta, in accordance with its purpose. The cornice and its brackets are of copper. A remarkable innovation is the grading of the brick, which is a light brown at the bottom of the building and nearly black at the top. The grading is not apparent in the illustrations or to a casual observer, but gives a sunny and sparkling effect to the wall that adds greatly to its interest. The grading was accomplished by the use of different colors of bricks from the same factory, tied together by the use of a light buff mortar. The frieze is formed of brick laid in pattern, with considerable variation in color, and tiles are used as ornament in the spandrels.

House of Philip R. Mallory, Esq., Rye, N. Y. Plates 11–14. This house is located on the crest of a hill, on the west side of Forest avenue, commanding a splendid view of Long Island Sound. The style adopted is an adaptation of Elizabethan half-timber work, following ancient methods of construction, with the addition of modern waterproofing materials and processes. The frame is of solid oak timbers, 6 by 8 inches, hand hewn, mortised and tenoned together, and held by oak pins. The panels are filled with common brick laid in patterns. The overhang of the second story over the living room is supported by the projection of the ceiling beams, which are solid 8 by 10 inch oak timbers. The main entrance to the building is at the rear, at the top of a driveway winding up the hill from the road. The natural grades were also retained to the fullest extent, except where terracing and road-making was necessary. The plan of the house is informal, being designed with a view to comfort and suitability to the location. The living room projects on the southwest, and the dining room on the southeast, each occupying a wing with light and air on three sides. The den is on the northwest side, adjoining the entrance, and the service wing on the northeast. On the second floor there are three separate sleeping apartments. The first is the master's quarters, consisting of bedroom No. 1, with its bath, dressing room, boudoir, and porch. The second is the children's quarters, bedrooms 3 and 4, with a bath and porch. The third section is for guests, consisting of bedrooms 2 and 5, with a bath and a small porch. The servants' quarters are in the third story and are reached by a separate stairway leading from the pantry.

House of Alexander H. Gunn, Esq., Wellesley, Mass. Plates 15, 16. The construction of this house is brick veneer over frame, the intention being to keep down the expense to a minimum, while affording the maximum of comfort for a small family. A cheap grade of rough surfaced, water struck brick was used, laid in equally rough mortar. In the main rooms of the first floor the ceiling timbers were left exposed, the spaces between being plastered. The finish throughout is the simplest type of hard pine, stained brown for the most part, many of the walls being given only one coat of plaster, stained to harmonize with the woodwork. The main chimney was located as an element in the exterior treatment, this being almost the only expense incurred for the sake of outward appearance. Cost slightly over $6,000.

House of J. L. Sullwold, Esq., St. Paul, Minn. Plates 17, 18. The house is set in a grove of trees, 60 feet back from a boulevard, making it possible to use the terrace facing the road without loss of privacy. The material is brick and hollow tile, the brick being laid in Dutch bond with joints 1 inch wide. The plastering of the interior and the stucco of the exterior on the second story are applied directly to the tile, an air space 1 inch wide being kept in the interior of the wall. The roof is of shingles, stained in assorted shades and mixed in laying. The cost of the house was about $10,000, or 24 cents per cubic foot.



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# EDITORIAL COMMENT AND NOTES FOR THE MONTH

BEGINNING with this, the January 1917 number of our publication, its title, which for twenty-five years has been The Brickbvilder, is changed to THE ARCHITECTURAL FORUM. The ownership and management remain the same. Mr. Arthur D. Rogers will continue his work of more than twenty years as Managing Editor.

Since a new title has been adopted for our publication it seems probable that our readers will be interested to know some of the reasons that have influenced us in making the change. While it may appear that the title is of comparatively minor importance, and that a publication might depend solely upon its editorial merits for recognition in its field, there is still an undoubted advantage in expressing in the title the full scope of the work. Moreover, the former title did not seem to lend itself naturally to the development of our work along broader lines — a development for which we have been building and which we now feel ourselves capable of undertaking.

In exactly what respect and in what measure the nature of our work will be altered has not as yet been definitely determined, but our whole purpose is to make our publication of larger value to the profession we serve, and of ever increasing interest to those who are served by that profession. In our endeavor to meet what we consider to be a larger opportunity for service in the architectural publishing field it is obviously unnecessary that we should in any measure abate our interest in the ideals upon which we have built. Architecture in materials of clay has been a distinct feature of our work in the past, and will continue to be so in the future. The place that these materials occupy and will continue to occupy in the building world is secure. That we shall present within our pages buildings that have been executed in other materials cannot detract from the inherent beauty and stability possessed by brick, terra cotta, and tile. These materials, rich in their traditions and better to-day than ever before, need no sponsor.

Within the domain of an architectural publication, and one of its recognized functions, is the presentation of data, in the form of articles and illustrations, that shall record progress made in plan, design, construction, materials, and business administration; and of no less importance is an unbiased and fearless discussion of the ethics that should govern the practice of architecture. A work of this nature, if carried on with intelligence and energy, will have the largest value for the architect, and it must also, if properly directed, command a growing interest among laymen, or among such of them as are concerned in a work that is so vitally important to our well-being as a people.

The time is undeniably at hand when the value of good architecture, in its broadest interpretation, should be better understood; and it should be made known that only a true, virile art can be depended upon to meet properly the manifold needs of a people if we are to have an architecture that shall adequately represent the intelligence and wealth of this country. An art worth while is not to be found in card indexes and departments organized to render first aid to the prospective client.

It is in the furtherance of a work of broader scope that we see a larger opportunity in architectural journalism; and along these lines ours will be laid, although, as previously announced, no new features will be introduced unless their desirability has been carefully considered. If our vision is a true one, we do not covet the entire opportunity; on the contrary, we shall be content to do our part as best we can in bringing to those who practise architecture the help of constructive thought and to architecture itself that larger recognition to which it is justly entitled. That this work can be better undertaken under the new title than under the old is our belief. — THE EDITORS.



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## PLATE ILLUSTRATIONS



## LETTERPRESS



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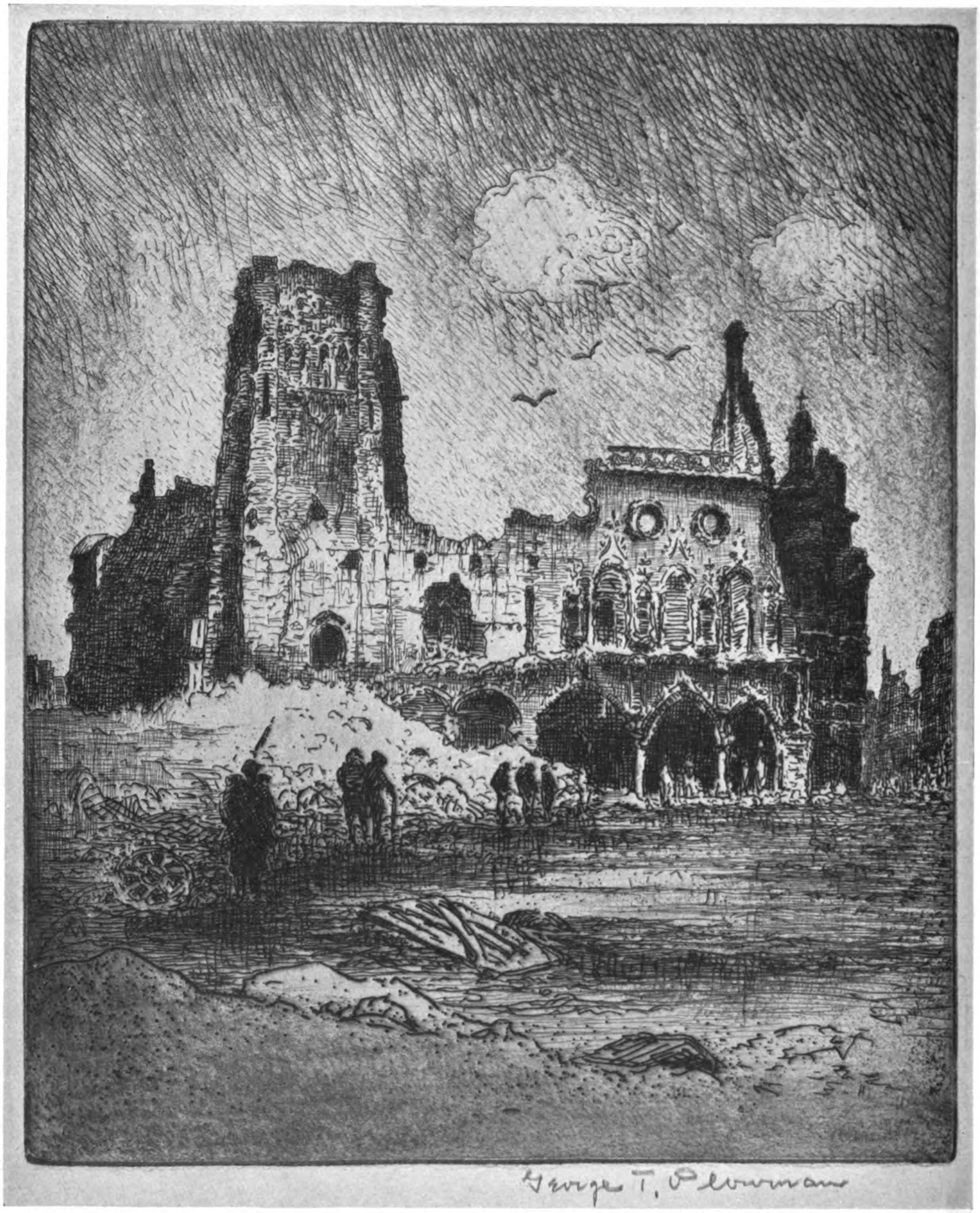


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RUINS OF THE HÔTEL DE VILLE AT ARRAS, FRANCE

AFTER AN ETCHING BY GEORGE T. PLOWMAN

*THE Hôtel de Ville at Arras was one of the finest monuments in Flanders. It was built in the sixteenth century, under the Spanish domination. The additions at the ends were of later date and different in style from the main building.*

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# THE ARCHITECTURAL FORUM

## FOR QUARTER CENTURY THE BRICKBUILDER

VOLUME XXVI | FEBRUARY 1917 | NUMBER 2

# The Adam Style*

## PART I. EXTERIOR COMPOSITION AND DESIGN

*By* HARBOROUGH DESMOND UPTON

TO the student and admirer of the Adam style there is much of biographical and architectural interest to be found in the several books available in architectural libraries, written either specially on the life and works of the Adam brothers, or on the history of the buildings, furniture, arts, and crafts of England during the years in which these gifted and deservedly successful Scotchmen were exercising their remarkable influence on English taste. It is quite interesting to see how this influence finally reached the far-off shores of America, where our forefathers evolved the Colonial style, in which so many echoes of the Adam style occur. It is the intention of these papers to try to point out some of the essential qualities that have given to the Adam style such deserved recognition and approbation since its inception, and in our own day an enthusiastic reception in America, where its recent prominent introduction to the general public has caused quite a demand upon architects by their clients for its use, with a result that perhaps in many cases the product lacks the vital characteristics of the style.

It is not proposed to digress into an historical review either of the life or works of the Adam brothers, but it will be advisable to trace very briefly the influences that were so largely responsible for the birth of this delightfully graceful style, and to do this it will be necessary to boil down to a mere summary the many pages of interesting reading to be found on this subject in almost any architectural library, but with which the average reader rarely has the time to thoroughly acquaint himself.

The Adam brothers were four in number, and all were architects; but the interest of this article centers upon Robert and James, and particularly upon Robert, who was the dominating factor in the development of the style which he and his brother James evolved, if not *created*. As stated earlier these men were Scotch, and not English as is commonly supposed. They were the sons of a prominent architect of Edinburgh, Scotland, who had a wide knowledge of his profession and who had made a thorough study and analysis of British architecture. In this way the sons were undoubtedly familiar, at an early age, with the works of Inigo Jones, Wren, and Vanbrugh, as well as the classic Palladio of whose "school" their father was a strong adherent.

While this early influence and atmosphere gave the sons an appreciation and knowledge of sound fundamen-

*NOTE. Illustrations from "Works in Architecture of Robert and James Adam," London, 1822, and "Robert Adam and His Brothers," by John Swarbrick. Published by B. T. Batsford, London.

Design for Gateway of Sion House, near London

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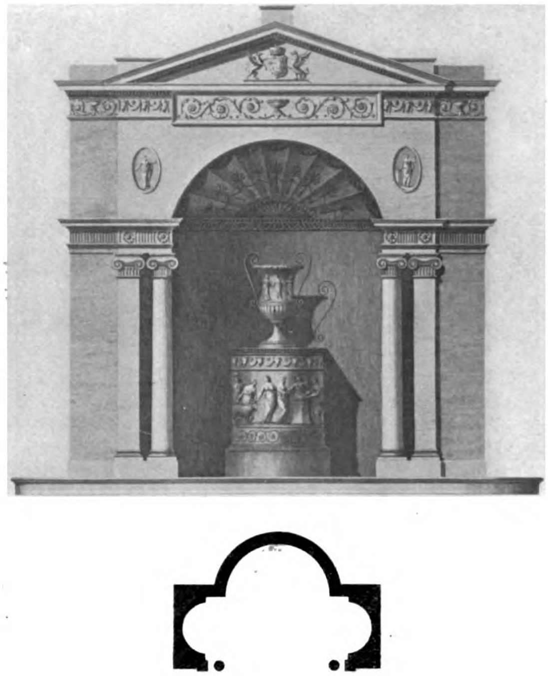


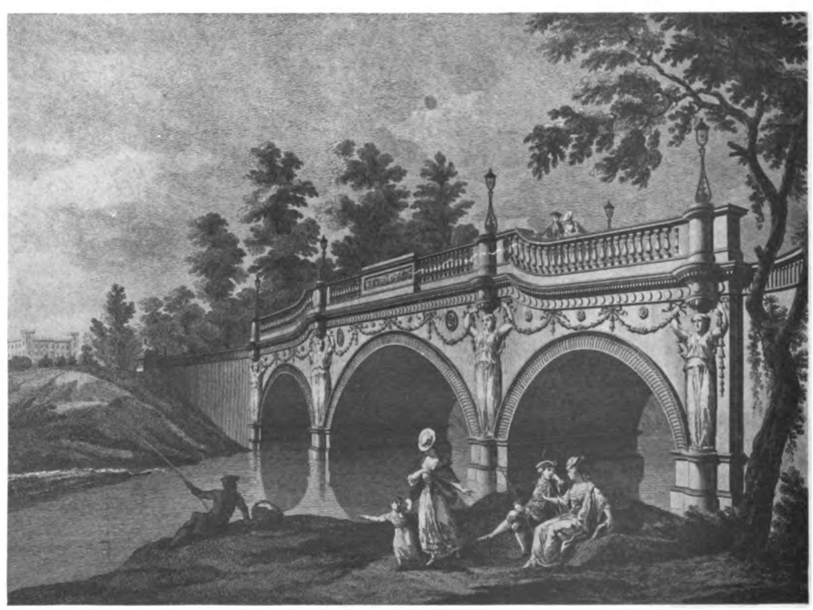
Garden Pavilion for the Duke of Montagu at Richmond

tal architectural principles, it did not, however, fetter their individuality as might have been the case with less dominating personalities; and though their subsequent work shows the influence of their early training and their later study and research in Greek, Roman, Renaissance, and French architecture, their individuality asserts itself so undeniably that they cannot be accused of merely imitating any of the styles with which they were, for architects of their day, so unusually familiar. Their ideas may have been obtained from the sources before mentioned, but the manner in which these ideas were developed, and in fact the whole character and composition of their designs was so distinctly their own, that they must be given full credit for developing and creating the style which bears their name.

Both Robert and James came into prominence at a time when English architecture and decoration were showing a tendency toward throwing off set rules and taking on a greater freedom. The severity of Inigo Jones' influence had passed and the lighter and more graceful taste of Sir Christopher Wren had been amply exhibited through his many buildings. Knowledge of the many variations in the hitherto supposedly fixed rules of Classic Greek and Roman architecture had come through increased travel and the publication of various books on art and architecture, and the natural consequence was a drift toward an instability of style where every passing fad and whim was reflected.

From this confusion the Adam brothers stepped forward with their wider knowledge and thorough appreciation of the fundamental principles of composition, gained by study and travel and by actual research among the ruins of antiquity, and strengthened by the intimate association and acquaintance abroad with men possessed of high ability and training in art and architecture. At their command, too, lay a wealth of decorative motifs through the possession of drawings of Roman and Cinquecento work hitherto little known or appreciated in England. Also they had sensed and appreciated the underlying principles that were shaping the contemporary Louis XVI style in France.

With this fund of knowledge and inspiration to draw upon, together with his natural ability, Robert Adam soon made for himself a place in the foremost ranks of his profession, and not only became the fashionable architect of his day, but also, on account of his great ability and taste, exercised a dominating influence upon his fellow-architects. James Adam, working with his brother Robert, attained to a certain degree of prominence; but to Robert must be given the credit of having been the prime factor in the evolution and development of the Adam style, and, by the nature and quantity of work his ability and prominence made possible, of having given to succeeding generations a rich and beautiful fund of architectural and decorative inspiration, ranging from monumental buildings down to the last detail of interior decoration and furniture. Having thus epitomized the history of the birth of the Adam style, we come to the delineation of the characteristics in composition and de-



Design of Proposed Bridge for Sion House

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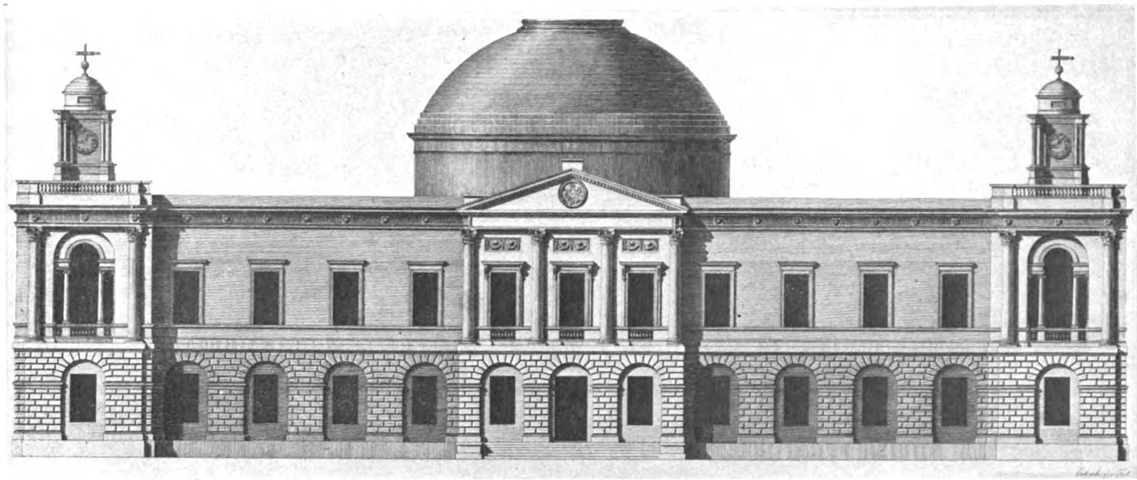

Design for Register House, Edinburgh

tail that give to it the individuality and the charm which have lived through various periods of taste to this day.

One of the greatest errors in studying the Adam style is to start with the idea that detail alone constitutes the value and charm of the work. The old proverb that "fine feathers make fine birds" has no true application in the field of architecture, for an ill designed and badly proportioned building cannot be redeemed by dressing it in beautiful detail. True, the detail may suffice to satisfy the lay observer in some cases, as for instance a case within the writer's own experience, when an elderly lady of his acquaintance, in commenting on one of the public buildings in New York which was nearing completion, asked him if he did not think it a splendid work of architecture because "it had such rich carved ornament and such beautiful capitals to the columns," ignoring entirely the question whether the composition and general proportions of the building were good or bad, whether the building was suitable for its purpose, or whether, if stripped of its bead necklaces and other secondary adornments, it could still stand proudly conscious of a beautiful form.

The Adam brothers fully realized the value of "bead

View of Register House, Edinburgh, as Executed

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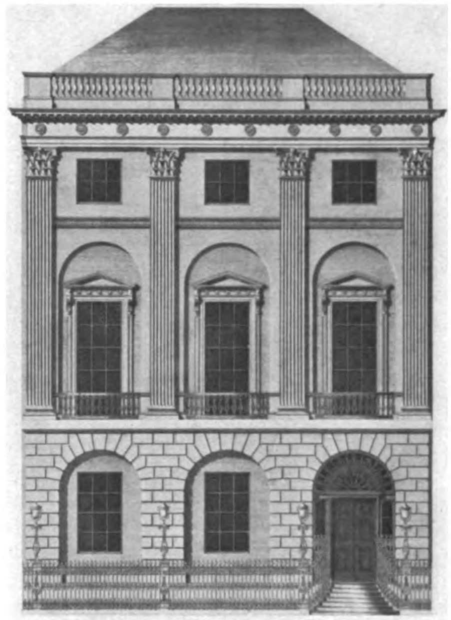
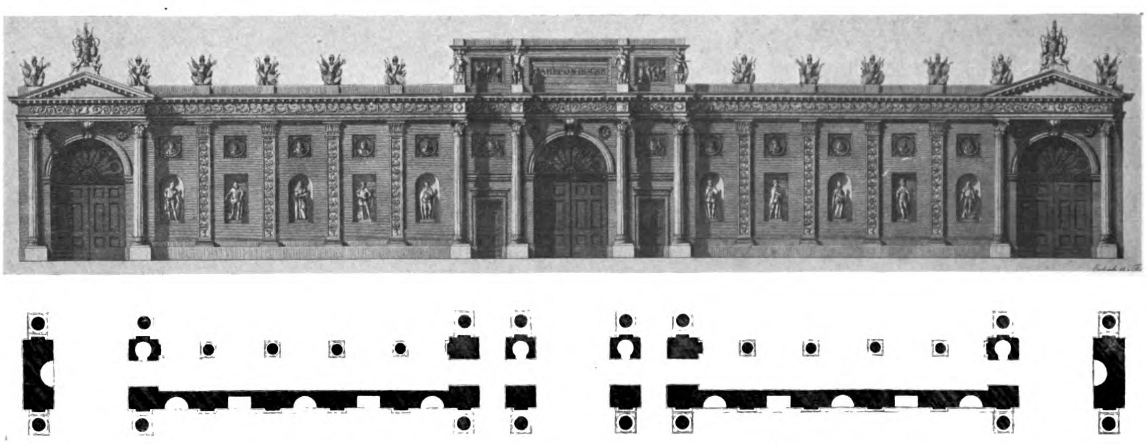
necklaces" and designed their ornament with consummate skill; but back of all the detail they began with a building of simple dignity, composed along broad lines, usually well proportioned and nicely balanced. It is this simple dignity of composition that gives their buildings much of their charm — a charm which is often attributed solely to the ornamental detail — and which is just as much a part of the successful *ensemble* as a well proportioned body is a necessary requirement of the perfect human being. There is in this simplicity an element which to-day strikes us as a note of "quaintness," an almost naïve primitiveness of composition, to eyes jaded with overcrowded architectural effort, where enough motifs are squandered on one façade to serve amply the needs of three or four additional buildings, sometimes of totally different character. This simplicity serves also to accentuate the charm of the detail, for its value can be absorbed without mental effort. We do not have a confusion of competing elements of composition to disturb our vision. Almost at a glance we get the story which the mass of the building has to tell, and we can pick out simply and in true value the adornments with which the composition has been accentuated.



House of Sir Watkins William Wynn, St. James Square, London

Examine, for instance, the façade of the Register Office, or "Register House," for the new town of Edinburgh. The first impression is one of great simplicity and dignity, and as we look at it further we realize that this is the result of a carefully balanced composition, where each element has been given a definite value in the study of the whole. If we analyze it we find, first, that the repetition of the wall arches and the rustication of the ground floor give a continuous base that ties the whole façade together and permits the central and end pavilions to take their proper value as central and terminal motifs, without dividing the façade into separate units. Second, to give emphasis to the importance of the central axis, the portions of the façade between the center and end pavilions have each four windows, obviously intended to proclaim a secondary importance in the entire composition. Had there been three or five openings, there would have been the danger of breaking the façade into five complete units of composition; but the four windows obviously bring our attention back to the center of the design and give added importance to the central feature. Then we look at the simple drum and dome in the second plane, acting as a dominating mass, but yet so simple in treatment and outline that it does not jump forward into the first plane and compete with the colonnade and pediment that enrich this part of the design. We grow to like that simple, homely dome and to appreciate the splendid discretion that caused the designer to avoid the temptation to dress it up with a lantern, ribs, or other unnecessary adornments.

Coming back to the main façade, we realize the value of repetition in the second story. With the exception of the Palladian motifs in the end pavilions, we have all square headed openings with almost identical trim and cornice, but kept from becoming monotonous by the addition of consoles and balusters in the three windows of the central pavilion. The columns give the necessary dignified note to the central pavilion and are skilfully recalled in a less formal grouping in the end motifs, where also the



Plan and Elevation, Gateway of Carlton House, London

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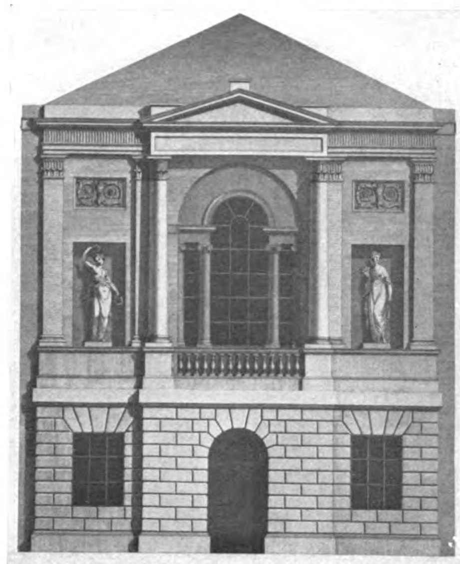
recall of the balustrade below the sill line helps to link the ends to the middle and show that they are not independent elements of design. Having carried the unity of composition to this length, the ability of the designer shows itself in the contrasts that we find brought in, and which serve to accentuate even more the central axis of the building. The plaques over the three central windows of the second floor have no recall either by horizontal lines or sunk panels in any other part of the building; likewise the pediment has no competitor in this composition. The Palladian motifs and the two crowning features containing the clock dials serve to give enough individuality to the end pavilions to keep them from being mere breaks in the façade, and in consequence they attain a proper value as terminal motifs. The frieze runs uninterrupted through the entire façade until it dies back of the plaque that extends from axis to axis of the end columns of the central pavilion, and which by its plain white surface gives a final dominating quality to this part of the building, yet the continuance of the ornament at each end of this panel serves to carry the unity of the frieze throughout the entire length of the façade.

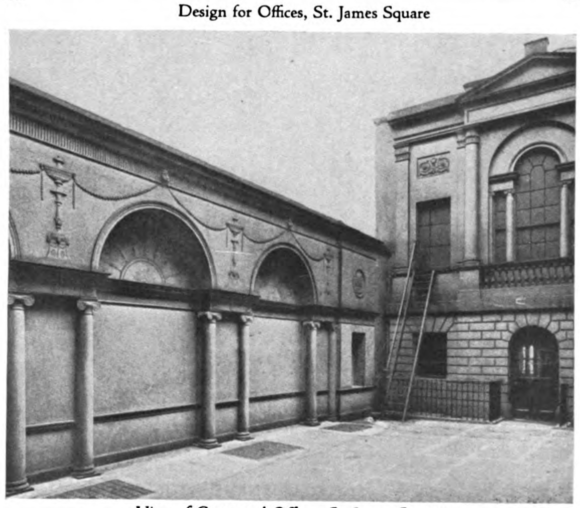
The whole composition thus analyzed is really excellent. There are possibly some minor faults that can be forgiven, such for example as the proportions of the intercolumniation, which however seems intentional, as it tends rather to give a calmness and quietness to the design. We have purposely made this rather lengthy analysis of the composition of this façade because the same sound principles are found in all the better examples of the Adam work.

The same dignity of composition is shown in the façade of Sir Watkins William Wynn's house in St. James Square, London. This façade shows also the influence of the contemporary Louis XVI style of France, of which mention was made earlier in this article.

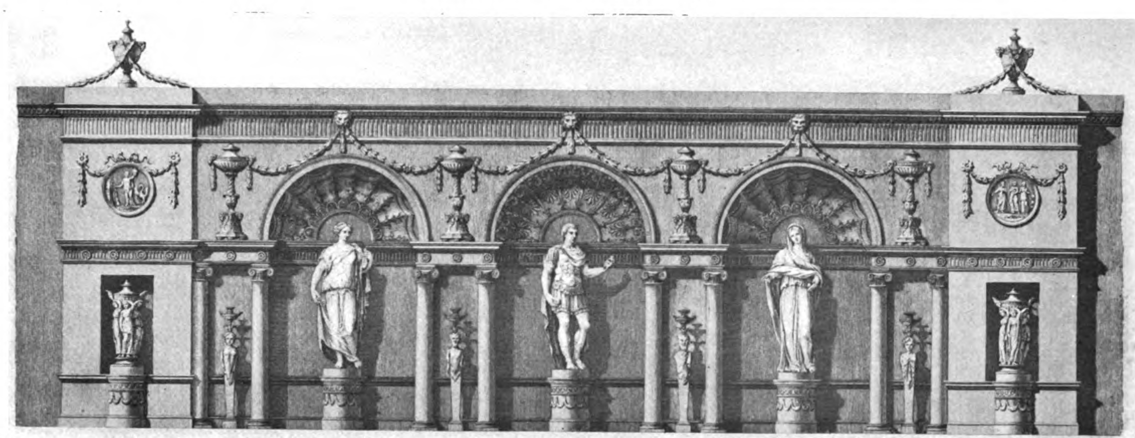
We will not analyze this composition exhaustively, as it is not our purpose to write a treatise on the theory of architectural composition. It will suffice to point out a few essential elements which are characteristic of Adam work; the rusticated first story, the pleasing relation between the height of the first story and the height of the order running



Design for Offices, St. James Square



View of Court and Offices, St. James Square



Design for Wall in Court, House of Sir Watkins William Wynn, St. James Square, London

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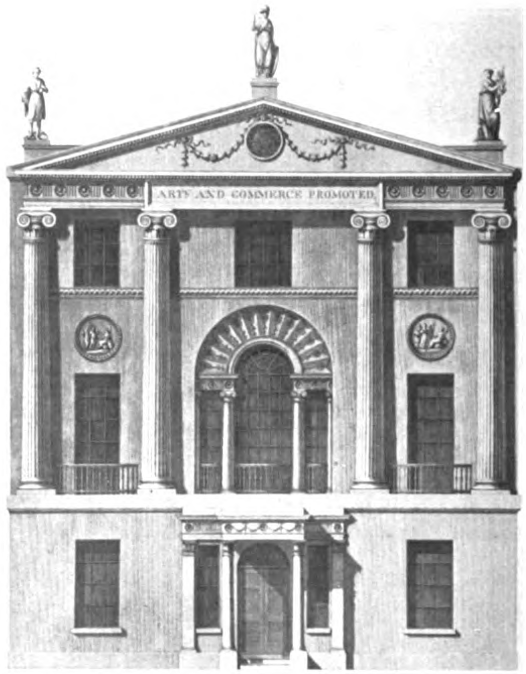
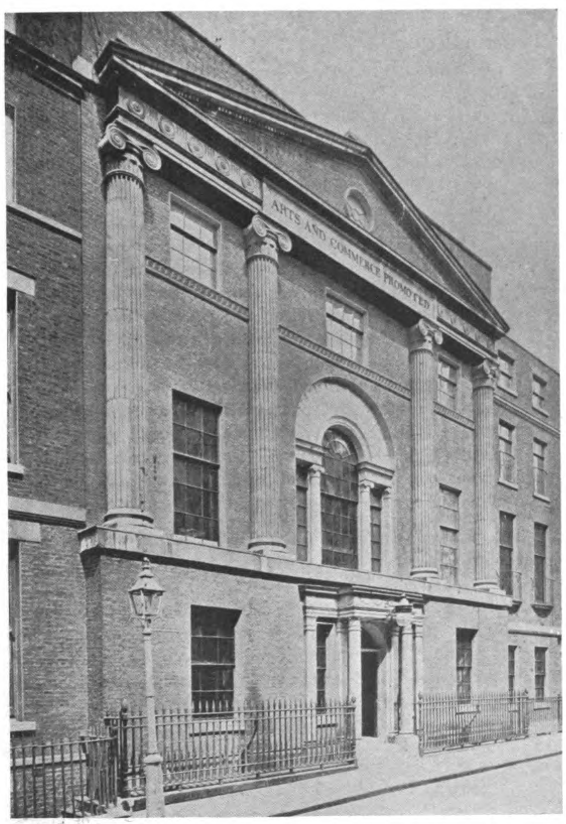
through the second and third stories, the well studied intercolumniation, and the height of the entablature (about one-seventh of the order). This reducing of the entablature height is very characteristic of the Adam style and usually has the happy result of preventing too heavy a crowning feature to the building. In this particular example the balustrade above the entablature gives enough additional crowning to the building to offset any feeling of weakness, and unless we are slavish in our devotion to Vignola, we must admit and applaud the cleverness of this seemingly trivial detail in the composition. Repetition and contrast are used to quite as good effect in this building as in the Register House just described. The repetition of wall arches on first and second floors is not monotonous because they are so differently treated on each floor. The arches of the rusticated ground story frame simple square headed openings (omitting in this comparison the iron grilled tympanum over the entrance door — obviously a distinct note in the composition), while above, plain and unadorned shallower wall arches frame the elaborate pedimented windows of the second story, and what at first glance may have seemed a *repetition* is in reality a *contrast*, and a very skilful and clever contrast, too, and moreover quite a characteristic Adam "trick." The bare simplicity of the third floor is another familiar Adam feature and prevents any conflicting of interest with the richly ornamented pilaster caps and the cornice and balustrade directly above.




Design for Society of Arts, Manufactures and Commerce, London




View of Building, Society of Arts, Manufactures and Commerce, London

It will be noted that the scale of the ornamentation is quite small (but yet not so small as to be trivial), giving to this façade a maximum effect of size and an importance which is really astonishing, for it does not in any sense border on "false scale."

The Adam brothers have clearly pointed out to us the great value of scaling down the detail and ornament on both exterior and interior work. They did not fall into the error of trying to obtain "monumental" effects by use of large scale, and consequently were never guilty of any of the heavy, cumbersome, and generally graceless buildings produced under the impression that big scale detail spelled monumental effect. Perhaps if the Adam brothers had been commissioned to design prisons, fortresses, or treasure vaults, they would have departed from their usual delicacy, knowing that such problems require a more brutal scale in order to produce an effect of defying destruction.

This happy balance of broad, simple masses of composition, properly contrasted by refined and delicate detail, is one of the principal reasons why the Adam style has won the approbation of succeeding generations, and it is the growing appreciation of the value of this balance that is largely responsible for the recent popular interest in the revival of this style in America.

Those who have had the good fortune to be able to study the original examples of Adam work will note that most of the modern efforts in this style lack the feeling of the original. This may be attributed to the incorrect handling of the detail, especially as regards the *modeling* of the ornament; but back of all that lies the fundamental error of applying Adam detail to a composition that the Adam brothers would and could never have per-

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mitted, resulting in an incongruity that at times amounts almost to an absurdity, and which even in the less pronounced cases produces a mongrel effect.

Another interesting example of Adam composition is the original design for a gateway for Carlton House, in Pall Mall, London. What has been pointed out in the preceding illustrations may also be found in this design, namely, simplicity of mass, concentration of interest in the central motif (here through the use of a more imposing mass), the clever recall of the central arch in a lesser importance at each end of the façade, the alternation of square headed and semi-circular headed niches in the intermediate portions of the façade, thus giving a contrast in the repetition that prevents monotony, and finally the reduced height of the entablature, which in this particular case is a little over one-fifth of the height of the order and is nearer to the standard classic proportion than is usual in the work of the Brothers Adam.

The famous gateway of Sion House possesses its full quota of the simple dignity so characteristic of Adam work, and is composed along the general lines that form the basis of their designs.

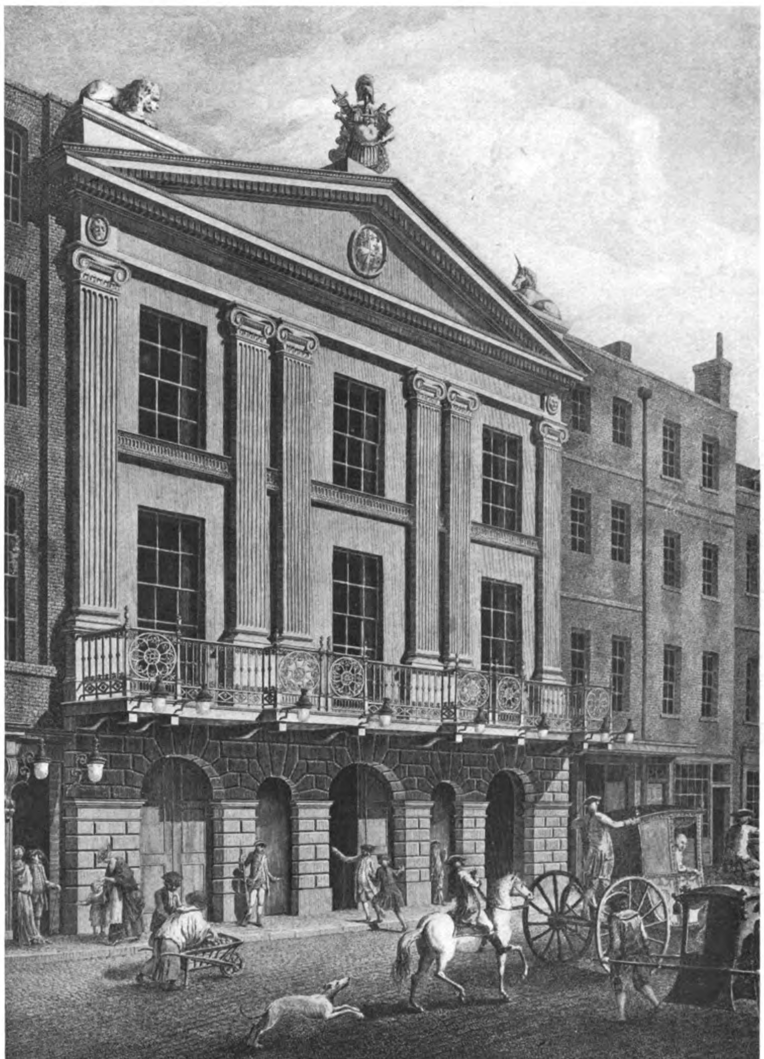
The drawing for the proposed bridge for Sion House shows again this insistence upon centering the interest. In this design the middle arch is not only bigger than the flanking spans, but it also carries a higher mass, which is led up to by the easy upward curve of the belt course mouldings and the balustrade of the roadway. This upcurving of the silhouette is either a deliberate desire to obtain contrast with the curves of the arch below, or it may have been employed to produce an effect of lightness and grace. If the latter was the purpose, it could hardly have been better accomplished in any other way.

This upcurving line is a frequent element in Adam ornament, but its use in exterior architectural composition is rather unusual, and gives to this design a less formal note than is generally found in their exterior architecture. The result, however, is so delightful that it is well worth while to keep the motif in an accessible pigeonhole of one's memory.

In the façade of the House of the Society of Arts, Manufactures and Commerce we find a very typical Adam composition, containing the Palladian motif that occurs so frequently in their work. The same simplicity and dignity that have been pointed out in the preceding examples are also found here, likewise the contrast of large and small scale, and the reduced cornice. This is a most successful design, and the actual building more than carries out the promise of the drawing.

The Palladian motif figures again in the court façade of the offices in the rear of Sir Watkins William Wynn's house and in the arcaded screen wall built along the side of the same courtyard. Both these works are good examples of Adam style, not only in composition but in the general spirit and handling of the design. The arcaded courtyard wall was not carried out in all the fulness of detail shown on the original drawing, the statues, pedestals, and gaines having been omitted.

The design for the new façade for the Royal Drury Lane Theatre is well worth studying for its simplicity of composition and for the strength of the design. We note here again the fondness for a rusticated ground story, forming a strong base to carry the order that extends through the second and third floors, and also preventing



View of Royal Drury Lane Theatre, London

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the balcony at the second floor level from seeming too heavy in projection.

One rather interesting feature of this design is the coupling of the pilasters between the center and end bays — an unusual treatment, and yet so arranged that it does not shock. It gives the appearance of greater length to the façade by adding enough width to the piers between the main arched openings of the ground floor to permit the introduction of the narrow arched secondary doorways, thus making a five part composition. It is undoubtedly the existence of these openings below the coupled pilasters that gives them a *raison d'etre*, otherwise they would have made the design seem weak at the ends.

The small amount of ornamentation used on this façade makes it an especially good example to study, its interest lying almost wholly in composition and proportion, which we have pointed out as underlying the success of the Adam works.

The delightful little pavilion intended for the garden belonging to the Duke of Montagu at Richmond shows so much of the real character and spirit of Adam design that it should be given a place of importance in the study of their work. The arrangement and proportion of the composition and the general disposition of the ornamental motifs are all so truly "Adam," that we recommend the reader to study them carefully so that the picture may be well recorded in his memory.

Before closing this article we must refer to the famous Adelphi Buildings though the exterior of these buildings is not as interesting or as ornamental as some of the other façades designed by the Adam brothers. This was a private speculative venture of the Adams, and the magnitude of the undertaking did not permit them to put very much money into the exterior architecture.

In discussing the various Adam buildings and works included in this article, the question of ornament has been purposely omitted in order to point out insistently, and we hope clearly, how important a part *composition* plays in the success of the Adam exterior architecture. The character of their work lies just as much in their theory of composition as in the ornamental detail used, and modern designers in this style must recognize this fundamental characteristic of Adam work if they wish to catch the true character of the style. In a later article it is proposed to deal with the ornamental elements of the Adam style, studying the composition as well as the detail of the ornament.

General View of the Adelphi Buildings, London, from the Thames

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# Penalties and Liquidated Damages

*By* WILLIAM B. KING
*General Counsel of the National Association of Builders' Exchanges*

In two other articles Mr. King will treat of the powers of the architect, particularly in relation to the discretion granted him under ordinary building contracts, and responsibility of the owner for the sufficiency of foundations and plans. — *Editors.*

IT IS an old custom to try to enforce the prompt and complete performance of a contract by a provision that the party guilty of delay, neglect, or faulty performance shall pay a fixed sum of money as damages. Sometimes this is called a penalty and sometimes liquidated damages. There is a great difference between the legal effect of these two terms.

Sometimes the amount of the actual damage is easily ascertainable. Sometimes it is impossible to fix it with any reasonable certainty. Sometimes the sum named as penalty or liquidated damages is out of due proportion to the contract price and greatly in excess of the damage done to the injured party.

What is done by the courts in such cases? Is the offender always obliged to stand to the letter of his agreement and pay the sum named, no matter how unjust it would be to him or how greatly it may exceed the damage suffered? It is the object of this paper to show some of the rules adopted by the courts.

The English courts very early decided that where the sum to be paid is called a "penalty," the party complaining would be required to show his actual damages and would be allowed payment only to the extent of these. Why was this? Did the courts venture to set aside the intent of the parties and refuse to compel them to do what they had agreed to do? It is one of the first principles of law in a free state that people shall be at liberty to make their own contracts. The courts are organized to construe and enforce these, not to make new contracts for the parties. Nor is it the duty of courts to protect parties from improvident or unwise contracts.

The reason for violating this principle was that the courts were often met with demands to enforce some grossly excessive penalty which would result in rank injustice. In order to avoid this, they were forced to adopt the rule above stated and to refuse to enforce penalties above the amount of the actual damages done. This was a compromise between two principles: the first, that the right to make contracts freely must be recognized; and the second, that the courts must not be made instruments of oppression and injustice.

Then contracts began to be drawn in which the term "penalty" was omitted. The parties recited that the actual damages were difficult to ascertain and that they agreed in advance that the damages, if there was delay or default in performing the contract, should be "liquidated" at a sum fixed in the contract, not as a penalty, but as an agreed measure of damages. If the courts had sustained such provisions, the old hardship would have recurred under a different name. A learned English judge said of this: "The mere alteration of the term cannot alter the nature of the thing," and it was consequently held there that the nature of the case and not the term used must govern the law.

A case arose in England in 1830 where an actor and manager had made an agreement that in case either party broke any one of many stipulations, the offending party should pay a thousand pounds "to be liquidated and ascertained damages, and not a penalty." The court decided that in spite of this expression of the parties the sum named should not be recovered, but the manager must show his actual damages and be limited to them.

Such provisions either for penalties or liquidated damages occur rather more in building and engineering contracts than elsewhere. Is this principle applied to such contracts at this time?

It is the purpose to try to answer this question, and in the midst of conflicting decisions to lay down some general rules as far as they are customarily observed by the courts on this difficult subject.

1. The courts are more inclined than in past years to hold the parties to a contract to its literal performance and to enforce a provision for liquidated damages to the full extent of the sum named. Chief Justice White of the Supreme Court of the United States in a very celebrated opinion rendered about fifteen years ago said that if the parties to a contract mutually agree that a certain sum shall be assumed as the actual damages, where the true amount is uncertain, "I know of no sound principle that will enable a court of law to say that they intended something else. The courts are bound to ascertain and carry into effect the true intent of the parties." This must be taken as a general statement of the law on this subject as now enforced. But it is subject to some limitations now to be pointed out.

This rule, if followed in all cases where the parties bind themselves to liquidated damages, would result in gross injustice in some instances. It has been pointed out by a later court decision that in the very case in which the Supreme Court made this decision the literal enforcement of the agreed damages might have resulted in a recovery of $1,750,000 for the hire of a yacht the agreed value of which was only $75,000.

2. To avoid the possibility of such injustice some exceptions have been recognized to the enforcement of such contracts literally. Thus if a contract is made for the payment of a sum of money and the parties agree that upon failure to make prompt payment a larger sum shall become due, the courts will not enforce this, whether the sum payable be called a "penalty" or "liquidated damages." This was declared by the Supreme Court of the United States thirty years ago in regard to a bond for "the penal sum of $10,000 liquidated damages," given to secure the payment of numerous small claims. It was held that actual damages must be shown to warrant a recovery, and that recovery would be limited to the sums unpaid with interest, without regard to the penalty of the bond.



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3. So, also, if a contract be made to do a number of different things and liquidated damages are provided for failure of all or any one of these things, recovery will not be allowed of the sum named, but only for the actual damages suffered.

This is illustrated in a very recent case in one of the United States Courts of Appeals. A contract was made for furnishing terra cotta, including among other things coping and lintels. The contract contained an agreement to pay liquidated damages at $50 a day for failure "to complete the work" on time. Everything was finished except the coping and lintels, amounting to about $300 on a contract for $13,000. Claim was made for over $3,000 as liquidated damages. The court held that this could not be recovered because the same damages were provided for a failure in the entire contract and a failure to furnish these minor parts. This could not be a real effort to liquidate or fix the actual damages suffered, since these must be very different where failure is in regard to a greater or less amount of material.

4. Another similar case occurring previously in the Federal courts illustrates this point. A contract was made to furnish 400,000 ties, 90 per cent of the payment to be made on delivery and 10 per cent retained until all were delivered, and if default were made in the full quantity, "the 10 per cent of contract price retained shall be applied by party of the second part in satisfaction of its liquidated damages." Ties to the number of 378,392 were delivered and the railroad company claimed the right to retain the entire 10 per cent because of the failure to furnish the remaining 21,608 ties. The court said that this agreement for the same damages for a larger or smaller default was essentially unjust and unreasonable and beyond the intention of the parties. The recovery was limited to the actual damages arising from the failure to deliver the small balance.

5. Some courts go so far as to hold that a great disproportion between the liquidated damages named in the contract and the actual damages will defeat the right to recover the sum named. A case in the Supreme Court of North Carolina illustrates this. The contract price of a building was $1,600. A deduction of $10 a day for delay in completion was provided "as liquidated damages." The actual damages would be the rental value of the house,— not over $20 a month. The court said that this could not possibly be a *bona fide* liquidation of damages and ordered an ascertainment of the actual damages caused by the delay. A similar case in Iowa was decided in the same way, where the agreed damages were $5 a day for completing a house to rent for $25 a month.

A case occurred in the Court of Claims some time ago, involving a government contract on this point, where the contract provided for liquidated damages amounting to 43 per cent of the contract price. The court held that this should not be enforced because disproportionately large and that the government could recover only its actual damages. Whether this doctrine would now hold in the Federal Courts except in extreme cases is very doubtful in view of the decision of the Supreme Court of the United States first referred to, although that decision does admit the need sometimes of construing such contracts with some relation to their consequences.

6. On the other hand, many courts have held that a stipulation for liquidated damages will be enforced to the amount agreed upon, if the actual damages are uncertain and difficult of ascertainment and the parties endeavor to solve their difficulty by accepting the sum fixed in lieu of attempting the impossible task of ascertaining the actual damages. Thus in a case in one of the United States Circuit Courts of Appeals a deposit was provided of 5 per cent of the amount of a bid which "shall be considered as liquidated damages and forfeited to the city, if the bidder fails to execute a contract." It was there held that, since the actual damages arising from such a default were uncertain and the parties had agreed to fix them at 5 per cent, the agreement of the parties should be enforced as made rather than for the court to attempt to establish what could not be satisfactorily fixed, if attempted.

Similarly in Michigan, it was held as long ago as 1858 that the "forfeiture of the sum of $1,000, to be collected as damages," if a retiring partner went into business again at the same place should be sustained as a *bona fide* assessment of damages by the parties where the sum would be almost impossible of ascertainment by evidence.

7. It has already been stated that the word "penalty" means a sum under which actual damages only can be recovered and the term "liquidated damages" implies that the parties have agreed upon a sum as the assumed damages to be recovered in case of default. While the courts have in general adopted these definitions and enforced contracts according to them, yet they have uniformly held that they will not be governed by the term used, but that the essential nature of the contract will be considered in deciding whether the sum named in the contract can be recovered or the injured party limited to actual damages. In some of the cases to which reference has already been made, the term "liquidated damages" has been held to mean "penalty" and only actual damages awarded.

In a recent case in the Supreme Court of the United States, the word "penalty" was construed to mean "liquidated damages" and enforced for the full sum named. The government advertised for the construction of gun carriages. The correspondence preceding the contract declared that it was very important to get them promptly and different prices were proposed and accepted for furnishing the guns at different dates. The contract made a similar provision, with a deduction from the price of each for each day of delay. This deduction was referred to as a "penalty." Over 20 per cent of the contract price was withheld from the contractor for these delays, although it was found as a fact that no injury or damage resulted to the United States from the delay. The Supreme Court said:

> "The word 'penalty' is used in the correspondence, even by the officers of the Government, but we think it is evident that the word was not used in the contract nor in the correspondence as indicative of the technical and legal difference between penalty and liquidated damages. It was used simply to provide that the amount named might be deducted if there were a delay in delivery. Either expression is not always conclusive as to the meaning of the parties."

Accordingly, the deduction provided by the contract was enforced, although there were no actual damages.

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8. Many building contracts provide that the work shall be begun by a certain time and ended in another fixed period, with liquidated damages for failure to complete at the time fixed. The owner may not have the ground ready to begin the building on time or may otherwise delay the beginning of a contract, or he may interfere with the due progress of the work and prevent its completion on the date named.

It has often been claimed by the owner that to the original contract period is to be added the amount of delay caused by the owner and that the delay damages begin at the close of such extended period. The courts hold that this is wrong; that, where the owner prevents the beginning or the completion of the work on time, the date from which a penalty or liquidated damages shall be computed is at an end and nothing can be recovered under clauses providing for a fixed sum. This does not interfere with the recovery of actual damages due to the default of the contractor.

This principle was interestingly illustrated in a recent case before the Supreme Court of the United States. A contract to build a pumping plant for the United States provided for $25 a day liquidated damages, if not completed by a fixed date. Certain official delays caused the work to be suspended. Modifications were made in the contract and the work was then concluded long after the contract date. Most of the delay was due to the government, but for about eight months the contractor was held responsible and the government deducted $6,000 for this period as liquidated damages at the contract rate. The Supreme Court of the United States declared that this could not be done because the government's delay had prevented the work being finished within the original contract term and that initial delay made void the date of completion fixed in the contract. Consequently, there was no date from which the liquidated damages could run. For delays due to the contractor's fault occurring under these circumstances, the government must show actual damage if it would seek to recover.

The rules which are here laid down are in general accepted by the courts in regard to this subject, but conflicting decisions may be found in the different courts of the various states on all its branches. This is so true that when I told a fellow lawyer in the law library that I was looking up a point of law relating to penalty or liquidated damages, he said to me: "You are sure to find what you want, for you can find cases on that subject deciding every point in two different ways." In a well known case, the highest court of one of the states says that "judges have been long and constantly complaining of the confusion and want of harmony in the decisions upon this subject."

The difficulty has already been pointed out, that there is a conflict between two principles, — the one that freedom of contract must be recognized and contracts enforced as made, and the other that the courts must not lend themselves to the exaction of injustice. In the conflict between these two principles, it is hard to tell which will be considered paramount in a particular case.

Courts have long since laid down the general principle that a wholly unconscionable contract will not be enforced. Thus, it was long ago held in England that a contract to pay for a horse at the rate of a farthing for the first nail in his shoe, doubling the amount for each succeeding nail, would make such a price as would shock the conscience. The celebrated contract in Shakespeare's *Merchant of Venice* for the pound of flesh as the penalty of a bond could never have required the pleadings of a Portia for release in Shakespeare's England in the days of Queen Elizabeth.

It is easy to say that freedom of contract is essential to the transaction of business, and that the courts will enforce contracts as made, but it is very hard to apply this rule when by so doing a court will make itself an instrument of injustice. It is easy to say that an unconscionable contract will not be enforced, but it is not always easy to say that a particular provision in a contract is clearly unconscionable. It is very difficult to say in which direction any court will lean on a particular question involving this subject, but it has been the effort here to point out a few of the general rules which have the weight of authority in their favor.

Village Store Block, Tarrytown, N. Y.
Carrère & Hastings, Architects

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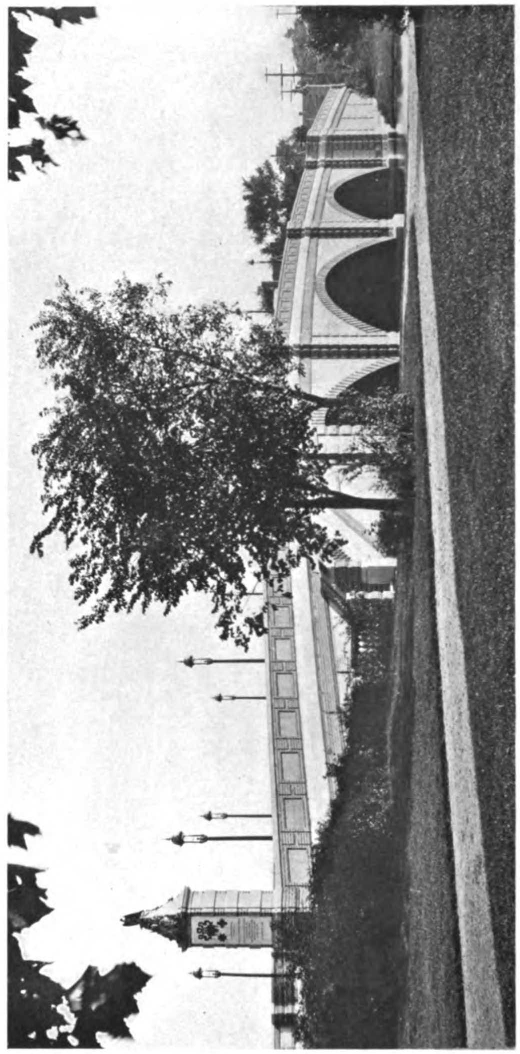

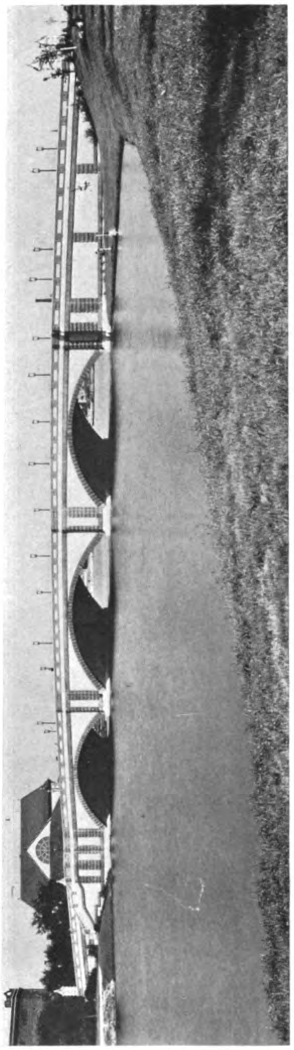

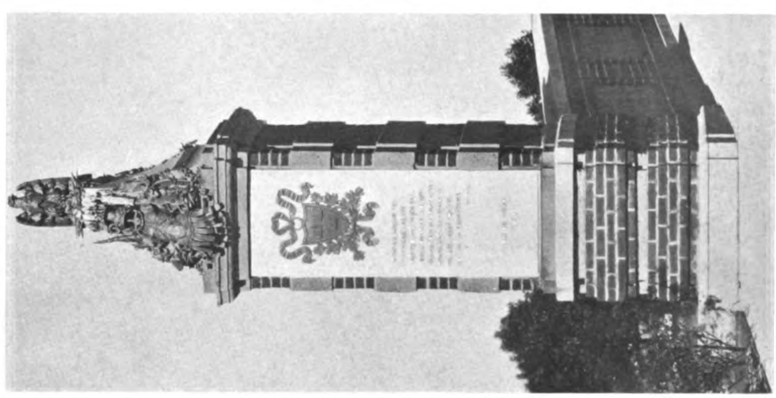

ANDERSON BRIDGE OVER CHARLES RIVER BETWEEN CAMBRIDGE AND BOSTON, MASS.
WHEELWRIGHT, HAVEN & HOYT, ARCHITECTS; JOHN R. RABLIN, ENGINEER

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# Ways to Gain Practical Knowledge in Architecture

*By* HAROLD V. WALSH

*Instructor, Architectural School of Columbia University*

WHEN the young architect graduates from an architectural school, especially from a school which has emphasized paper design more than real structural work, he faces the overpowering mass of practical knowledge yet to be acquired. It makes him feel absolutely helpless. The great question rises in his mind of where to begin. He is kindly advised that two years of practical experience will give him the necessary knowledge. He knows well enough that this is not true.

The realization of this tremendous need of technical knowledge never dawns with great force upon the office trained draftsman, for his small bits of knowledge in this line picked up here and there have given him confidence that he knows this side of architecture, especially when he compares himself with the school trained designer. He does not realize that his horizon is very narrow, and that his wisdom has only been developed from the habits of one particular office.

The first need that meets them both is to gather together practical facts concerning the modern demands of the different types of buildings. Before the plan of a house can be made, the practical needs of people living in it must be recognized. Standard ways of doing things in this line must first be known. But there are so many different kinds of buildings to learn about and collect facts upon, that the task is one of knowing where to begin. The school designer has been puzzling over monuments, large public buildings and the like, of which he knew nothing. Practical requirements were not considered important — it was all design and invention. He knows, however, that this will not answer for a real building, and also that it will be a long time before he will have a large public building to design under his own name. He must collect the data, but where will he start?

Then he is face to face with the vast mass of facts upon building construction which he must gather for his own personal use. If he follows the much recommended system of picking this up entirely from practical experience, it will take many years to grow, and the information will come in odds and ends without logical order or broad and general scope.

Next comes the demand that he know something about the various trades, such as plumbing, heating, and electric work. This information can hardly be picked up in small parcels. What will he do?

Again he is faced with his detail drawings. How will he put this together, what is customary for this or that, and can he economize by one detail or another? It is a big puzzle. When will he ever learn how to do it all?

He then looks over the specifications and trembles in awe at the vast amount of knowledge of building shown in them of which he knows nothing. He never saw a book that was very satisfactory upon this subject. Any attempt upon his part to look too far in this direction while in the office is likely to be frowned upon.

At last comes a job to superintend. What is best for him to look at? Has anybody ever written a list of the various methods used by contractors to skin the work? He has heard that this is what he is to look for.

Then come the legal difficulties of an architect. Has he ever studied law? Why, no, he is an architect; but then there are contracts to be made, money to handle, a client to protect. Yes, there is much to learn here.

Summing it up, he finds that he has to face the problem in seven distinct lines, and collect his knowledge under each one of these headings, which are: 1. Needs of different types of buildings; 2. Different methods of building; 3. Different trades; 4. Detail drawings; 5. Specification writing; 6. Superintending; 7. Legal questions.

With his problem tabulated in this form before him, the next step is to tabulate the sources from which he can get the necessary information upon these subjects.

Nearly every large city has some special technical courses in various lines of practical building work given at universities, high schools, or trade schools in the evenings. Such courses can be attended while the daily work is being carried on. They are useful for a working basis and foundation outline for further development of this knowledge.

The text book is also another excellent source for getting a broad and complete foundation to build upon. There are a great number of technical books published in this field. Most of them are very expensive, so that the greatest care should be taken in selecting them. In no field of publishing are there so many useless books. Catchy titles and alluring descriptions ought not to be the means of judging books for purchase. The best way to buy them is to go through the list of technical books at different libraries, look at all of them, jot down a list, and determine, after having seen a great number, which are the best for personal use. The date in a technical book is very important. It must be a very recent publication, for things move rapidly in the building line. There are many good English books on these practical subjects, but it is best to buy only American publications, and read the English books in the library to compare methods.

The most condensed form of technical building knowledge can be obtained from building codes, such as that of New York City. But to thoroughly understand these documents there must be a former basis of knowledge gained from technical courses or books. One of the most useful reference books is the "Building Code" recommended by the National Board of Fire Underwriters.

A vast amount of information can be obtained from advertising literature, which can be secured free. Considerable judgment must be used in selecting facts from this source. This information should be clipped and filed for ready reference. Standard manufacturers' specifications and handbooks are some of the most useful of all the references for practical information.



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Magazine articles are one of the best methods of keeping information up to date. The young architect cannot subscribe to all the architectural and building publications, but he should have as big a list as possible. The rest he should refer to at the library. Trade journals for plumbing and heating, etc., should be glanced at occasionally for new ideas in these lines. Semi-scientific magazines contain many suggestions which will be of great use to the architect. The engineering magazines are also a big field of information. Some publish lists of articles appearing in other publications upon practical subjects relating to architecture, and these can be secured from them for filing purposes. A regular monthly visit to some library to glance over these magazines is absolutely necessary for keeping abreast of the times.

Building contractors are also excellent fountains of information, if intelligently questioned, and association with other architects and draftsmen is another splendid source if the opportunity is used to advantage.

Practical experience is the finishing touch to gaining information. It is held by many architects to be the only way, but in reality it is the most expensive, slowest, and most discouraging. The man who refuses to profit by the experience of others and depends upon his own practical experience is only half wise. Somebody said that the secret of success is to use other peoples' brains along with your own. Leave practical experience as the last resort for gaining knowledge in this field. The experience of a large number of men as recorded in books and articles is far safer than that of any individual.

Going back to the original list of necessary practical information to collect, it will be found that the information upon the modern practical needs of various types of buildings is very difficult to obtain. The best source is from the bound volumes of architectural and building magazines. By patient study and collecting information here and there this material can be tabulated for ready reference. There is a scarcity of good books in this field. A few of them will be found. Most, however, are either too general or are the collection of ideas of only one individual architect. Architectural histories do not help much in giving this practical set of facts for modern American buildings. In collecting this information the work should be carried along in a logical and useful manner. It is best to tackle first the problems of the buildings that the young architect will be most likely to encounter. Such a list should run similarly to the following:

Residential, Society, Business and Commercial, Industrial, Recreation and Amusement, Ecclesiastical and Religious, Educational and Scientific, Monuments, Administrative and Governmental, Etc.

The same process should be used in collecting information upon the various methods of building construction. The most obvious and simplest constructions should be studied first. Thus it would be ridiculous to be collecting facts about how to build a skyscraper when nothing is known of how to construct a wooden framed country house.

Collect the information in the following order, and tabulate it under proper headings, so as to make it accessible:

Frame Construction, Ordinary Construction, Mill Construction, Fireproof Construction.

The sources of information in this line can best be obtained from technical courses and books, and later from building codes and advertisements, as well as hints from contractors, magazine articles, other architects, and practical experience.

The gathering of facts for the different trades divides itself naturally into Masonry, Carpentry, Iron and Steel Work, Plumbing, Heating, and Electric Work. The chief facts to gather for masonry and carpentry and iron and steel work is the way each trade comes upon the job and the various sub-contracts under these headings. Facts upon plumbing and heating and electric work must be gathered separately. Technical courses, building codes, and technical books are the best for the latter trades. Keep abreast of the times in these trades by reading the trade periodicals and advertisements.

In collecting information for detail drawings there are some very excellent published works which can be followed. Magazines also offer good clipping material, as well as sketches made from other architects' methods. A scrap book, portfolio, and sketch book are very necessary for this information.

The best system for securing information upon specification writing is to get a good specification reminder or some printed list found in a book on expert filing systems, and take off the list upon a card index file of about 4 by 6 inches. If a good reminder is secured, a very complete file can be made from the list, and there will be room in the index for any amount of facts. Fill up the cards whenever an opportunity offers itself from old specifications, standard specifications, advertisements, and books. In a short time a very large amount of information will have accumulated that, as the index grows, will become invaluable. Whenever new ideas are noted and old methods are put on the shelf, the index cards containing the information should be changed. It is very bad practice to write specification from the "dope" taken from some old specification, for this repeats errors and prevents expansion of the work as processes change.

Information for superintending will gradually be accumulated from the former knowledge, but there should be a little pocket-book reminder of information gained from other architects and contractors on methods of skinning work. Before going upon a job all the necessary points to be noted should be tabulated, and a glance taken at the reminder. This will freshen the information in the mind.

There are a few good books published upon the legal side of architecture which are very necessary additions to the library of the young architect. Magazines of architecture publish regularly legal decisions of interest to architects, and these should be filed away for reference. The "Standard Documents" of the American Institute of Architects should be obtained.

If the young architect will plan his campaign for acquiring his necessary practical knowledge along the lines described, he will hasten the day when the mountain of necessary facts to be learned has been climbed, and his services will be worth their full value. However, if he goes along in a planless manner, the day will be far off when he sees the top of the mountain.

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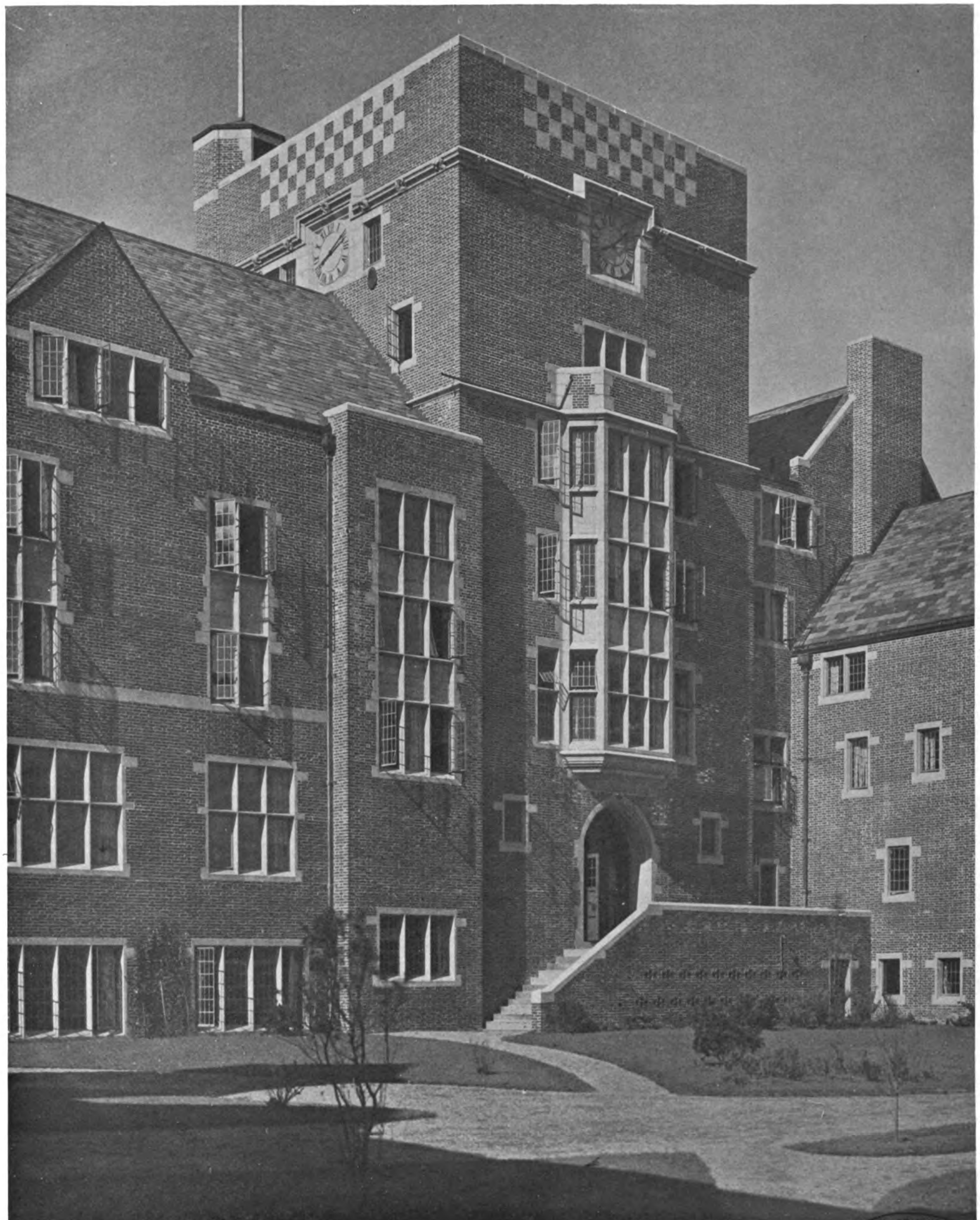

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DETAIL OF TOWER AND NORTH SIDE

TAFT SCHOOL, WATERTOWN, CONN.

BERTRAM GROSVENOR GOODHUE, ARCHITECT

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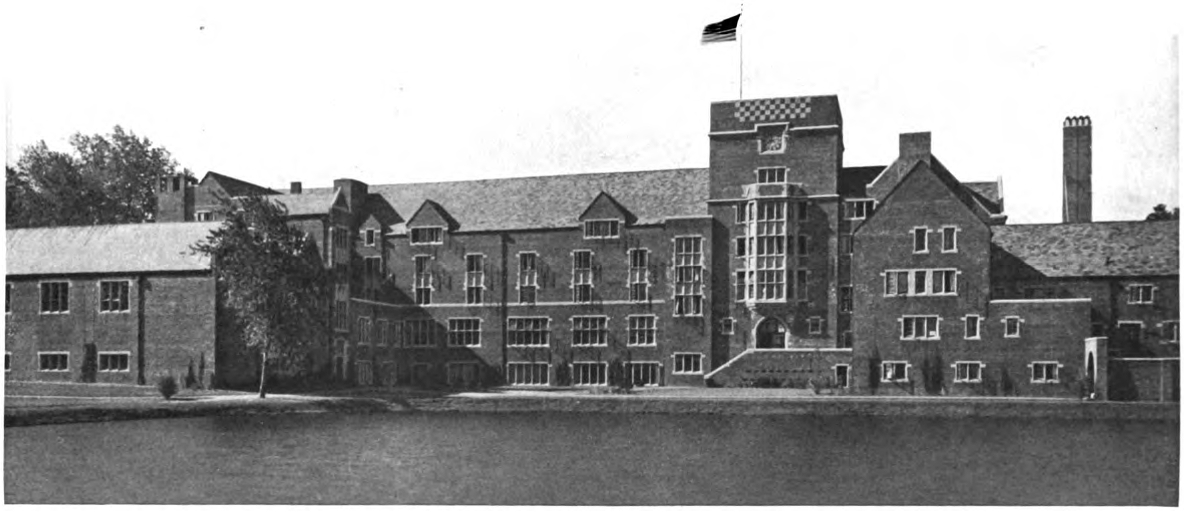

GENERAL VIEW FROM THE NORTH

VIEW OF ENTRANCE OR SOUTH SIDE

TAFT SCHOOL, WATERTOWN, CONN.

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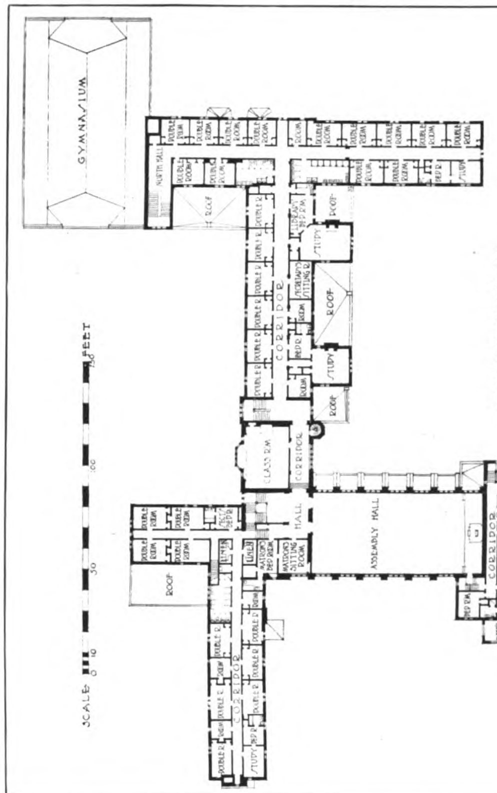


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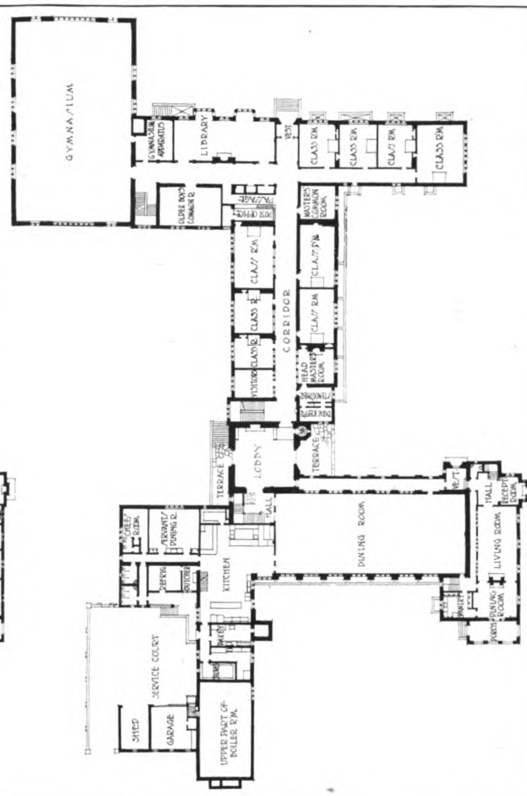


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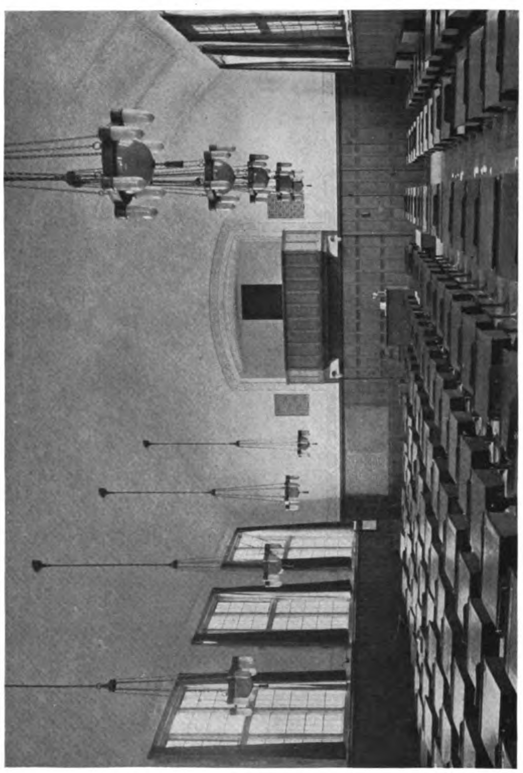

STUDY HALL

MASTER'S LIVING ROOM

TAFT SCHOOL, WATERTOWN, CONN.
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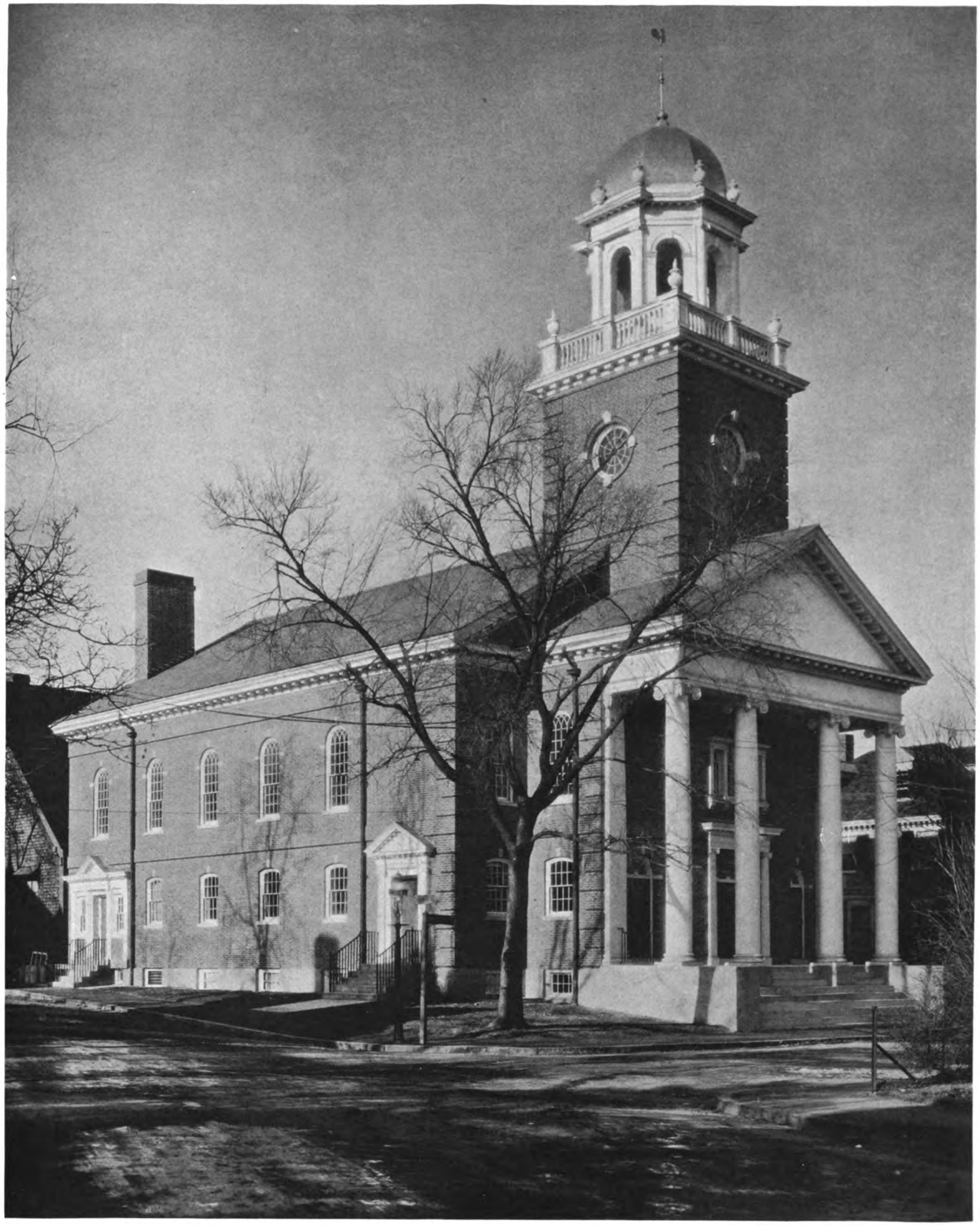

SECOND UNITARIAN CHURCH, BROOKLINE, MASS.
EDWIN J. LEWIS, ARCHITECT

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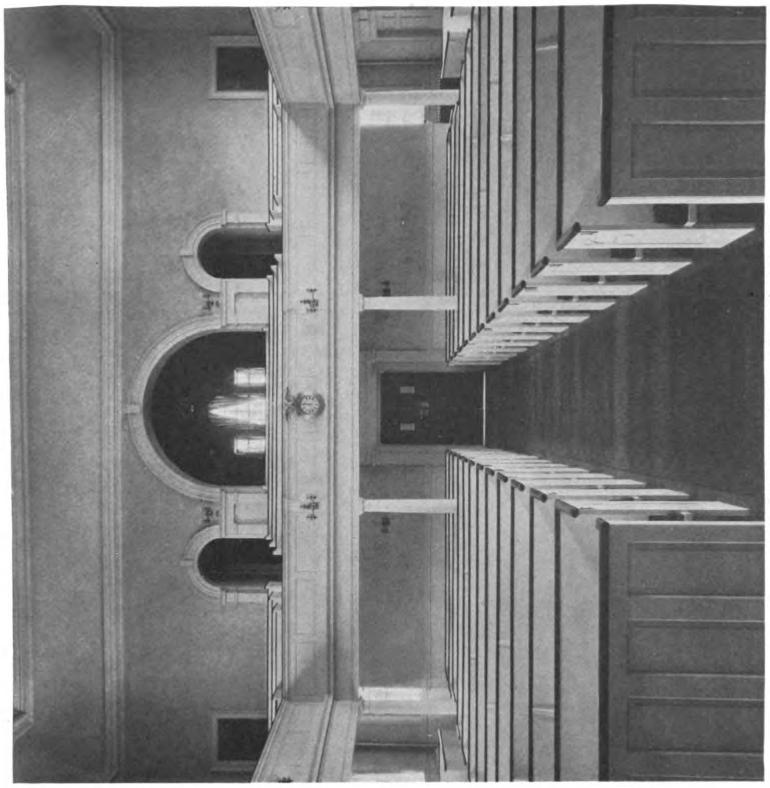

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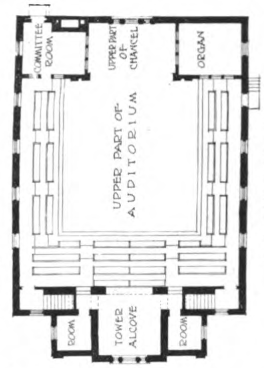


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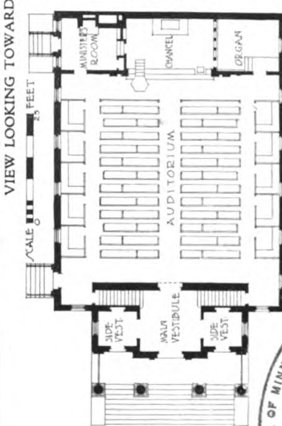


FIRST FLOOR PLAN

VIEW OF CHANCEL AND PULPIT

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EDWIN J. LEWIS, ARCHITECT

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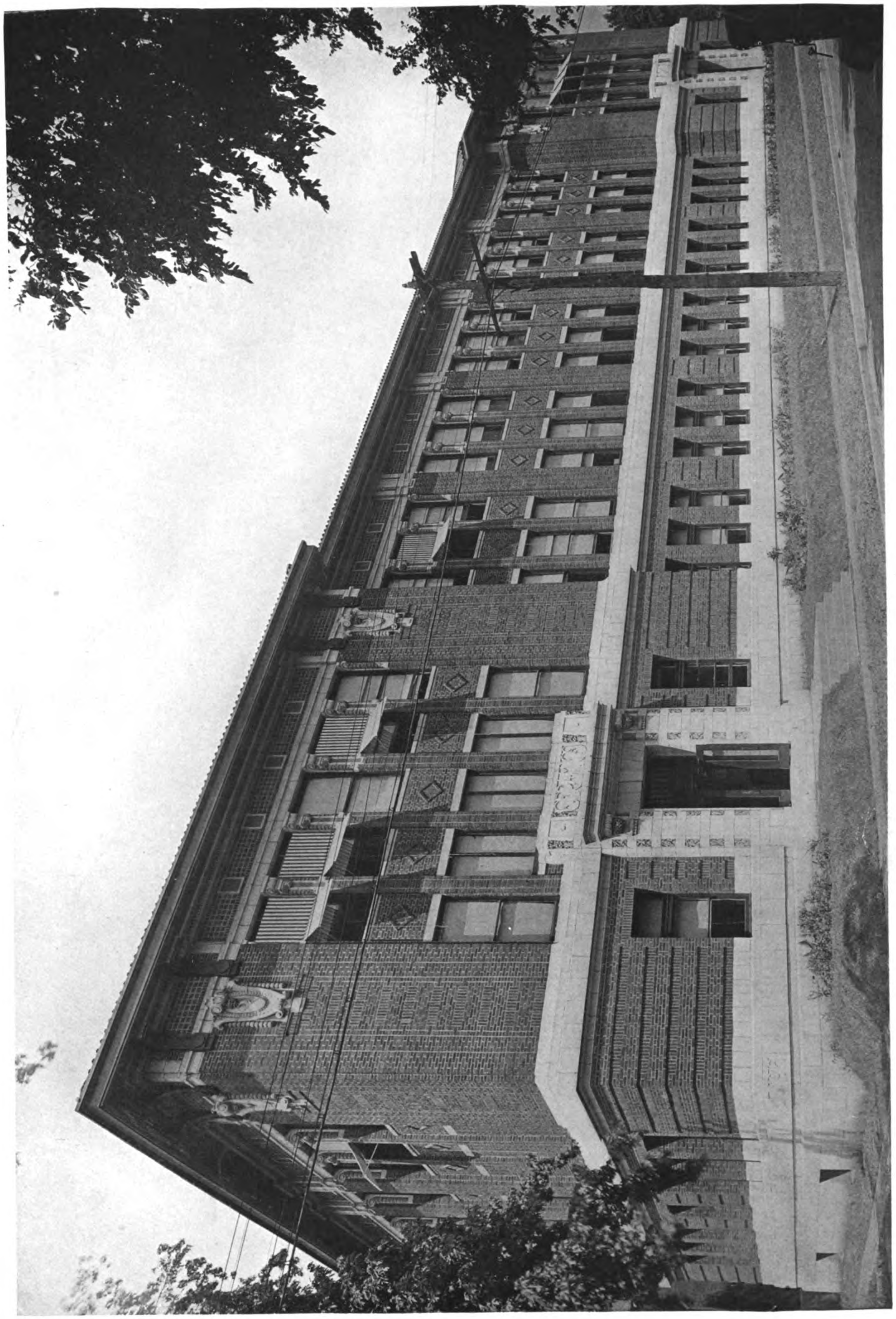

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JAMES B. DIBELKA, STATE ARCHITECT, PROF. JAMES WHITE, SUPERVISING ARCHITECT

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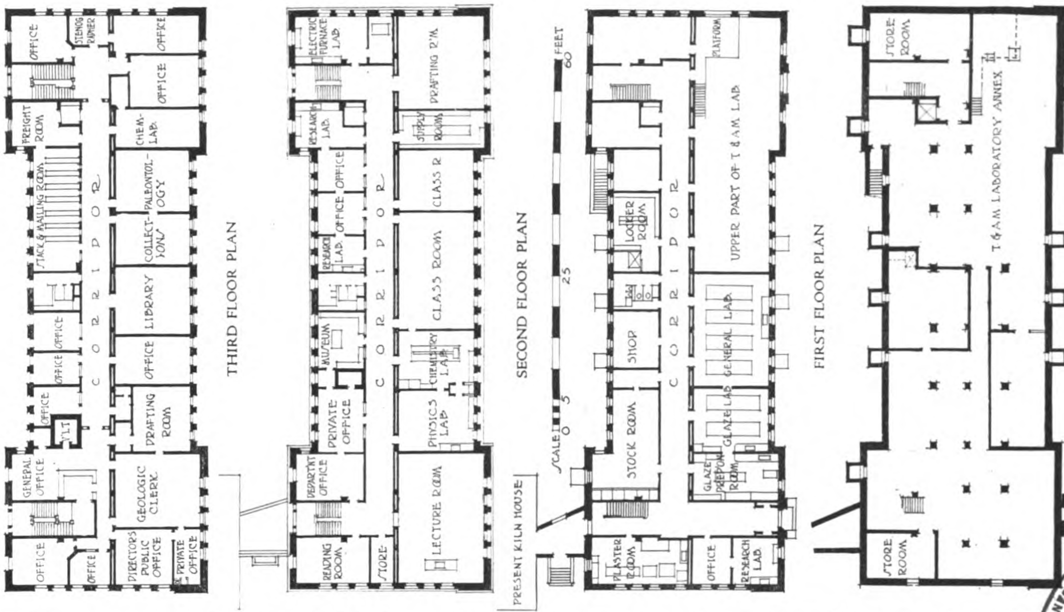
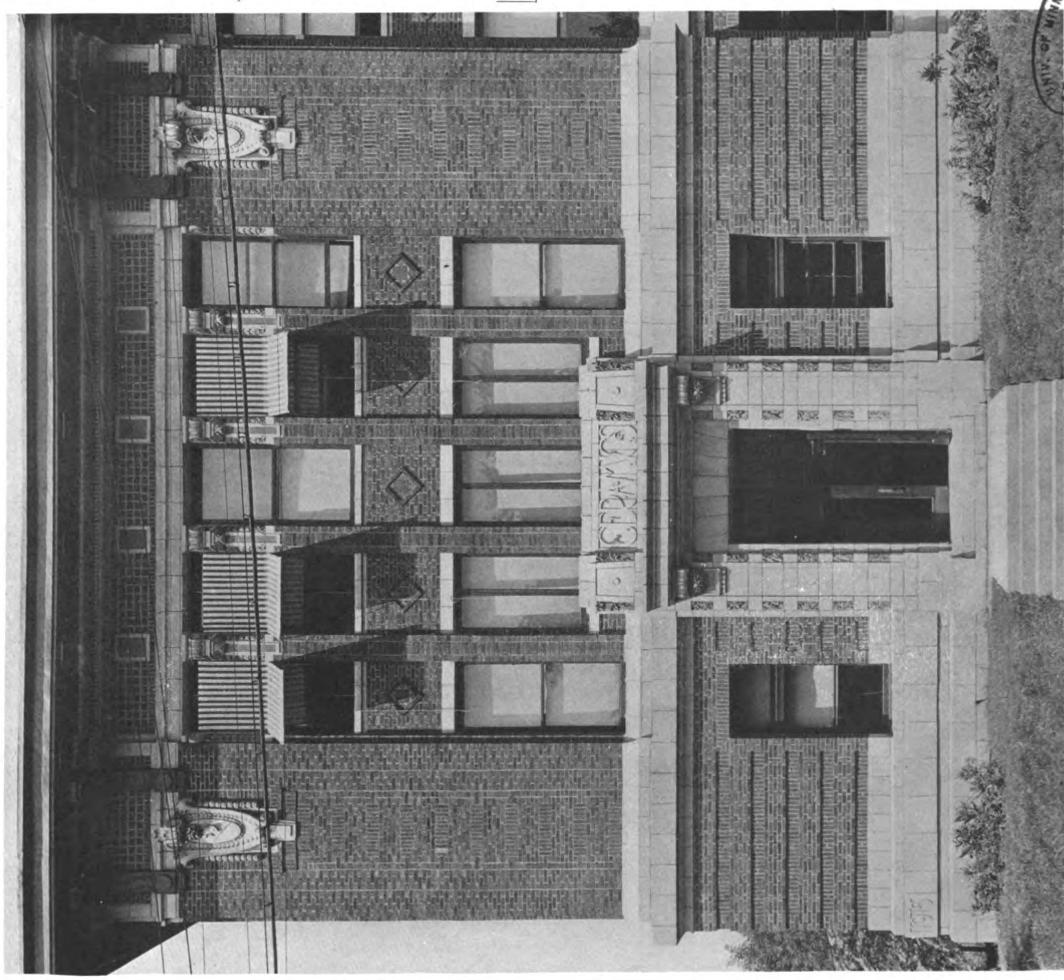


THIRD FLOOR PLAN

SECOND FLOOR PLAN

FIRST FLOOR PLAN

BASEMENT FLOOR PLAN



DETAIL OF END BAY AND ENTRANCE

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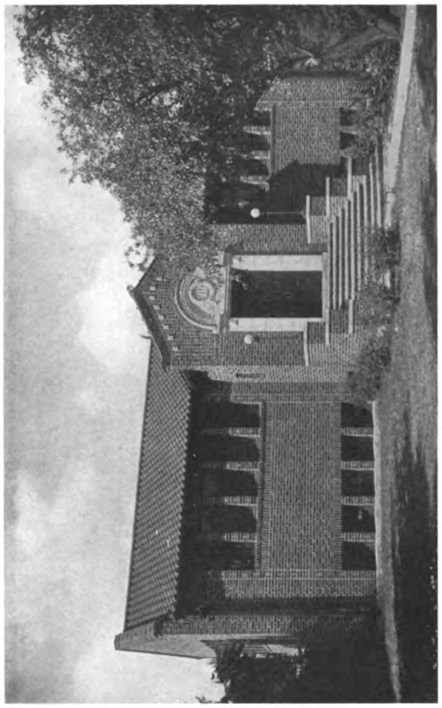
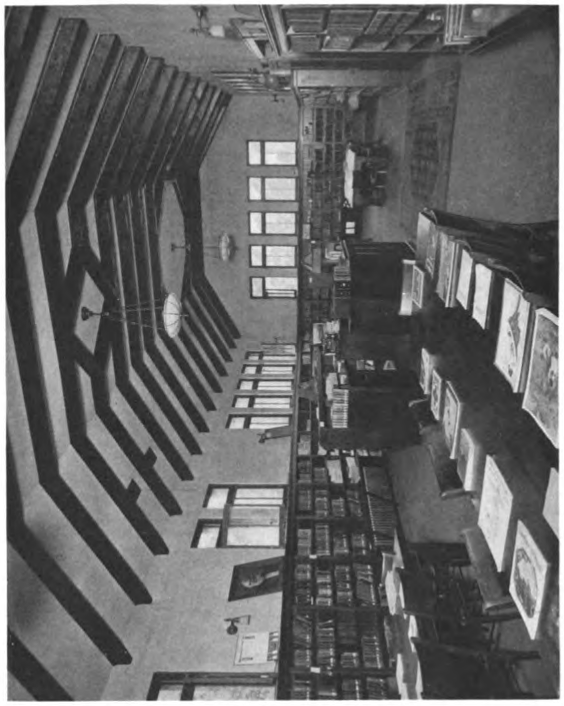
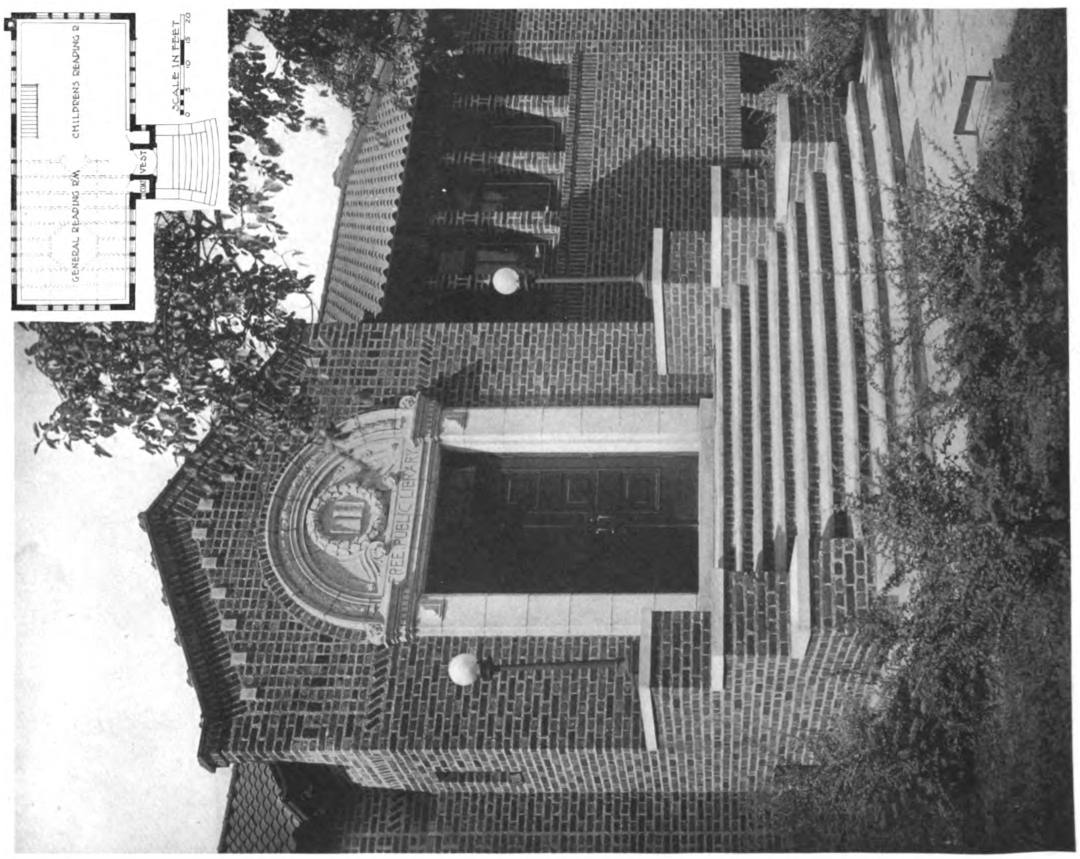


GENERAL VIEW OF EXTERIOR



GENERAL VIEW OF INTERIOR




DETAIL OF ENTRANCE

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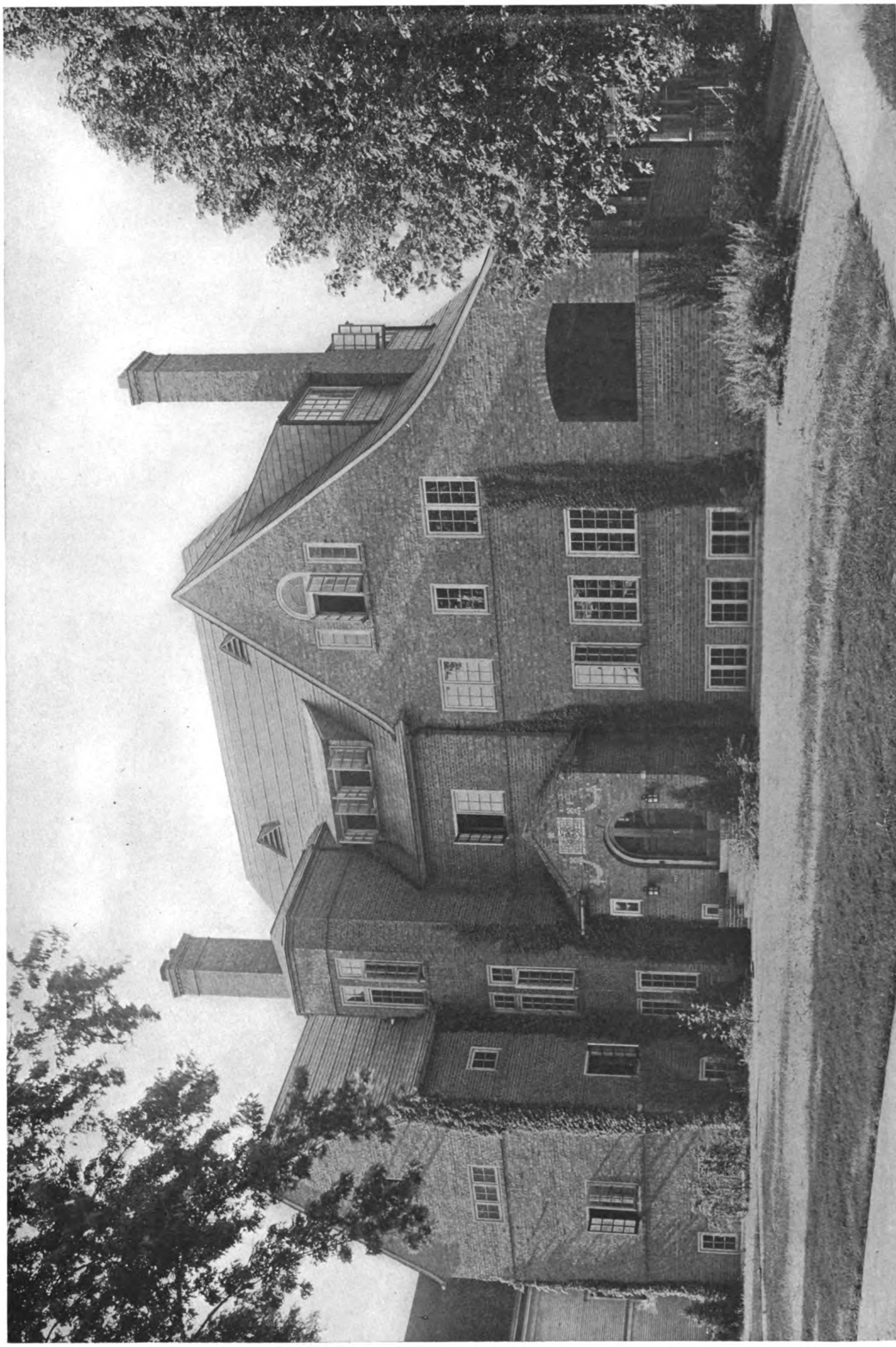

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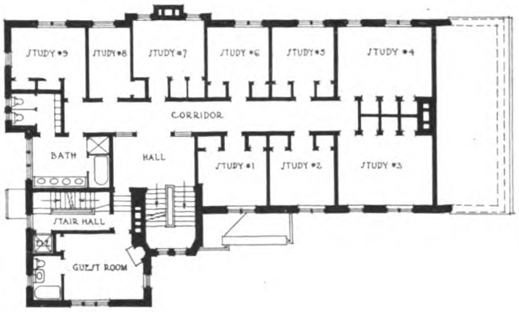


SECOND FLOOR PLAN


THIRD FLOOR PLAN

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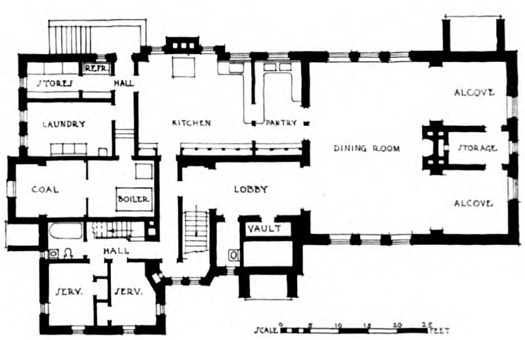
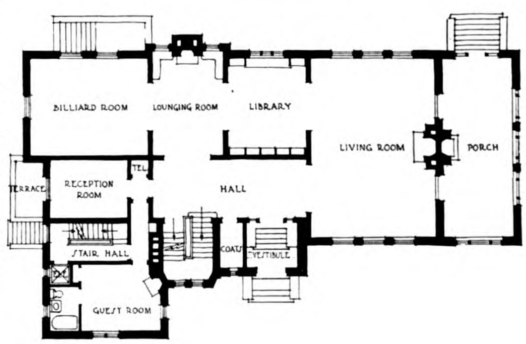



BASEMENT FLOOR PLAN




FIRST FLOOR PLAN

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VIEW FROM DRIVEWAY APPROACH

GENERAL VIEW OF REAR

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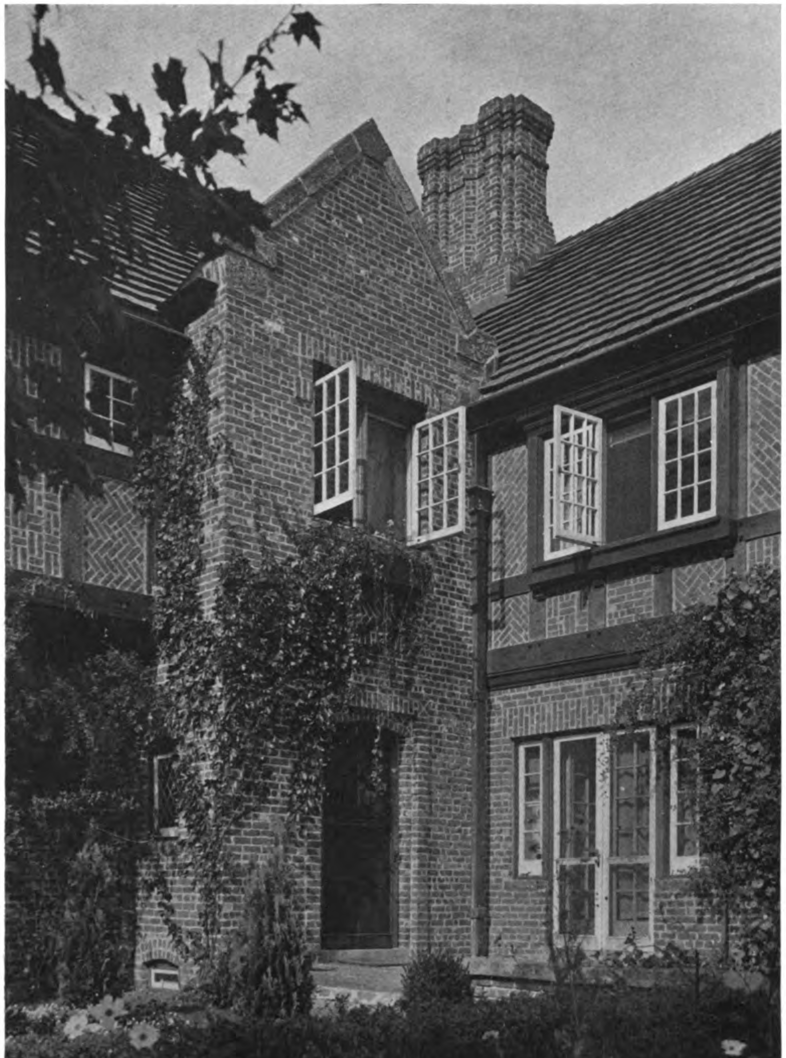
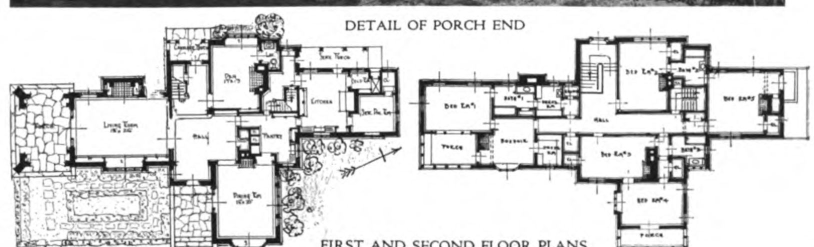


DETAIL OF GARDEN ENTRANCE

DETAIL OF PORCH END



FIRST AND SECOND FLOOR PLANS

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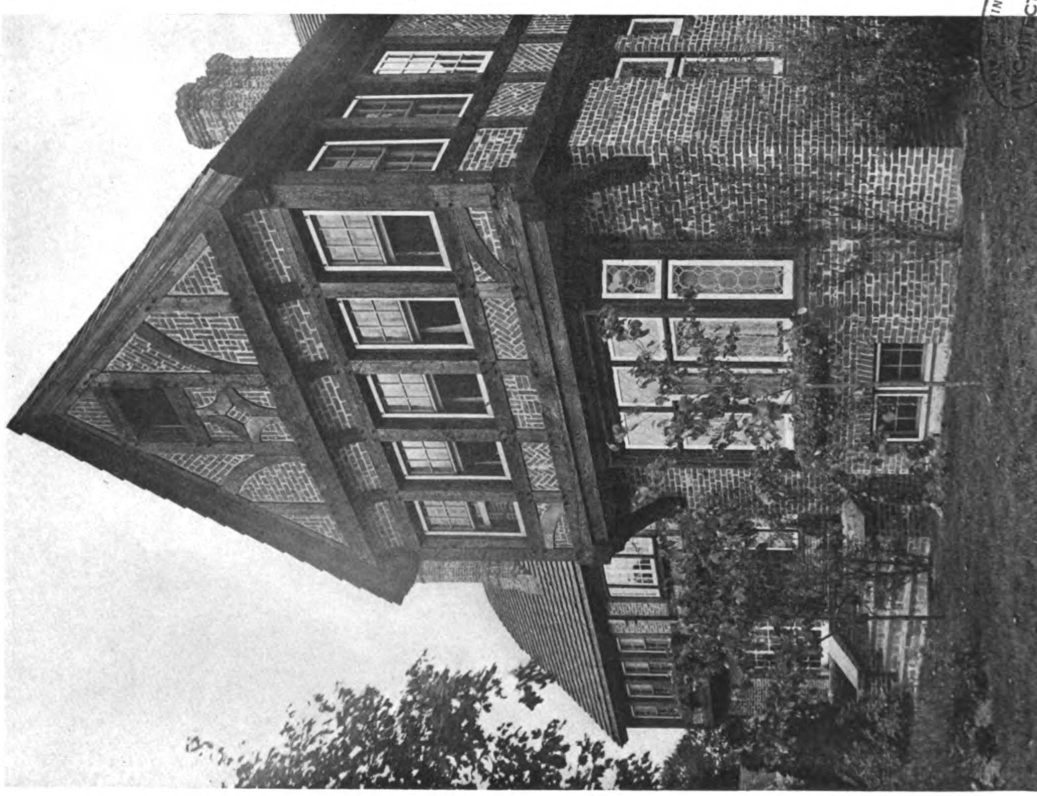
DETAIL OF DINING ROOM WING


DETAIL OF MAIN ENTRANCE

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GENERAL VIEW OF EXTERIOR


FIRST FLOOR PLAN

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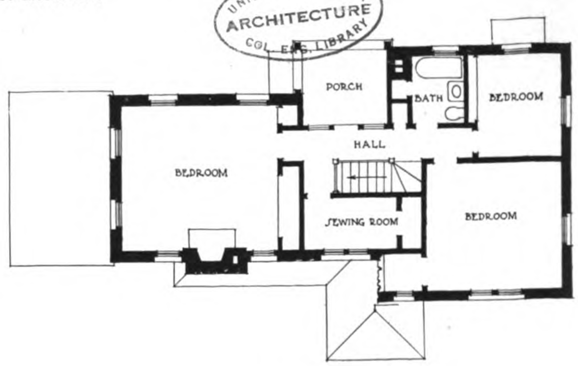


SECOND FLOOR PLAN

HOUSE OF ALEXANDER H. GUNN, ESQ., WELLESLEY, MASS.

FRANK CHOUTEAU BROWN, ARCHITECT

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DETAIL OF ENTRANCE FRONT

HOUSE OF ALEXANDER H. GUNN, ESQ., WELLESLEY, MASS.
FRANK CHOUTEAU BROWN, ARCHITECT

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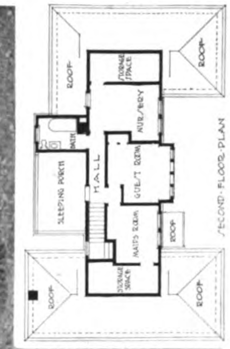

HOUSE OF J. L. SULLWOLD, ESQ., ST. PAUL, MINN.
H. A. SULLWOLD, ARCHITECT

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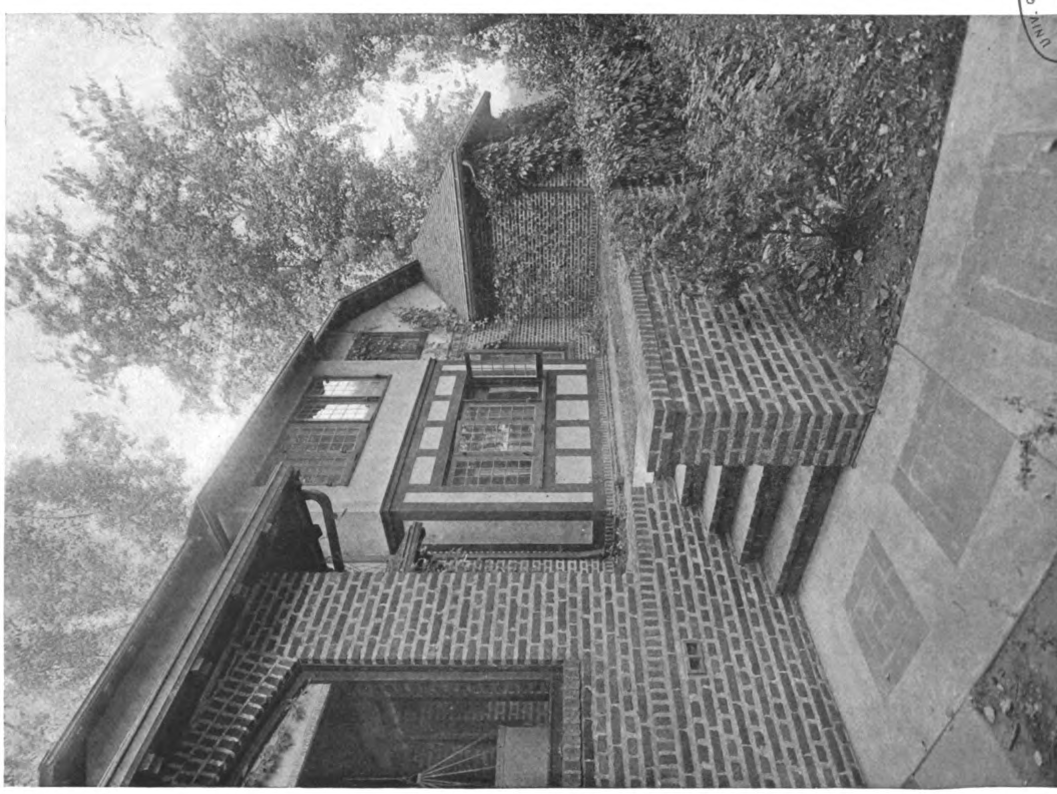
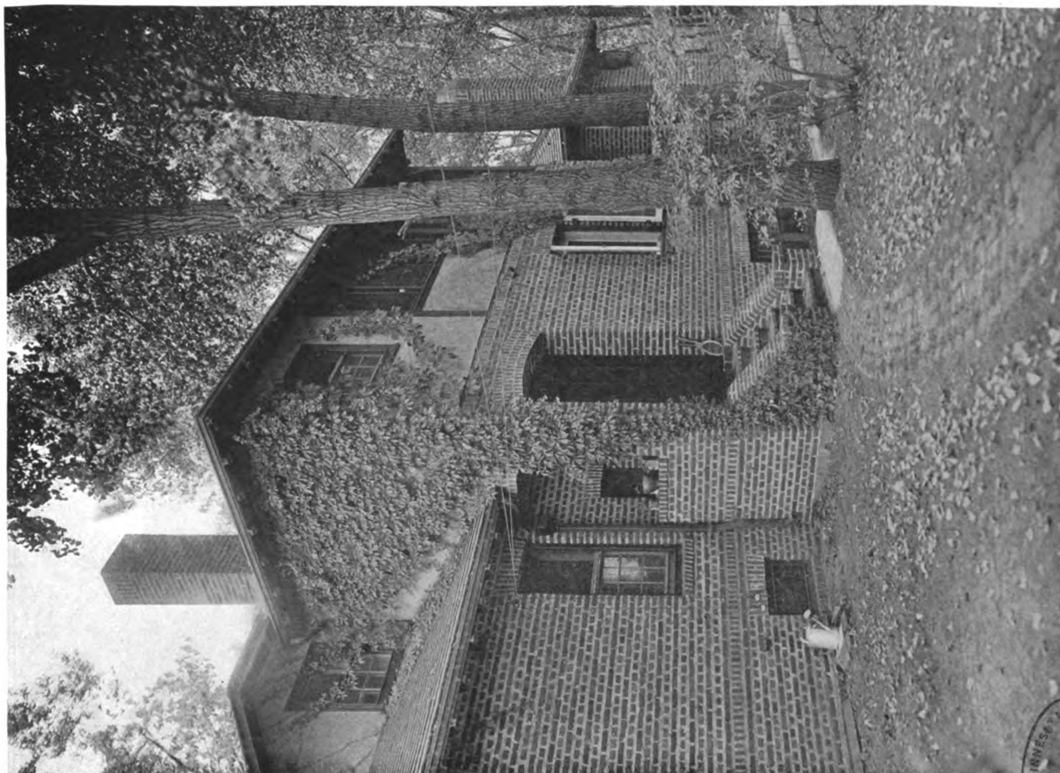


VIEW ALONG TERRACE



DETAIL OF REAR

HOUSE OF J. L. SULLWOLD, ESQ., ST. PAUL, MINN.

H. A. SULLWOLD, ARCHITECT

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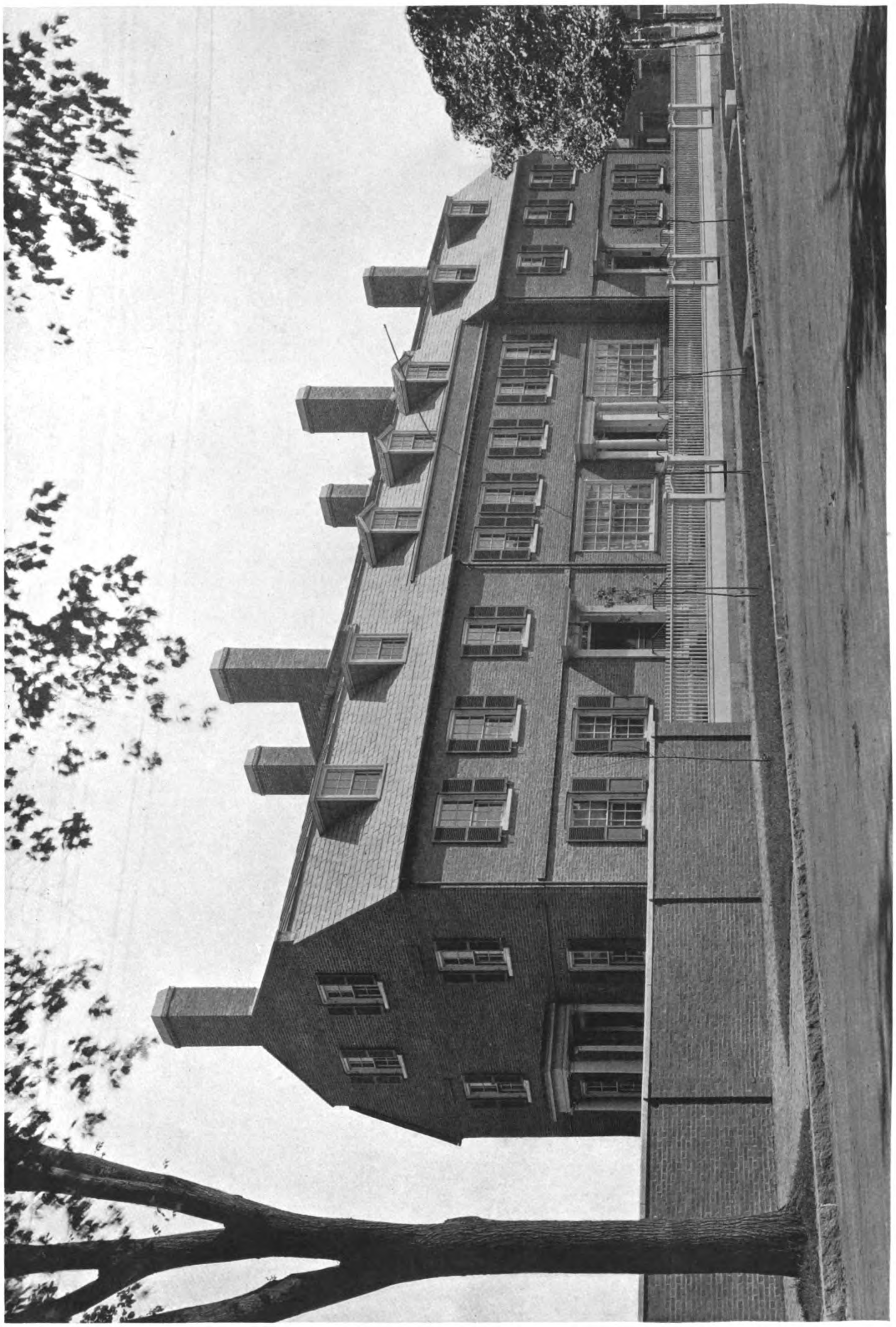

GROUP OF HOUSES, SALEM, MASS.
WILLIAM G. RANTOUL, ARCHITECT

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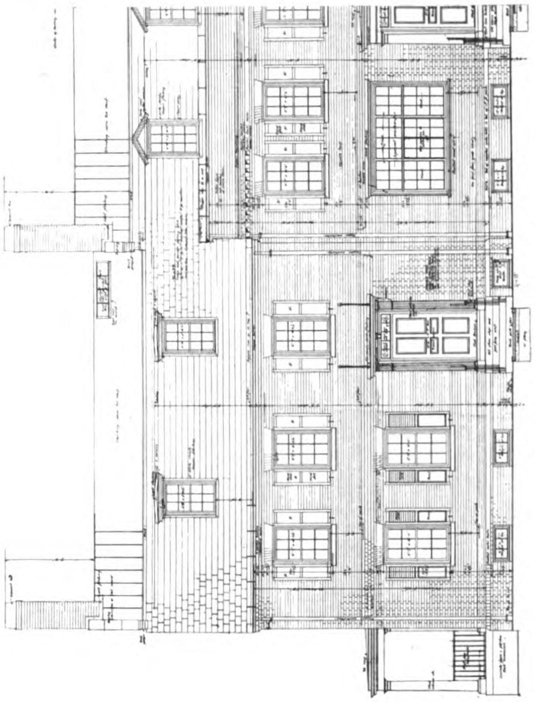
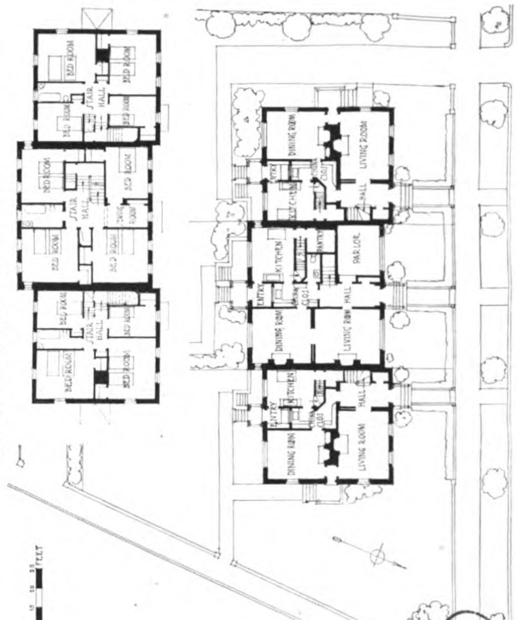


DETAIL OF MAIN ELEVATION



FIRST AND SECOND FLOOR PLANS

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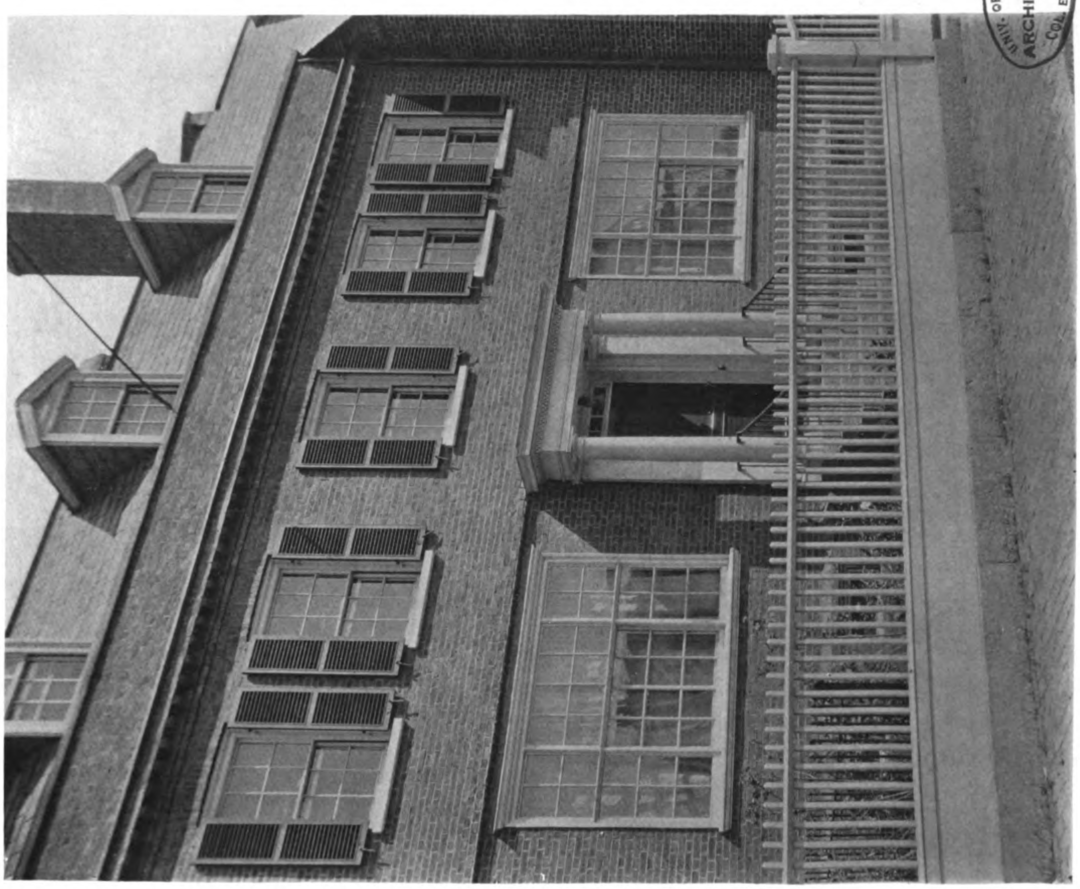

VIEW OF CENTER HOUSE

GROUP OF HOUSES, SALEM, MASS.
WILLIAM G. RANTOUL, ARCHITECT

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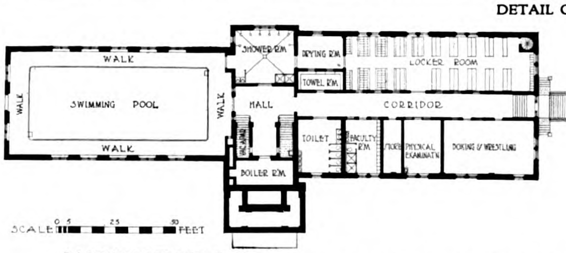
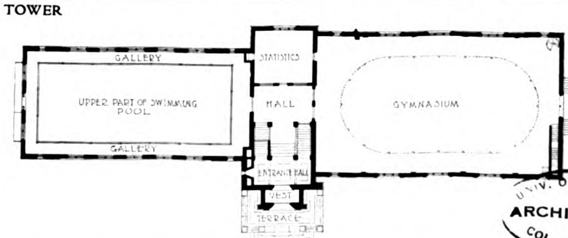
DETAIL OF TOWER




BASEMENT FLOOR PLAN




FIRST FLOOR PLAN

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GYMNASIUM, WORCESTER ACADEMY, WORCESTER, MASS.

PEABODY & STEARNS, ARCHITECTS

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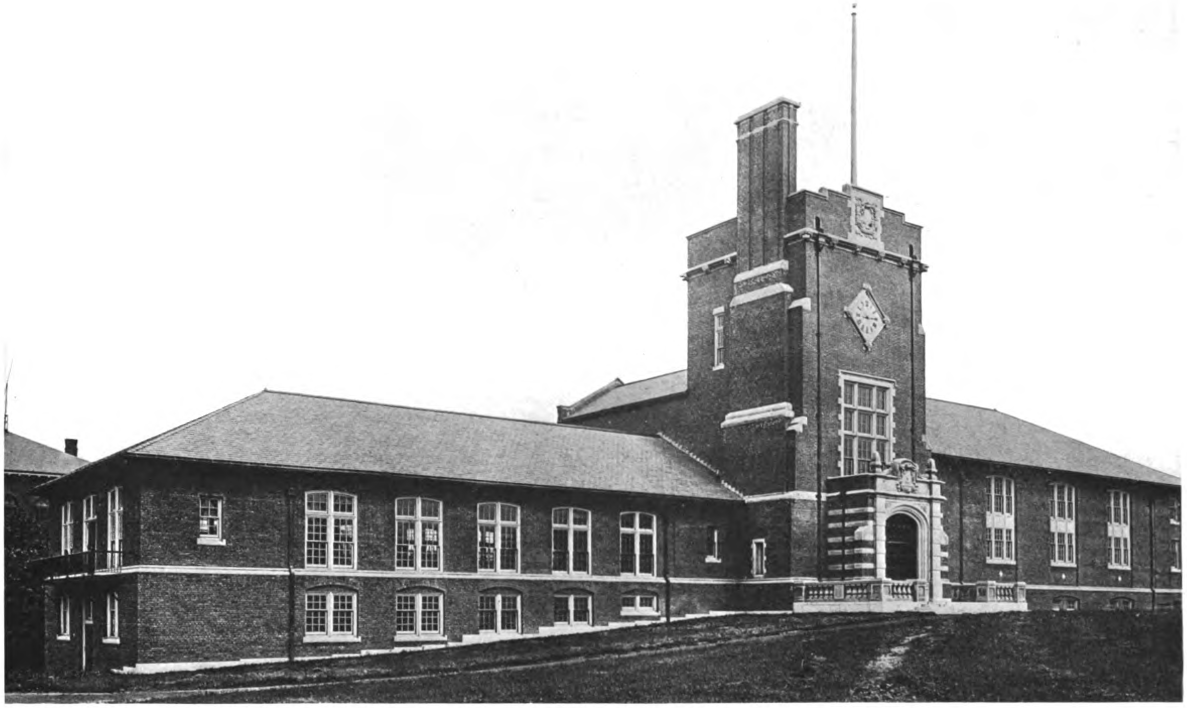
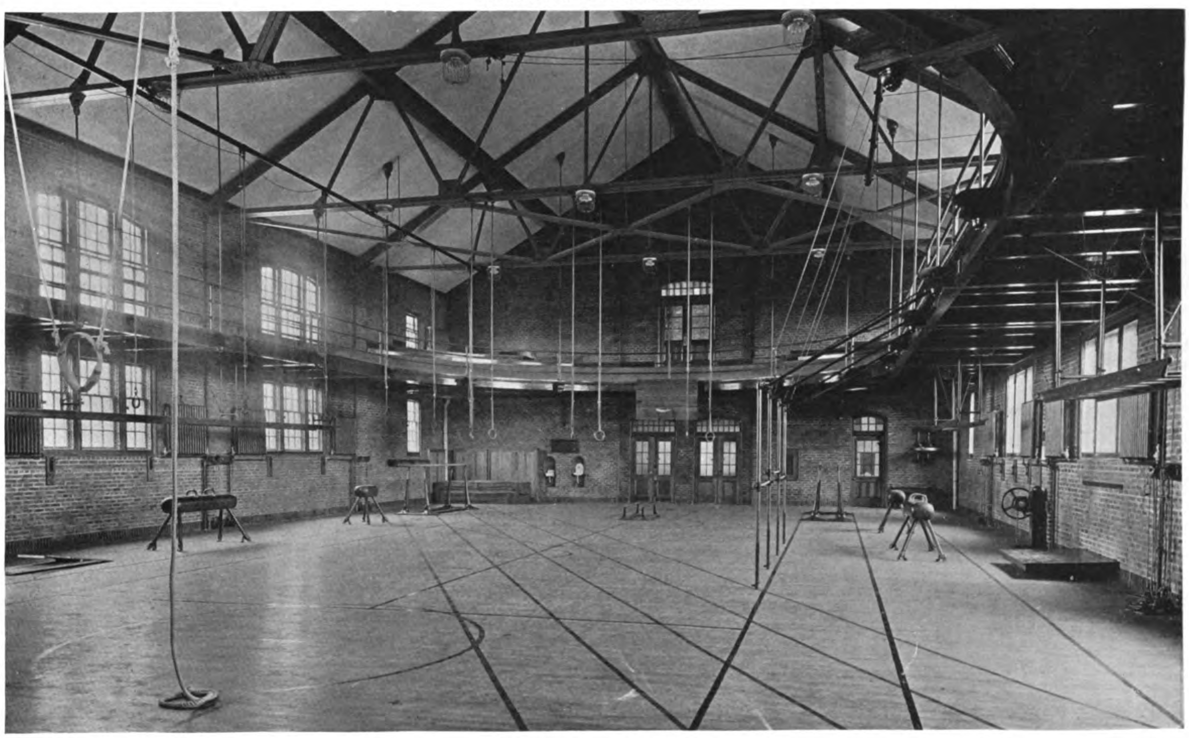


GENERAL VIEW OF EXTERIOR



INTERIOR OF GYMNASIUM

GYMNASIUM, WORCESTER ACADEMY, WORCESTER, MASS.
PEABODY & STEARNS, ARCHITECTS

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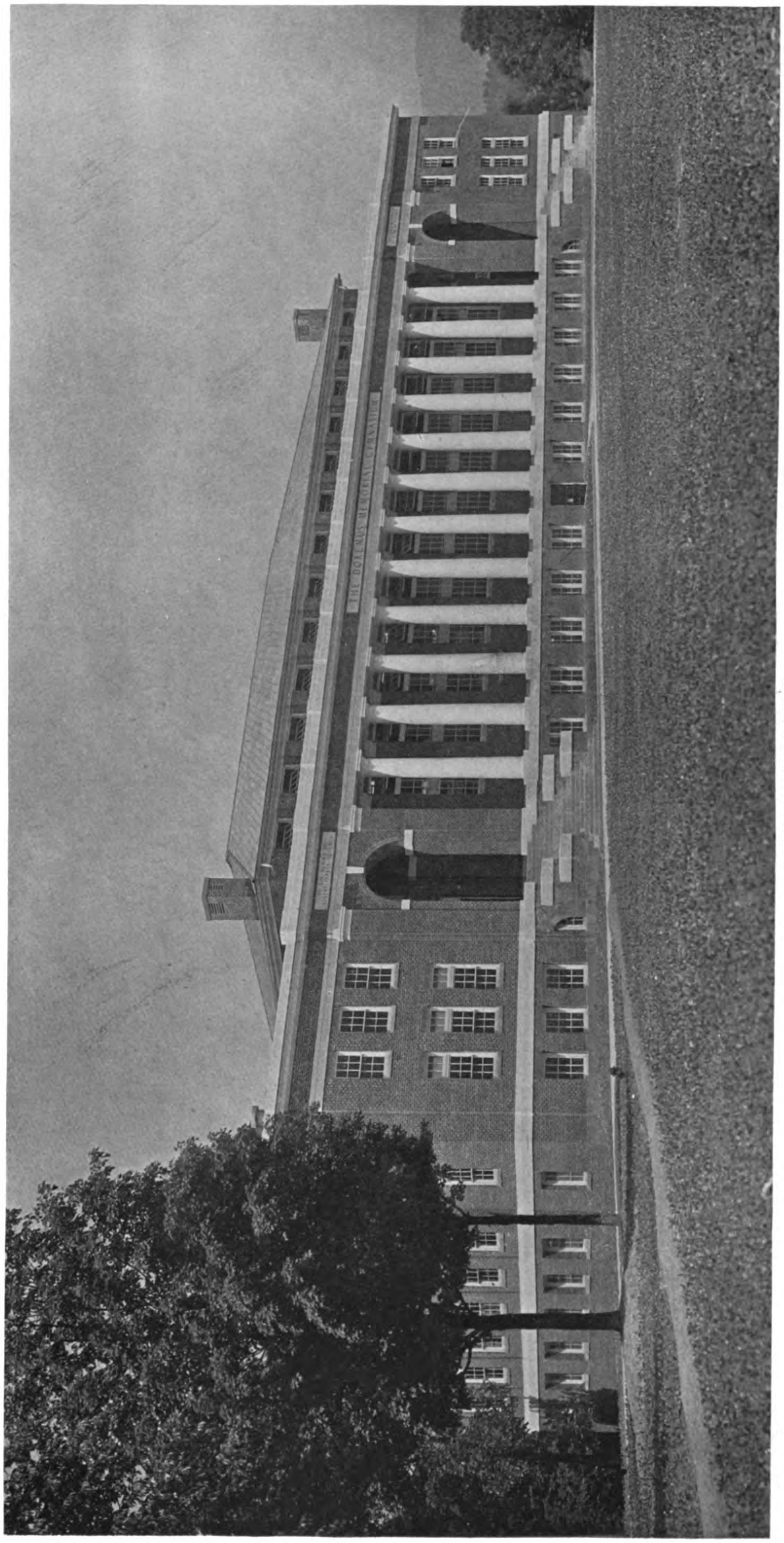
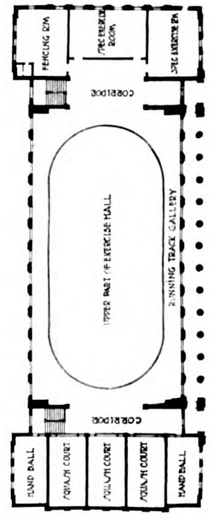
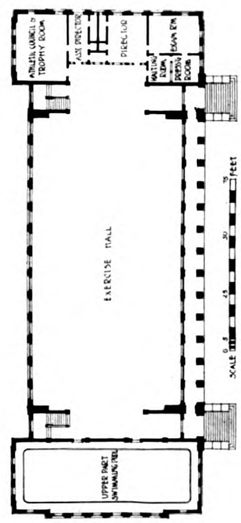


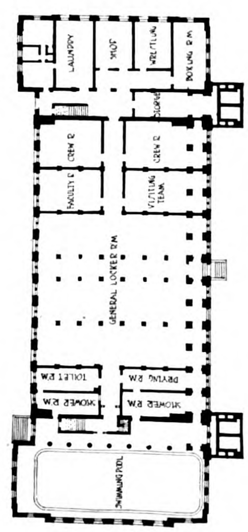
GENERAL FRONT VIEW



SECOND FLOOR PLAN



FIRST FLOOR PLAN



BASEMENT FLOOR PLAN

DOREMUS MEMORIAL GYMNASIUM, WASHINGTON AND LEE UNIVERSITY, LEXINGTON, VA.

FLOURNOY & FLOURNOY, ARCHITECTS

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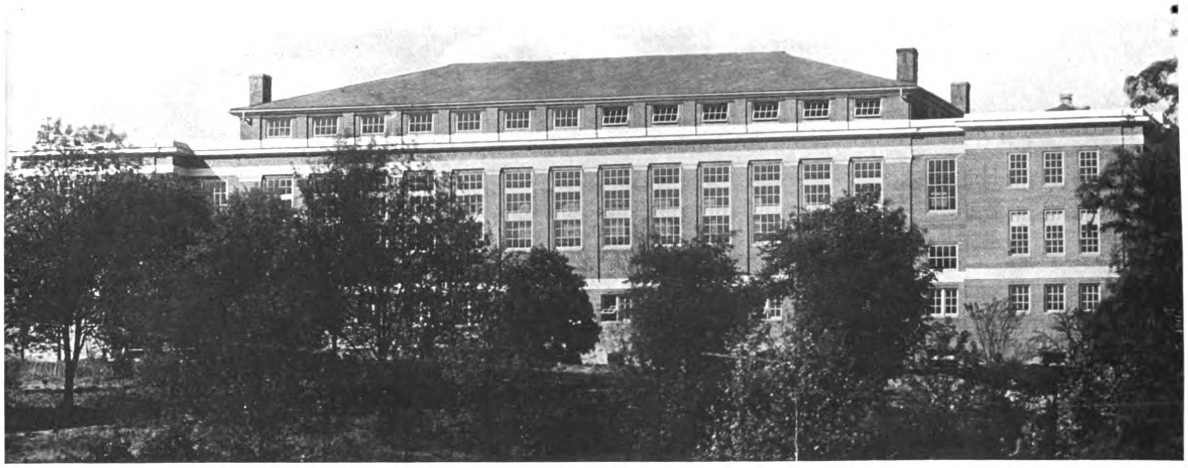
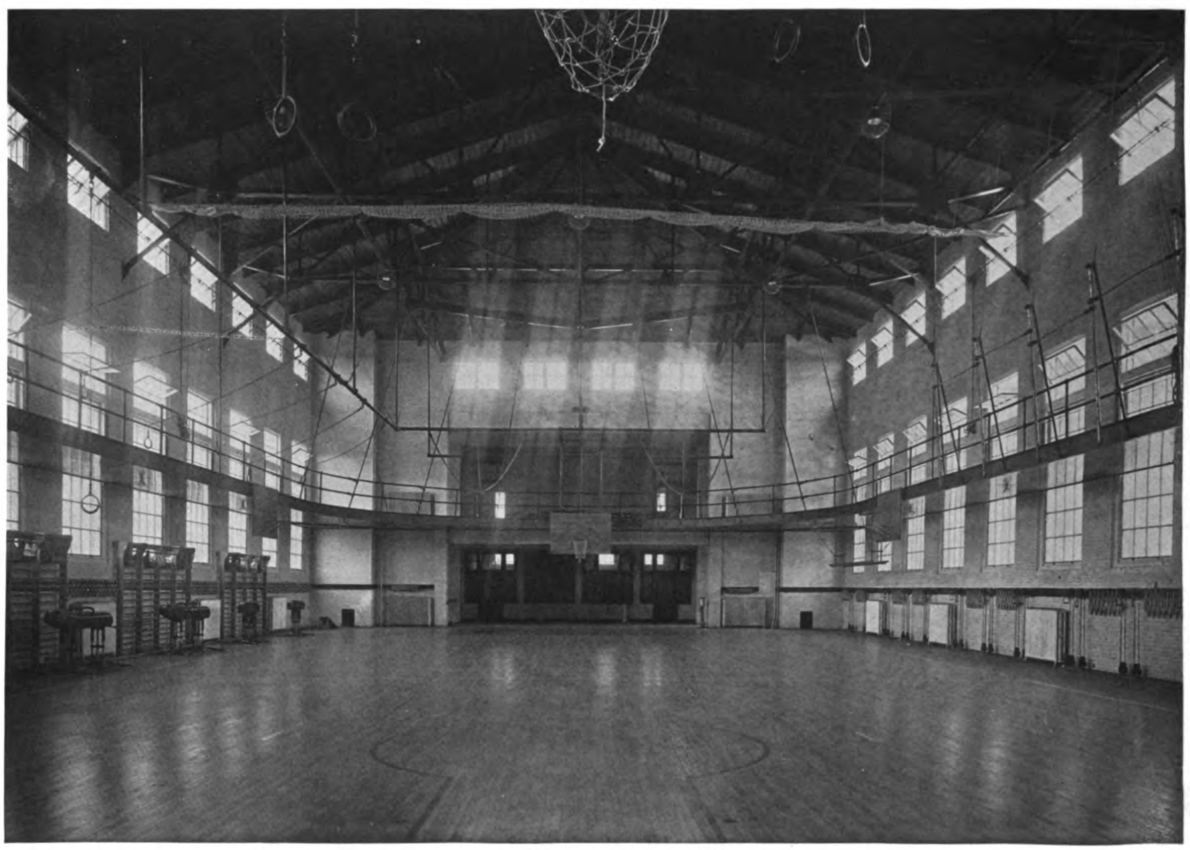


VIEW OF REAR



INTERIOR OF GYMNASIUM

DOREMUS MEMORIAL GYMNASIUM, WASHINGTON AND LEE UNIVERSITY, LEXINGTON, VA.

FLOURNOY & FLOURNOY, ARCHITECTS

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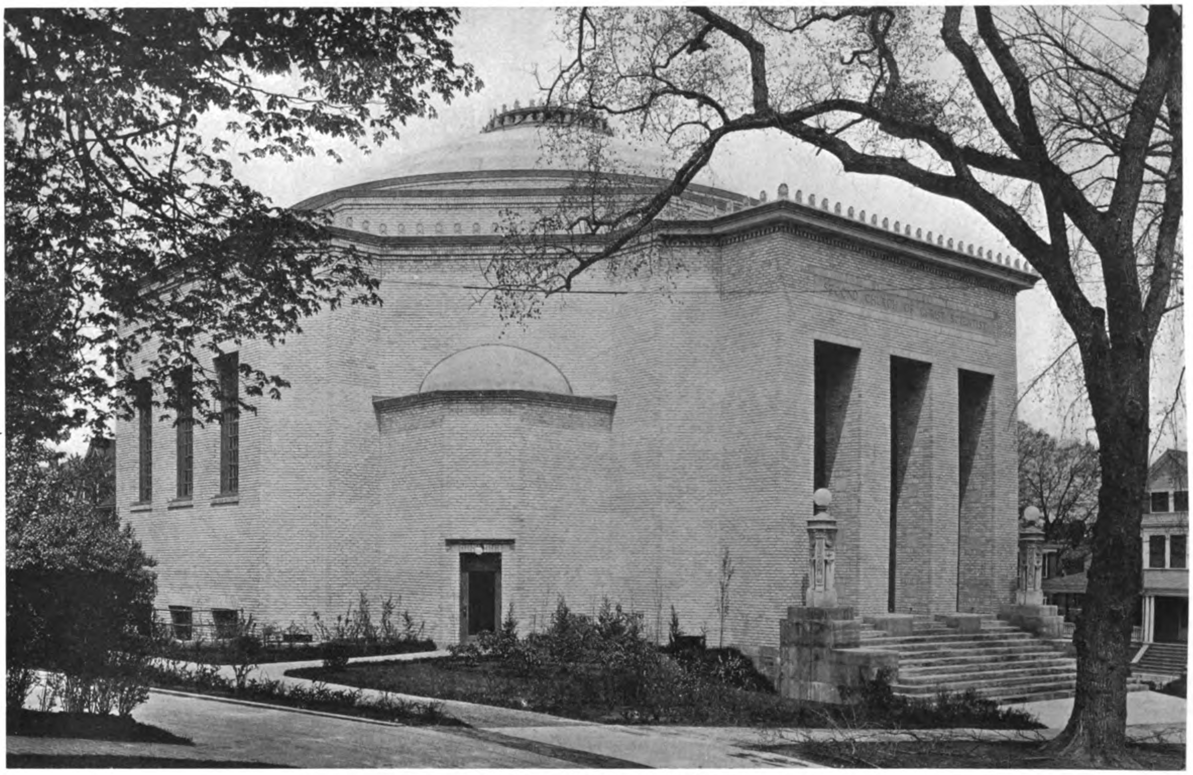
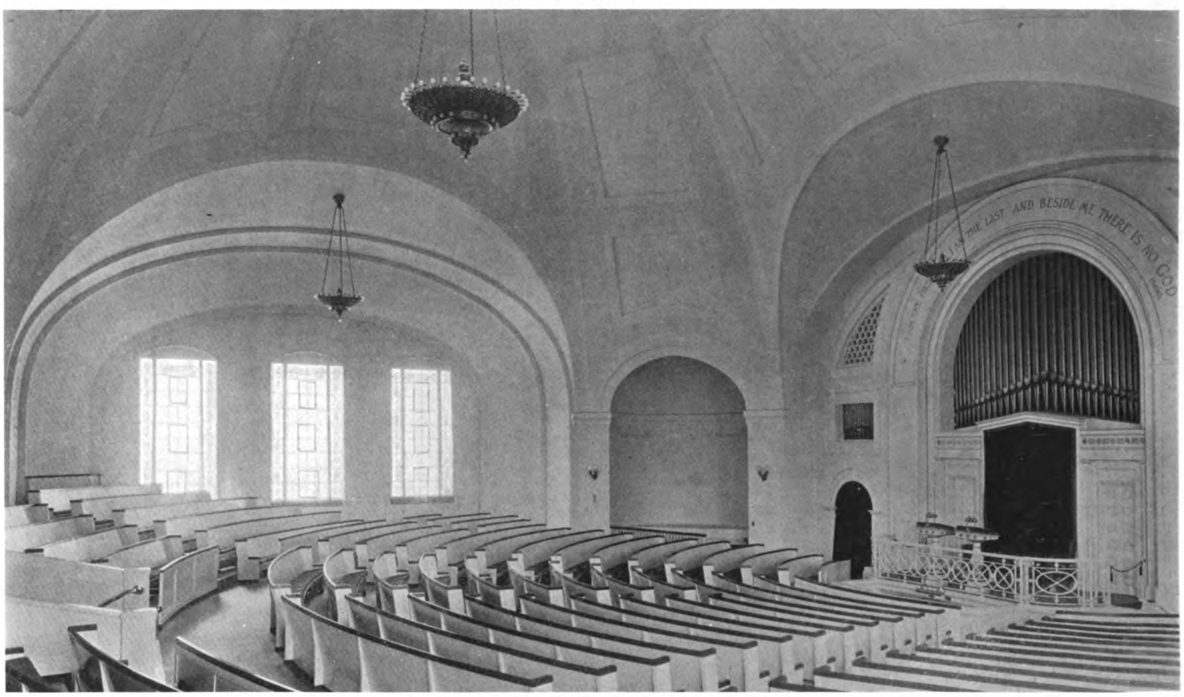


GENERAL VIEW OF EXTERIOR




VIEW OF INTERIOR LOOKING TOWARD ROSTRUM

SECOND CHURCH OF CHRIST, SCIENTIST, ROXBURY, MASS.

SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS

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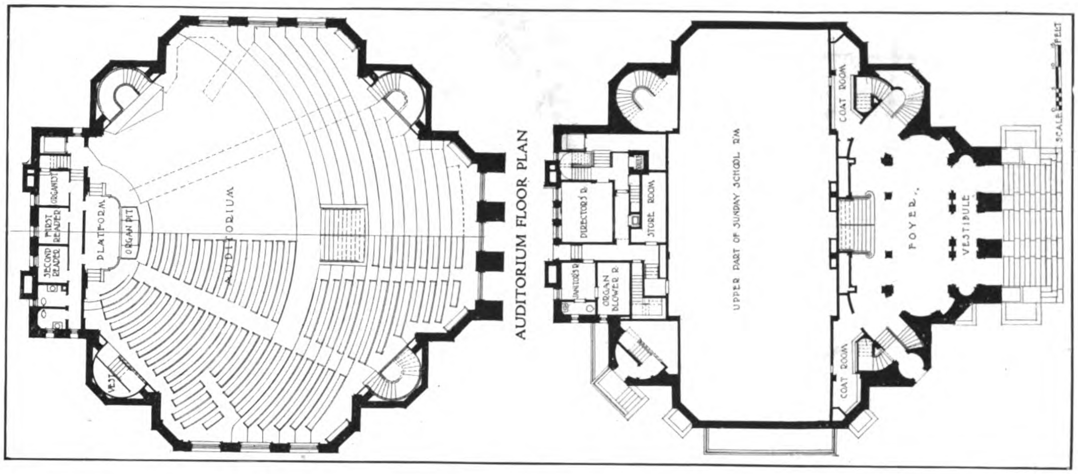


AUDITORIUM FLOOR PLAN

GROUND FLOOR PLAN

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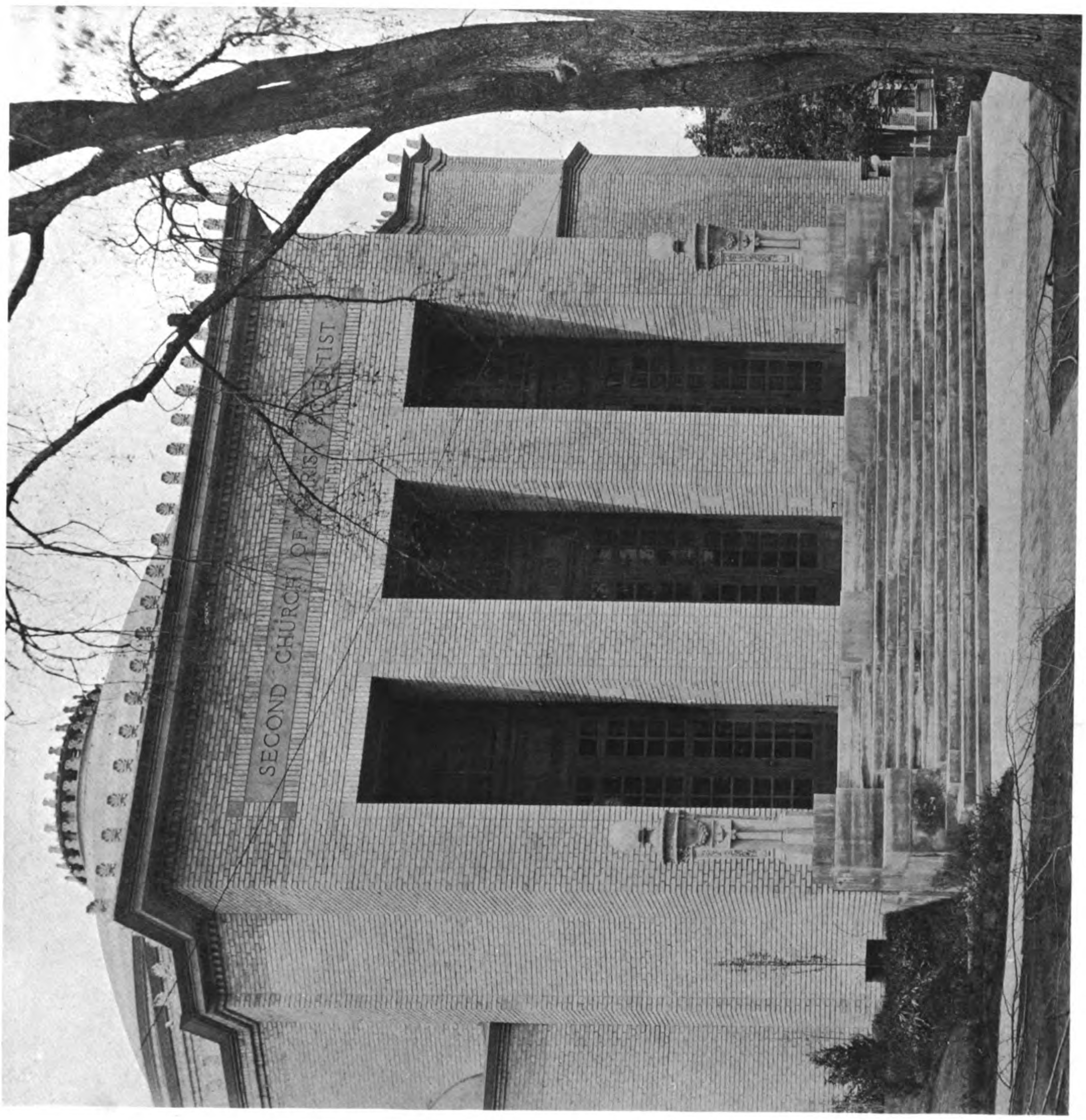


DETAIL OF ENTRANCE PAVILION

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SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS

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GENERAL VIEW OF EXTERIOR

DETAIL OF MANTEL IN PRIVATE OFFICE

OFFICE BUILDING OF G. G. HARTLEY, ESQ., DULUTH, MINN

BERTRAM GROSVENOR GOODHUE, ARCHITECT

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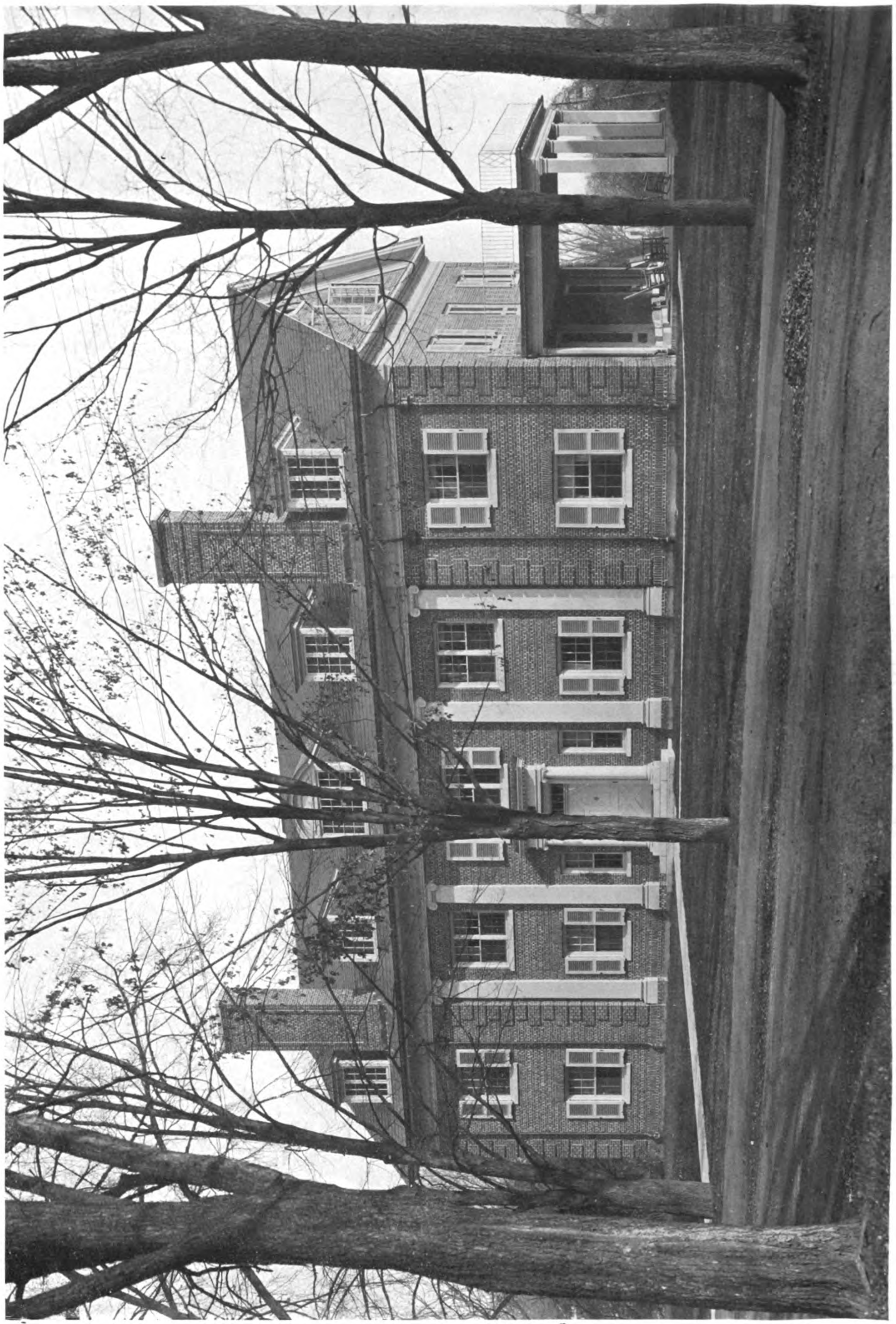

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DELTA UPSILON FRATERNITY HOUSE, AMHERST COLLEGE, AMHERST, MASS.
PUTNAM & COX, ARCHITECTS

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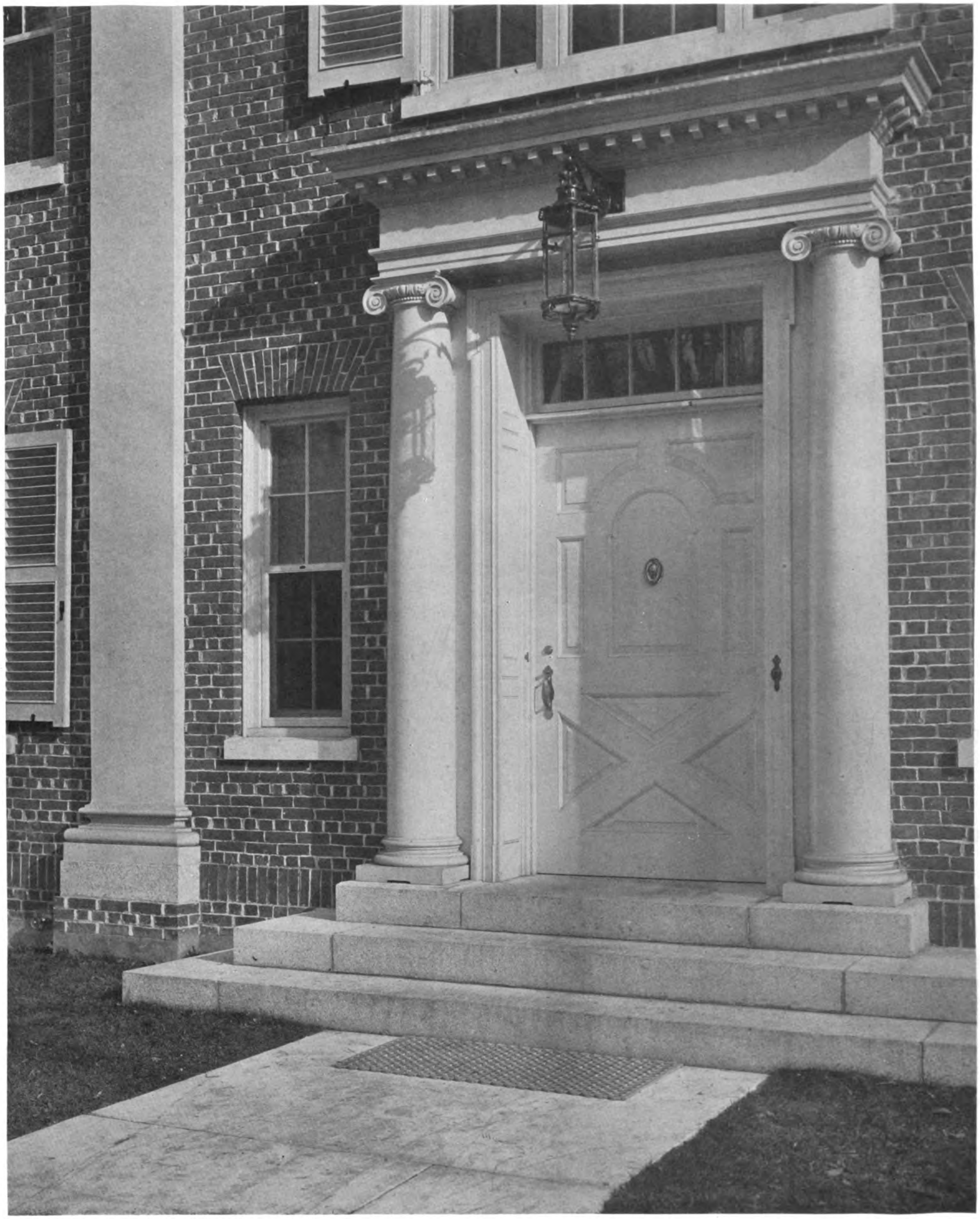

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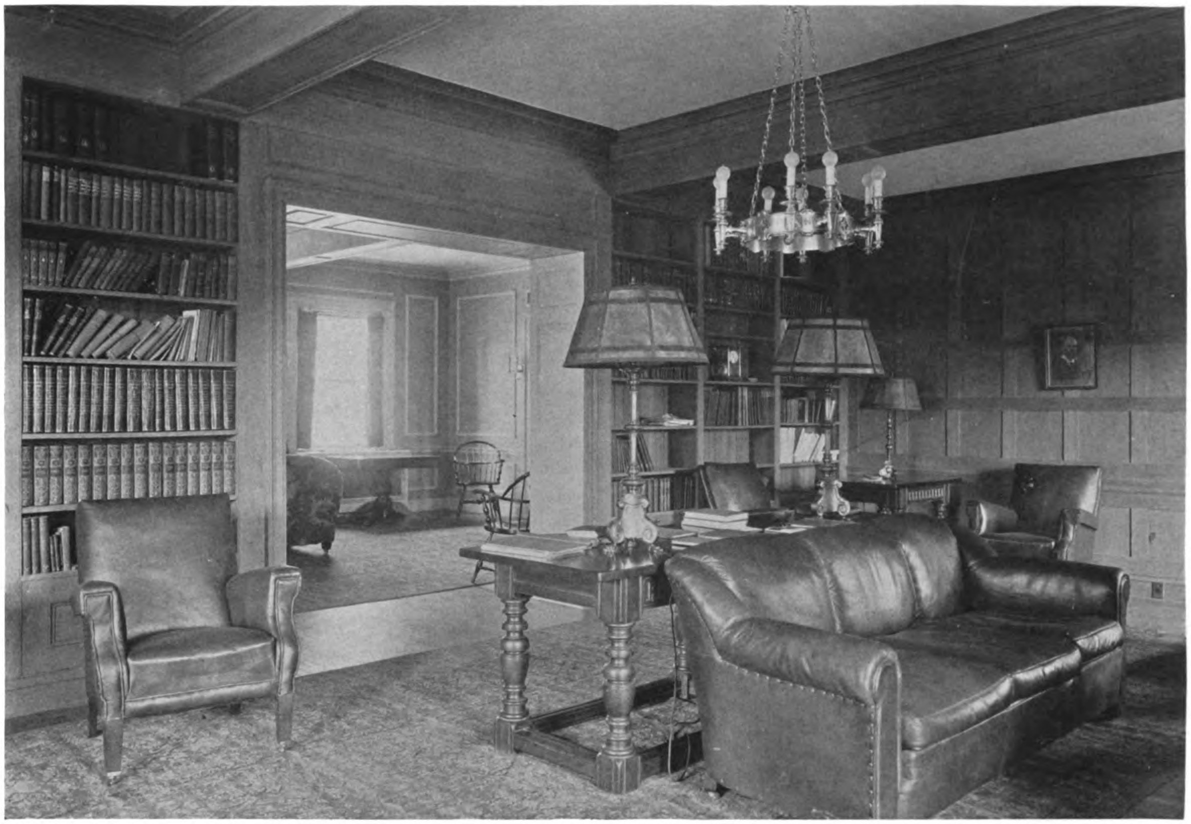
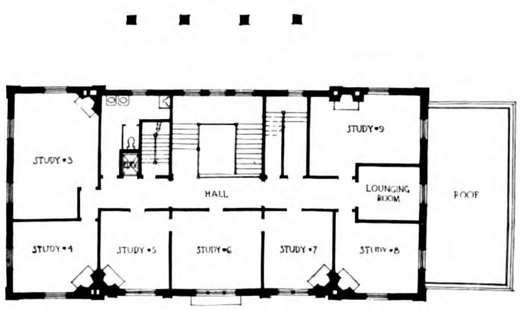
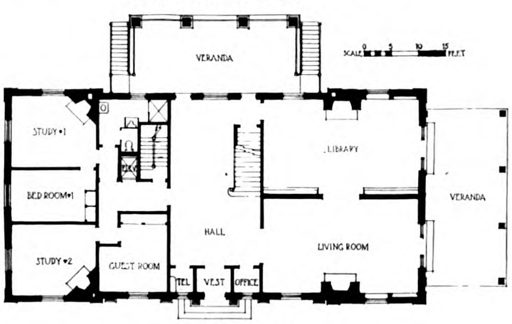


VIEW OF LIBRARY




SECOND FLOOR PLAN




FIRST FLOOR PLAN

DETAIL OF MANTEL IN LIBRARY

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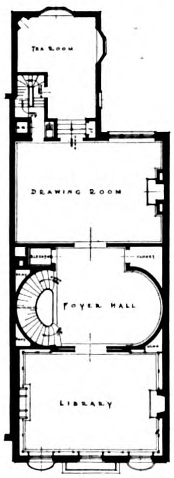
THIRD FLOOR PLAN

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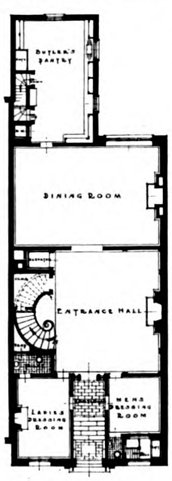
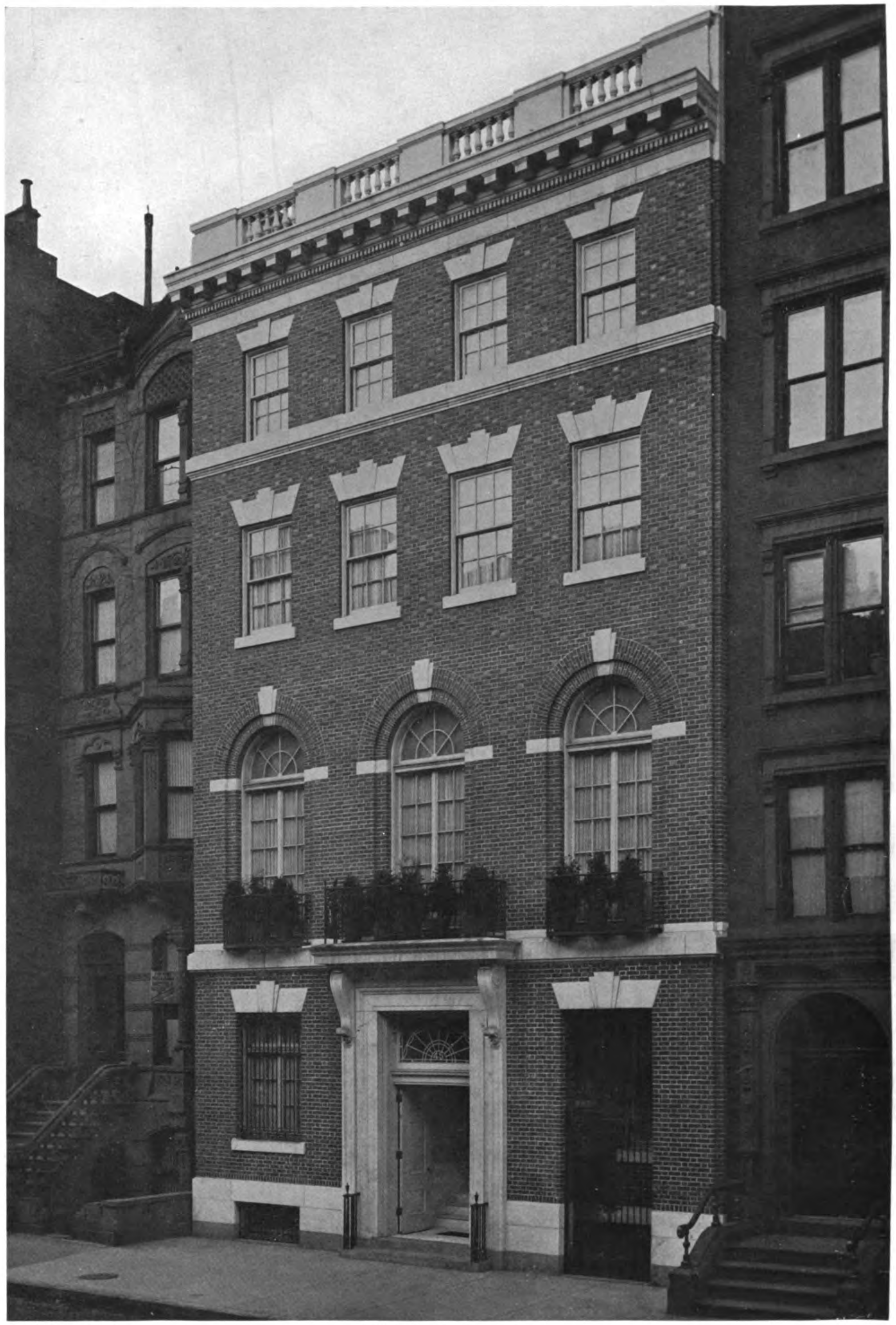



FIRST FLOOR PLAN



VIEW OF STREET FRONT

HOUSE OF ALBERT RATHBONE, ESQ., 45 EAST 78TH STREET, NEW YORK, N. Y.

A. C. JACKSON, ARCHITECT

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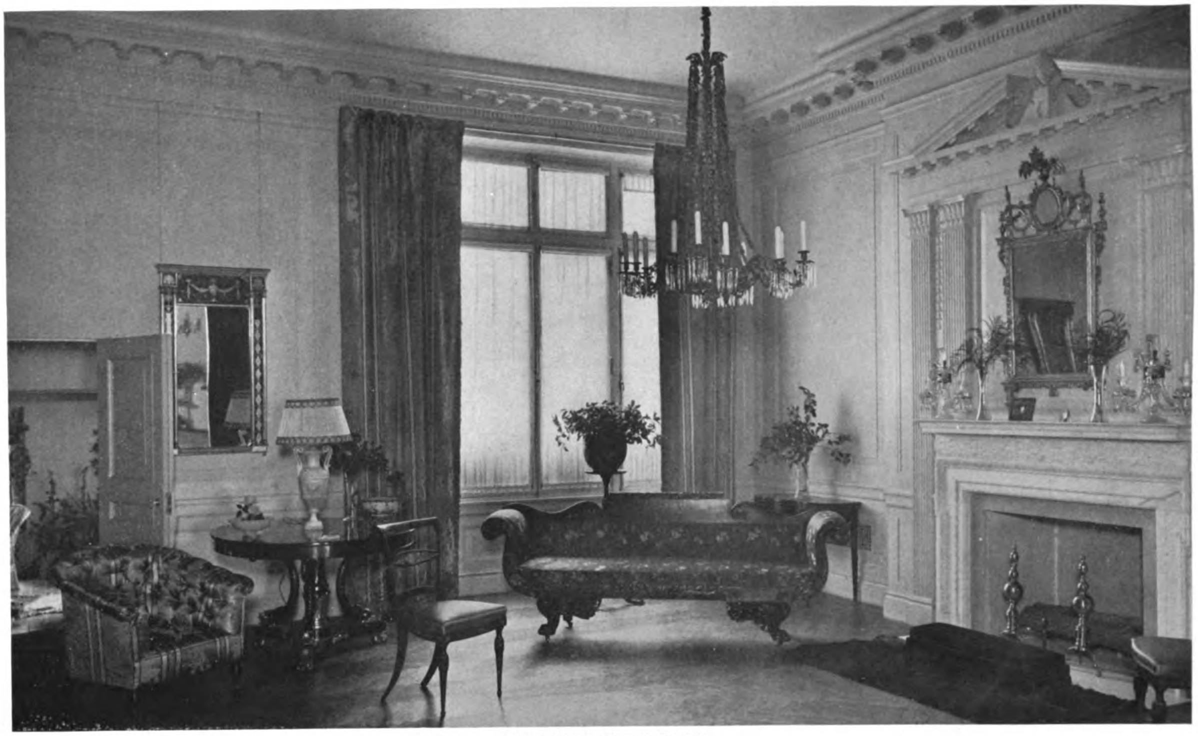

VIEW OF DRAWING ROOM

VIEW OF DINING ROOM

HOUSE OF ALBERT RATHBONE, ESQ., 45 EAST 78TH STREET, NEW YORK, N. Y

A. C. JACKSON, ARCHITECT

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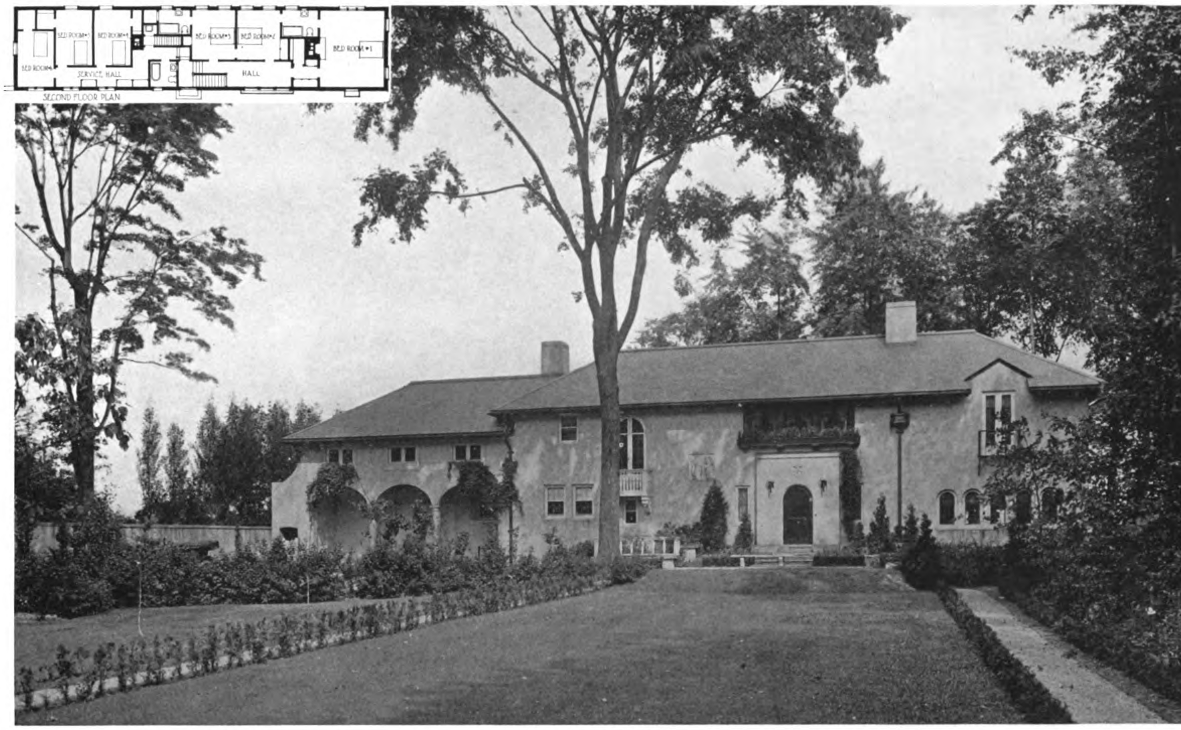


ENTRANCE FRONT


GARDEN FRONT

HOUSE OF MAX McMURRAY, ESQ., LAKE SHORE BOULEVARD, BRATENAHL, OHIO

WALKER & WEEKS, ARCHITECTS

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DETAIL OF ENTRANCE FRONT
HOUSE OF JAMES M. WILLCOX, ESQ., RADNOR, PA.
HOWARD SHAW, ARCHITECT

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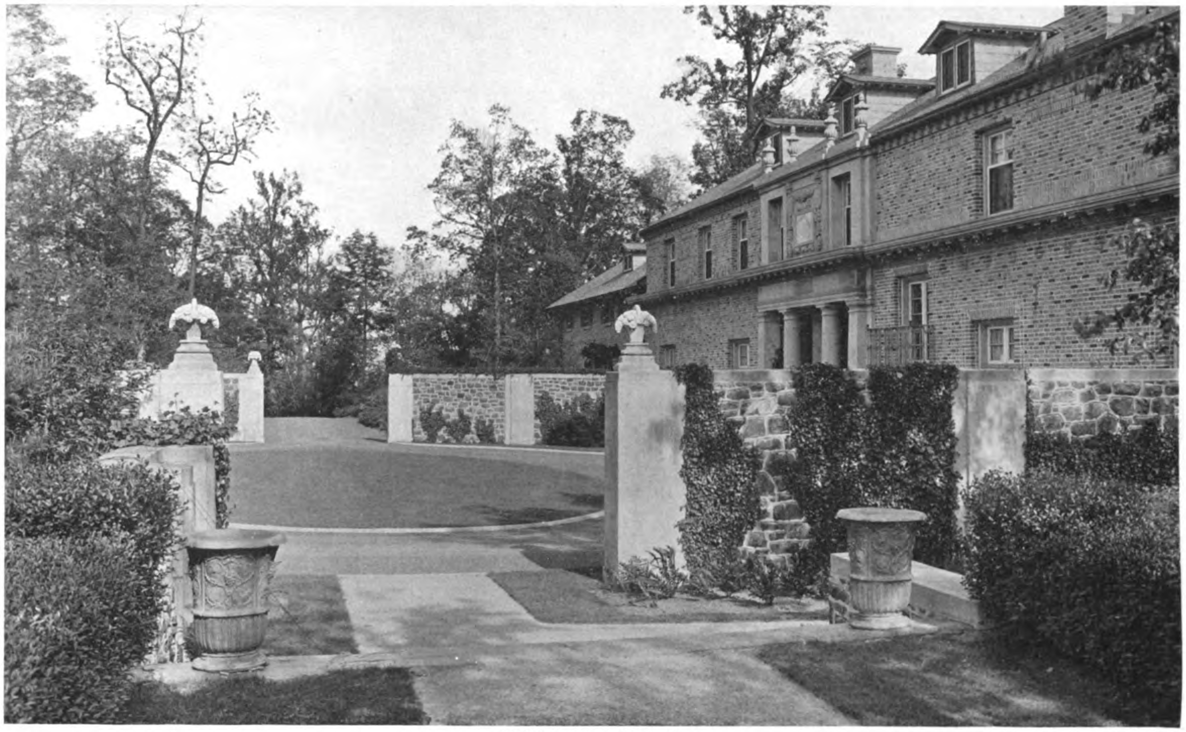

VIEW OF FORECOURT

VIEW OF GARDEN FRONT

HOUSE OF JAMES M. WILLCOX, ESQ., RADNOR, PA.

HOWARD SHAW, ARCHITECT

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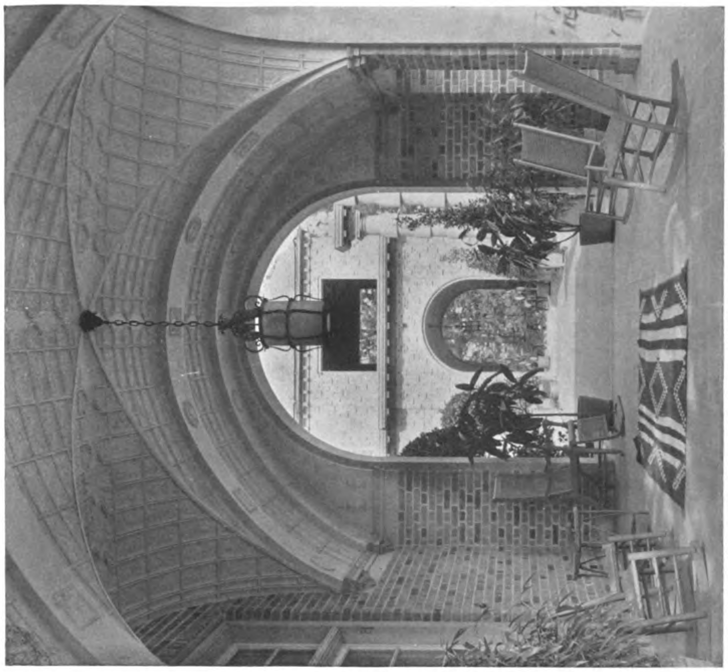
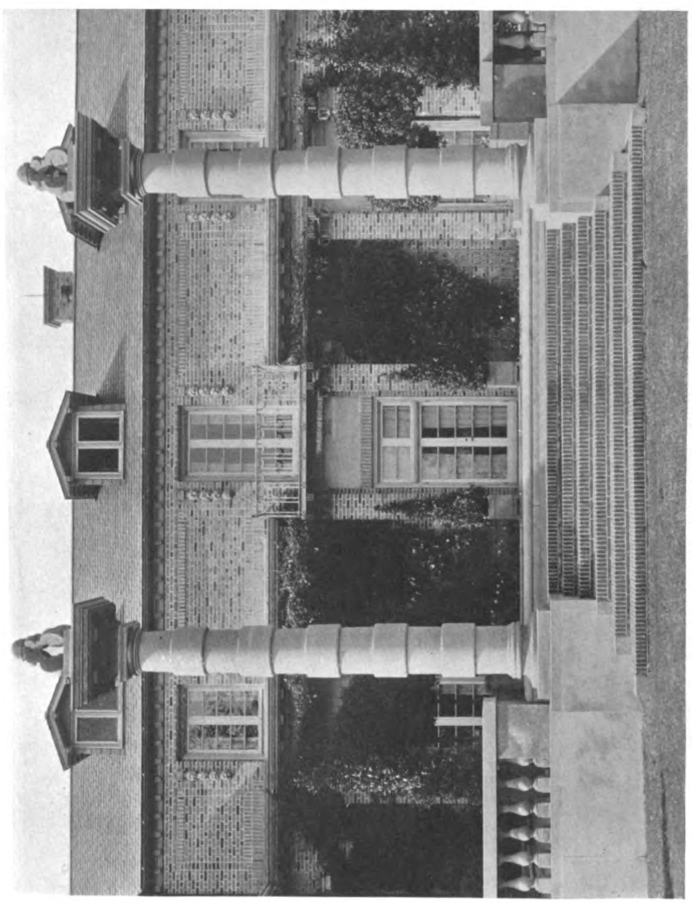
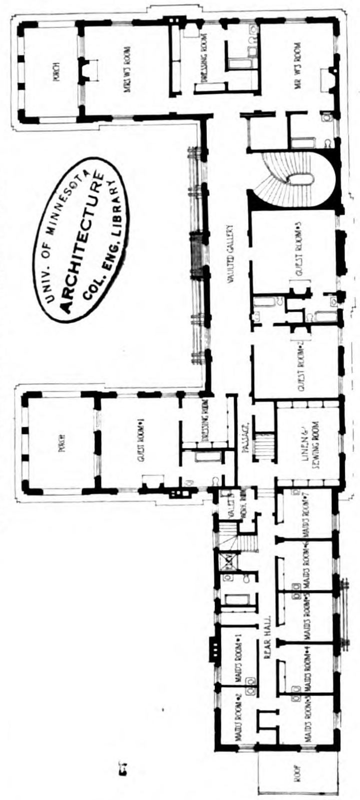


VIEW OF PORCH LOOKING ACROSS TERRACE



VIEW OF GARDEN FRONT AND COURT



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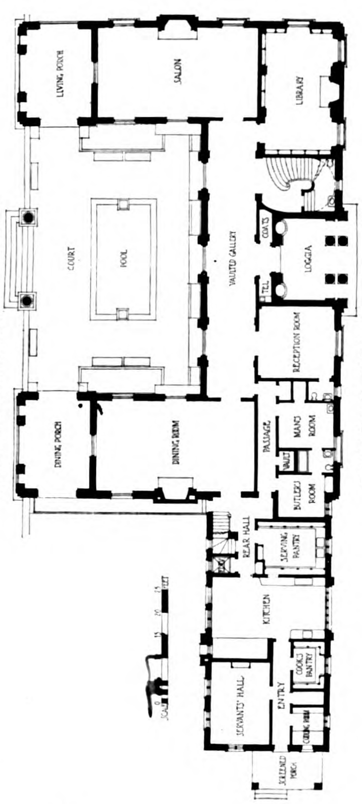
SECOND FLOOR PLAN



FIRST FLOOR PLAN

HOUSE OF JAMES M. WILLCOX, ESQ., RADNOR, PA.

HOWARD SHAW, ARCHITECT

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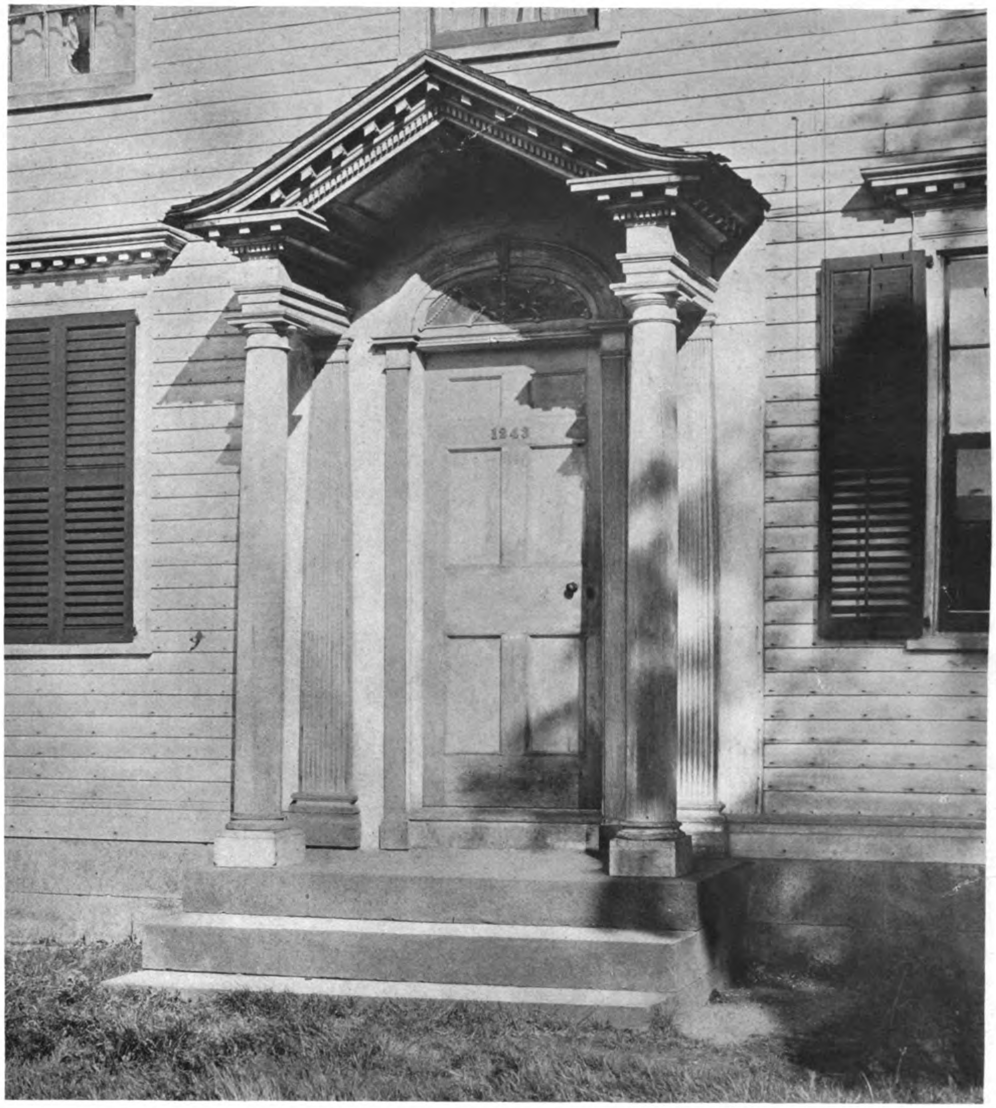
# THE FORUM COLLECTION OF EARLY AMERICAN ARCHITECTURAL DETAILS

PLATE THIRTY-SEVEN




*THIS entrance is built of white pine, except the shafts of the columns, which are turned from solid pieces of maple. Its most pleasing feature, perhaps, is the curve with which the sloping roof terminates on either side. This is repeated in the main cornice of the house at the ends of the gables.*

*The designer of this doorway evidently followed classic precedent in many respects, as both spirit and proportions indicate. The adjustment of the parts and their relation to each other is finely felt, although the entasis of the pilasters is so strong that the effect of this detail is not altogether pleasing.*

DOORWAY OF THE BASSETT HOUSE, HAMDEN, CONN.

Built about 1819

MEASURED DRAWING ON FOLLOWING PAGE

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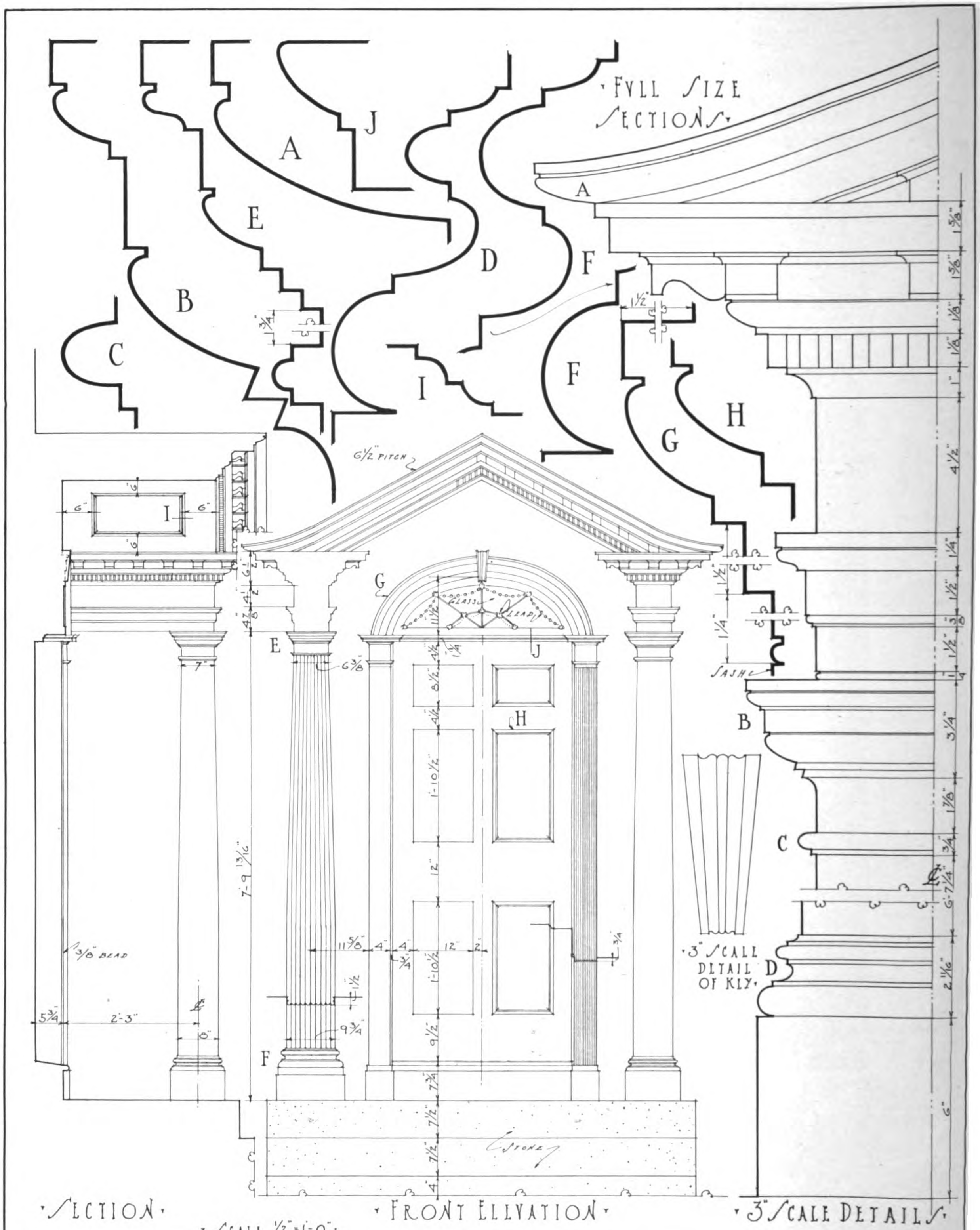


| PLATE 37<br>FEBRVARY 1917 | BASSETT HOVSE<br>FRONT ENTRANCE<br>HAMDEN CONN· BVILT 1819 | MEASVRED AND DRAWN BY J·FREDERICK KELLY |
|---|---|---|



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# Sewage Disposal for Suburban and Rural Homes

*By* CHARLES SABIN NICHOLS

*Associated with Engineering Experiment Station, Iowa State College of Agriculture and Mechanic Arts*

ARCHITECTS who are developing a clientage outside of incorporated towns or cities are facing a new problem in the recent development of the demand for modern conveniences in suburban, village, and rural homes. Things which used to be considered luxuries only to be enjoyed by residents of cities are now coming to be regarded as necessities of life. To-day, hardly a man who engages an architect to design a residence for construction outside the service limits of a municipal water supply but will demand a water pressure system, together with sinks and complete toilet and bath-room equipment. Standard water supply systems are now well known to the architectural profession.

Having such a water supply, it is necessary to dispose of it after use when it has become sewage. The wastes from the house will be more than ninety-nine per cent water, but the remaining fraction of one per cent, composed largely of organic matter, is subject to putrefaction and must be so treated that it can neither be offensive nor troublesome. It is a proper function of the architect to provide plans for a sewage disposal plant which will accomplish this.

Because this is a new and important problem, and one not usually discussed in colleges of architecture, some liberties will be taken here in outlining the fundamental principles involved in the operation of private sewage disposal plants, and in suggesting some types of construction which have proven satisfactory through years of hard service. It is hoped that, with a clear understanding of the subject, architects called upon to furnish plans for such plants may not only provide designs of merit, but may also render their clients an additional important service by giving intelligent advice as to operating necessities. A sewage disposal plant, to work satisfactorily, must have proper maintenance. If the owner is led by his architect to believe that his plant is sufficient in itself and requires no attention whatever, that man will eventually become dissatisfied, not only with his plant, but also with his architect. It is therefore important that architects be fully conversant with the principles and details of these little plants.

DANGERS FROM CESSPOOLS AND SEPTIC TANKS. Much entirely erroneous or misleading literature has recently been published regarding septic tanks. The public has been told that the overflow from them is pure and harmless, whereas it is in reality foul and dangerous. Septic tanks are only water-tight cesspools provided with an overflow. The term "septic tank" seems to suggest to the lay mind a structure possessing some peculiar, inherent endowment which enables it completely and continuously to dispose of household wastes. This is untrue. A septic tank is only a receiving tank for the sewage in which the solid material is settled out and allowed to remain for "septic" (*i.e.*, bacterial) action. Experience has shown that certain provisions as to size, shape, and structural details will facilitate the proper operation of such a tank, although septic action will take place in any receptacle which will retain sufficient liquid to cover the solid material and exclude light and air.

The liquid escaping from such tanks, whether through a tile overflow from a tight tank or through the porous soil or rock seams of a "leaching" (not water-tight) cesspool, is extremely foul and is dangerous to life and health.

The liquids leaching from loose walled cesspools or overflowing from septic tanks may soak away into the ground year after year until all the surrounding area is fully contaminated. It is difficult and oftentimes impossible to predict the path which the leaching sewage will take. It is safe to assume, however, that it will readily seek out the natural channels of the underground waters.

The danger of sewage-polluted water supplies to health is ever present. Outbreaks of typhoid fever and other infectious intestinal diseases contracted only by the taking of the products of human wastes into the stomach are often caused by clear, cold well waters which are thought to be pure, but which an analysis proves to contain disease germs common to sewage. Either the well has been contaminated by surface wash or by infiltration of a polluted underground water supply. The leaching sewage may never reach the water-bearing stratum supplying the owner's well, but may find a direct route to a neighbor's well.

When a plant capable of so purifying and disposing of the sewage as to free it from danger to community health can be constructed at little or no more expense than an ordinary cesspool, no man can afford to take the risk which the cesspool or simple sewage tank entails.

THE TWO FUNDAMENTAL PRINCIPLES OF SEWAGE DISPOSAL. The complete, modern sewage disposal plant, embodying the principles which long years of scientific investigation and practical development have proved essential, provides for two distinct, supplementary, and equally necessary treatments of the sewage.

The first fundamental process is by *septic action*, provided for in a properly arranged, water-tight, covered masonry tank for removing, retaining, and decomposing the solid material contained in the sewage.

The purpose of the septic tank is to separate and settle out the solid material from the liquid, to retain it in the tank, and, so far as possible, to destroy it by bacterial agencies. Part of the solid material in sewage will settle out readily, part is so finely divided that it will remain in suspension for many days, and part is so fine that it would probably never settle. Special thought must, therefore, be given the problem of securing as complete a separation as possible.

As the solid matter settles, countless billions of "anaerobic" and "facultative" bacteria (those which can live in the absence of light and air) attack these solids and change them into various compounds, part liquid and part gaseous. Due to these changes and the influence of the gases of fermentation, some of the deposited materials will rise. These and other material lighter than water,



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together with vegetable growths, will form a mat or scum at the surface of the sewage. This mat should be undisturbed except when the tank is cleaned, as it is a natural product contributing to success in the operation of the septic tank.

The rush of sewage following the discharge of any fixture, if allowed to enter the tank unretarded, would stir up the entire contents of the tank and disturb the purifying process. It is very essential, therefore, that some simple device be provided at the entrance to break up the force of the incoming sewage. An ordinary box 12 by 12 by 12 inches, open at the top, bolted to the end of the wall of the tank and receiving directly the downward discharge of the inlet pipe through an elbow on the end, has been found to be as effective as the more complicated schemes sometimes proposed.

Even with the utmost precaution, some disturbance of the tank contents will result. As a consequence, much fine sediment would naturally pass away through the outlet and clog the filter bed if some means were not adopted to prevent it. The upward sand filter shown in the accompanying designs is a simple means of minimizing this difficulty. Acting upward as it does, any tendency to clog will not stop the operation of the tank, as clogging will merely cause a sufficient head of sewage to lift a little of the filter material. This filter is mainly mechanical in its operation and is intended for the purpose of preventing outflow of fine solid matter rather than to induce any additional bacterial action.

By the tank treatment the sewage is prepared for its further treatment by discharge on to a filter bed. In general it may be said that only about one-third of the necessary purification takes place in the tank. A large part of the solid material is removed from the sewage, and a small additional amount of purification is probably effected.

Although the breaking down of the solid matter is continued in the tank for a long period of time after it is deposited, still the solid material in the tank will never be completely destroyed. Thus there will result an accumulation of sludge in the bottom of the tank. About once a year the contents of the tank should be removed. If a suitable pump is not available, the simple method of bailing with a bucket will suffice. The depth of sludge can be determined or tested with a stick. The tank need not to be cleaned out unless the sludge is 5 or 6 inches deep. The sludge will not be found particularly offensive to handle, so far as odors are concerned, as the bacteria will have so changed the solid material coming into the tank as to reduce it to a condition much like peaty earth.

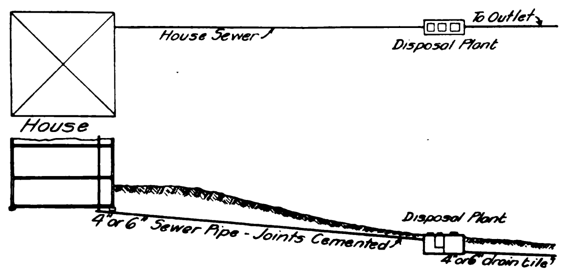
If the contour of the ground will permit, a valve may be arranged in the bottom of the tank so that the sludge may be flushed out by gravity on to an underdrained gravel bed. When the sludge has dried sufficiently it can be hauled away, and the gravel bed cleaned for the next discharge.

The second fundamental process is *filtration*, and consequent oxidation and nitrification, by means of a properly arranged and maintained area of porous material through which the effluent from the tank is filtered and subjected to bacterial action.

The object of a sewage filter is to oxidize and destroy the organic matter in solution in the sewage and to filter out and destroy any remaining solid material floating in the sewage.

Countless billions of "aerobic" bacteria (requiring oxygen from the air) live and work in the surface layers of the filters. As the sewage comes on to the bed it slowly percolates through the porous material, comes in contact with these minute living organisms covering the surfaces of the filter particles, and should emerge a clear, inoffensive, and comparatively harmless liquid suitable to discharge into any stream not used as a drinking water supply. The application of sewage to the filter must be accomplished in such a manner that a constant or frequently periodic supply of air will circulate through the filter material. Otherwise the supply of oxygen will be so decreased that the aerobic bacteria cannot live, and the sewage will pass through the filter unpurified except for the removal of some solids in suspension.

Very special difficulties arise in choosing a type of filter suitable for all private plants. They require several times the area of filter per person needed for city plants because of the lack of corresponding care, and because of the extra amount of sediment carried from the tank on to the bed, even with the utmost precaution. For proper operation the surface of the filter must be kept loose and clean. Experience has proved that the average citizen




Plan and Section of Typical Layout

cannot be expected to give his plant the attention which would be given a city plant. It is therefore necessary to provide one capable of operating for long periods of time without attention. Special mechanical devices liable to disorders have no place in the ordinary private sewage disposal plant.

Sprinkling filters, requiring a relatively small area and using material with particles from ¼ to 2 inches in size, are in common use in city plants. This material has air spaces throughout its extent sufficient to permit the operation of the aerobic bacteria while the sewage is continuously sprinkled over the bed and slowly trickles through. It is impracticable to provide any sprinkling device for small plants, but their operation is such that a relatively steady small flow can be expected on to the filter, supplemented by periodic increases due to flushing of fixtures. Experimentation has shown that a bed of ½-inch pebbles, with ample provision for its æration and the even distribution of sewage in small quantities over its surface, will do good work and discharge an effluent comparatively free from offensive materials. With such beds it is necessary that very special precautions be exercised to insure thorough aeration so that the purifying agencies may have a constant supply of oxygen.

Intermittent sand filters are made of ordinary coarse

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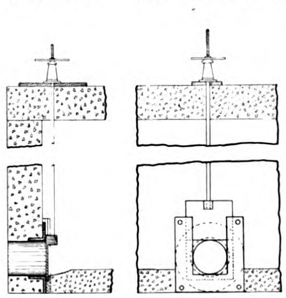
clean sand, and, if properly constructed, operated, and maintained, will produce the most highly purified effluent of any type of filter now in common use. With this type of filter, periodic dosing of sewage is essential. After each dose has flooded the bed to a relatively shallow depth, its flow is automatically stopped, the sewage sinks gradually away into the sand, and the air rushes down into the openings after it to supply oxygen to the bacteria. It is necessary that the bed be rested for a considerable period after each dosing so that the sand pores may again become filled with air and the bacteria be given opportunity to work on the films of sewage around the sand grains.

Serious difficulties may occur in the operation of a sand filter, due to neglect by the owner. The surface of the sand must be kept loose and clean so that the sewage can readily penetrate into the bed. If it becomes sealed by dirt or sediment from the tank, sewage will stand on the surface and the bacteria of purification will die from lack of oxygen. If the automatic dosing device gets out of order, sewage may run continuously and keep the bed flooded, thus destroying its effectiveness. Such a plant is easily maintained if given the same care as other important pieces of machinery around the modern home or farm.

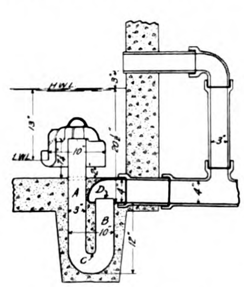
Special arrangements are necessary to provide for the periodic dosing of the sand beds. The most common and satisfactory way is to construct a dosing chamber immediately adjoining the septic tank and connected therewith by means of a weir or overflow. The sewage passes through the septic tank, the upward sand filter, and over the weir into the dosing chamber until it collects in sufficient quantity to discharge itself automatically on to the bed by means of a specially designed sewage siphon. The size of the dosing chamber is made such that the quantity of sewage discharged will flood the bed to a depth of only about one-half inch, this being repeated from two to four times during twenty-four hours.

The sewage siphon consists of two castings, — one a U-shaped pipe and the other a bell which rests securely on the end of one branch of the siphon pipe. Its operation can be understood by studying the accompanying illustration of a Miller Standard Sewage Siphon.

The U-shaped pipe or siphon trap normally stands filled with sewage somewhat below the level of the top of the short leg (B) at D. As the sewage rises in the tank above the low water line (L.W.L.) the confined air in the bell and the long leg (A) starts to push down the column of sewage in the long leg toward the bend in the



Shear Gate for Gravity Discharge of Sludge



Standard 3-Inch Miller Siphon

Typical Plant No. 4 Under Construction

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pipe at C. As the sewage is pressed downward it rises in the short leg and spills over into the outlet pipe at D. When the sewage in the tank has risen to the high water line (H.W.L.) the column of sewage in the long leg has been forced downward until it is nearly level with the bend at C. Any further rise of sewage will still further lower the column in the long leg. When the column of sewage passes below the bend at C the pressure of the confined air due to the head of sewage in the tank is sufficient to force out the column in the short leg (B). This permits the escape of air from the bell and from the long leg, the sewage rushes in from the tank to take the place of the escaping air, and the siphon continues to discharge until the tank is emptied to the lower edge of the bell. Air is then admitted to the bell through a special device in the side of the bell, the sewage settles back to its normal level, and the siphon is ready for a recurrence of the operation.

As a result of proper filtration, then, the foul, dangerous liquid from the septic tank will be purified to such an extent as to be largely free from putrefactive matter. The effluent from a good sand filter, properly operated, will be clear and odorless and comparatively free from bacteria. That from a pebble filter may not have so good an appearance, nor will it be so highly purified as that from a sand filter; but if the pebble filter works properly, the resulting liquid can with safety be discharged into any large tile drain or running stream not used for a drinking water supply, and often would cause no nuisance if emptied into any natural drainage outlet.

Instinct generally dictates a remote location for the sewage disposal plant, although one well designed, built, and maintained could be located quite close to the house without resulting unpleasantness. Such a structure is not a thing of beauty, and some inconspicuous spot should be chosen, as remote as practicable. The "dead-line" of public opinion seems to be at least 100 feet from the house.

While three of the plants here illustrated are shown to be constructed of concrete, the owner at his option may specify brick, terra cotta blocks, stone, or other suitable masonry with tight mortar joints and inside surfaces well plastered.

Plant No. 1 is believed to be as simple and economical to construct as any that can probably be devised. It is

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intended to meet the demand for a cheap, fairly efficient sewage disposal plant, requiring a minimum of attention, which will bridge the gap between the dangerous privies or cesspools and the more expensive, highly efficient plants which demand intelligent care for their successful operation.

The septic tank is 3 by 5 feet in area and provides for 2 feet 9 inches depth of sewage. This is suitable in size for the average family of five to eight persons.

The depth of the tank below the surface of the ground will need to be such as will properly accommodate the house sewer. If the slope of the ground surface will permit a good grade for the house sewer, the inlet pipe need not be more than 18 inches under ground where it enters the tank. This would place the bottom of the tank about 5 feet below the surface. If the surface is level, and the basement of the house is to be served, the excavation for the tank may need to be 10 or 12 feet deep.

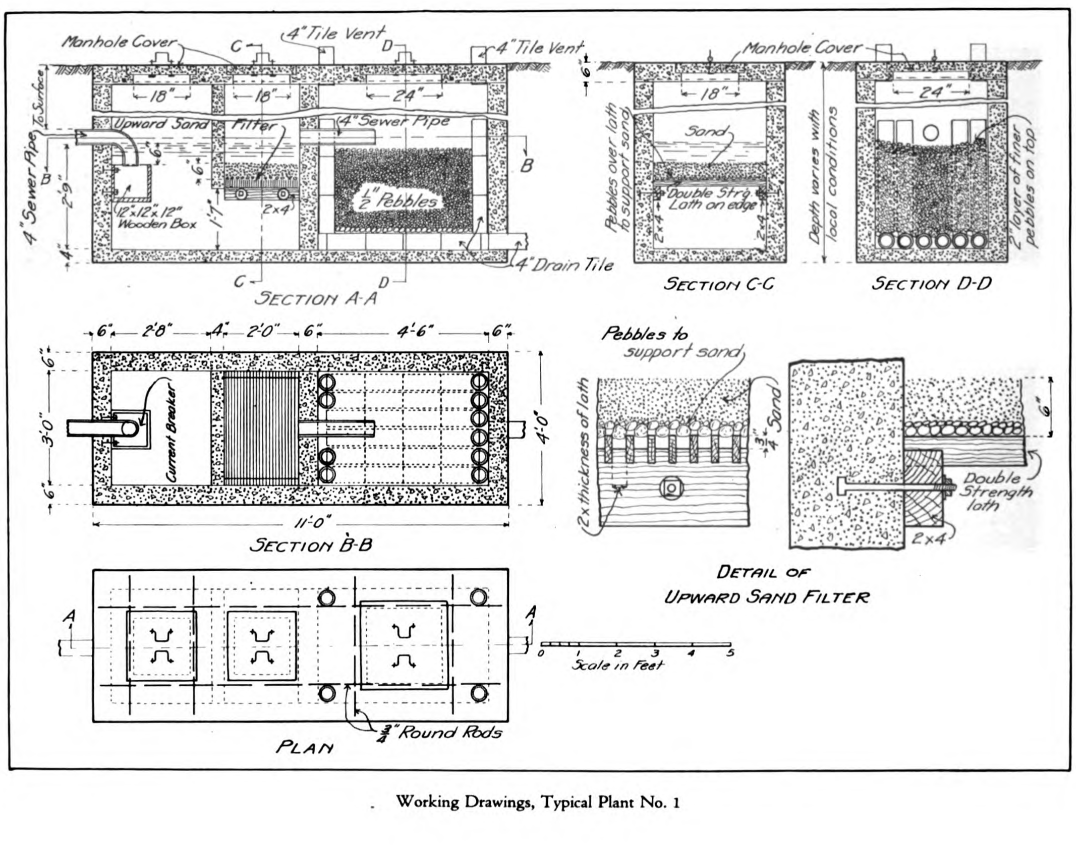
A concrete cover is provided over the entire plant, with manholes for easy inspection of the inside of the tank and filter.

The 4-inch sewer pipe elbow inlet discharges into a 12 by 12 inch wooden box open at the top and bolted to the end wall, thus breaking the force of the inrushing sewage and minimizing the disturbance to sludge in the bottom of the tank. The top of the box should be at least 6 inches below the surface of the sewage so that the mat will not be disturbed. This wooden box, being always entirely submerged in the sewage, will last indefinitely. The force of the incoming sewage will in general be sufficient to make it self-cleaning.

With the upward sand filter properly installed, none but the most finely divided particles can escape from the tank. A 4-inch concrete wall, fastened securely by reinforcing to the side walls, is suspended to within 19 inches of the tank floor. A 2 by 4 inch wooden strip is bolted to each side of the tank wall with its top even with the bottom of the 4-inch wall, and extending longitudinally the length of the filter area. Spanning these strips are double strength lath on edge, spaced twice their thickness apart. The ends of the lath fit into notches cut in the side strips. For stability, spacing blocks should be securely fastened between the lath at the center of their length.

A layer of pebbles, in size only sufficient to remain on top of the lath and support the fine sand above, is spread over the lath. The sand is added to make a total thickness of sand and pebbles of about 6 inches.

The filter area, which is 3 by 4½ feet inside, immediately adjoins the septic tank, is made monolithic therewith, and is carried to the same depth. A concrete cover is provided, with a large center manhole. Vent pipes extend through the cover well above the surface, so as to insure an ample supply of air to the filter. Along the bottom, and extending above the surface of the pebbles at each end, are 4-inch drain tile laid ½ inch apart both ways. These provide easy access of air to all parts of the filter. Large pebbles should be placed just over the tile to admit of ready drainage and to prevent filling of the




Working Drawings, Typical Plant No. 1

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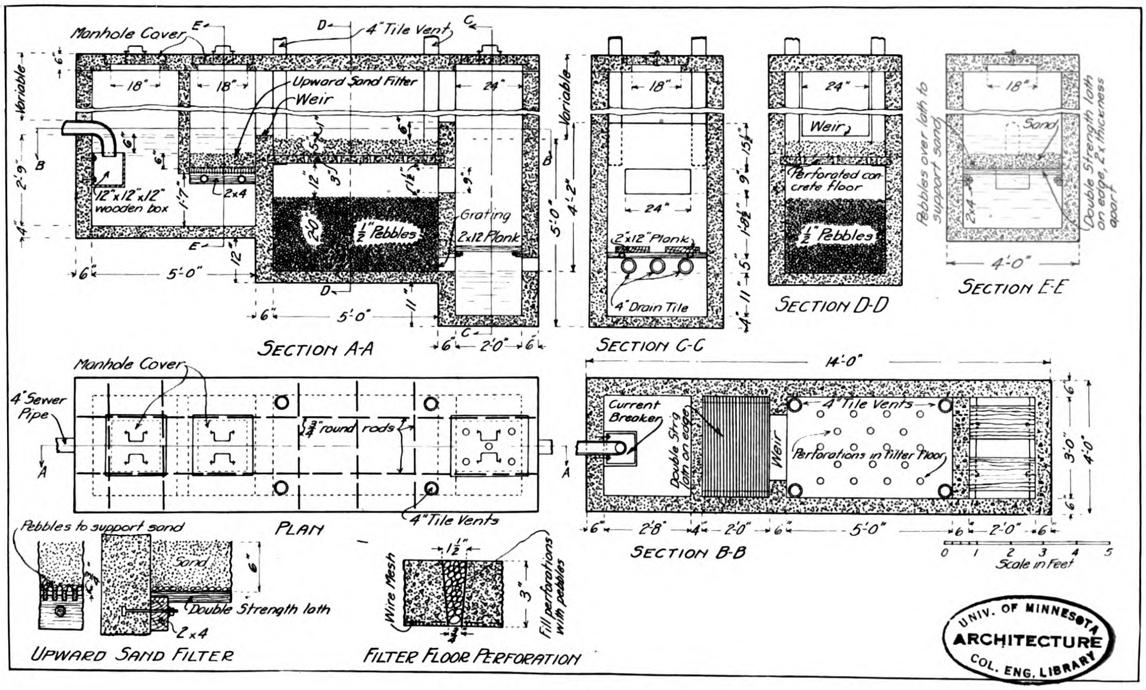


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Working Drawings, Typical Plant No. 2

tile by smaller pebbles. The filter area should then be filled with ½-inch pebbles to within 1 inch of the bottom of the tank outlet pipe. The top — 2 inches of the filter — should be composed of finer pebbles to distribute the sewage uniformly over the bed.

The following list of materials required for Plant No. 1 is based on average conditions and will vary with the depth at which the tank must be placed to secure proper grade for the house sewer. Form lumber, sewer pipe for house sewer, and drain tile for outlet are not included in this list.

10 barrels Portland cement for concrete.
6 cubic yards pit run gravel for concrete.
1 cubic yard ½-inch pebbles for filter.
1 4-inch sewer pipe elbow for inlet.
1 2-foot length of 4-inch sewer pipe.
1 bundle double strength lath.
64 feet of 4-inch drain tile for filter.
4 pieces ¾-inch reinforcing bars, 4 feet long.
2 pieces ¾-inch reinforcing bars, 11 feet long.
1 piece 2 by 4 inch pine, 4 feet long.
6 ¾-inch bolts, 8 inches long, with nuts and washers.

Plant No. 2 is intended to maintain the elements of simplicity characteristic of Plant No. 1, but still to add some features contributing little to extra cost but much to the efficiency of the plant. Little, if any, additional care will be required to keep it in operation.

The septic tank is the same as for Plant No. 1, including current breaker and upward sand filter. The upward sand filter will prove particularly valuable in this plant in keeping the sediment from the sand filter beyond.

Two filters have been provided in this plant, one above the other. The upper filter is of ordinary coarse clean sand, supported on a perforated concrete floor. The lower filter is made of ½-inch pebbles similar to that in Plant No. 1. There is an air space of 12 inches between the surface of the pebble filter and the bottom of the perforated floor supporting the sand filter.

With each discharge of a fixture in the house the sewage rushes from the septic tank over a 24-inch weir on to the 6-inch sand filter. It spreads out over the surface, percolates slowly through the sand, out through the perforations in the slab floor, and drops 12 inches through air to the lower filter. Through this it finds its way to the outlet tile in the bottom.

At the end of the filter beds a manhole is provided from which a view of both beds can be obtained. Any loosening or replacing of material in the filters can be accomplished through the openings left for this purpose. In the bottom of this manhole is a well 11 inches deep which serves as a sedimentation basin to collect any very finely divided particles passing through the filters. It should be cleaned out whenever the sediment accumulates to any great extent. The well is partly covered with plank on which to stand while inspecting the filter beds.

Four 4-inch tile vents extend from the bottom of the perforated slab floor to the surface of the ground. These, with the perforated manhole cover, provide a ready circulation of air for the filter beds. The vents should be extended well above ground so that they may not become obstructed.

The following list of materials is required for Plant No. 2 under average conditions, but will vary with the depth at which the tank must be placed to secure proper grade

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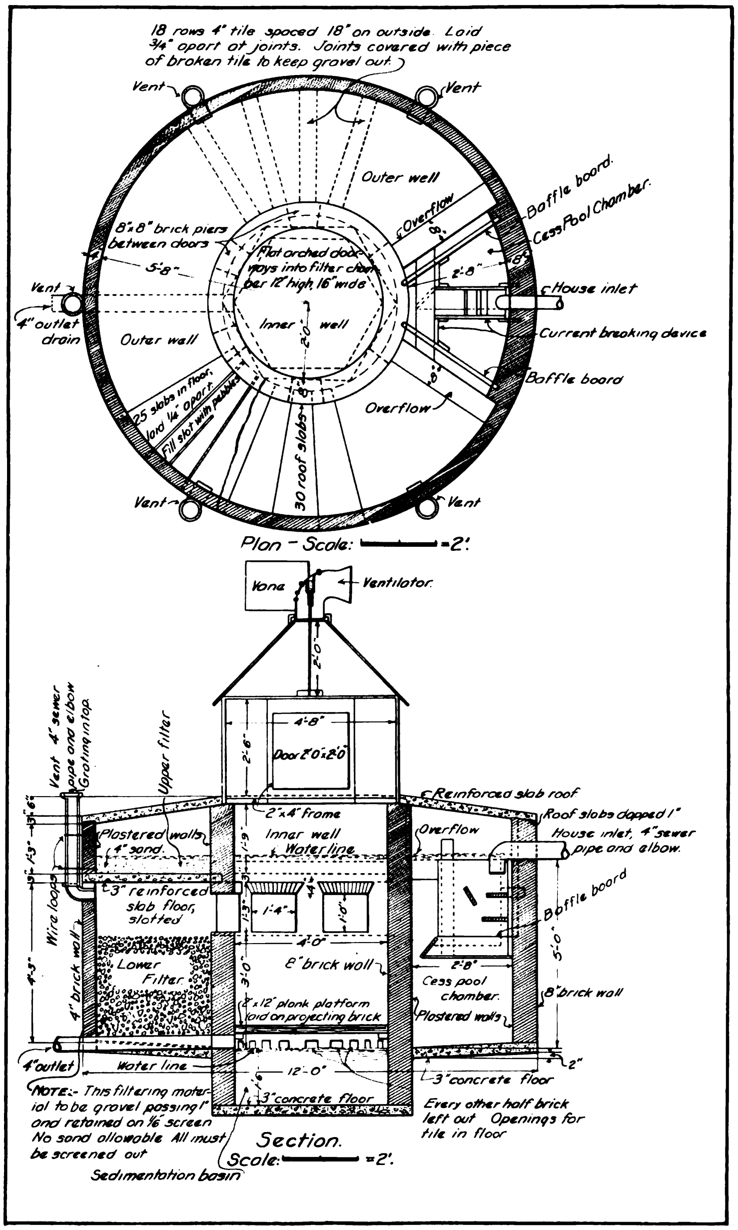


Working Drawings, Typical Plant No. 4

for the house sewer. Form lumber, pipe for house sewer, and tile for outlet are not included as items in this list.

12 barrels Portland cement for concrete.
7 cubic yards pit run gravel for concrete. (Sand for upper filter can be obtained by screening.)
1½ cubic yards ½-inch pebbles for lower filter.
16 feet 4-inch sewer pipe for vents.
1 sewer pipe elbow for inlet.
3 feet 4-inch drain tile, filter to sedimentation basin.
1 piece 2 by 4 inch pine, 4 feet long, for upward sand filter.
1 bundle double strength lath for upward sand filter.
1 piece 2 by 12 inch pine, 6 feet long, for sedimentation basin cover.
1 piece 2 by 2 inch pine, 6 feet long, for sedimentation basin cover support.
10 ¾-inch bolts, 8 inches long, with nuts and washers.
2 pieces ¾-inch reinforcing bars, 11 feet long.
4 pieces ¾-inch reinforcing bars, 4 feet long.

Plant No. 3 is of a type considerably different than Nos. 1 and 2, and is intended for owners who wish to secure the highest degree of purification of the sewage and who will expect to take the same pains with its maintenance as is accorded any other modern installation around the home.

This plant includes a septic tank identical with those for Plants 1 and 2, a dosing chamber with automatic siphon, and an intermittent sand filter.

The filter is 15 by 20 feet in surface area and 2 feet deep, constructed of ordinary clean coarse filter sand. Underdrains laid longitudinally in trenches along the bottom of the bed conduct the filtered sewage to the outlet, while vent pipes extending from them to the surface assist in supplying air to the bed.

If the contour of the ground surface permits the selection of an area within reasonable distance, somewhat lower in elevation than the siphon discharge pipe, the filter bed can be constructed with little or no excavation — only enough to level off the required area and provide dirt banks to hold the sand. The sewage should then be carried in joint-tight sewer pipe from the siphon to the bed, using a good grade to expedite the flow. If the ground is level, or nearly so, an excavation of sufficient depth will need to be made for the filter, preferably immediately adjacent to the tank. The banks should be sloped back from the surface of the sand and sodded to prevent washing of dirt on to the bed.

Intermittent sand filters should receive special preparation for the winter months by the formation of ridges and furrows on the sand surface. Then when the sewage is discharged on to the bed in freezing weather, as it fills the furrows an ice roof will gradually form, spanning them and protecting the sides and bottoms of the furrows from freezing, especially if a snowfall occurs before the severe weather sets in. After each thaw, when the ice roof has

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disappeared, the sand in the furrows should be loosened and cleaned. In the spring the surface of the filter bed should be leveled off for use during the summer.

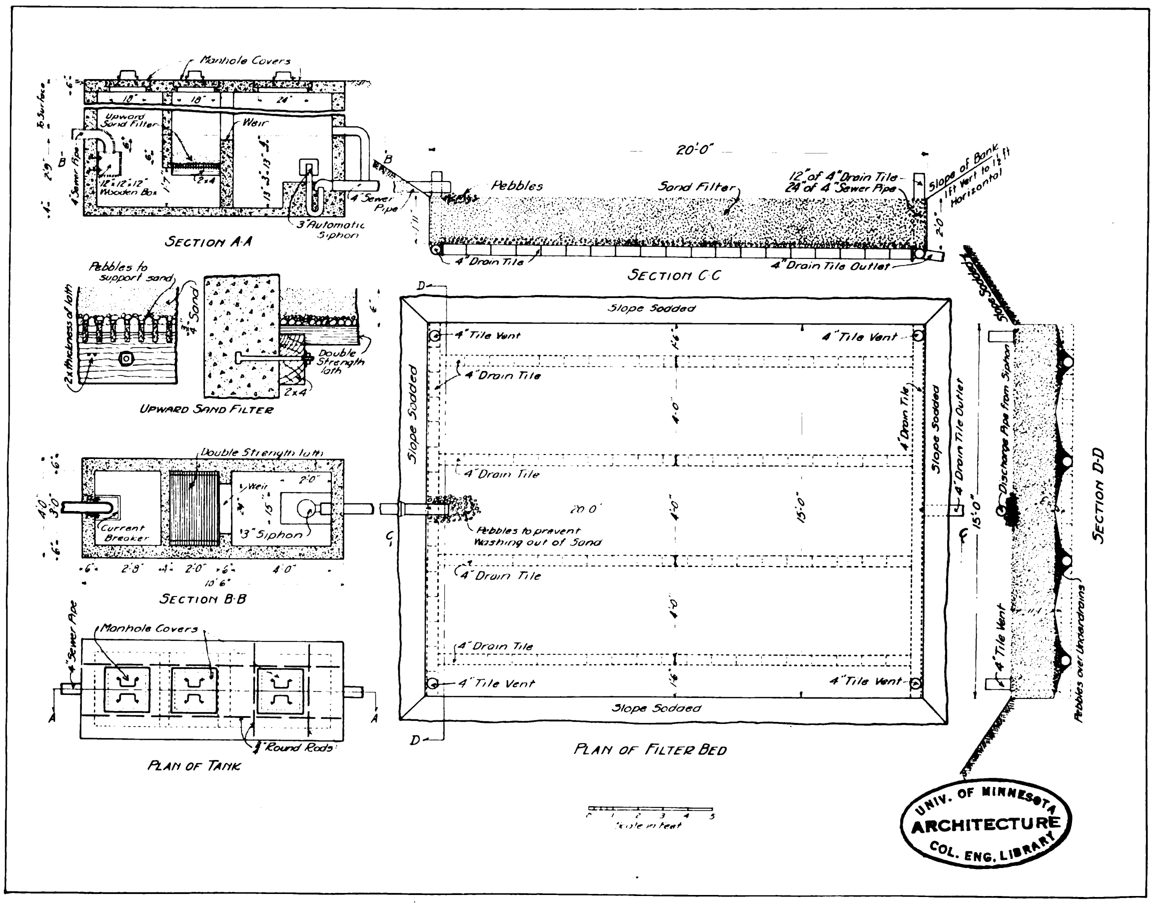
The following list of materials is for average conditions. Form lumber, sewer pipe for house sewer, and drain tile for outlet are not included.

- 10 barrels Portland cement for concrete.
- 6 cubic yards pit run gravel for concrete.
- 2 cubic yards pebbles over underdrains.
- 22 cubic yards sand for filter.
- 1 3-inch automatic siphon (cost about $15, factory).
- 1 4-inch sewer pipe elbow.
- 1 bundle double strength lath.
- 6 ¾-inch bolts, 8 inches long, with nuts and washers.
- 2 pieces ¾-inch reinforcing bars, 4 feet long.
- 2 pieces ¾-inch reinforcing bars, 10½ feet long.
- 13 4-inch drain tile tees.
- 8 feet 4-inch sewer pipe for vents.
- 110 feet 4-inch drain tile for underdrains and top lengths of vents.

Plant No. 4 is circular in shape and has the two filters as shown in Plant No. 2. Its special ventilating device, compactness, and finished details make it a desirable plant for the best houses. It has proved very popular in various parts of the country, especially for summer homes where harmony with surroundings is desirable.

The following materials are necessary for its construction:

- 3,000 common brick.
- 12 barrels Portland cement.
- 110 ¼-inch round rods, 3 feet 8 inches long.
- 55 ¼-inch round rods, 10 inches long.
- 55 ¼-inch rods, 4 inches long.
- 3 pieces 2 by 12 inches by 16 feet common lumber.
- 8 pieces 2 by 4 inches by 12 feet common lumber.
- 10 pieces 1 by 10 inches by 16 feet common lumber.
- 1 piece 1 by 12 inches by 16 feet common lumber.
- 1 pair hinges.
- 1 hasp and staple. 1 padlock.
- 1 piece galvanized screen, 12 by 18 inches.
- 1 galvanized iron ventilator.
- 6 2-foot lengths 4-inch sewer pipe.
- 6 4-inch sewer pipe elbows.
- 70 feet 4-inch drain tile.
- 6 cubic yards sand.
- 11 cubic yards broken stone or pebbles, with all sand screened out, ¼ inch to 1 inch.



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Working Drawings, Typical Plant No. 3

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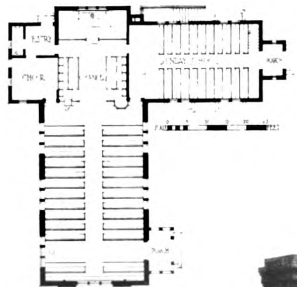
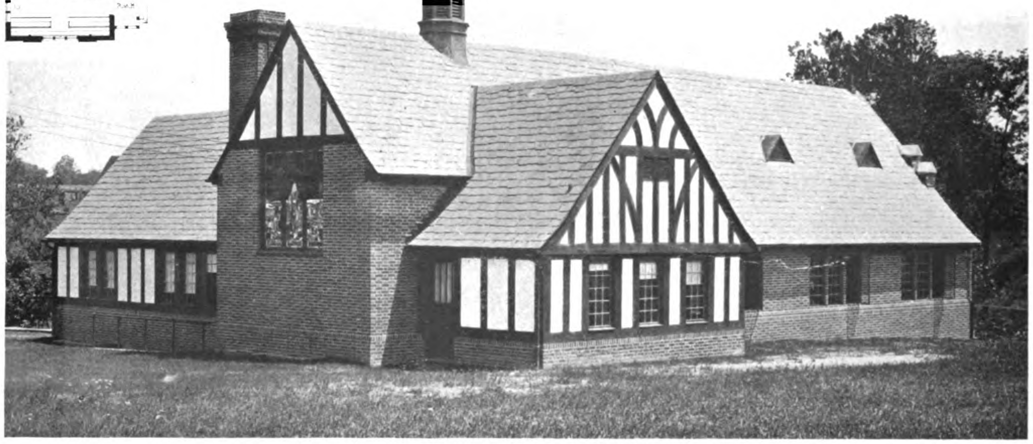
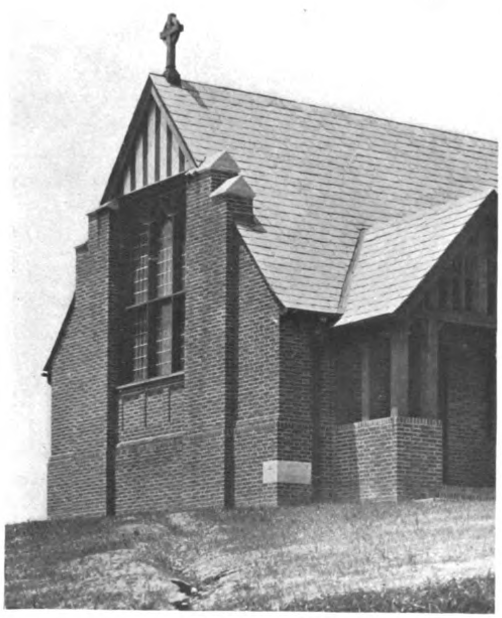
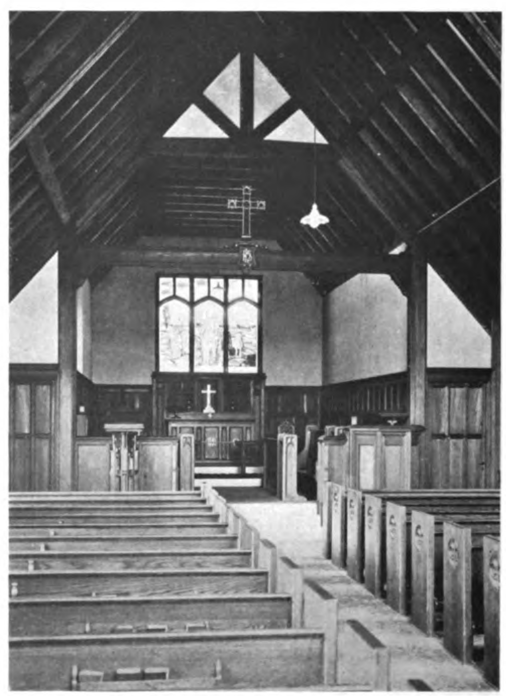
# CHAPEL OF THE GOOD SHEPHERD, RUXTON, MD.

THOMAS BOND OWINGS, ARCHITECT











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# PLATE DESCRIPTION

GYMNASIUM, WORCESTER ACADEMY, WORCESTER, MASS. PLATES 21, 22. The new gymnasium, situated so as to face the original Academy Building on the opposite side of the Academy Green, is built of dark red brick with stone trimmings. The style of the architecture is inspired from the collegiate work of the Jacobean period, representing the transition from the Gothic style to the Renaissance. The levels of the ground have caused a somewhat unusual arrangement of the front, one wing being two stories in height and the other but one ; the difference of height is brought into harmony by the tower over the entrance vestibule and stairs. The basement contains the swimming pool, locker rooms, and various minor rooms, including rooms for visiting teams, for boxing and wrestling, and for the faculty. On the first floor are the gymnasium room and a gallery around the pool. The second floor contains a running track around the gymnasium room, capable of being used as a gallery when basket-ball or other games are being held. The cost of the building was approximately $100,000.

DOREMUS MEMORIAL GYMNASIUM, WASHINGTON AND LEE UNIVERSITY, LEXINGTON, VA. PLATES 23, 24. This building was erected as a memorial to the late Robert Parker Doremus, of New York, on a site near the western corner of the campus. It stands on a high bluff, and the open colonnade between the two main entrances commands a wide view across the athletic field and the valley of the North River. The gymnasium was designed to harmonize with the older University buildings, which are of the early nineteenth century. It is of red brick, with cement stone trimmings and a wooden cornice. The main rooms are finished in white brick, the offices and other small rooms in sand finished plaster. The floors are of maple, white terrazzo being used in toilets, showers, and swimming pool room. The cost of the entire building was under ten cents per cubic foot, including plumbing, heating, and wiring.

SECOND CHURCH OF CHRIST, SCIENTIST, ROXBURY, MASS. PLATES 25, 26. This church is unusual in having a large auditorium without galleries, but with a foyer of considerable size located under a part of the hall. Another interesting feature is the location of the organ console, sunk in the floor in front of the platform, so that the organist, although invisible to the congregation, is in close touch with the soloist. The decorative scheme of the hall is very simple, as is the exterior architecture. The building is of fireproof construction, the walls being of brick and terra cotta, with a concrete dome.

OFFICE BUILDING FOR G. G. HARTLEY, ESQ., DULUTH, MINN. PLATE 27. This building is located in a commanding position on Superior street, in full view of Lake Superior. It is of brick with stone trimmings, its plan being a simple rectangle, with a gable roof of graduated green slates. On the first floor are two shops, with large show windows, divided into small panes so as not to destroy the substantial appearance of the building. Between the shops is the entrance leading to Mr. Hartley's offices, which are on the second floor, his private office being a large room 20 by 28 feet, with a fireplace in an ingle. The beams and cornice of the room are of ornamental plaster, and above the entrance to the ingle are plaster reliefs representing occupations symbolical of the four seasons.

DELTA UPSILON FRATERNITY HOUSE, AMHERST COLLEGE, AMHERST, MASS. PLATES 28-30. The construction of this building, except for the roof framing, is almost entirely of fireproof materials. The walls are of common brick, and the floor construction of reinforced concrete. The roof is covered with black slate. The first floor is mainly occupied by rooms of a more or less public nature, the second by studies, and the third by bedrooms. The design is of a simple Georgian type, altogether appropriate to its location in a New England college town.

HOUSE OF ALBERT RATHBONE, ESQ., 45 EAST 78TH STREET, NEW YORK, N. Y. PLATES 31, 32. This house is built on a lot 33 feet 8 inches wide and is 96 feet deep, including the extension. The front is of Harvard brick with random black headers and Vermont marble trimmings. The interior is arranged for large entertainments, the guests being able to pass directly from the entrance vestibule to the two dressing rooms, and thence to the main entrance hall. On both first and second floors the plan is very open, giving vistas from front to rear of the house. The tea room over the butler's pantry is on a lower level than the drawing room, allowing the introduction of a mezzanine story for service purposes. The large bedroom on the second floor is used by the owner and his wife, and has a sleeping porch and two dressing rooms and baths. The front suite, consisting of a study, bedroom, dressing room, and two baths, is used by the two daughters. On the fourth floor are servants' quarters and guest rooms, while a small deck house on the roof is used as summer quarters by the owner. The service entrance is through the grille on the right, avoiding areas and projecting steps, which are forbidden by a recent city ordinance.

HOUSE OF MAX MCMURRAY, ESQ., LAKE SHORE BOULEVARD, BRATENAHL, CLEVELAND, O. PLATE 33. The house occupies almost the entire width of a long and narrow property extending from the Boulevard to the shore of Lake Erie. A studio and high wall on the Boulevard screen the approach to the main building. The plan of the house is of particular interest because of the manner in which the garage is incorporated in it, the loggia forming a decorative feature of the front and an approach to the house from the garage. The sun room is the main living room of the house and is reached directly from the entrance gallery. The exterior walls are of rough plaster.



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# EDITORIAL COMMENT AND NOTES FOR THE MONTH

THE time was when architects were considered primarily designers of building façades — artists whose imaginative talent conceived the arrangement of materials and the disposition of such practical features as windows and doorways as to afford beautiful compositions. No thought was necessary to the arrangement of interior spaces save the creation of large apartments to be enriched with architectural forms; convenient relation of one apartment to another was not expected, and equipment for the comfort of occupants was unknown.

To-day the conditions under which architecture must be produced are as vastly different as can be imagined. It is true that the modern architect is a designer of façades, but this is only one of his duties, and in many of the commercial buildings entrusted to him, pure design becomes almost incidental. He must first be able to interpret in actual terms of building the manifold demands of a public constantly acquiring knowledge of new things and expecting more and more conveniences to make the business of living easier. He must further fully understand the demands of capital invested in buildings, so that the structure he plans will be of a suitable type for the neighborhood in which it is located, fully meet the requirements of its occupants and be constructed of materials compatible in durability with its intended use, thereby insuring a return in proper proportion to the cost and upkeep.

These, then, are the requirements that modern times have added to those of beauty and proportion and all of which must be fulfilled before a structure may be considered an architectural success. A modern building which does not perform any useful function, and whose only claim for existence is the beauty of its façade, is not in a true sense a product of architecture and it cannot permanently live. Yet in what a large number of buildings to-day do we see this false standard asserting itself! What in many cases serves to make matters worse are the vain attempts at securing architectural effect through the lavish smearing of façades with atrociously ugly forms, representing a waste of money that should more properly be used to secure a better form of construction or more adequate equipment. To cite one type of building in which false standards are evident, let us consider the modern apartment house.

It would seem that in planning such a building to house from three to one hundred families, and in some cases even more under one roof, the practical considerations insuring quietness, comfort, privacy, and convenience to the occupants would take precedence over all others; but the percentage of the apartment buildings constructed every year in which these necessities for comfortable living are provided is very low. When this fact is considered, the reason for the rapid depreciation in the value of apartment property is not far to seek. Tenants are free to take advantage of greater value for the money they pay if they find it, and any building which it is hoped to maintain as a permanent earning power solely through its marble entrance foyer or the number of cartouches and swags that its street façade parades, is doomed to become a losing property.

Sound proof floors and walls between apartments so that one occupant will not disturb another, ample water heating apparatus, a properly designed heating plant, elevator shafts located so that the noise of operation will be confined to the smallest space, well fitted hardware, conveniently placed gas and electric outlets, well lighted and ventilated service staircases and lifts, reasonable closet area — these and as many more service-giving features as are practicable, depending upon the type of tenants it is proposed to attract, should surely be provided first in every apartment house. Clothe the structure thus planned with a façade of dignified materials, honestly treated, and expressing in form the purpose of the building, and the result, if influenced by a correct knowledge of proportion and a discriminating use of ornament, will be architecture in its true and complete sense.

Another important factor in modern practice is the duty of safeguarding human life against destruction by fire. The recent fire in the Lenox Hotel in Boston is a case in point, showing the great value of such fireproofing as actually existed, even though it was not developed to the highest degree. All the conditions for a bad fire were present: a high wind, freezing temperature, an early morning hour. The fire started in an occupied room, a window was open, the guest discovering the fire ran to the corridor leaving the door open, and the flames rapidly spread. Despite the serious handicaps, the fire was confined to two stories. The walls and floors which were fireproofed with hollow tile remained intact, with no material damage except to furniture and interior finish. Such examples are conclusive evidence that fireproofing is an actual possibility and that it only remains to be generally applied to reduce greatly our annual fire loss.

In Mr. Aymar Embury's article, "From Twenty-Third Street Up," published in our issue for November, 1916, the illustrations of the Film Building were printed with the name of H. L. Meader as architect instead of Arthur Loomis Harmon. We regret that Mr. Harmon should have been deprived of the credit that was his due.

Mr. Bertram Grosvenor Goodhue has asked us to state that the Taft School, published in our January issue, should have been credited to Cram, Goodhue & Ferguson, Architects (New York Office).

Messrs. Howells & Stokes, architects, announce the dissolution of their New York partnership. Mr. I. N. Phelps Stokes will continue the office at 100 William street, and Mr. John Mead Howells has opened a new office at 470 Fourth avenue. The western practice of the firm will, however, be maintained, with offices in Seattle, Wash., and at 100 William street, New York.



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# THE ARCHITECTURAL FORUM

VOLUME XXVI NUMBER 3

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### LETTERPRESS




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RUINS OF THE CATHEDRAL OF ST. MARTIN AT YPRES, BELGIUM

AFTER AN ETCHING BY GEORGE T. PLOWMAN

*THE Cathedral of St. Martin stood behind the Cloth Hall and within a short distance of it. It was a work of the thirteenth century, while the tower, 190 feet high, was added in the fifteenth century. The small view shows the former appearance of the interior, from very nearly the same point of view as that of the etching.*

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# THE ARCHITECTURAL FORUM

## FOR QUARTER CENTURY THE BRICKBUILDER

VOLUME XXVI MARCH 1917 NUMBER 3

# The Adam Style*

## PART II. INTERIOR DESIGN AND ORNAMENT

*By* HARBOROUGH DESMOND UPTON

ADAM ornament offers a most interesting and plentiful field for study. In this particular phase of their work the Adam brothers were so versatile and prolific that one hardly knows where to begin or what line of analysis to pursue. The many varieties of ornamental work to which these gifted architects gave their attention would probably have resulted in mediocrity with the average designer, who would either have slurred over the less interesting details, or else have become so befogged by them that his ability to study the larger and broader architectural problems would have been seriously impaired. The Adam brothers, however, do not seem to have been fettered by either of these handicaps, and though they apparently lavished great care and attention on the most trivial bit of ornamental detail, their work in the broader phases of architectural design shows that they remained unhampered both in breadth and in clearness of conception and logic.

Portrait of Robert Adam

One reason why their work has so much charm is that they gave serious attention to studying it to the very last detail. How many designers there are who have evidently lost interest in the *minutiæ* of the building they are creating, and who in consequence spoil the final result by insufficiently studying the detail! It has been truly said that it is far easier to *begin* a building than to *finish* one, and this applies just as much to the architectural design as to the structural features. There are often so many little (and sometimes big) uninteresting spots in the design, where one feels that if only a little attention and study had been given, the results would have been very different, or where the observer is tempted to believe that the designer lacked imagination and that his stock of ideas and his interest in the work were exhausted after the general scheme was blocked out!

This fault can never be laid at the Adams' door, nor on the other hand can they be censured for overdoing their ornament and confusing the interest. Even in the most intricate and complicated decorative scheme there is always some dominant feature that stands out as the central motif for which all the other interweavings of decoration are intended to serve merely as the background.

This care and evident enjoyment with which every last detail has been studied, not only by itself but also in its relation to the entire scheme, is a marked characteristic of Adam work, and is one essential quality that must be thoroughly absorbed and understood in using this style. If the designer likes the style, there should really be no difficulty in his lavishing all the interest in his makeup on the study of the detail, for the motifs are so delightfully dainty and graceful that the real trouble lies in knowing when and where to stop; and this brings us to another characteristic of Adam work—the Adam brothers *knew where to stop* and did not allow themselves to fall into the pit of confusion that aimless and meaningless overornamentation holds for the unwary and inexperienced designer.

For their exterior work the Adam brothers usually showed a greater restraint in ornamentation than with their interior design. The ornament is studied primarily with the intent to bring out the general scheme of the composition and to add those touches of richness that enhance, rather than destroy, the splendid simplicity of the design, serving as punctuation marks that emphasize and clarify the composition and carry the eye along the lines that should be followed in order to appreciate fully the value of the ensemble.

This is the real art of ornamentation, and therein lies the fundamental value of the use of ornament. It is so easy to cover a design with decoration, yet so difficult

*NOTE. Illustrations from "Works in Architecture of Robert and James Adam," London, 1822, and "Robert Adam and His Brothers," by John Swarbrick, published by B. T. Batsford, London.

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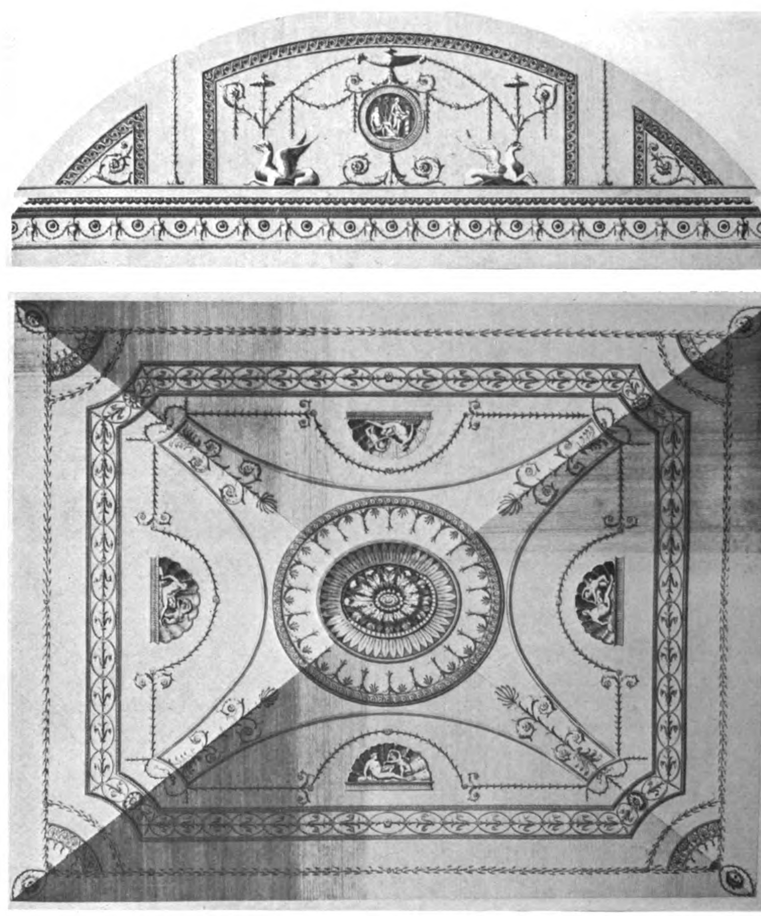
to bring order out of chaos and have the result anything more than a confused jumble of motifs, which, while perhaps each a gem in itself, are only a meaningless and uninteresting spatterwork when viewed as a whole.

We find in Adam ornament a certain definite flow of line that ties the composition together and leads easily and gracefully from one point of interest to the next. Isolated or interrupting plaques were introduced where, in the judgment of the designer, they either arrested the smooth flow of the ornament or gave a spot of interest or a note of contrast, and so prevented monotony. In interior work these plaques lent themselves particularly to the use of color, usually the so-called "Wedgwood" tones, that added greatly to the interest of the decorative scheme and permitted the introduction of such gems of ornament as could hardly have been produced by any other means; moreover, by the depth, vigor, and richness of the color, and the strength and action of the figures brought out like cameos in these plaques, the entire composition acquired a robustness and strength almost incredible, considering the light and delicate character of graceful elements out of which it was built.

These "graceful elements," however, when carefully studied and analyzed, are found to be by no means weak or characterless. Every line, every phase of modeling in the original work, bears the evidence of careful study to ensure its fulfilling its purpose in the design. Even the most dainty string of beads, looping in a graceful curve from one point to another in the composition, will be absolved from any stigma of weakness by the clever increase in the size of the beads at the lowest part of the curve, or by the introduction of some ornamental feature of especially vigorous line, while the feature itself is scaled down to an appropriate size in order not to destroy the value of the bead garland.

The modeling of acanthus leaves in *rinceaux* or other decorative motifs always plays an important part in the scheme. At times the relief will be flat and colorless for the definite purpose of not making it overprominent and thereby destroying the value of some other part of the design intended to be more important. Then again, by a turn of a lobe here and there, by the vigorous bringing out of the veins and lines of the leaves, by a back turn or reverse movement, and by a hundred other niceties of modeling, a thin *rinceau* will be given as much strength as could be obtained in a more heavy and solid Renaissance *rinceau*, but saved from the defect of being as cumbersome and unwieldy as the latter. The "husks" and the "honeysuckle" motifs can each be found in a dozen or more different characters, differing entirely from one another in contour and modeling, and each filling a special requirement in the particular composition where it occurs.

It is in these niceties of differentiation, in the careful balance of values, and the special treatment of the component parts of the design, just as much as in the graceful flow of the lines of the composition, that Adam ornament is so difficult to imitate; for even an original Adam drawing would not serve as a talisman of success if the person using it were not acquainted with the refinements of modeling that are so vitally a part of the style. Unless particular care and attention are given to studying the modeling, especially in this country where the majority of the modelers in ornamental plaster shops are either Italians or Frenchmen, a perfectly good Adam design will develop into a mixture of Empire, Pompeian, and Renaissance, and betray not a single trace of true Adam character. Even such a typical Adam motif as the much overworked "web" can be absolutely denatured by incorrect curvature of the surfaces or by the loss in play of light



Side Wall and Ceiling in Anteroom at Sion House, near London

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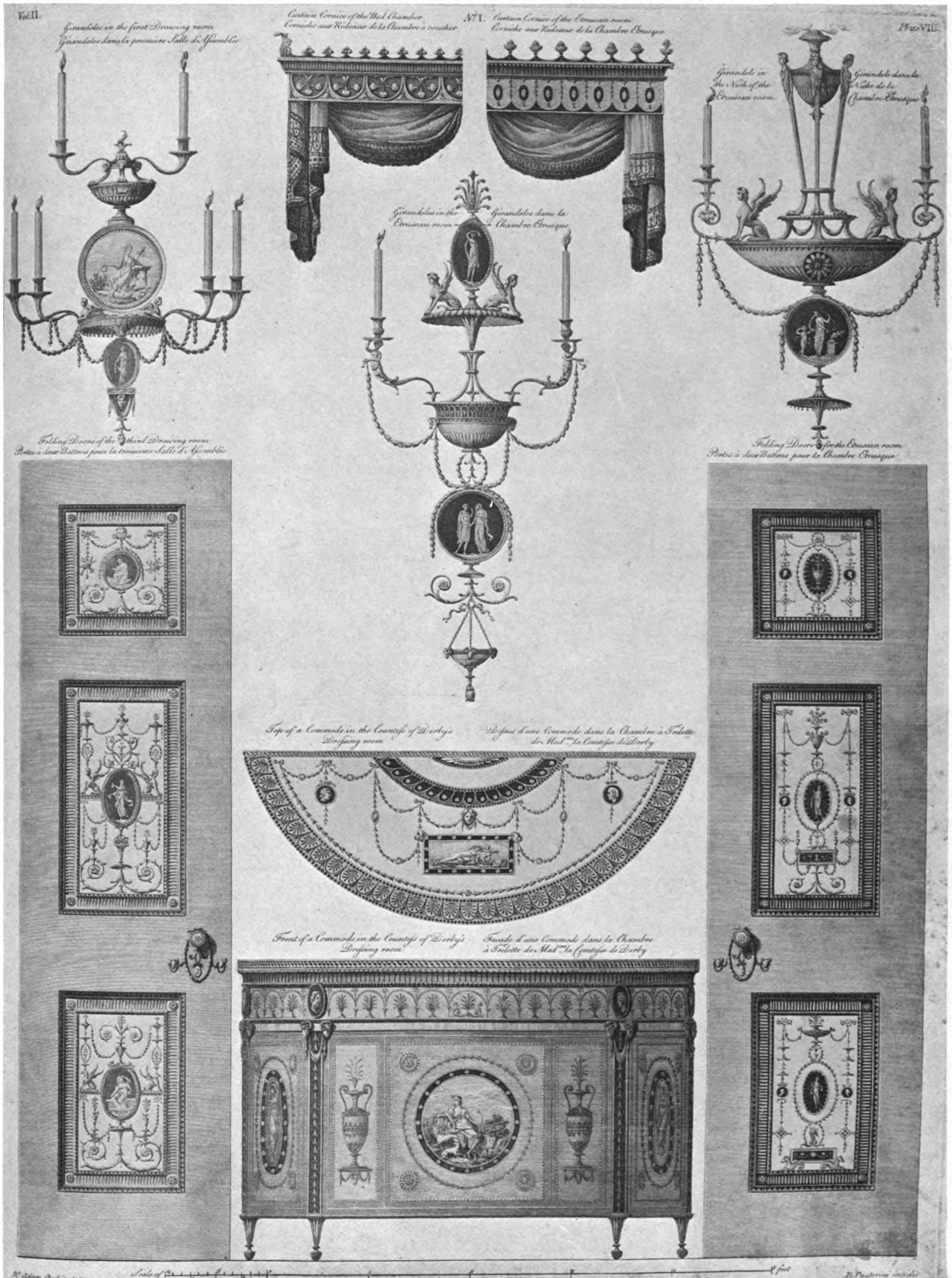


Details and Furniture from the Earl of Derby's House, Grosvenor Square, London

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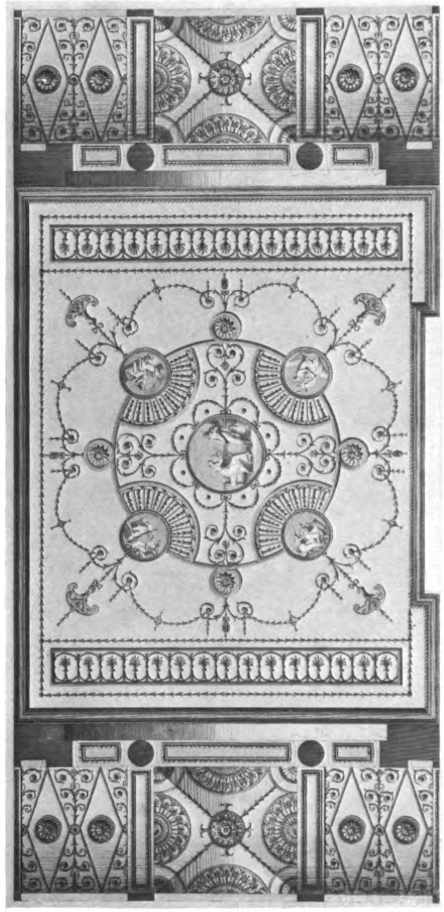
and shade due to having insufficient projection for the ribs, or by having too great a rib projection that makes the web a gross caricature of the style.

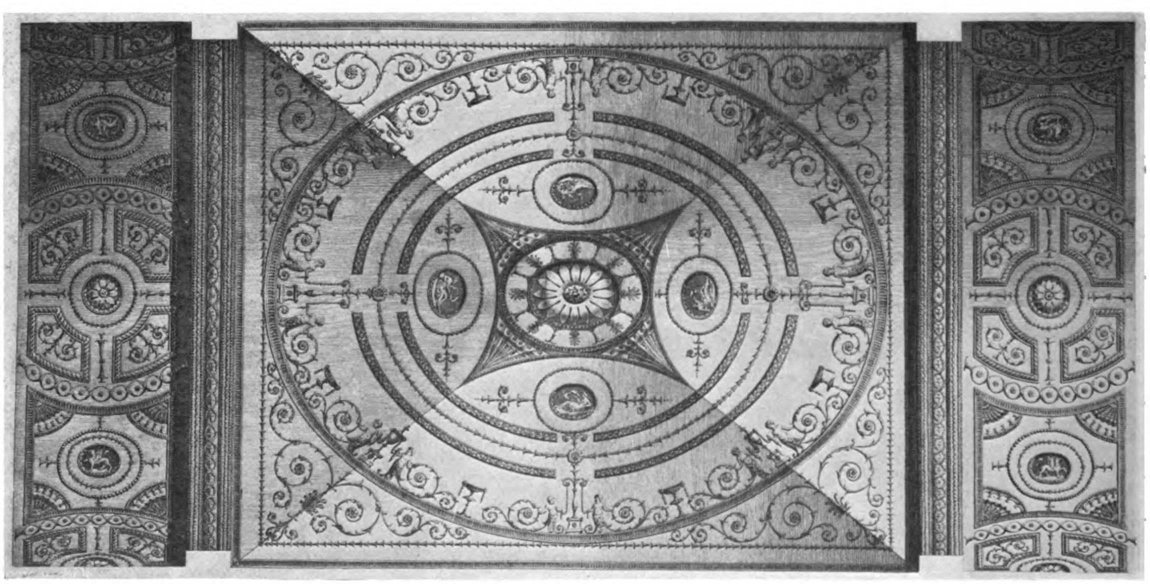
The reader will no doubt say that it is all very well to describe these niceties of modeling in Adam ornament, but where are they to be studied in this country if the original Adam drawings are not a sufficient guide? The drawings in the "Works in Architecture of Robert and James Adam," and photographs of Adam work to be found by diligent search in architectural libraries (for they are seldom classified under "Adam style"), or the illustrations in the recent excellent work by Mr. John Swarbrick, entitled "Robert Adam and His Brothers," will serve as a preliminary guide in the matter of silhouette and mass. From these plates a great deal can be learned by careful and analytical study, and the student will lay for himself a fairly sound foundation in the essentials of the style.

For the actual modeling of the ornament much can be learned by carefully and critically studying in the showrooms of reputable antique dealers such objects as mantelpieces, girandoles, candelabra, mirror frames, carved furniture, etc., that are vouched for as genuine Adam work or good examples of the Adam school. These will afford valuable instruction to the student with quick and discerning eyes.



Ceiling from Sir Watkins William Wynn's House

For a more comprehensive study of the Adam style, both in design and detail, there is a wealth of excellently composed and well executed Adam ornament in the Ritz-Carlton Hotel, New York City, and in the Carlton Hotel, Montreal, all of which is the result of careful study of original Adam work in England. Special attention was paid to the modeling of the ornament in these buildings to keep it true to the spirit and character of the original work, and in several cases the ornament was modeled from casts made from the same boxwood moulds used in casting the ornament designed by the Adam brothers themselves. Some parts of the ornamental ironwork in the Ritz-Carlton Hotel are original Adam work, or were recast where necessary from moulds made directly from the originals. Many of the mantelpieces are authentic, and girandoles, candelabra, tripods, and other decorative features are



Ceiling from Sir Watkins William Wynn's House, St. James Square, London

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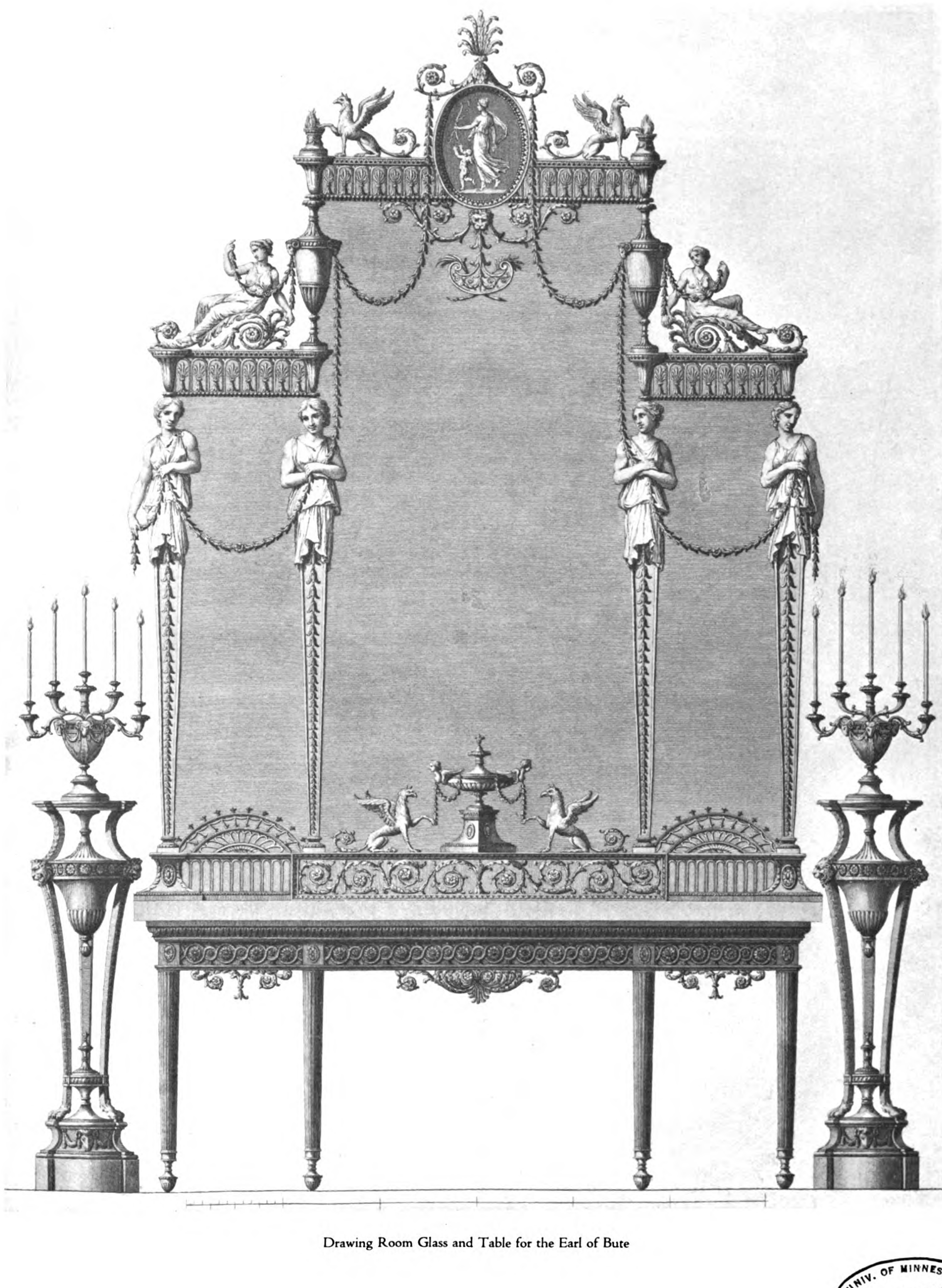

Drawing Room Glass and Table for the Earl of Bute

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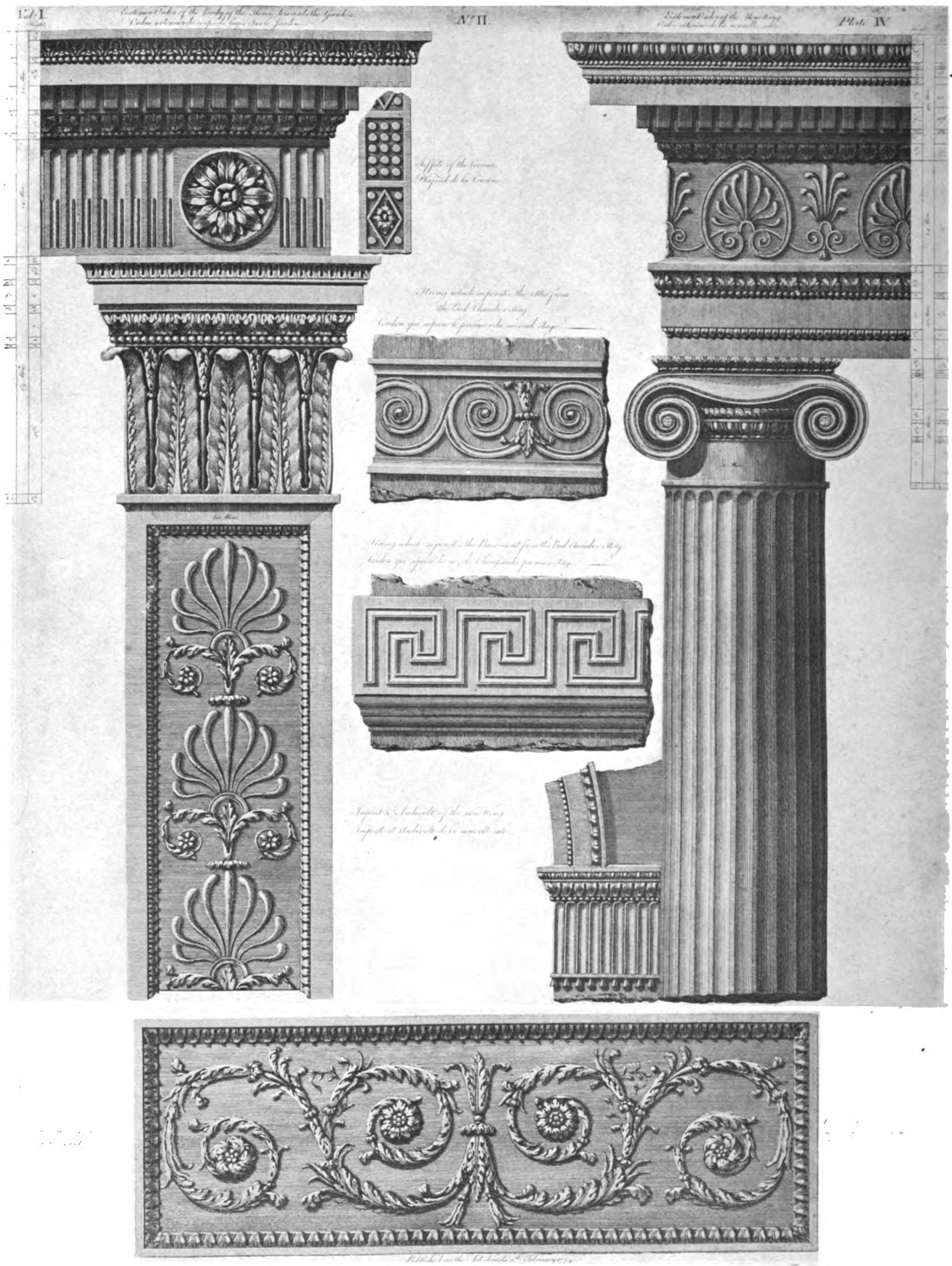


Exterior Ornamental Details from Lord Mansfield's Villa at Kenwood, Middlesex

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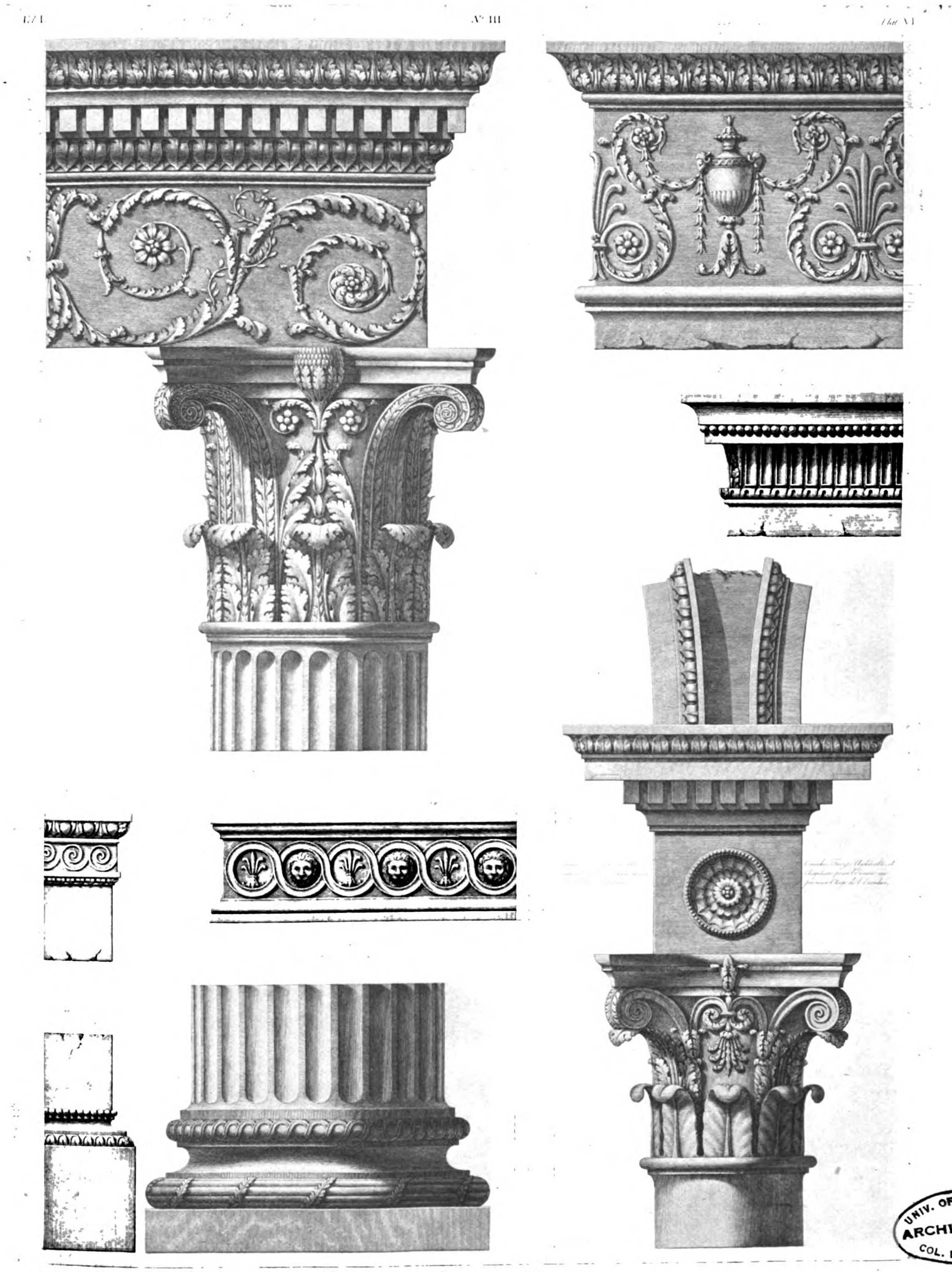

Interior Ornamental Details from Luton House, Bedfordshire, built for the Earl of Bute

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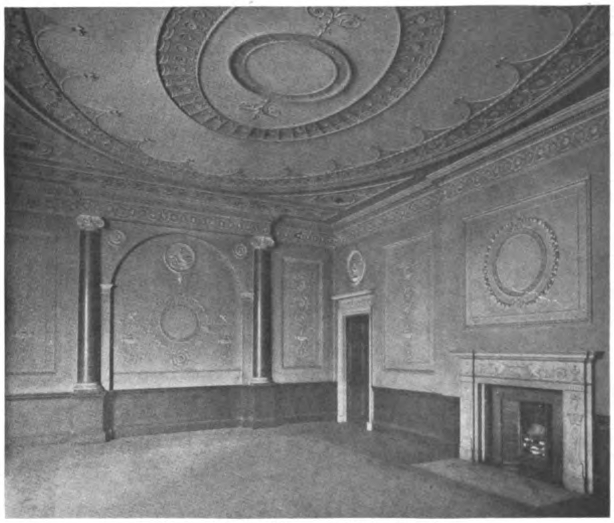
modeled or adapted from original Adam examples, found after a diligent and thorough searching of the most reliable antique shops in London.

The Ritz-Carlton Hotel is a veritable museum of carefully selected Adam work, and it is really due to the care and conscientious study displayed in this building and in its furnishings and appointments that there has been such a great interest in the Adam style in this country. Prior to the erection of this hotel there were, of course, many excellent examples of Adam work in America, either originals or modern copies; but as they were chiefly confined to private dwellings and were mostly interior decorations or furniture, these gems were hidden from general view and therefore of no educational value save to the owners and their intimate friends.



Dining Room, Harewood House, London

Accompanying this article are a few reproductions from "The Works in Architecture of Robert and James Adam" which have been selected as illustrating some of the most characteristic motifs and elements of Adam ornament. The details from "Kenwood" give excellent examples of an acanthus and anthemion arabesque, a water-leaf cap, frieze ornamentations of fluting and rosettes on one entablature and anthemion decoration on another. The acanthus *rinceau* in the panel detail is a very good and typical example, and shows as far as is possible in a drawing the spirit of Adam ornament of this kind.

For the details from Luton House we cannot do better than quote the description written by the Adam brothers themselves in reference to this particular plate: "The capital of the order in the saloon is altered from an antique one, the drawing of which his Lordship brought from abroad, and is an example of the latitude which the ancients took in compositions of this kind. A similar latitude is taken with regard to the composition of the cornice which is not subjected to any of the customary rules, yet we have the satisfaction to find it has been approved by men of taste.

"The capital to the screen of columns in the great stairs is also new. These having been very closely imitated in various places . . . shew the approbation they have met with from the public.

"It does not appear necessary to mention the rest of the detail in this plate, which will not be found altogether of the common type hitherto used." This last sentence expresses truthfully one of the charms of the Adam style, for the individuality and gracefulness of Adam ornamental detail lifts it far above "the common type hitherto used" (if not since!), and there is a subtle, aristocratic element in Adam ornament that gives to it a refinement lacking in many other styles or periods.

The illustrations of the furnishings and "finishings" from the Earl of Derby's house are all good specimens, and the drawing-room glass and table designed for the Earl of Bute contain inspiration for a dozen or more compositions of Adam decoration. The motifs are all typical, well balanced, and true to style. The composition also is a very characteristic example of Adam work.

The ceilings from the famous house of Sir Watkins William Wynn, St. James Square, London, while perhaps not the best examples of the Adam ceiling design, are at least very good types to study on account of the ornamental elements employed and the general grouping of the motifs forming the design. The ceiling of the anteroom of Sion House is an interesting example and is well worth studying carefully, as it contains some typical Adam motifs. The dining room of Harewood House is also an excellent example of the application of Adam ornament.

The illustrations here reproduced will, it is hoped, serve to stimulate a greater recourse to the original documents and plates from which they were taken. The three volumes of the "Works" are available to the student in almost every large city possessing a well equipped architectural library, and are to be preferred to any of the reprints which, as is usual in such publications, have lost much of the clearness of the plates from which they were reproduced.

It is to be regretted that in the crowded curriculum of architectural courses only brief mention (if any at all) is made of the Adam style, on the theory no doubt that it is necessary to give the students as thorough a knowledge as possible of the "classic" styles, leaving the study of the offshoots from these styles to future chance or inclination.

In the case of the Adam style, however, with its simple dignity of composition and wealth of graceful ornamental motifs, it would seem that more recognition should be given, and that every well planned course in archæology ought to require at least one problem in this style in order to cultivate a desire for further research and study when the purely academic course was completed.

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# Details of Italian Renaissance Architecture

MEASURED DRAWINGS BY MAURICE P. MEADE

THE work of the Italian Renaissance is notable for its great skill in detail and execution, and these drawings of doorways have been made to emphasize this point. Although they show general dimensions and proportions of openings, their greatest interest is in the detail of the architraves. The relatively slight reveal of all these examples should be noted, as well as the fact that the doors, in general, are hung directly on the masonry jambs without a wood frame. The mouldings used are very refined, and their ornament contrasts effectively with the plain surface of the fascias. Sometimes the architrave members return on themselves at the base, while in other cases they are cut off squarely on the face of the jamb, and these two treatments are often used together in the same building.


Side Doorway, Church of San Marco, Rome

The central doorway of the church of San Marco, under the loggia on the Piazza Venezia, is flanked by pilasters. The architrave is unusually simple, the pilasters and their entablature, on the contrary, being considerably ornamented. The opening is 8 feet 2 inches by 15 feet. The architraves of the side doors are richly moulded, though without carving. They are identical except for the inscriptions in the frieze. The work is attributed to the architect Filarete.

The doorways of San Giacomo degli Spagnuoli, in the Piazza Navona, attributed to the architect Pontelli, were executed about 1450. The central doorway is particularly rich in its decoration, the rope moulding being an unusual feature. The broad, unbroken architrave is also a rarely used feature.

The doorway of the palace on the Piazza Pallarola is very similar to the side doorways of San Marco in design, but has different mouldings and richer ornament. The doorways of Santa Maria del Popolo are very similar to those of San Giacomo in general type, though simpler in treatment, and form the chief features of a very plain front.

Central Doorway, Church of San Marco, Rome

Central Doorway, Church of San Giacomo, Rome

Doorway of Palace, Piazza Pallarola, Rome



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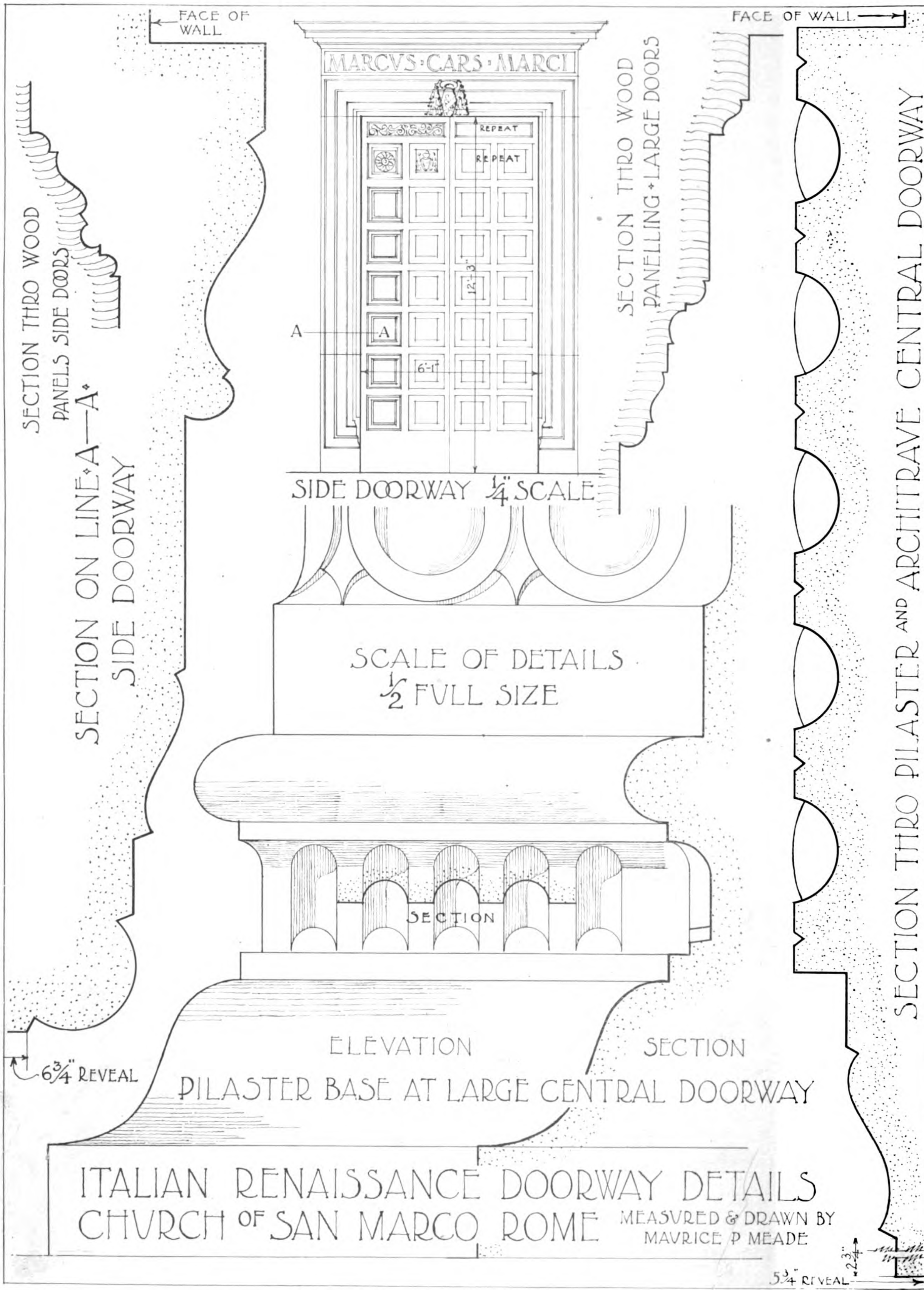




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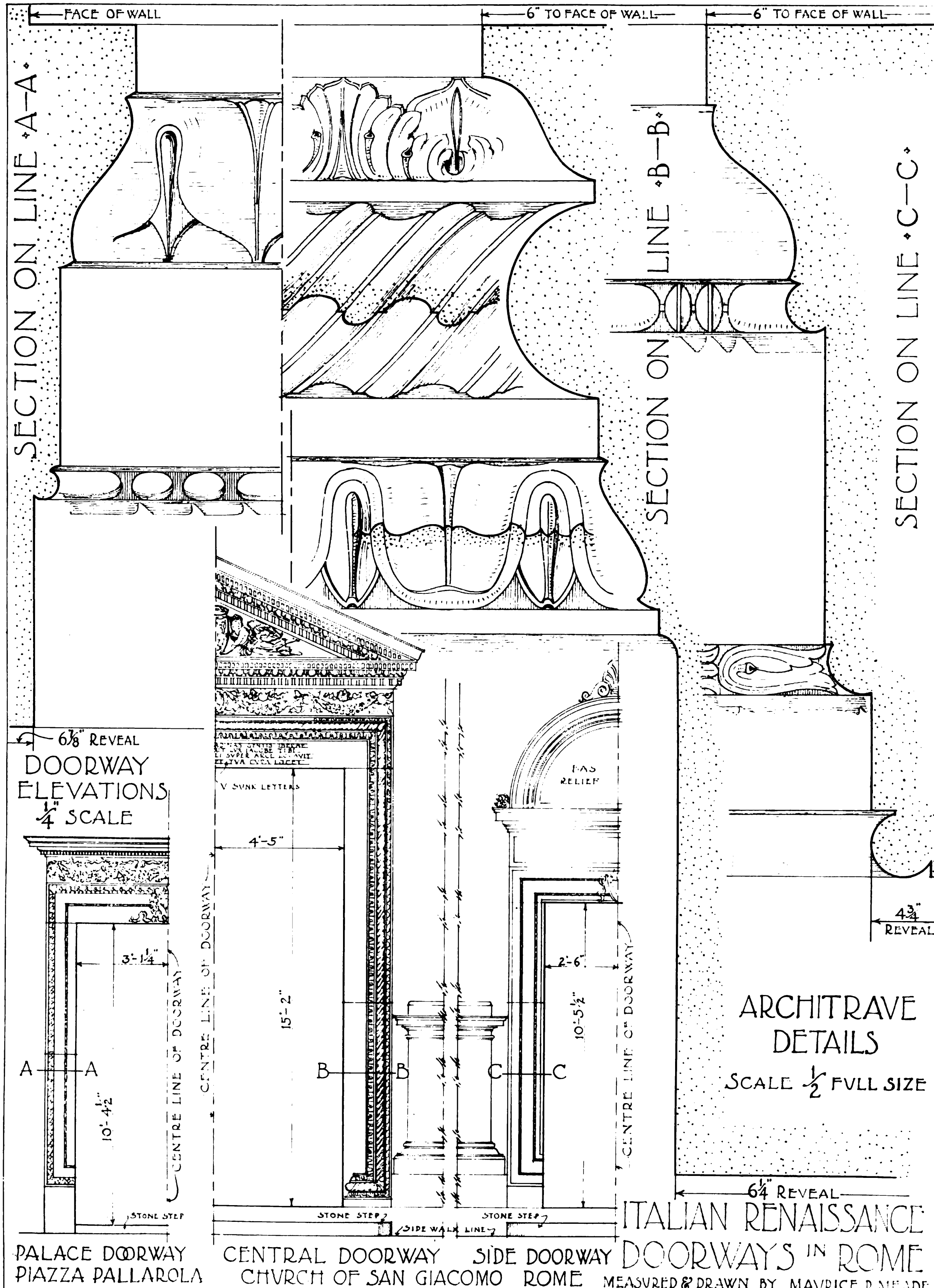




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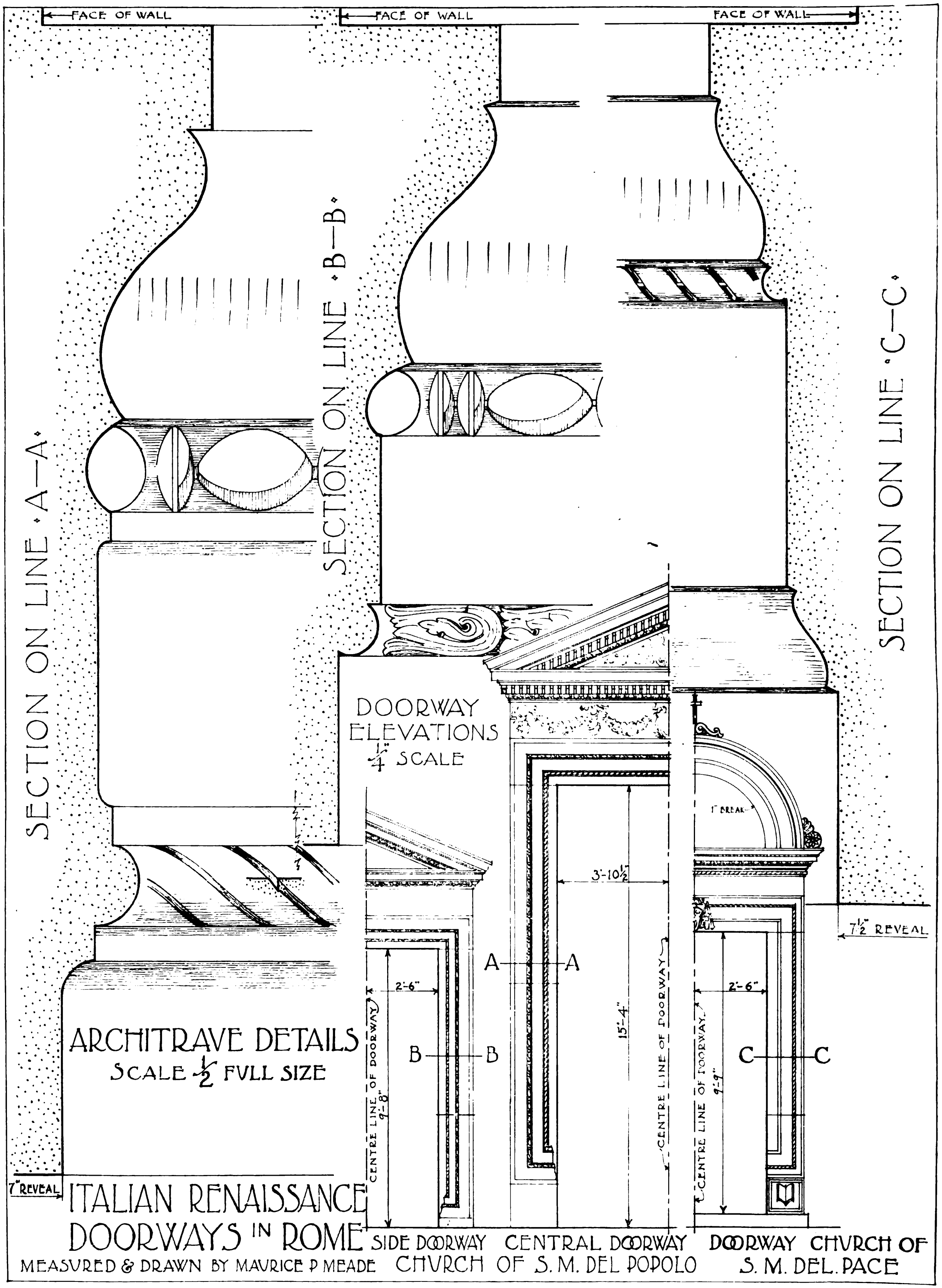




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# Practical Perspective Methods for Office Use

*By* ROBERT FULLER JACKSON

FIRST PAPER

THE use of perspective drawings in architects' offices is so general and important that no draftsman's training can be considered complete without a fair knowledge of the subject. Unfortunately, most draftsmen dislike perspective work and never attain proficiency in it, because as ordinarily taught it is unnecessarily slow and tedious. The purpose of these articles is to explain some methods and devices by means of which the work of laying out perspective drawings may be materially lessened. These methods are not original, but they are far less known than they should be, in view of their great value to the profession.

In approaching the subject, a few definitions are necessary. The following is a list of the terms and abbreviations most generally used, with an explanation of their meaning. While this is the general use of these terms, they vary somewhat in different treatises on the subject.

PICTURE DIAGRAM — the image projected upon the picture plane seen in elevation from the front side, including the perspective projection of the object, called the picture.

P.P. — PICTURE PLANE — vertical plane of projection on which the picture is made.

S.P. — STATION POINT — the observer's EYE.

C. of V. or C.V. — CENTER OF VISION — the point directly opposite the eye and level with it.

VISUAL ANGLE or ANGLE OF VISION — the angle determined by the extreme limits of the object included in the picture from the observer's eye.

C.L.V. or C.L. — CENTER LINE OF VISION — formed by the vertical plane through the S.P. with horizontal planes in plan, and with P.P. in the picture diagram seen in elevation.

RECEDING LINE — one that is not parallel to P.P.

VANISHING LINE — one that goes to a V.P. in perspective.

V.P. — VANISHING POINT.

D.P. — DISTANCE POINT — the V.P. of a line at 45 degrees to P.P. in plan.

D.V.P. — DIAGONAL V.P. — or V.P. of the bisector of an angle of 90 degrees in any plane.

M.P. — MEASURE POINT — the V.P. of a line which

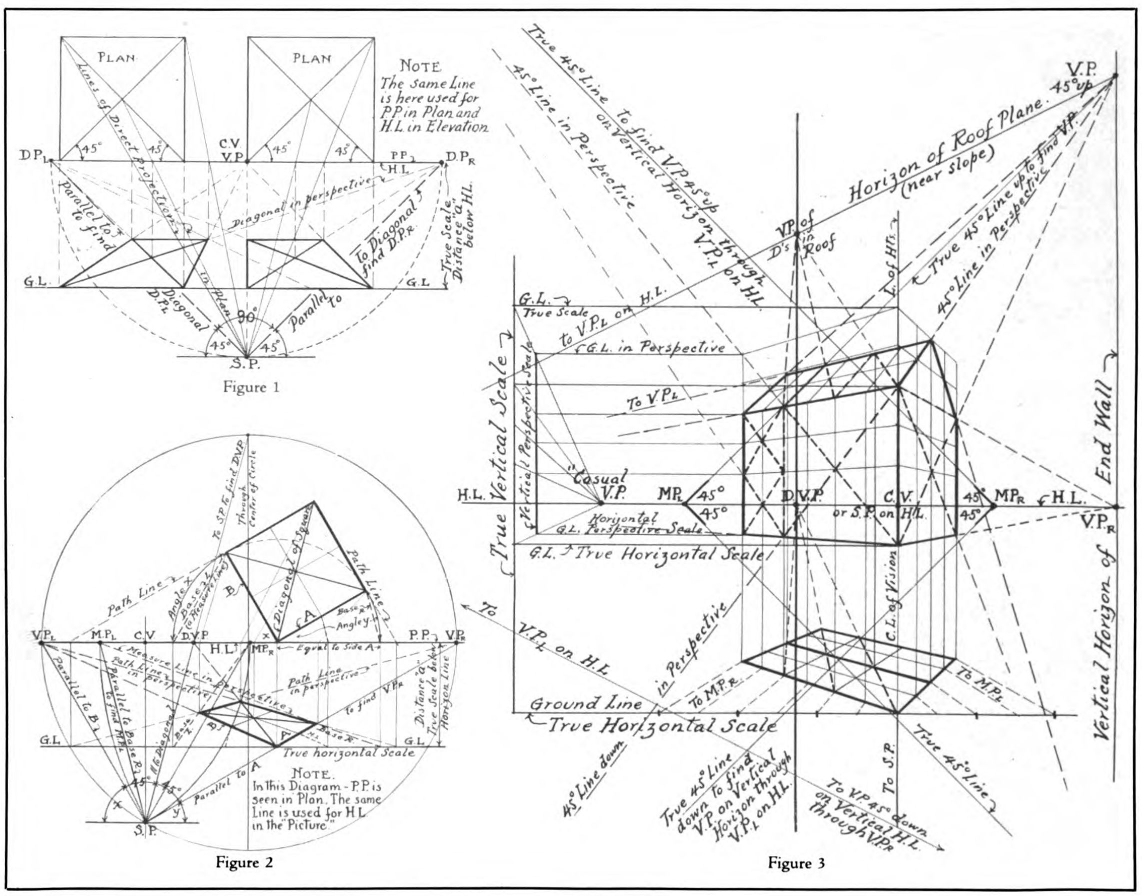


Figure 1

Figure 2

Figure 3



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makes equal angles with a receding line and with P.P. in plan.

H.L. — Horizon Line — the eye level in the picture diagram, or section diagram, or on elevations.

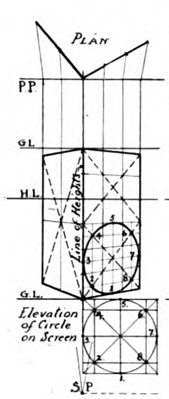


Figure 4

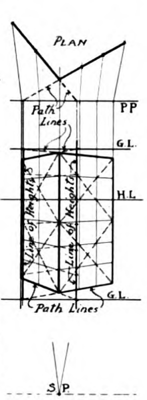


Figure 5

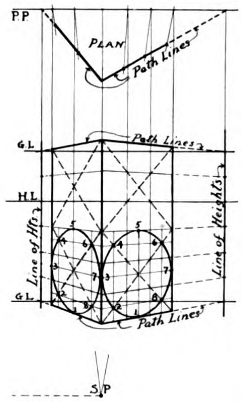


Figure 6

Other H.L.'s or Vanishing Trace of Planes — used loosely to denote any line toward which parallel planes vanish in perspective, whether the planes are horizontal, vertical, or inclined. The drawings show that no confusion results from this notation.

G.L. — Ground Line — the horizontal scale line formed on P.P. by any horizontal plane which cuts it.

L. of Hts. — line of heights or vertical scale line.

A perspective drawing can be made without the use of V.P.'s or M.P.'s, but the time saved by their use is worth saving if there are several parallels to be drawn.

Any V.P. (whether a V.P., D.P., D.V.P., or a M.P) is found on P.P. by drawing through S.P. in plan a vanishing line parallel to the given line whose V.P. is required.

The V.P. is then transferred to the horizon in the picture and used for all lines parallel to the given line.

Measure Points. The theory of the M.P.'s is simple. In Figs. 1 and 2 receding lines vanish to their proper V.P.'s. To divide or mark off in perspective these lines into definite divisions or lengths, the principle of the isosceles triangle is used. Lines drawn parallel to the base of an isosceles triangle cut its equal sides in the same measures or divisions. The receding lines are drawn in perspective, and the required divisions are laid off on the other sides in the P.P (on a G.L.) and taken to the V.P.'s of the bases of the isosceles triangles. In Fig. 1 the base makes an angle of 45 degrees with P.P., and its V.P. is D.P., which is thus the M.P. for perpendiculars to P.P. In Fig. 2 the V.P.'s of the bases of the two isosceles triangles formed by them and the receding lines and the sides in P.P. are the M.P.'s of the receding lines. The short way of finding any M.P. of a line is to lay off the distance from its V.P. to S.P. on H.L. This obviates the use of the plan in fixing M.P. on H.L. Fig. 2 also shows two ways for finding the D.V.P. (1) By drawing a vertical through the center of H.L., between the two V.P.'s, and connecting the upper end (on the circle) with S.P. Where this line cuts H.L. is the D.V.P. (2) By bisecting the 90 degree angle formed at S.P. by the two vanishing parallels. Where the bisector cuts H.L. is the D.V.P.

Heights in Perspective. The level ground on which an object stands is a horizontal plane. Where it cuts P.P. is the ground line, a true scale line from which heights can be measured vertically. There is properly only one G.L., but custom calls all horizontal lines formed by horizontal planes cutting P.P., G.L.'s, so that by extending the horizontal plane containing any point or line till it cuts P.P., the scale height is determined in the picture. In Figs. 1 and 2 the G.L. is distance "a" below H.L., which is the height of the figure below the eye. What we term path lines are lines which recede in perspective to a V.P. To find the height of a path line, it is extended to cut P.P. at its true scale vertical distance from H.L.

If a vertical plane or wall of heights is drawn through any path line, it will cut P.P. in a vertical line called a line of heights, and any height in that plane can be scaled on this line, and carried back to V. P. by horizontal

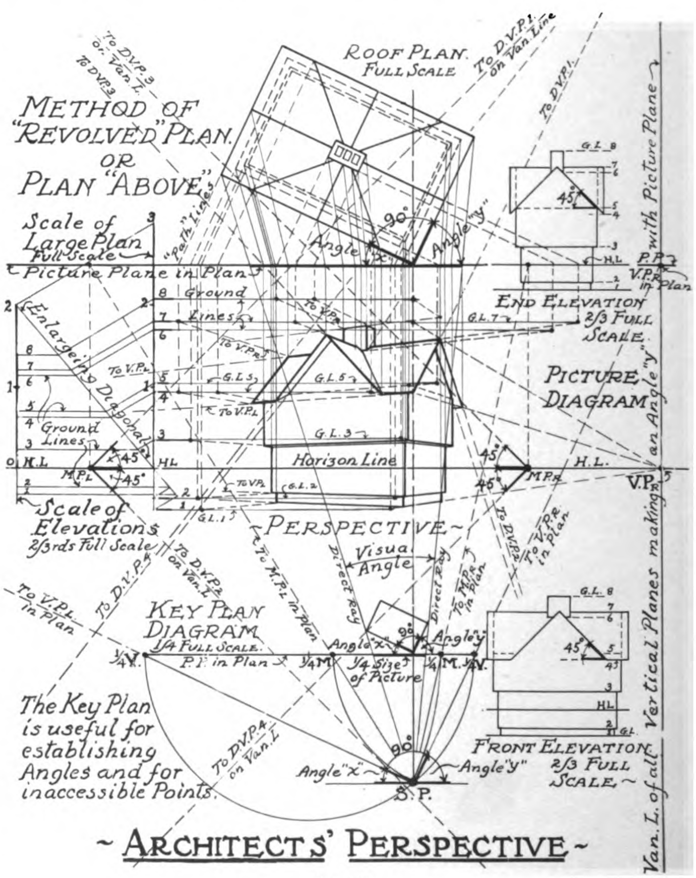


Figure 7

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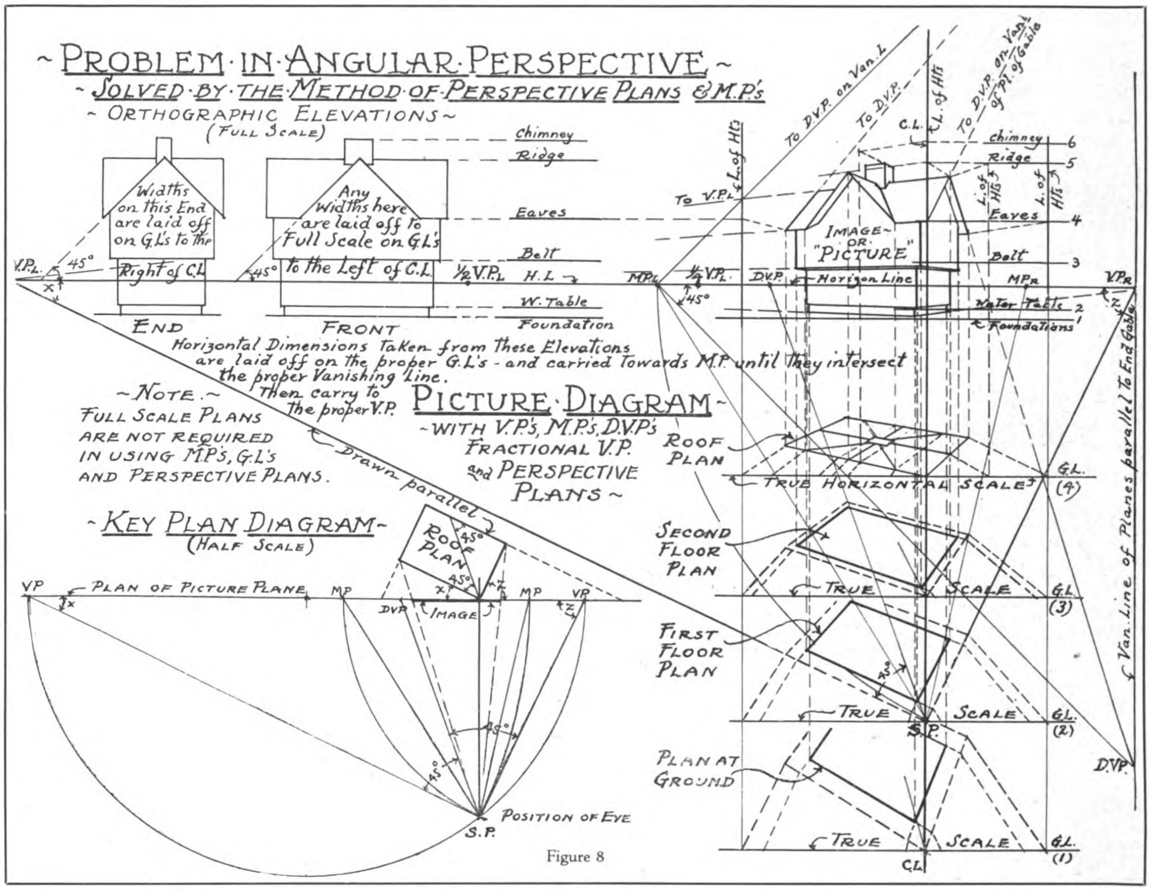


Figure 8

parallels to find the perspective heights of points in that plane. (See Fig. 3.) It is convenient to use a L. of Hts. in the left margin of the picture, out of the way of other lines, to avoid confusion. Any "casual" V.P. may be taken on H.L. for carrying back into perspective horizontal parallels of height, laid off on this scale line of heights; and G.L.'s carried horizontally until they cut this wall of heights can be measured at that perspective distance on a vertical scale line of heights there, or can be taken forward along the path wall to the larger scale L. of Hts. in the P.P.

This matter of finding heights is often puzzling to draftsmen, but is so simple if once understood that space will be given to a full explanation of finding lines of heights for different positions of the P.P. in relation to the object in plan.

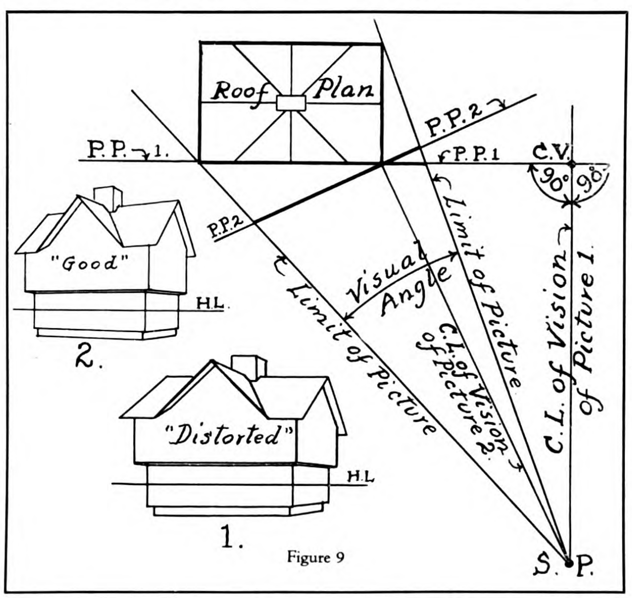


Figure 9

In Figs. 4, 5, and 6 a double fold screen is shown in angular perspective. The P.P. is taken in Fig. 4 on the corner of the screen; in Fig. 5 P.P. is taken forward of the screen; in Fig. 6 P.P. is taken back of it. If P.P. touches a receding line of the plan, a line of heights can be erected at this point. In Fig. 4 this corner lies in both of the receding lines representing the two planes of the screen, and it also lies in the P.P. Therefore a L. of Hts. at this point serves for finding the heights of horizontal lines in both planes, which are thus walls of heights.

If the P.P. cut the screen back of the corner, two lines of height could

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be erected, one at each point where it cuts the two receding lines. In Fig. 5 P.P. is wholly in front of the screen, so that it does not touch or cut either receding line unless they are extended purposely. They are so extended in order to establish points on P.P. for erecting L.'s of Hts. Still being path lines, receding to V.P.'s, heights of points in either plane can be scaled on each line of heights and carried back to their perspective positions as determined by direct projection in plan, or by using measure points and G.L.'s for measuring their horizontal distances from P.P. along the receding path lines which contain the points. Fig. 6 differs from Fig. 5 only in that the receding path lines are extended backward to cut P.P. instead of forward, in order to establish L.'s of Hts. From these, at true scale, the heights are carried forward from the proper V.P. along the proper path line to the proper perspective positions of the points, by the same methods as in the other cases.

Working Methods. There are several methods of making a perspective drawing. The two most commonly used are the "revolved plan" and that of the "measure points" for finding the perspective location of points; both methods employ the G.L.'s and the lines of height.

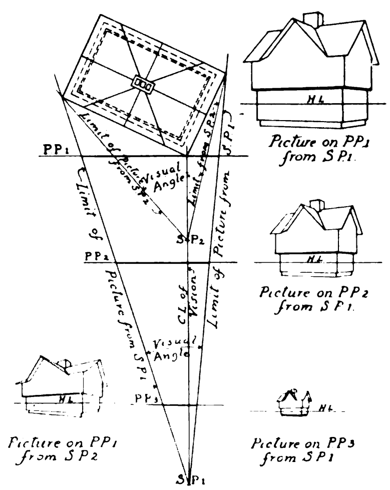

Figure 10

Parallel perspective differs from angular perspective only in the fact that in the first the main lines are parallel with P.P., and in the latter the main lines make angles with it. The principles of both are identical.

Fig. 7 shows a building solved by direct projection in plan, and Fig. 8 shows the same building solved with M.P.'s, with auxiliary perspective plans for each separate story.

The Perspective Plan. The use of a perspective plan when the solution is by M.P.'s is especially valuable for finding the position of points in planes near the horizon. This is because the lines (measure lines and receding lines in perspective) which determine the positions of the points become so flat that their intersection is apt to be indefinite. By taking a G.L. far from the H.L. their intersecting angle becomes acute, thus making the point of intersection definite. Another purpose of taking a G.L. far above or below the H.L. is to keep the auxiliary plan away from the main picture, thus avoiding the confusion of crowded lines.

The height of the plane on which the perspective plan is made for the sole purpose of locating positions of points does not affect their actual height positions, which are found on lines of height erected on path lines cutting P.P. as described above.

The use of M.P.'s and the perspective plan obviates the necessity of a plan diagram, and enables the whole process to be kept within a small compass in the picture diagram. It also serves as a record of the work at all stages, so that a drawing partially completed can be left and finished later by another draftsman, while the use of the revolved plan gives no such record of positions of points which have been ticked off from the plan. This method also enables corrections and changes to be made, and parts of the design to be studied in perspective and put back into plan and elevation without confusing the drawing.

Distortions. Probably the most common fault made in drawing perspectives is in choosing an unfortunate position for S.P. A good rule is to place it in front of P.P. so that the width of the picture limits is included within the normal visual angle.

If the S.P. is too close to the object, the extreme high and low vanishing lines will make disagreeably sharp angles with H.L. If it is taken too far away, the vanishing lines will become more and more flat, or parallel with the horizon line in proportion to its distance from the object. This effect is one that is seen in a photograph taken with a telescopic lens. It is restful, but is not often natural, and in the making of a perspective drawing a distant S.P. means that at least one of the V.P.'s will be so far away on the H.L. as to become impracticable. Certain devices are used when these inaccessible V.P.'s occur, which will be described in the second paper of the series.

In selecting a viewpoint so as to bring into view the best features of the subject, the easiest method is to draw the P.P. in plan, and to place the plan of the object with a corner on P.P. At a point approximately opposite the center of interest, locate S.P. at such a distance in front of P.P. that the visual angle determining the limits of the picture, formed by enclosing lines from the outer points of the plan to the S.P., will make an angle of less than 60 and preferably little more than 30 degrees.

It is better to revolve the plan so that one side makes a greater angle with P.P. than the adjacent one, both because one side of the object usually has more of interest to be shown, and because vanishing lines to two equidistant V.P.'s are stiff and monotonous. In other words, it is better practice to place the plan so as to make unequal angles with P.P. rather than to place it so as to make two angles of 45 degrees and move the center of interest to one side of the center line of vision in order to make the V.P.'s unsymmetrical. The reason is that if the center line of vision is made to fall outside of the visual angle, the resulting perspective is distorted and unnatural. Fig. 9 shows this, in the case of parallel perspective in "1," while "2" shows the same building from the same S.P. but with the plan turned so as to make the C.L. of vision fall within the angle of vision.

Fig. 10 shows the distorted effect of the S.P. taken too close, at S.P.2, and the effects of taking the P.P. at different distances but parallel to one another. The result is simply a change in size of the resulting picture, the diminution being directly proportional to the nearness of P.P. to the S.P.

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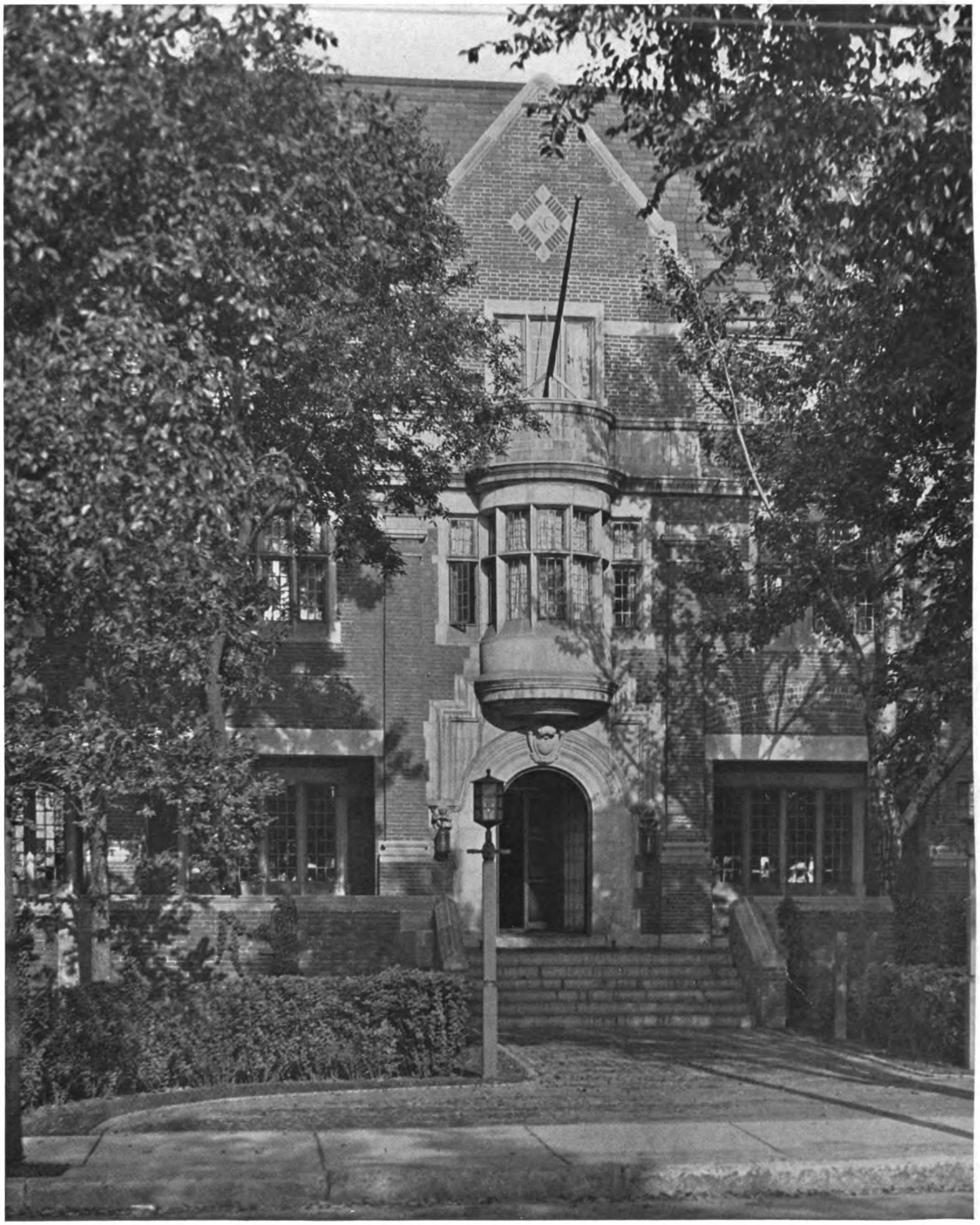

DETAIL OF ENTRANCE FRONT

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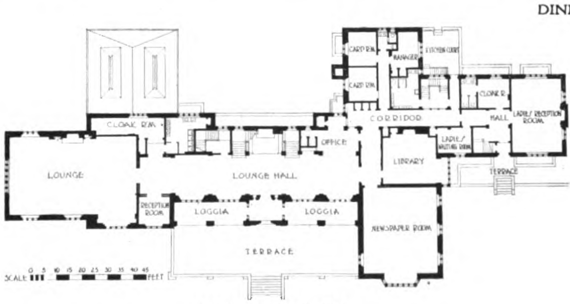
DINING HALL




FIRST FLOOR PLAN


SECOND FLOOR PLAN

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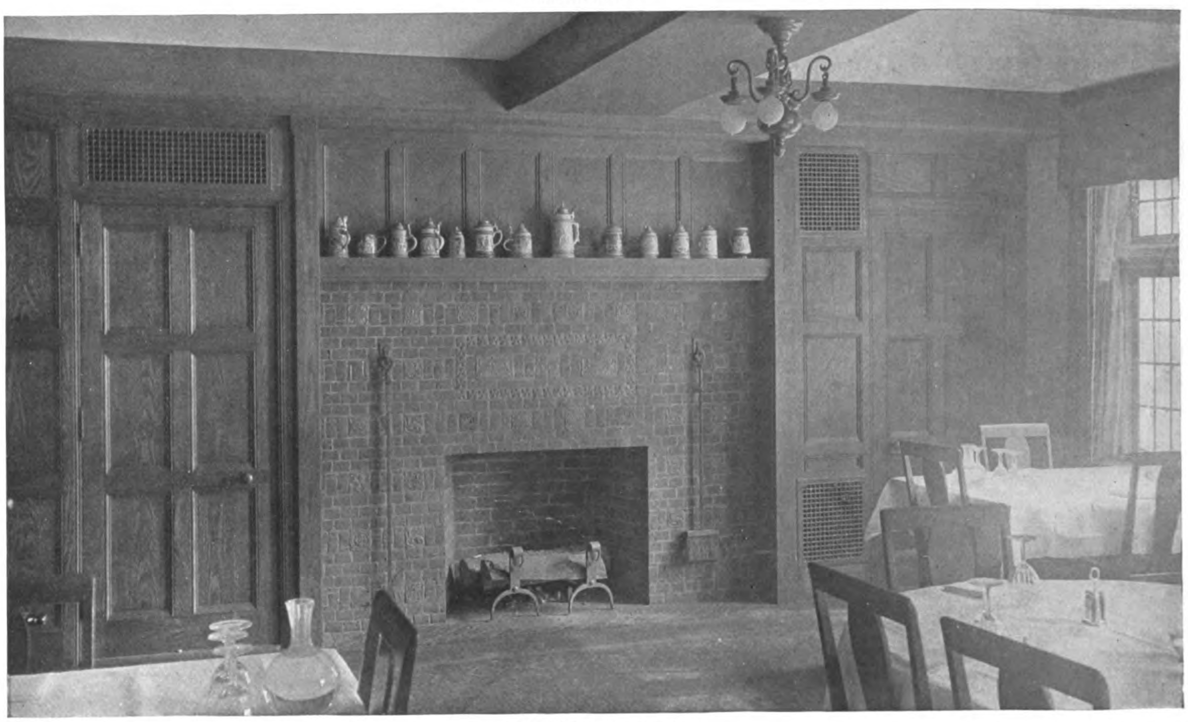
LOUNGE HALL



PRIVATE DINING ROOM

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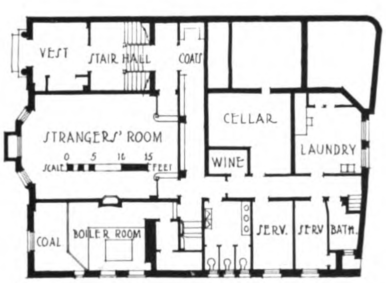
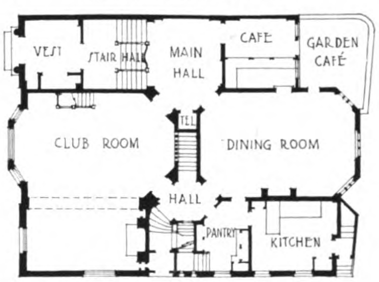
VIEW OF STREET FACADE




GROUND FLOOR PLAN

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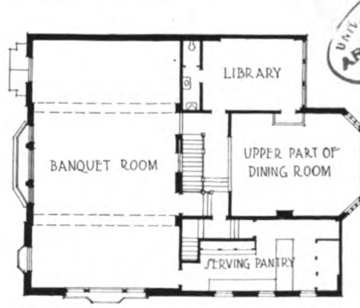


SECOND FLOOR PLAN

IROQUOIS CLUB, CAMBRIDGE, MASS.

WARREN & WETMORE, ARCHITECTS

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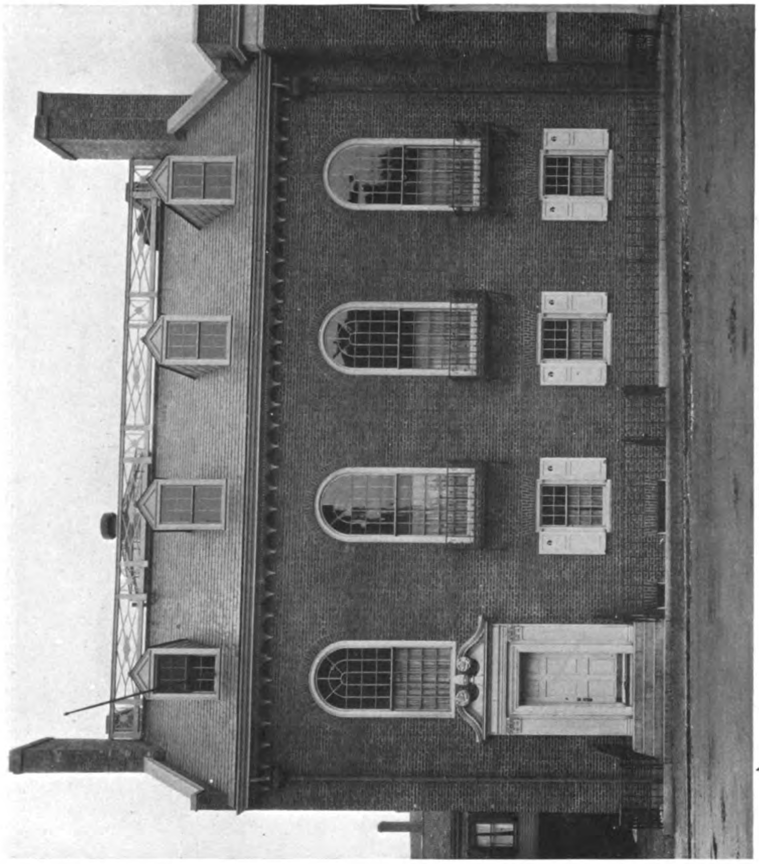
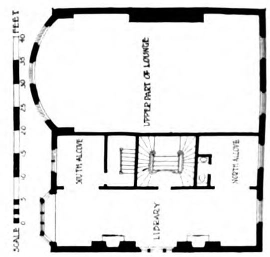


VIEW OF STREET FACADE




SECOND FLOOR PLAN


FIRST FLOOR PLAN


GROUND FLOOR PLAN

S. K. CLUB, CAMBRIDGE, MASS.
COOLIDGE & SHATTUCK, ARCHITECTS

DETAIL OF DOORWAY

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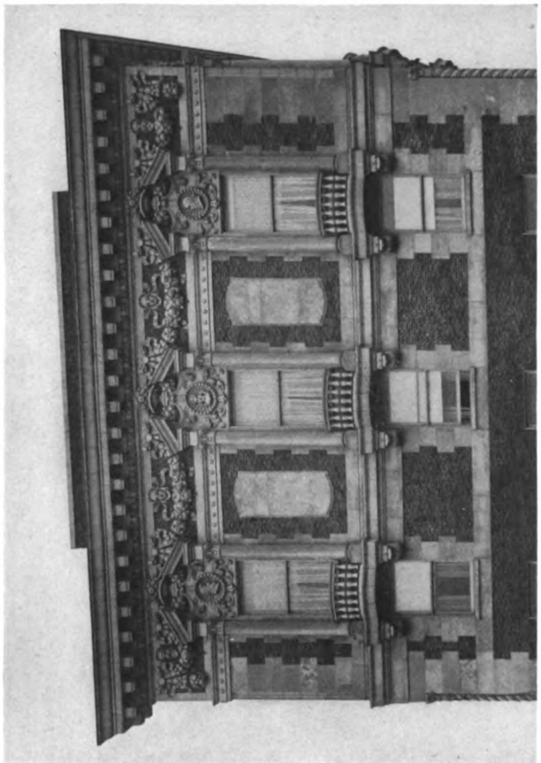
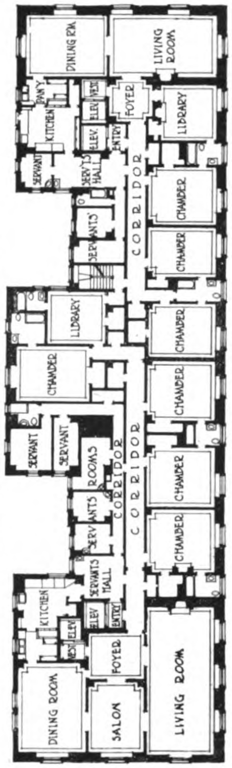
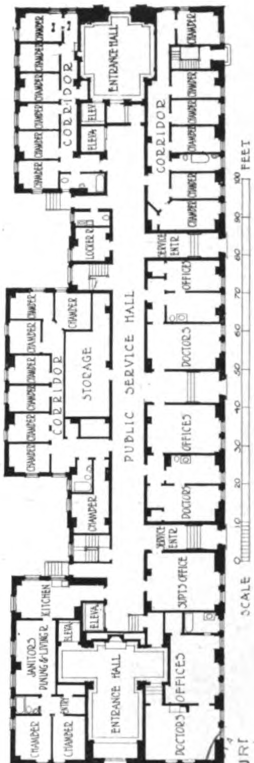


DETAIL OF UPPER STORIES AND CORNICE



TYPICAL FLOOR PLAN



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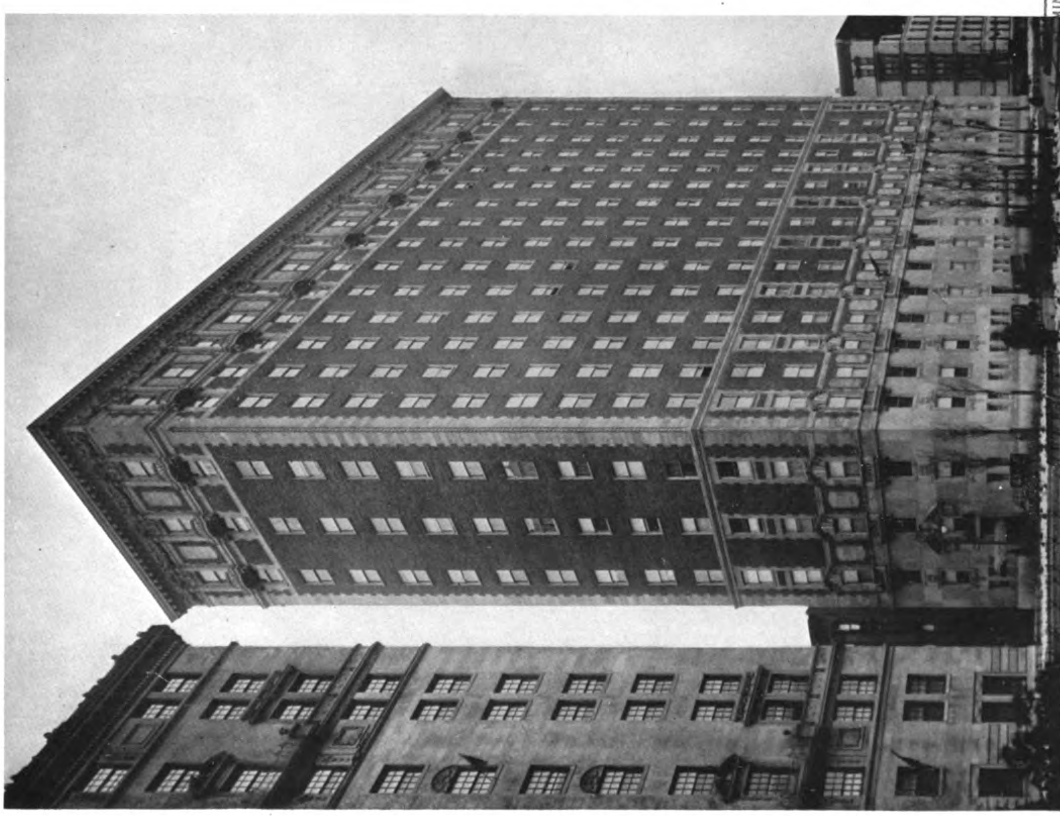

GENERAL VIEW OF EXTERIOR

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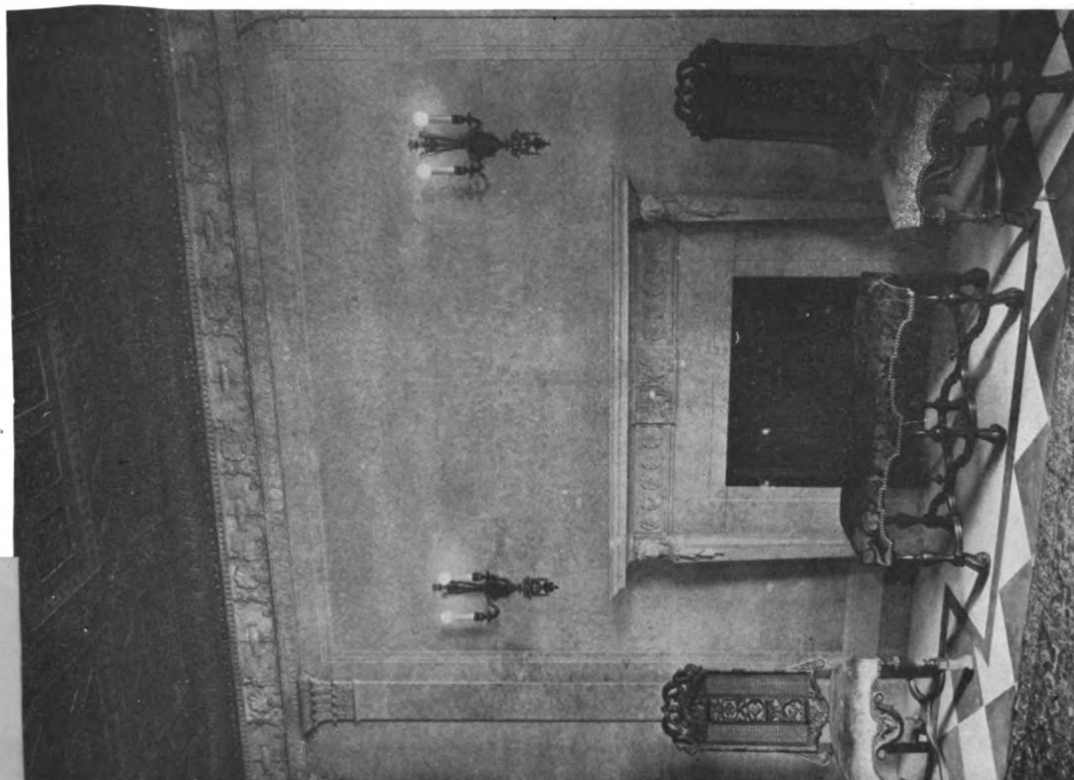

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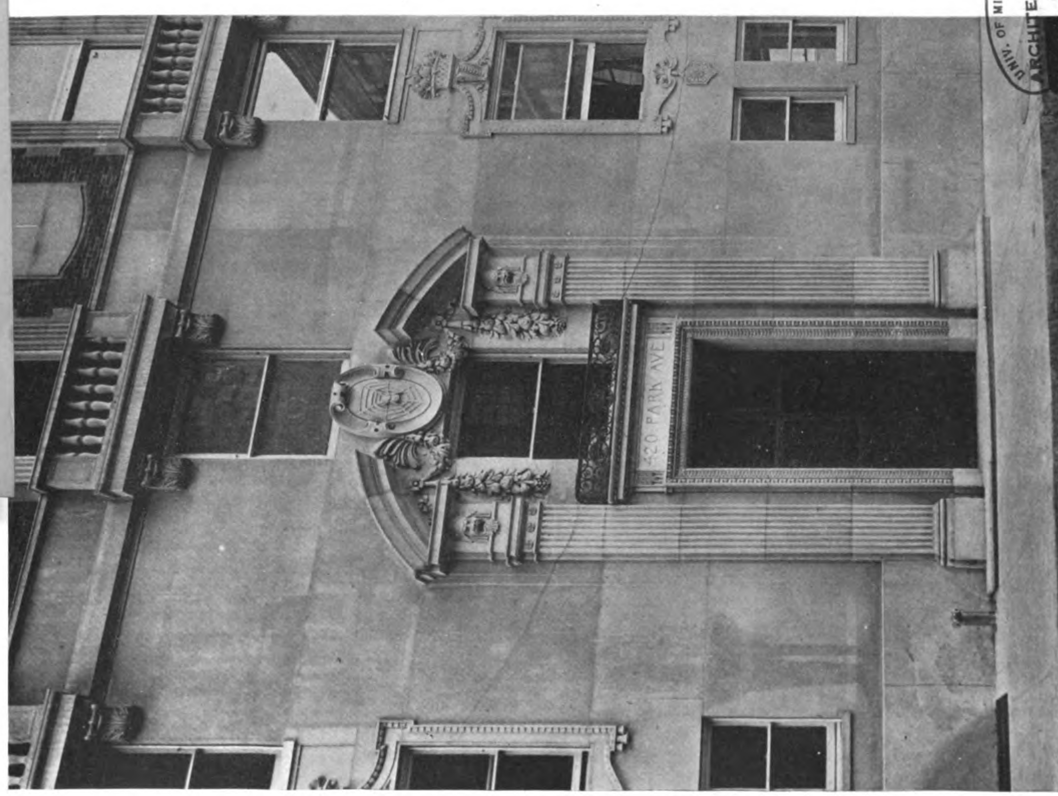


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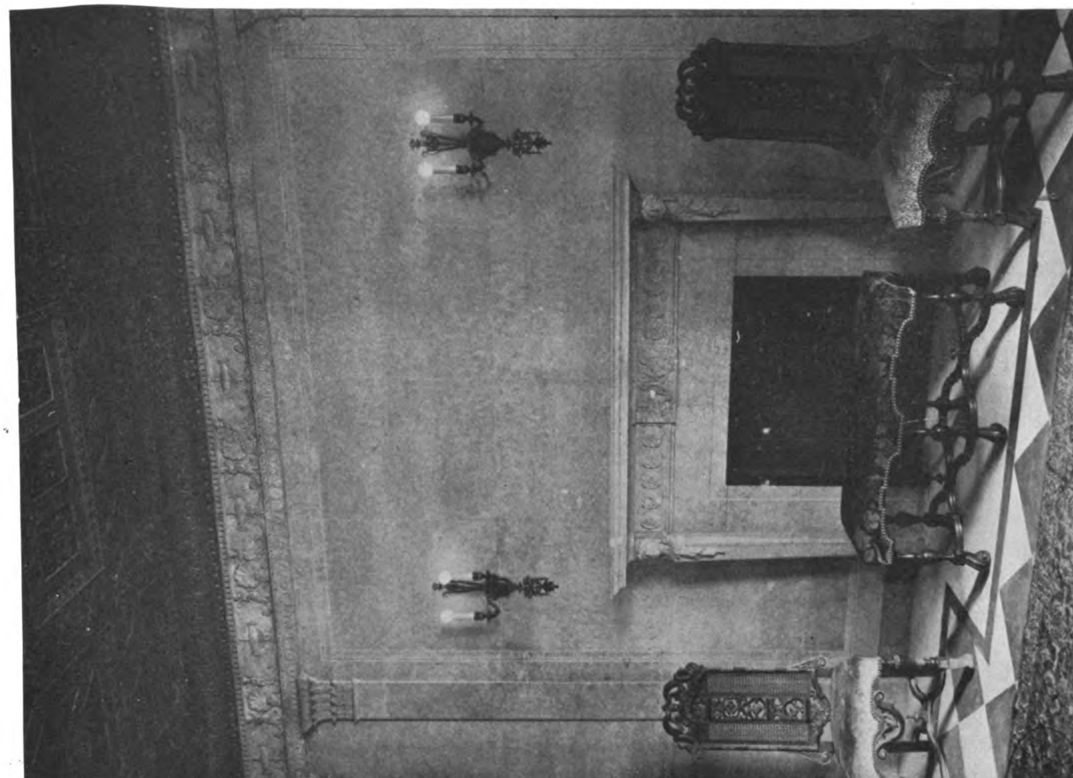

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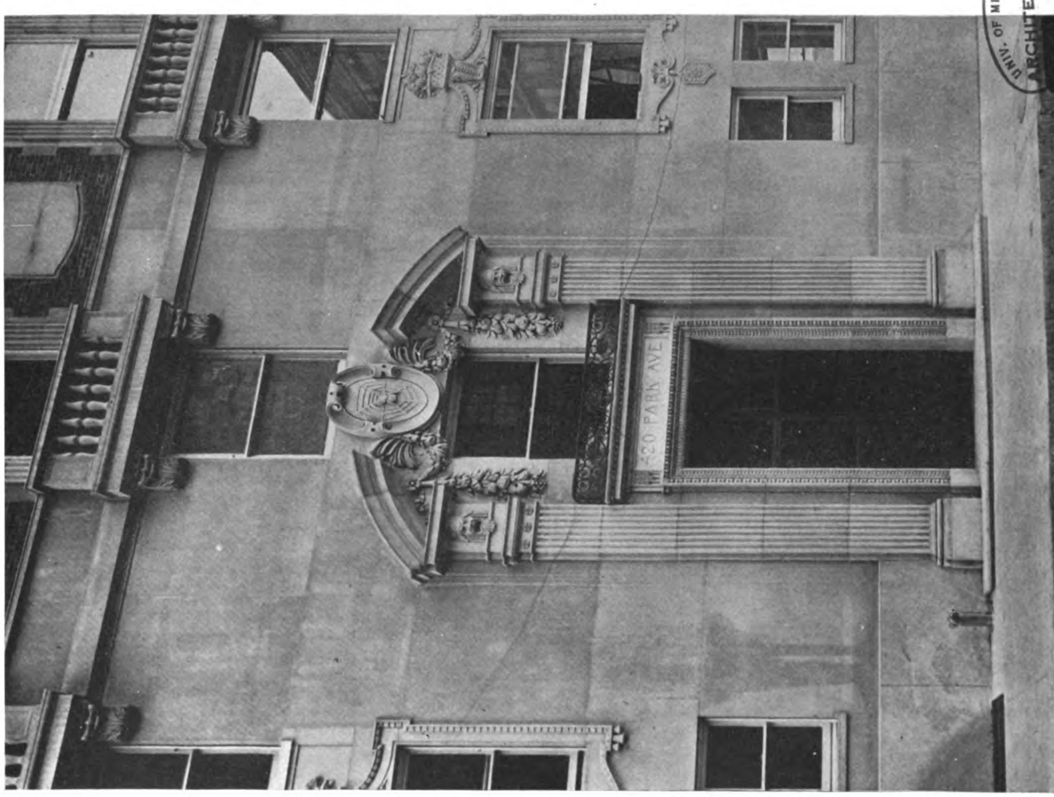


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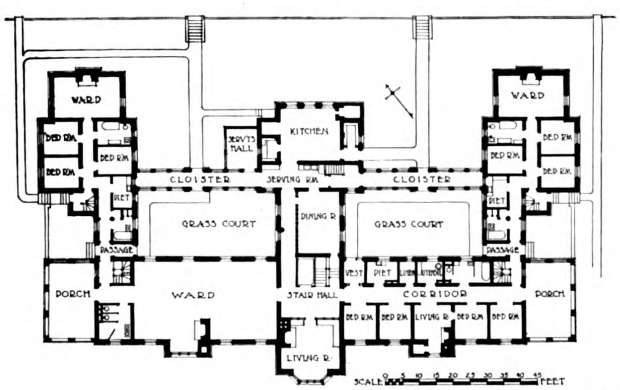
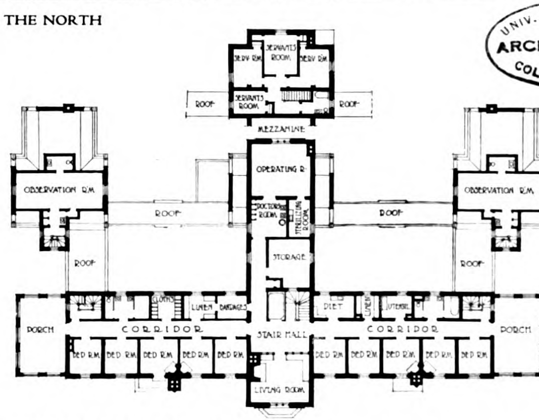



FIRST FLOOR PLAN




SECOND FLOOR PLAN

INFIRMARY BUILDING, ST. PAUL'S SCHOOL, CONCORD, N. H.

R. CLIPSTON STURGIS, ARCHITECT

CHARLES L. BORIE, JR., BENJAMIN W. MORRIS AND R. CLIPSTON STURGIS,
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VIEW OF ENTRANCE SIDE FROM THE STREET

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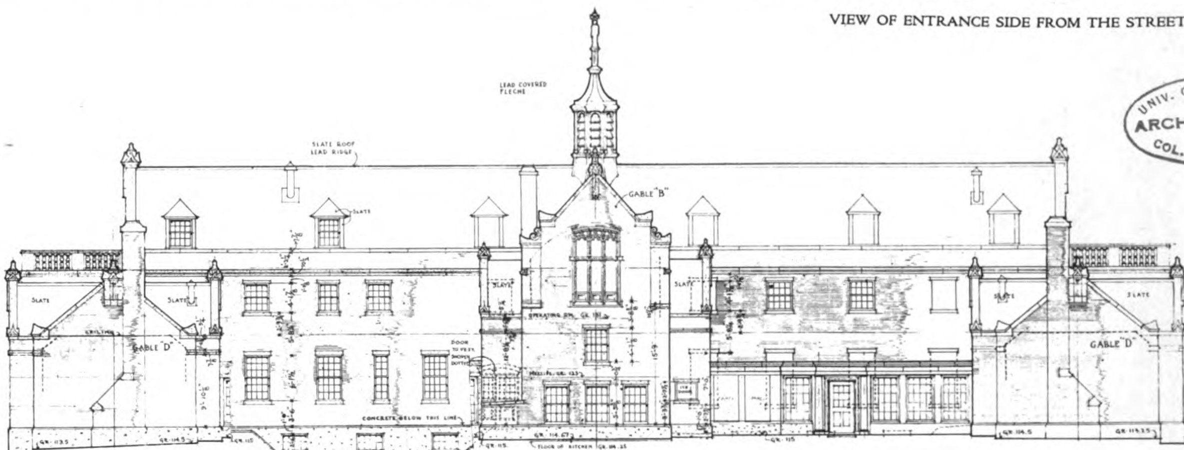
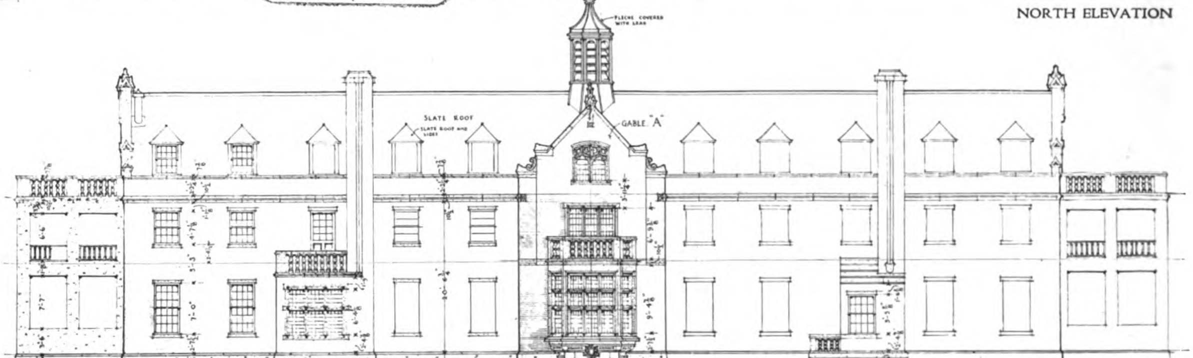


NORTH ELEVATION



SOUTH ELEVATION

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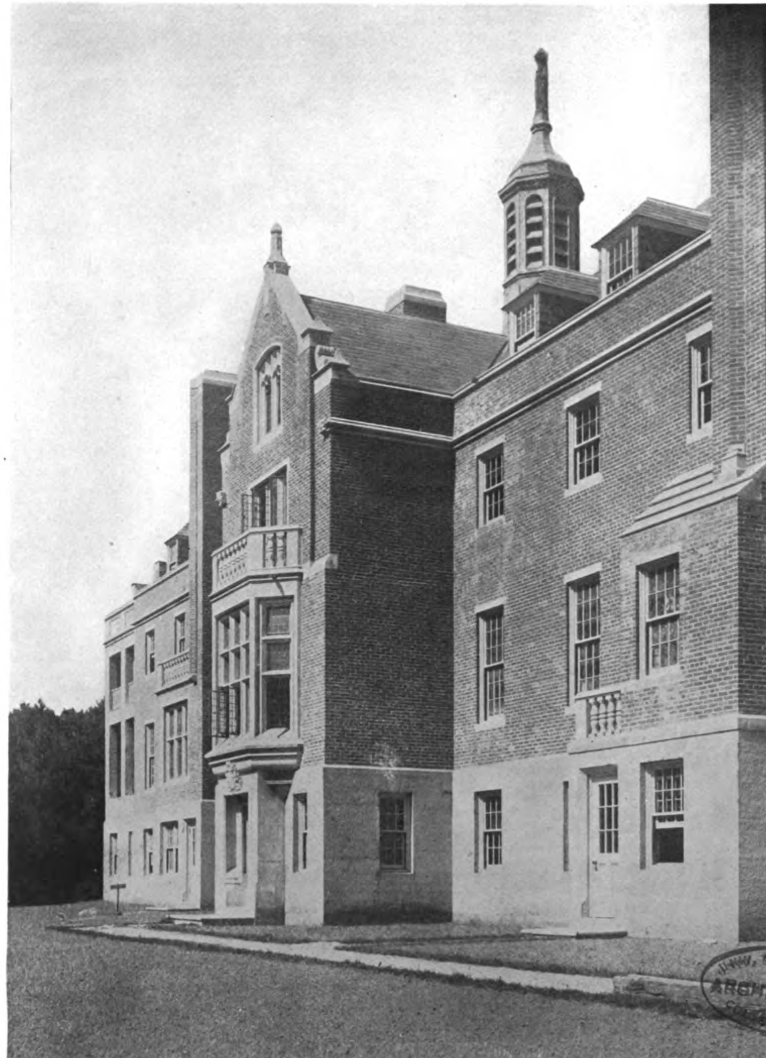
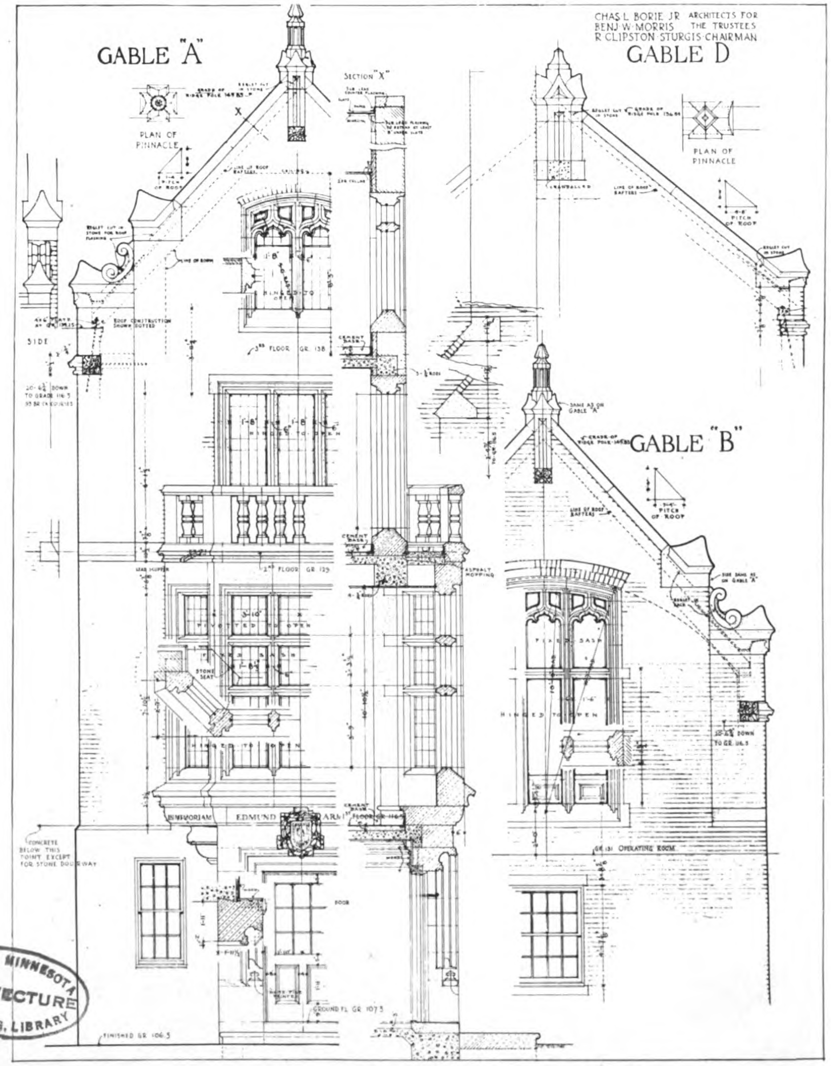


DETAIL OF SOUTH ELEVATION




DETAILS OF GABLES ON SOUTH ELEVATION

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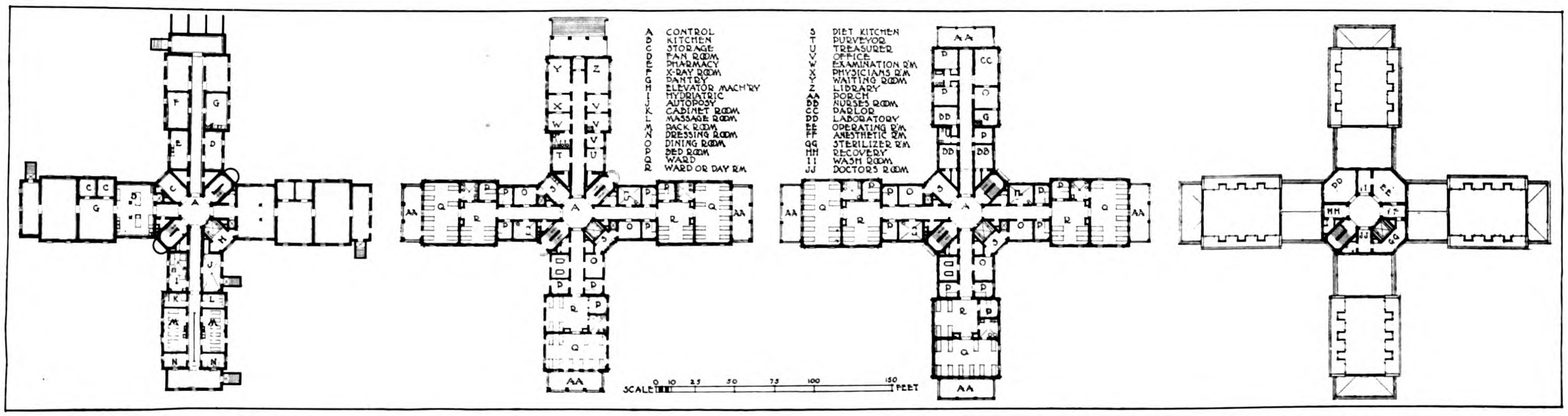
GENERAL VIEW OF JOHN HUBNER PSYCHOPATHIC BUILDING




BASEMENT FLOOR PLAN FIRST FLOOR PLAN SECOND FLOOR PLAN THIRD FLOOR PLAN

SPRINGFIELD STATE HOSPITAL, NEAR SYKESVILLE, MD.

PARKER, THOMAS & RICE, ARCHITECTS

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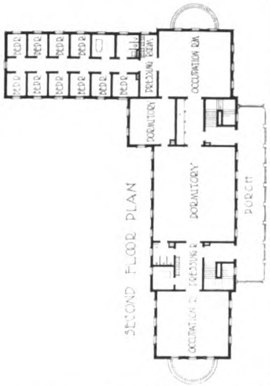


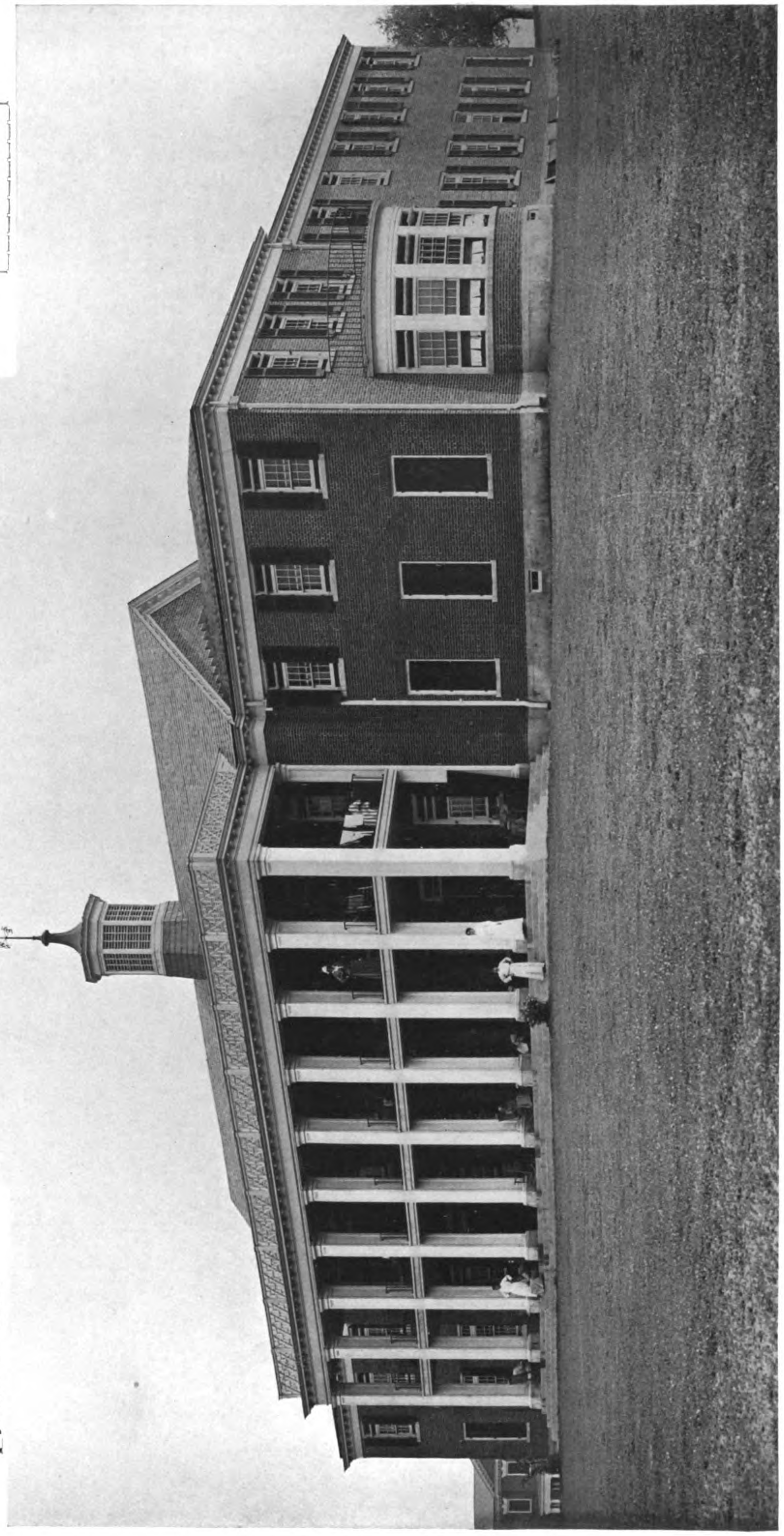


GENERAL VIEW OF CROTHERS COTTAGE OF WOMEN'S GROUP

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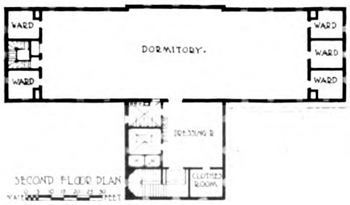
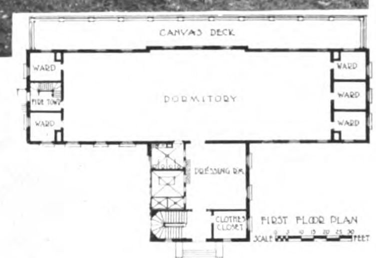



SOUTH SIDE OF COTTAGE "G"




ENTRANCE SIDE OF COTTAGE "G"

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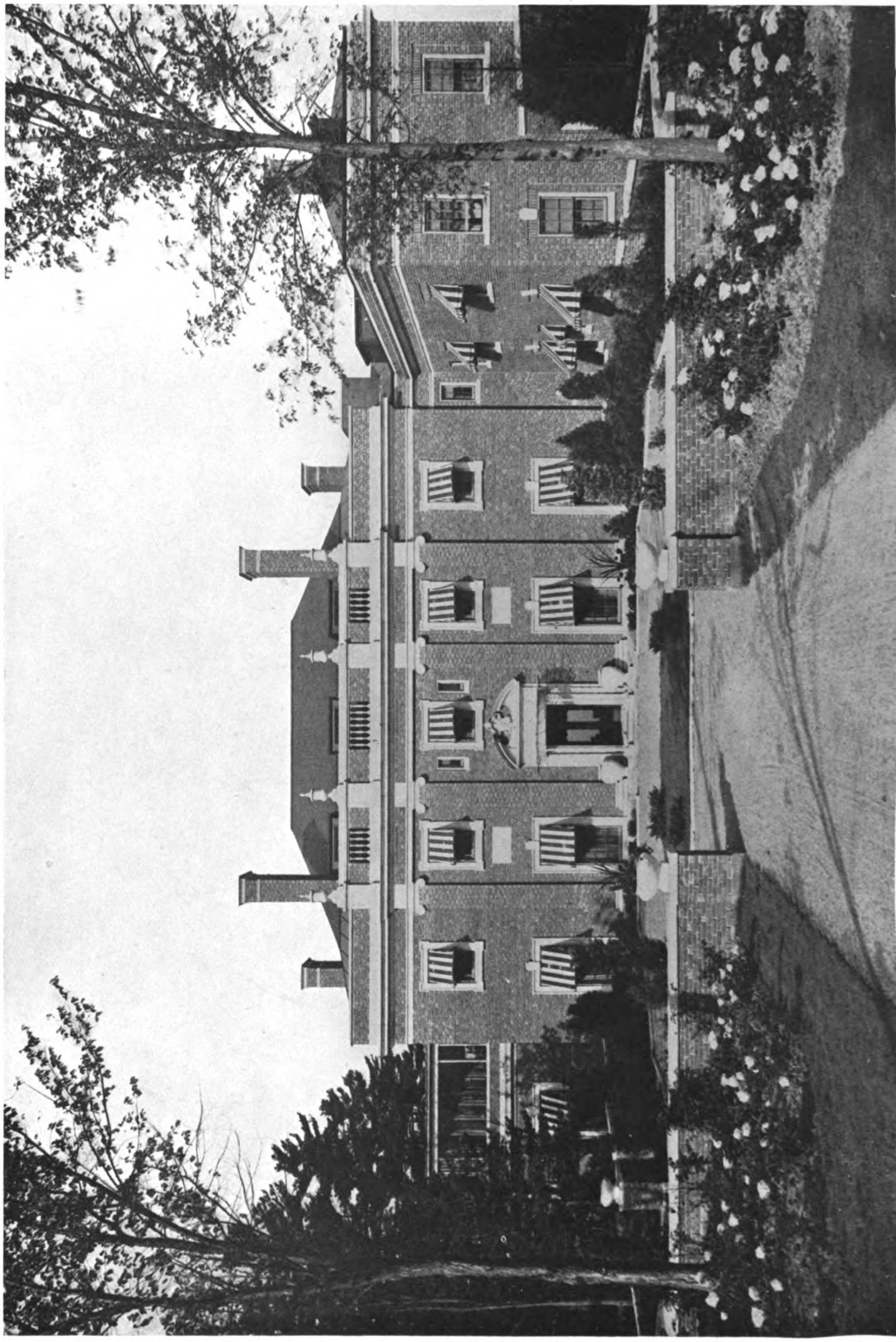

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GENERAL VIEW FROM DRIVEWAY

HOUSE OF FRANK R. WELLS, ESQ., BURLINGTON, VT.

MANN & MacNEILLE, ARCHITECTS

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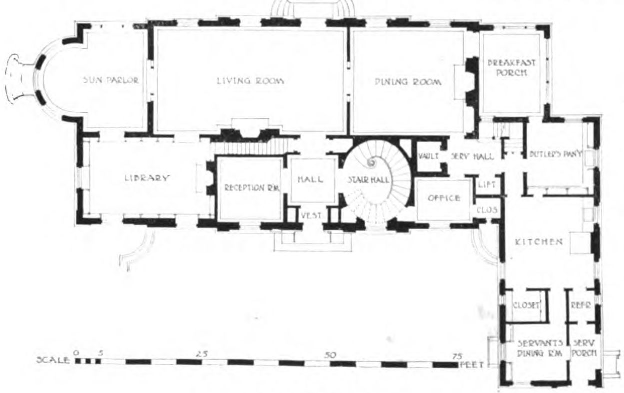
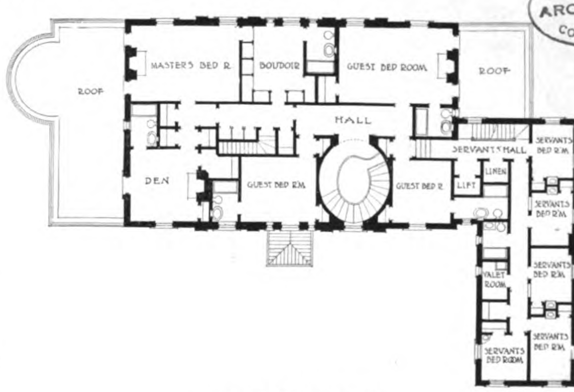
VIEW OF GARDEN FRONT AND SIDE




FIRST FLOOR PLAN




SECOND FLOOR PLAN

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HOUSE OF FRANK R. WELLS, ESQ., BURLINGTON, VT.

MANN & MacNEILLE, ARCHITECTS

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DINING ROOM

DETAIL OF STAIRCASE

SUN PARLOR

HOUSE OF FRANK R. WELLS, ESQ., BURLINGTON, VT.

MANN & MacNEILLE, ARCHITECTS

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# THE FORUM COLLECTION OF EARLY AMERICAN ARCHITECTURAL DETAILS

PLATE THIRTY-EIGHT

*THIS very pretentious doorway is part of an elaborate motif which is carried up the front of the house. Above it a Palladian window repeats the general feeling of the entrance itself. An unusual feature to be found in work of this date is the convex frieze, which, in Connecticut, is found almost invariably in the earliest work only. The builders evidently clung closely to their classic model, and only departed from it in the introduction of the fret in the bed mould of the cornice. The translation of proportions from stone to wood seems to have been very skilfully effected.*

DOORWAY OF THE PRUDENCE CRANDALL HOUSE, CANTERBURY, CONN.

Built about 1815

MEASURED DRAWING ON FOLLOWING PAGE

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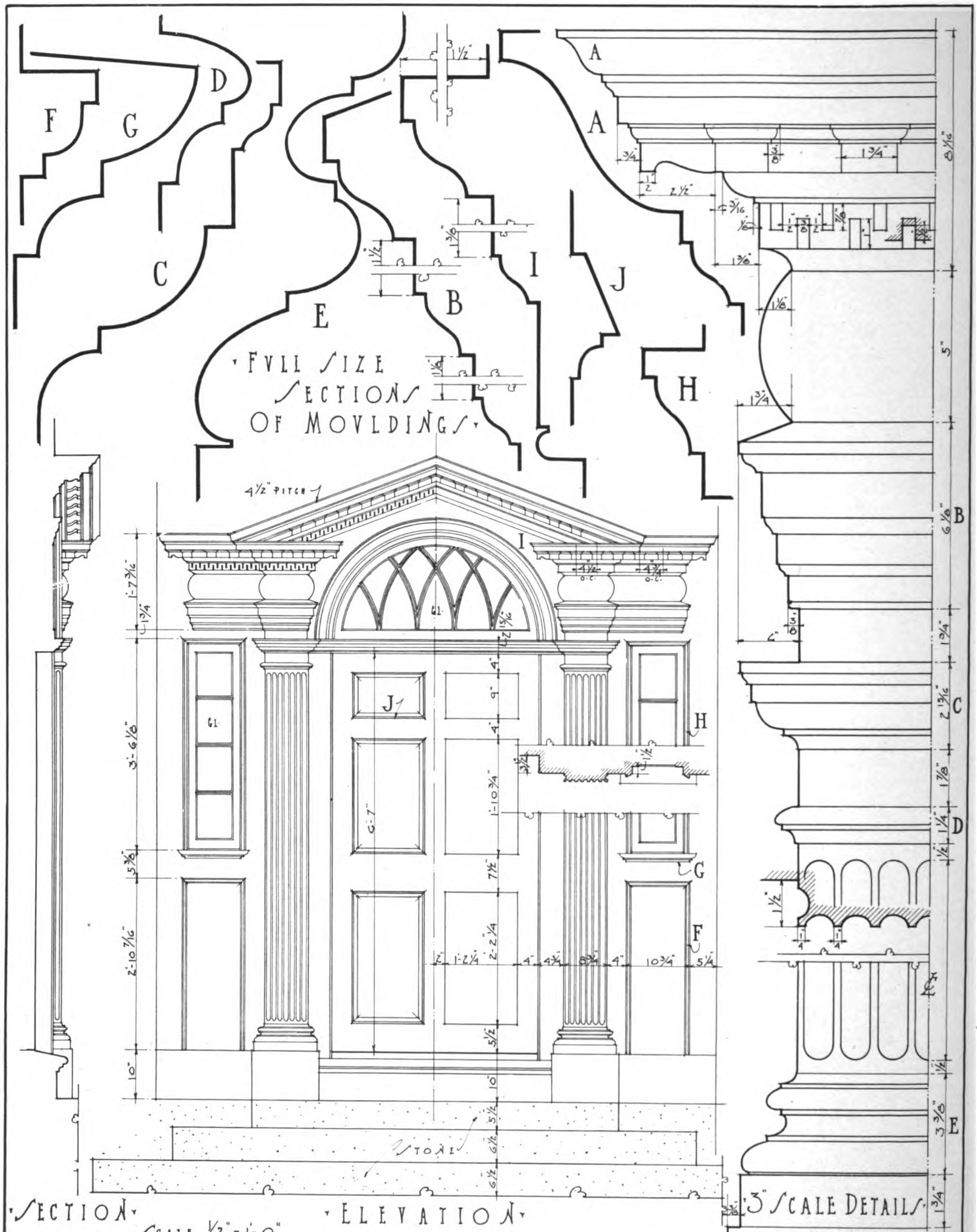


| PLATE 38<br>MARCH 1917 | PRUDENCE CRANDALL HOUSE<br>CANTERBURY-CONN.<br>BUILT CIR. 1815 | MEASURED AND DRAWN BY<br>J. FREDERICK KELLY |
|---|---|---|



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# Pattern from Magic Squares*

By CLAUDE BRAGDON

MAGIC squares are numerical acrostics associated in the popular mind with ideas of necromancy, melancholia, and madness. Their only known use hitherto has been to yield sterile amusement to the arid arithmetist. In this essay the author will endeavor to show that magic squares are a source of formal beauty. There is nothing strained or illogical in this, for beauty is ever the fine flower of order and necessity, and in magic squares order and necessity preëminently rule. They owe their amazing properties less to man's ingenuity than to the harmony inherent in number itself, a harmony which the mathematician does nothing to create, but simply brings to light.

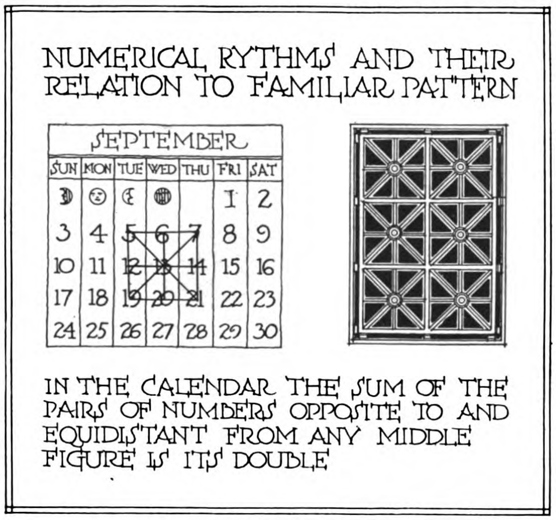


Figure 1

### The Acrostic of the Days

If you doubt this, refer for reassurance to your calendar — your calendar whose commonplace face, having yielded you information as to pay day, due day, and holiday, you obliterate at the end of each month without a qualm, oblivious of the fact that were your interests less sordid and personal, it would speak to you of that order which pervades the universe, would make you realize something of the music of the spheres. For on that familiar checkerboard of the days are numerical arrangements which are mysterious, "magical"; each separate number is as a spider at the center of an amazing mathematical web.

Test it. Choose any number completely surrounded by other numbers, and you will find that the sum of the pairs opposite to and equidistant from the chosen number is its double — that is, the pairs add to the same sum, and the central number divides this sum by two. Indicate this fact graphically on the calendar face by means of vertical, horizontal, and diagonal lines, all intersecting in the chosen number, and you have the rudiments of pattern. Indeed, you have automatically created that form of classic grille dear to the heart of every tyro draftsman (Figure 1).

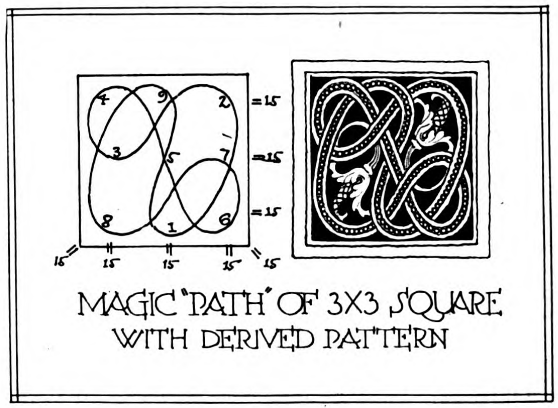


Figure 2

### The Magic Path

This particular numerical acrostic, though possessing magical properties, does not of course constitute a magic square. A magic square consists of a series of numbers arranged in quadratic form so that the sum of each vertical, horizontal, and corner diagonal column is the same amount. There is another condition to be fulfilled in order that the square may be considered perfect. In odd squares the sum of any two numbers that are geometrically equidistant from the center of the square shall equal the sum of the first and last numbers of the series.

It is clear that the arrangement of the numbers in a magic square is *necessitous*. Therefore the magic line or

* For much of the material contained in this essay the author is indebted to W. S. Andrews' "Magic Squares and Cubes," and particularly to that chapter entitled "Reflections on Magic Squares and Cubes," by Dr. Paul Carus.

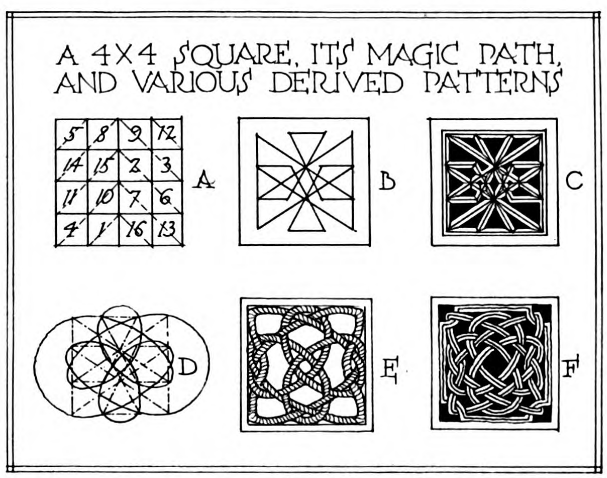


Figure 3



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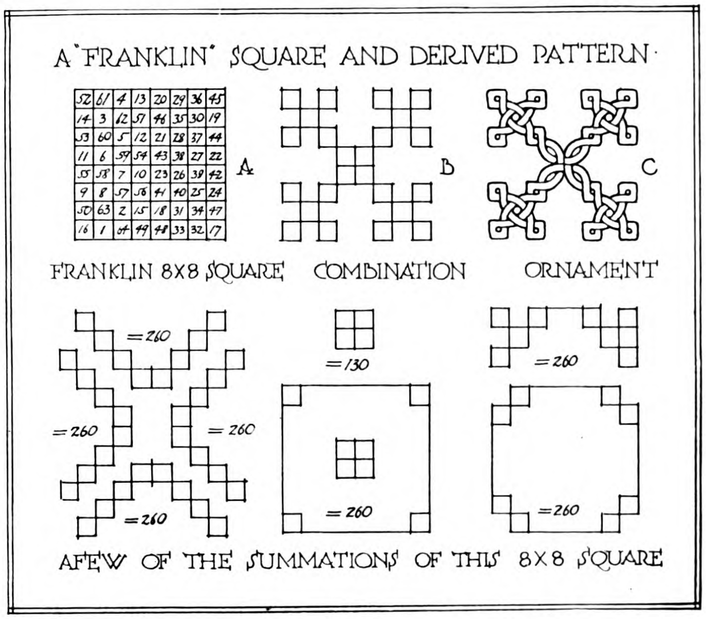


Figure 4

"path" traced by following the numbers in their natural order from cell to cell is a necessitous line; and because necessity is the mother of beauty, it need not surprise us that this line is often found to be beautiful — a motif, *per se*, for ornament.

This matter of the "magic path" will be dealt with only cursorily here, because of its fuller treatment in the chapter on Magic Squares in "Projective Ornament"; but in order that the reader may understand just what is meant by it, two simple but highly interesting examples are given in Figures 2 and 3. The left-hand drawing in Figure 2 represents the smallest aggregation of numbers that is capable of magic square arrangement, and it is also the only possible arrangement of nine different numbers relatively to each other which fulfils the conditions outlined above. It will be seen that each vertical, horizontal, and corner diagonal column adds up to 15, and the sum of any two opposite numbers is 10, which is twice the center number. The endless line is the magic path of this square developed by following free-hand the numbers in their natural order; that is, from 1 to 9 and back to 1 again. The drawing at the right of the figure is this same line translated into ornament by making an interlaced ribbon of it and filling in the larger interstices with simple conventional floral forms.

In A, Figure 3, we have a 4 by 4 square which, though not perfect according to the rules of even magic squares previously given, has the compensating interest of its *bent diagonal columns*, which yield the same magic sum (34) as its vertical and horizontal columns. The magic path of this square is of great beauty and symmetry, whether developed as a straight line (B) or as a curve (D). In either case it is easily translatable into ornament, as shown by examples C, E, F (Figure 3).

### The Franklin Squares

The characteristic properties of this 4 by 4 square are possessed by the 8 by 8 and 16 by 16 squares shown in Figures 4 and 5, together with many others even more curious and interesting. These squares were developed by Benjamin Franklin and described by him in a letter to his friend Peter Collinson. He thus enumerates the properties of the 8 by 8 square:

1. That every straight row (horizontal or vertical) of eight numbers added together makes 260, and half of each row, half of 260.
2. That the bent row of eight numbers ascending and descending diagonally, viz., from 16 ascending to 10 and from 23 descending to 17, and every one of its parallel bent rows of eight numbers makes 260, etc. And lastly the four corner numbers with the four middle numbers make 260.

Mr. James Parton, in his "The Life and Times of Benjamin Franklin," enumerates the following properties in addition to those mentioned by Franklin:

The bent row of 52 descending to 54, and from 43 ascending to 45, and every one of its parallel bent rows of eight numbers makes 260. Also, the bent row from 45 to 43 descending to the left, and from 23 to 17, descending to the right, and every one of its parallel bent rows of eight numbers makes 260. Also, the bent row from 52 to 54, descending to the right, and from 10 to 16, descend-

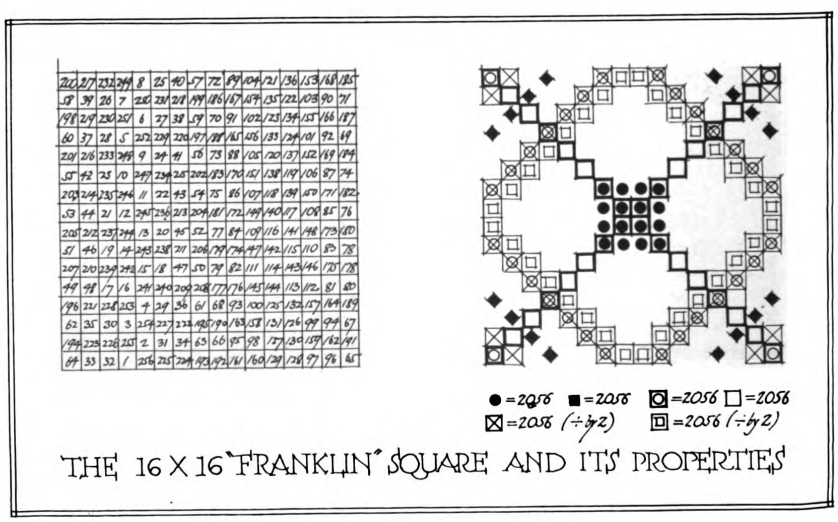


Figure 5

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ing to the left, and every one of its parallel bent rows of eight numbers makes 260. Also the parallel bent rows next to the above mentioned, which are shortened to three numbers ascending and three descending, etc., as from 53 to 4 ascending and from 29 to 44 descending, make, with the two corner numbers, 260. Also the two numbers, 14, 61, ascending, and 39, 19, descending, with the lower four numbers situated like them, viz., 50, 1, descending and 32, 47, ascending, make 260.

Certain of these remarkable characteristics are illustrated graphically in Figure 4, in which the relative position of the cells containing the numbers which make up the magic sum, 260, is indicated by the relation of the small hollow squares. In B these are shown superimposed, yielding a symmetrical arrangement of cells readily translatable into ornament (for example, as shown in C, Figure 4).

Franklin's 16 by 16 square (Figure 5) is constructed on the same principle as the 8 by 8 square, and possesses the same properties (the magic sum, however, being 2056). The properties of the larger square are indicated in the right-hand diagram of Figure 5. The combinations of cells which yield the magic sum may be identified by means of the different symbols employed, and though these symbols were chosen almost at random, without reference to decorative values, it is nevertheless true that their assemblage yields an odd and pleasing pattern.

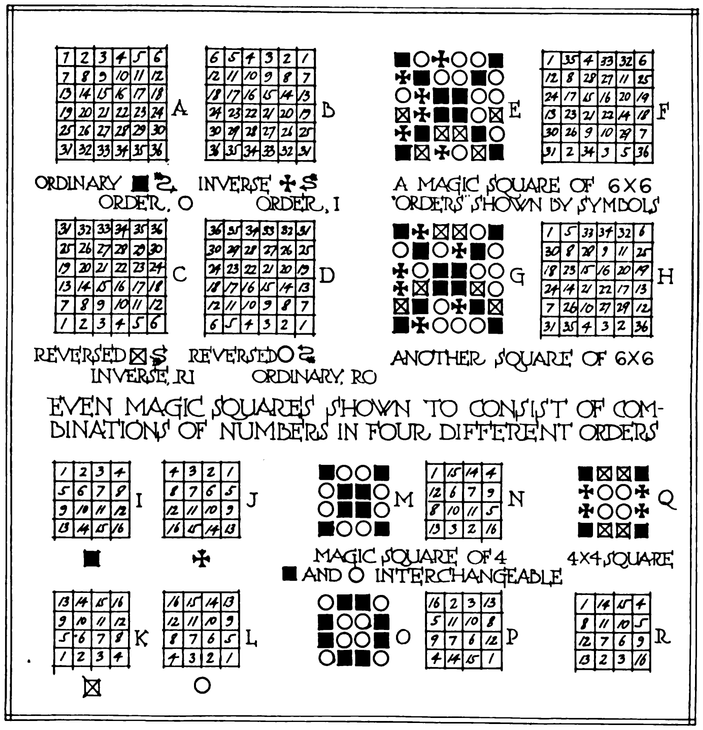


Figure 6

### The Four Orders (Numerical, not Architectural)

For the methods of magic square construction the reader is referred to mathematical sources: any discussion of them is outside the province of this essay, which aims only to show the novel uses to which magic numerical arrangements may be put. But in order to follow the next development of this theme, a peculiarity of even number magic squares of the accepted type should be understood. This peculiarity consists in the fact that they are made up of selections of numbers from four different orders of counting:

1. The *ordinary* way of writing from the left to the right proceeding in parallel lines downward, A (Figure 6).
2. Its *reverse*, proceeding from the lower right-hand corner toward the left, and line by line upward, thus beginning the series where the ordinary arrangement ends, and ending where it started, D.
3. The *inverse* direction to the ordinary way, beginning in the upper right-hand corner proceeding to the left, and continuing in the same way line by line downward, B, and
4. The *reverse-inverse*, starting in the lower left corner, proceeding to the right, and continuing line by line upward, C.

These four orders of counting are shown at the left of Figure 6. For brevity, let us call them respectively *o*, *ro*, *i*, and *ri*. Now all transpositions in the cells of even magic squares are brought about by the substitution of the figures of the *ro*, *i*, and *ri* order for the original figures of the ordinary, or *o* order, and the symmetry which dominates these changes becomes apparent in the diagrams of figures by the device of designating each order by a different symbol, as shown in the Figure.

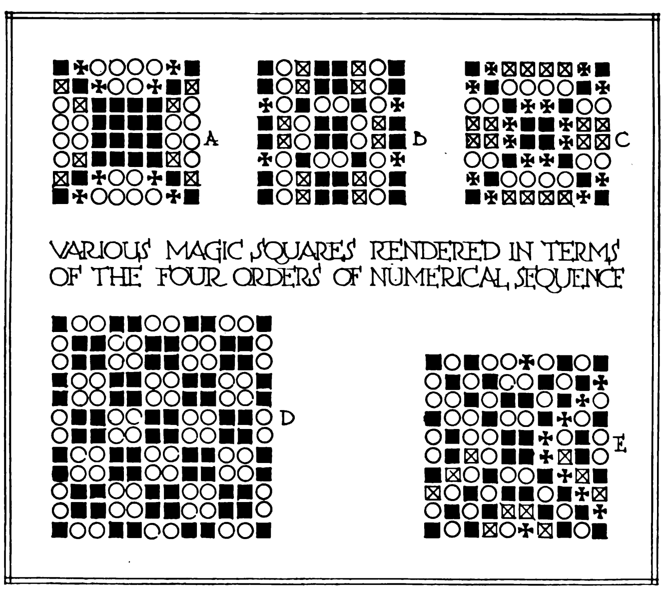


Figure 7

The cause of this peculiarity dwells in the

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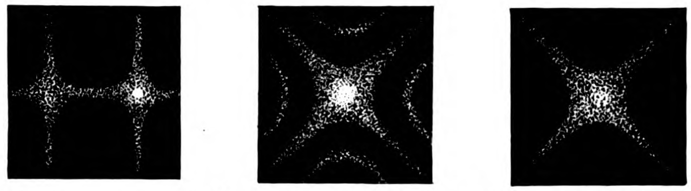
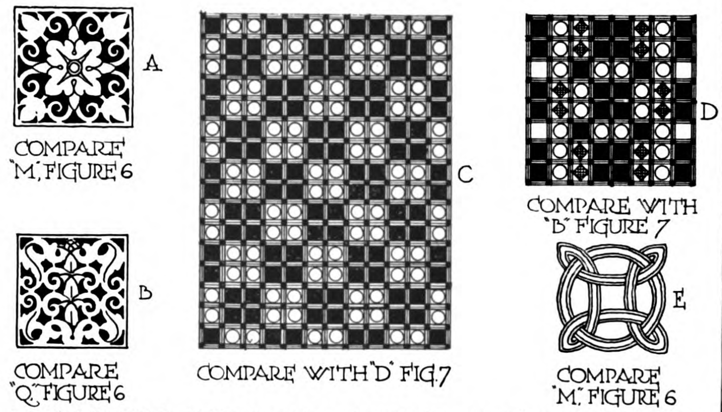
fact that these squares are formed by a series of *rotations* of the numbers in their natural order. It will be noticed that *i* is the vertical mirror picture of *o*, and *ro* of *ri*, and *vice versa*. Further, if the mirror is placed upon one of the horizontal lines, *ri* is the mirror picture of *o*, as well as *ro* of *i*, and *vice versa*. (A, B, C, D, Figure 6.)



COMPARE THESE WITH "B", "E" AND "C" OF FIGURE NO. 7
ACOUSTIC FIGURES MADE BY SAND ON GLASS

Figure 8

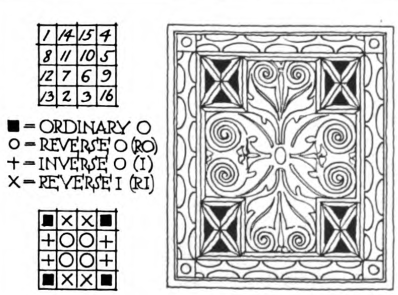



THE TRANSLATION OF MAGIC SQUARES INTO PATTERN

Figure 9

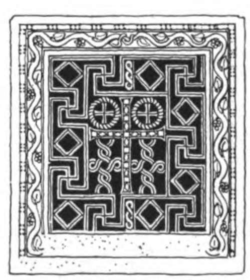
### A Magic Square of 4 by 4

Take the smallest square of even numbers, that of 4 by 4 (N, Figure 6). If we write the figures in their natural order, I, those standing on the diagonal lines can remain in their places, for each diagonal yields the magic sum of 34, while the rest must be reversed so as to replace every figure by its complementary to 17 (*i.e.*, 2 by 15, 3 by 14, 5 by 12, 9 by 8), the number 17 being the sum of the highest and lowest numbers of the magic square. This is equivalent to filling up the empty cells with the corresponding numbers from the *ro* square L. This is graphically indicated in M. But here another curious fact emerges, namely, that the positions of the two orders may be reversed without vitiating the magic qualities of the square, as is shown in O and P. The sum of each vertical, each horizontal, and each diagonal column is still 34. The 4 by 4 magic square Q, R, is more intricate and artful, involving as it does all of the orders. This is perhaps the most perfect of all 4 by 4 squares, for not only do all vertical, horizontal, and diagonal columns add to 34, but each of the four corner 2 by 2 squares of which it is composed adds to 34, and the sum of any four numbers in the square which are symmetrically arranged with relation to the vertical and horizontal axes is 34. In more complex magic squares the same properties exist.




AN ORNAMENTAL PANEL DEVELOPED FROM A MAGIC 4X4 SQUARE OF O, RO, I & RI ORDERS

Figure 10



PIERCED STONE SCREEN FROM RAVENNA
SUGGESTIVE OF MAGIC SQUARE ARRANGEMENTS

Figure 11

### Analogies in Physics and Art

The diagrams in Figures 6 and 7 make palpable to the eye the inherent harmony in magic squares which so satisfies the mind, but they do more than this — they link up numerical beauty not alone with beauty of form, but with beauty of sound as well. It is a fact of physics that musical tones create air waves whose symmetry is revealed by the geometrical patterns into which sand falls when scattered over the surface of a musically vibrating plate of

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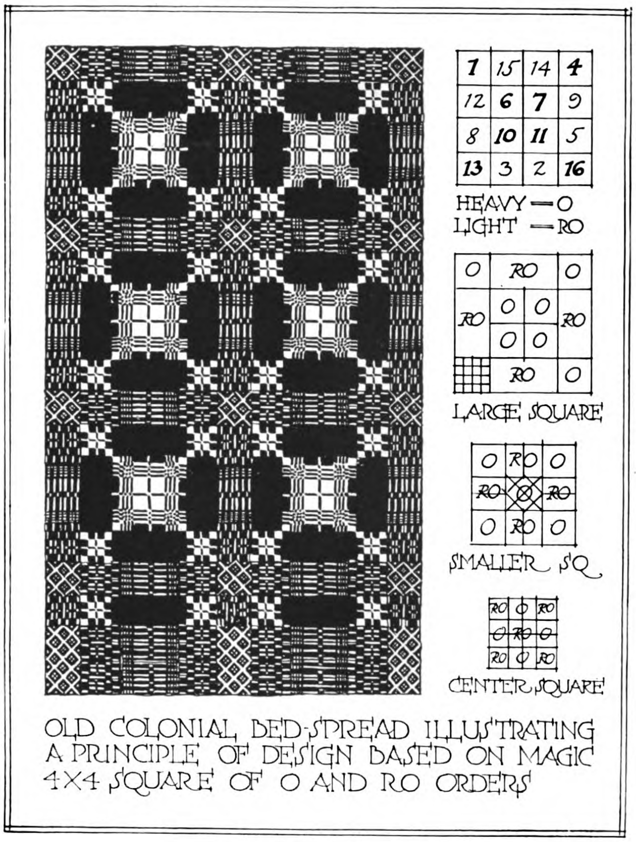

OLD COLONIAL BED-SPREAD ILLUSTRATING A PRINCIPLE OF DESIGN BASED ON MAGIC 4X4 SQUARE OF O AND RO ORDERS

Figure 12

metal or glass. Dr. Paul Carus, in his "Reflections on Magic Squares and Cubes" (see note, page 71), shows how staggeringly close is the parallel between magic squares and the so-called Chladni acoustic figures, and explains at length why it is natural that a symmetry producing wave should produce a similar effect in the magic square to that of a note upon the sand of a Chladni glass plate. Even without his interesting analysis one has only to compare the sand figures shown in Figure 8 with certain of the magic square diagrams to become conscious of a correspondence between the two.

One has only to vary, elaborate, or enrich his symbols for the four orders of counting to produce from magic squares patterns of real decorative value as shown in Figure 9. The interlace E, for example, is a perfectly direct presentment of the relation between the *o* and *ro* orders in a 4 by 4 square (compare M, Figure 6), and it is pleasing as pattern. If instead we represent the *o* numbers by leaves and the *ro* by spirals, the panel design shown in A is almost automatically created. The 4 by 4 square R, Figure 6, involving all four orders, requires four contrasted forms for its decorative expression. This is achieved in B, Figure 9, and differently and more elaborately in Figure 10.

The beautiful pierced stone screen from the Basilica of S. Apollinare Nuovo at Ravenna, shown in Figure 11, is oddly suggestive of this order of pattern making. By substituting the figures of the *o*, *ro*, *i*, and *ri* orders for the fret, the diamond, the circle, and the twist, one would not have an actual magic square, of course, but it is easily conceivable that with the same elements no less interesting patterns might result from *bona fide* magic squares. The hint once given, the clue once found, there is no need for a too literal adherence to the numerical "frame."

Just to show how the pattern-making instinct follows, unconsciously, in the "groove" thus traced out for it by mathematics, the attention of the reader is directed to the design of the old Colonial bedspread shown in Figure 12. The principal square and those subsidiary squares which form its corners conform exactly with the archetypal pattern, *o* corresponding to white and *ro* to blue. (Compare Figure 6.)

No numerical formula can possibly take the place of the creative imagination; the only claim that will be made by the author is that these harmonies inherent in number guide the creative faculty along the very road which it would follow, keep it from straying, led by mere whim, in the pathless fields of chance.

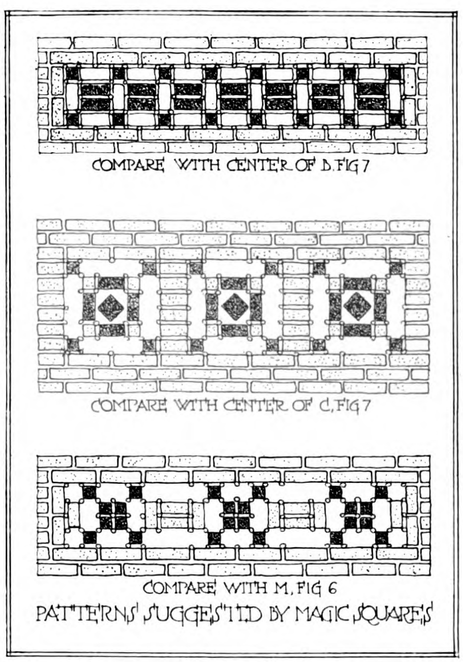


Figure 13

Each artist is as much a creator as God himself; he works in the same material — matter, and he follows the same law — the Beautiful Necessity, the Inevitable Order of the world itself. To the degree that he is able to express this Inevitable Order in the work of his hands, is that work worthy to endure. Number is the most abstract, yet the most perfect expression of the World Order. The artist's work is a work of *precipitation* — to render palpable to the senses the hidden numerical rhythms everywhere operative in the world. Just as the snow crystal shows forth the harmonies latent in a raindrop, so should a work of art show forth the richer harmonies latent in

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the soul — "the self-moving number" of Pythagoras.

### Pattern Brickwork from Magic Squares

Now in order to finish these intellectual acrobatics on solid earth instead of in mid-air, let us attempt to apply the discovered elements of magic square construction to some problem definitely practical; let us confine our demonstration to the subject of pattern brickwork.

To design good brick pattern which is at the same time practical and beautiful is not as easy as it appears, and any artificial aid that makes it easier is a thing not to be despised by however clever an architect. The magic square patterns scattered throughout these pages constitute such an aid. That some of them conform so closely to the familiar checker-board and diaper patterns found in brick architecture the world over, is sufficient proof that this is so.

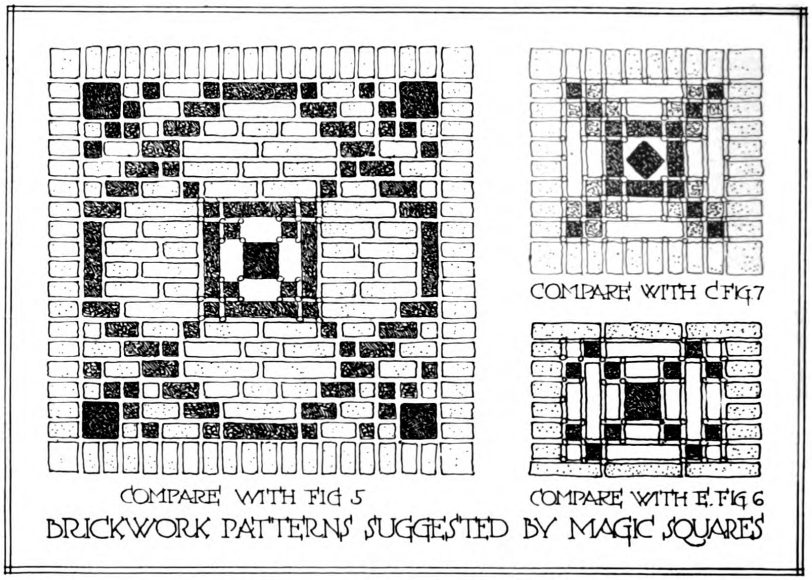


Figure 14

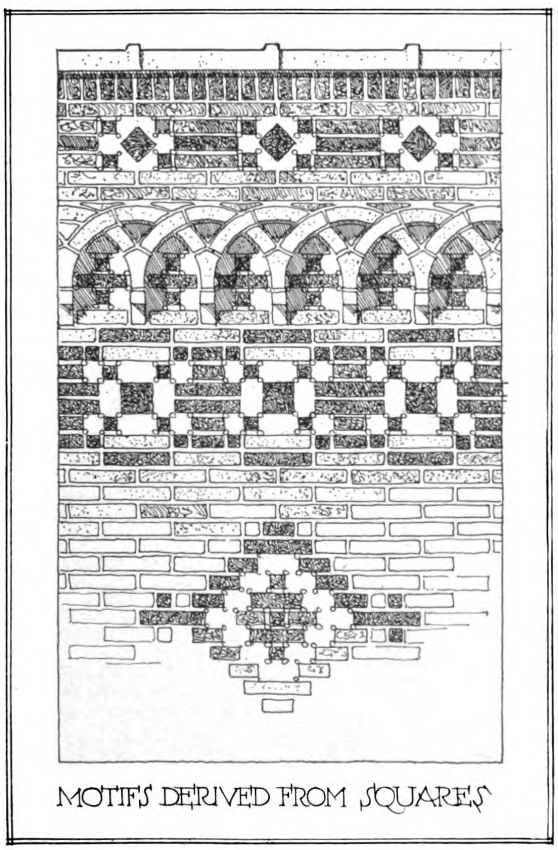


Figure 15

We have only to substitute bricks of different shapes and shades for the symbols of the four orders of counting, and we have brick pattern made to our hand. Figures 13, 14, and 15 represent such substitutions, slightly modified, in some cases, for the sake of greater variety or for greater ease of construction in the material employed.

### Conclusion

This brief essay, being but an arbitrarily isolated fragment of a larger work, may seem neither important nor convincing. The patterns here shown, arrived at by such indirect methods, are for the most part such as might easily occur to the mind of any clever designer, but carried further these same methods are capable of producing results which mere cleverness could never compass.* The principle involved in this method of design is important. By definitely linking up design with numerical order, we rediscover the secret source of style and are enabled to fill the empty vessel of our imagination at the perennially flowing fountain of the world order itself. For art, however various, is ever the expression of this order. The highest function of art is to show it forth. The perfection with which this is accomplished is one measure of the excellence of any work of art.

*Such a result, for example, as is shown on page 57 of "Projective Ornament," derived from the magic path of a magic square of 8 by 8.

Note. Mr. Bragdon's work on "Projective Ornament" contains a chapter in which the derivation of ornament from magic squares is very fully discussed, particularly the forms derived from "magic lines." In this chapter he considers not only the usual forms of squares, but also some other very interesting types, including the lines made by the Knight's tour, familiar to chess players. All these lines are capable of producing ornamental patterns of considerable interest, which seem capable of use in various fields of decoration. In the present paper, Mr. Bragdon takes up a different method of using magic squares as a source of ornamental pattern, and one that should have even more possibilities, as it involves not only linear patterns, but surface decoration as well. It is to be hoped that other architects will become sufficiently interested in this phase of design so that a general attempt may be made to develop other possible applications. — Editors.

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# The New York State Law for the Registration of Architects

*By* W. P. BANNISTER

A LAW restricting the practice of any profession or regulating business should be subject to careful analysis, as it involves the fundamental right of a person to earn a living. The framers of the architect's registration law in the state of New York had clearly in mind the evil of unjust restrictions, and believed the only justification for such a law to be the raising of the standards of the profession and the protection of the public from the incompetent.

The law does not deprive any person of the right to prepare plans for a building or structure, nor does it prevent any department having jurisdiction over the erection of buildings from considering and approving plans for the erection of buildings which have been prepared or submitted by an applicant not having the title of architect. It leaves the question as to who shall be employed to prepare plans and supervise work entirely to the person desiring such service; but it does prohibit the use of the title of Architect or Registered Architect, except where such right has been conferred by law.

Particular attention is called to this feature of the law, since there is among architects a feeling that no law enacted in their behalf should in any way seem to trespass upon the right of a structural engineer or builder; but this places upon the engineer and builder a responsibility in the conduct of their own occupations.

If the architect recognizes the competent structural engineer and builder, the public should be protected from the incompetent in such technical occupations by minimum standards fixed by the competent and having the force of law, otherwise those who believe that the law does not fully meet the situation are justified in their criticism.

There also arises the question of a citizen's right to insist upon recognition of æsthetic values, certainly as far as relates to its influence upon commercial values of environment. This principle is already recognized in governmental building by the establishing of Federal and Municipal Art Commissions, whose approval of the architectural merit of the proposed building is a condition precedent to its erection. The application of this principle should be extended carefully and justly, and is a factor that must be recognized by the framers of future laws requiring qualifications for those who design structures of any kind that are to be more or less permanent in their character.

The act to amend the general business law in relation to the practice of architecture in the state of New York became a law on April 28, 1915.

Let us first consider the provisions of the law for those who were entitled to registration under the waiver, that is, those who were actually engaged in the practice of architecture prior to the passage of the act; this involves both the architect and the draftsman.

The law requires that every person who was not styled or known as an architect prior to the passage of the act must obtain a certificate of registration to entitle him to use the title "architect." This provision applied to all draftsmen who had practised under the title of architect when the law went into effect. The law, however, permitted the Board of Examiners to consider an application for registration from such a draftsman provided he had been exclusively engaged in the practice of architecture for more than two years prior to the passage of the act, and that he could present such evidence of good character and competency as would justify the Board of Regents in issuing to him a certificate granting him the right to use the title of Architect or Registered Architect; but the law required such a draftsman to make application for registration prior to April 28, 1916.

The law also provides for registration under the waiver of those who were in practice under the title of architect prior to the passage of the act, provided that the applicant could submit satisfactory evidence as to character, competency, and qualifications. This provision made it possible for every competent architect in the state to become a registered architect. The constitution of the state does not permit of retroactive laws, so that the applicant who may have been denied registration still has the right to use the title as he used it prior to April 28, 1915, even though he was unable to present satisfactory evidence of ability to the Board of Examiners.

The above waiver provisions, which are essential in a just law, place a great responsibility upon the Board of Examiners; they are called upon to recommend the issue of certificates to persons of varying grades of ability without any minimum standard except such as they may consider just to the applicant considering the scope of his practice; then there is also the danger of granting a recognition to one applicant and not to another who may be a competitor, while the difference as to the essential requirements may be slight, but still enough to justify the Board in its action upon a judicial review. In New York State nearly two thousand applications for registration were made under these waiver clauses, the established architect recognizing the importance of the principle involved, those who desired to prove their right to recognition though not prominent in the profession, and possibly others who believe that there is some commercial advantage in state registration.

There are two provisions of the law which make examinations unnecessary if the Board is satisfied as to the competency of the applicant; while perhaps not in the order as indicated by the act, let us first consider the provision for registration when the applicant has been certified as an architect in another state or country where the standard of qualifications is the same, not lower than that of the state of New York. This compels the Board of Examiners to consider continually the standards required in other states or countries, that a comparison may be made before the acceptance of an application under this provision. It has the advantage, however, of requiring the Board to inform itself of the advances made in the requirements of similar Boards in other states or countries, and is therefore instructive and will lead eventually to a standardization of the minimum requirements of all



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Boards, with the result that the term "architect" will have a clear definition in law; this definition has long been needed in our state and is much needed elsewhere.

The act also provides that the Board may accept as evidence certificates or diplomas in architecture from colleges having certain academic and technical courses that have been approved by the Board of Regents, provided that the applicant has had three years of practical training in the office of a reputable architect subsequent to his college course. This places in the Board of Regents the power to standardize the academic and technical training in architecture for all colleges as far as relates to registration in the state of New York, and will raise the standard of many schools which now have courses in architecture which, while good, fall short of the requirements of the law. All such schools will undoubtedly endeavor to so develop their course that their diplomas will have a real value.

The act provides that applicants may be granted the right to practise under the title of architect by examination; in fact there is no other way of obtaining such right except as above noted, *i.e.*, by certification in another state or country and by certificate or diploma from an approved college with subsequent experience.

The examinations are conducted by the Board of Regents, the questions being prepared by the Board of Examiners. As a preliminary to examinations in architecture the applicant must pass a Regents examination as to his academic training; generally this comprises a high school course or its equivalent, with additional requirements in several courses which are usually included in the first two years of a college course. It is not essential that this education shall be acquired in a school or college, the door is left wide open for the ambitious man whose circumstances do not permit his attendance at a high school or college, but subsequent to such high school course or its equivalent he is required to have had five years' experience in the office of a reputable architect. The examination for such an applicant covers his knowledge of the history of architecture, historical styles, plan and design, construction including knowledge of the properties of materials, electric, heating, and mechanical installations, and specifications, contracts, laws and ordinances and other business requirements relating to the practice of architecture. The examinations are particularly directed to the ascertainment of the information and intelligence of the applicant as an adviser to the owner, rather than strictly technical in character.

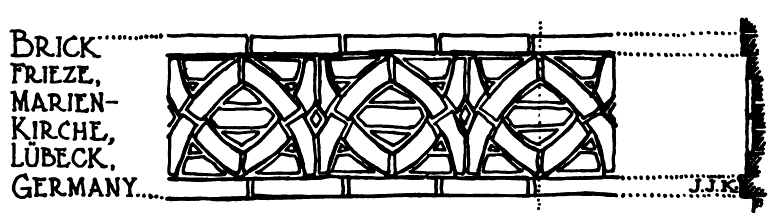
The above summary of the law indicates its broad scope and the efforts of the framers to do justice to all engaged in the practice of architecture, and clearly defines the required education of those who desire to be styled architect.

The administration of the law rests with the State Education Department, the Commissioner of which acts as executive for the Board of Regents of the University of the state of New York, which is the ruling body in all matters involving education in the state. The Regents exercise similar control over medicine, law, and many other professions requiring educational attainments, wherever laws have been made requiring registration. The Board of Examiners in architecture is appointed by the Regents; it prepares and rates all examination papers, except those relating to academic tests; it recommends action with its findings, all final action being in the hands of the Board of Regents.

The fee for registration is $25, and no provision is made for an annual fee. The question of an annual fee may be considered from two points of view: it is objectionable to many architects who feel that it establishes a permanent charge for the right to practise an honorable profession, placing him in a class with those having special privileges in the highways and public places; from another point of view the annual fee involves annual registration which facilitates the enforcement of the law, as the record is corrected each year by such registration; the fee may be a nominal one, covering the cost of recording. In the absence of a fee in New York it is the intention of the administration department to furnish lists of registered architects to all reputable organizations of architects throughout the state.

The above outline of the New York law indicates the principal points which were in the minds of its framers; but the subject is a broad one, and much thought and effort will be required to develop this and similar acts in other states and countries.

Let us consider the relation of the architects in this state to those engaged in practice in other states. Ten states of the Union have sought by law to define the academic and technical requirements of those who desire to use the title architect. It seems perfectly possible and most desirable that the minimum standards for practice in all of the states should be the same; but there are the states which have no standards whatever, where any one may call himself an architect, and competent architects residing in such states are under the necessity of taking examinations in neighboring states before being permitted to practise in such states. This seems to be a restriction upon their right, but the answer is clear — the obligation rests upon them to qualify by law in their own state. The minimum standard should be established in every state and country; it should be the same standard; it should be raised from time to time to meet the economic and æsthetic advances. The approach to public perception of the fundamentals of our profession must be prepared by the members of our profession at much personal sacrifice; the goal, that is, the combination of the beautiful, the substantial, and the social, is worthy of all effort.

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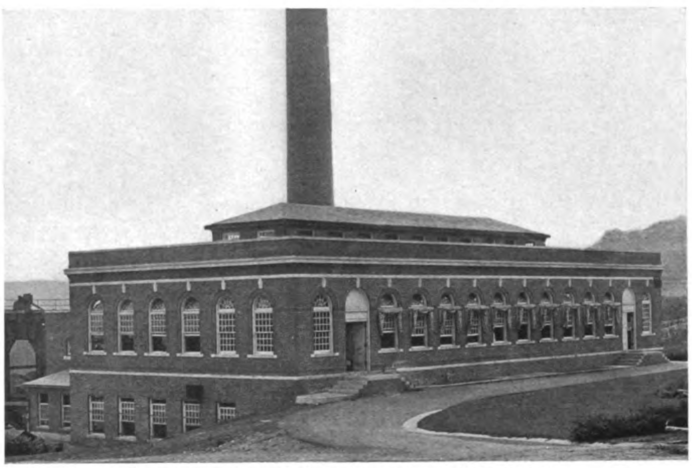
# PLATE DESCRIPTION

KITCHI GAMMI CLUB, DULUTH, WIS. PLATES 37–39. This is one of the most important buildings recently erected in Duluth. The architecture is inspired from that of the Tudor period, though in no sense a copy of any particular building. The clubhouse faces on Superior street, with a frontage of some 218 feet. The loggias, opening on the terrace, about three feet above the level of the sidewalk, command a direct view of the lake. The front is of brick with stone trimmings, and the roofs of graduated slate. The main floor contains the lounge, joined by a gallery or lounge hall with the library and newspaper room at the opposite end of the building. This gallery is paneled in oak, with an arched ceiling of ornamental plaster, and a fireplace in an ingle under the stairs. The lounge is a spacious room 30 by 50 feet, with white painted trim, while the library has oak paneling and a tiled fireplace. The main dining hall, on the second floor, is decorated after the manner of the English college refectories, with wood paneling and an open timber roof. It has a musicians' gallery over the fireplace at one end, forming the principal feature of the decorative scheme. On the same floor are several smaller dining rooms. This floor also contains the kitchens and other services, and a number of bedrooms with accompanying baths, opening on a corridor separated from the public portion of the building.

IROQUOIS CLUB, CAMBRIDGE, MASS. PLATE 40. This building is located at the corner of Mt. Auburn and Holyoke streets, with its main entrance on the former. It is constructed of Harvard brick, with marble water-table and sills. The trim is of wood, the window balconies of wrought iron, and the fan ornament over the Palladian window of white cement. The main social room is the large club room on the first floor, reached from a hall which also gives access to the dining room. The latter extends through two stories and has black brick walls, laid all headers, and a high half-timbered ceiling. These rooms have floors of broad oak planks, secured by flat headed brass screws. The banquet room, on the second floor, has walls of rough finished plaster. It is very simply treated, with a semicircular arched ceiling, corresponding to the window on Mt. Auburn street. The windows in the rear of this room overlook the stairs and the first floor dining room.



Power House, Springfield State Hospital, near Sykesville, Md.
Parker, Thomas & Rice, Architects

S. K. CLUB, CAMBRIDGE, MASS. PLATE 41. The S. K. Club building adjoins that of the Iroquois Club, facing on Mt. Auburn street. It occupies a lot 53 feet wide by 74 feet deep, the rear of which forms a brick paved terrace. The exterior is of Harvard brick, with wood trim and a slate roof. The interior walls are of rough troweled plaster, tinted with water colors. The entrance leads up a short flight of steps to a central hall, from which other stairs lead down to the dining room and up to the lounge and the library. The lounge is 26 by 48 feet, and 16 feet high. It is the principal room of the building, and is provided with service facilities that allow its use as a banquet room when this is desired on special occasions.

APARTMENT HOUSE, 420 PARK AVENUE, NEW YORK, N. Y. PLATES 42, 43. This building is a characteristic example of the better class of apartments that have recently been erected in upper Park avenue. It is seventeen stories high, the principal material being brick, with a limestone base and terra cotta cornice. The details are inspired from examples of the Louis XVI and Adam styles, and display a degree of refinement unusual in apartment house design. The building occupies an entire block front, with a depth of only 60 feet, so that the lighting and ventilation of the apartments are remarkably good. The entrances are on Fifty-fifth and Fifty-sixth streets, instead of on the avenue, so as to avoid interference with through traffic. The Fifty-fifth street apartments have eighteen rooms and five baths each, and those on Fifty-sixth street thirteen rooms and three baths.

INFIRMARY, ST. PAUL'S SCHOOL, CONCORD, N. H. PLATES 44–46. This is a fireproof structure, except for the roof framing. The walls are of local water-struck brick with limestone trimmings, the basement being of concrete. The roof is covered with slate. On the ground floor are the administration and dispensary, on the first floor the dining room and kitchen, in the central wing, with the operating room above. The main block contains private rooms and a large general ward. Doors are arranged to swing so as to form a corridor joining the end wings to the main building, or so as to leave an open air passage between, permitting their use as isolation wards; the second floor of each wing is arranged for further isolation, with an independent outside entrance.



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# EDITORIAL COMMENT AND NOTES FOR THE MONTH

ALTHOUGH the end of the present war is not yet in sight, several of the belligerent nations are already considering methods for repairing the injuries it has caused, particularly in the regions that have actually been the scene of the conflict, and where many buildings have been greatly injured, and often completely destroyed. Whole towns in certain districts have been demolished, but the local pride of the inhabitants is so great that they are determined to return to their homes as soon as this can be effected, determined, moreover, that these homes shall be rebuilt in the form with which they are familiar, which they received from their ancestors, and which they hope to transmit to their descendants.

To this end an exhibition has recently been held in Paris, under the auspices of the Société des Architectes Diplômés par le Gouvernement, for the purpose of collecting and displaying the greatest possible number of documents dealing with the architecture of the invaded provinces, so that their reconstruction, when it takes place, may be carried out along the lines of the local traditions, rather than with buildings of no particular character or interest.

This movement is worthy of the highest commendation, and it is to be hoped that any American companies that may co-operate in the rebuilding of Belgium and Northern France will be guided by it in their designs for the structures to be erected, whether these are factories, dwellings, or monumental buildings. The smaller European towns, as well as the large cities, have for years shown such variety and distinctiveness of appearance that any loss of this character would be most unfortunate, even though immediate needs might be more quickly satisfied by the use of whatever type of structure is cheapest and easiest of erection. No one who has traveled in the rural districts of Western Europe can fail to regret the losses due to the war, and to hope that they may be repaired as fully as possible, however great the effort required.

This, of course, does not mean the deliberate construction of archæological falsities. In preserving the general character of the region, it would obviously be impossible, and scarcely desirable if it were possible, to rebuild every house and every village church in its original form. Many of these buildings presented features that, however interesting and picturesque, were hardly in keeping with modern methods of life, and were only retained because of their antiquity. The present offers an opportunity for much betterment, if the opportunity be intelligently used. Modern progress in sanitation, in city planning, in lighting and heating, should be allowed to have their due weight in this work; but the general character of the region should in all cases be preserved, so that the inhabitants, regaining their homes, may have such environment as they have grown to cherish, so that their children may be able to grow up with the same local pride as their fathers. No machine-made architecture should be allowed to stamp out the characteristics of a region that for centuries has had its own distinctive forms and traditions.

For these local peculiarities are not mere eccentricities of the unlettered peasant. They have grown up gradually from the climate, the nature of the soil, and the various contacts with the outside world. Their growth is frequently unconscious, but all the more vital because of its unconsciousness, and all the more certain to be missed by those who have once known it. We in America can form only an imperfect idea of the attachment of the European farmer or artisan to his home, and of the variety of forms that have grown up from the soundest of reasons. Local materials, local usages, local methods of building, —all contribute their quota to the formation of local pride that has been the most fruitful soil for the growth of all the arts.

It is therefore to be hoped that the efforts now being made to preserve these local forms and characteristics may be wholly successful. The American manufacturer who exports his products to Europe for use in this rebuilding should not try to force upon these older countries the appearance of our mushroom settlements; he should rather be guided by the needs of those whom he supplies, which he may easily learn, if he so wishes. Even apart from any altruistic ideas, this should be to his material advantage, for only in this way can a permanent market for American products be built up in Europe.

And this respect for local usage and characteristics, brought into prominence by the present war, may teach us another lesson. It is not only in Europe that such traditions exist. Our own country has its local traditions also, although they are at present being gradually submerged by the flood of cosmopolitanism whose most powerful helpers are the mail-order houses that spread their products indiscriminately throughout the land. It is to be hoped that the people of the United States may be aroused to the importance of this question, as has been the case in Europe, and that the lesson will be learned by those who build Dutch farmhouses in Florida or Mission bungalows in New England.

The University of Chicago Press has recently published the Scammon Lectures for 1915, delivered at the Art Institute of Chicago, under the title of "Six Lectures on Architecture," by Ralph Adams Cram, Thomas Hastings, and Claude Bragdon. (Price $2.00 net.) Mr. Cram's lectures are on The Beginnings of Gothic Architecture and The Culmination of Gothic Architecture; Mr. Hastings' on Principles of Architectural Composition and Modern Architecture, and Mr. Bragdon's on Organic Architecture and The Language of Form.



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## PLATE ILLUSTRATIONS



## LETTERPRESS



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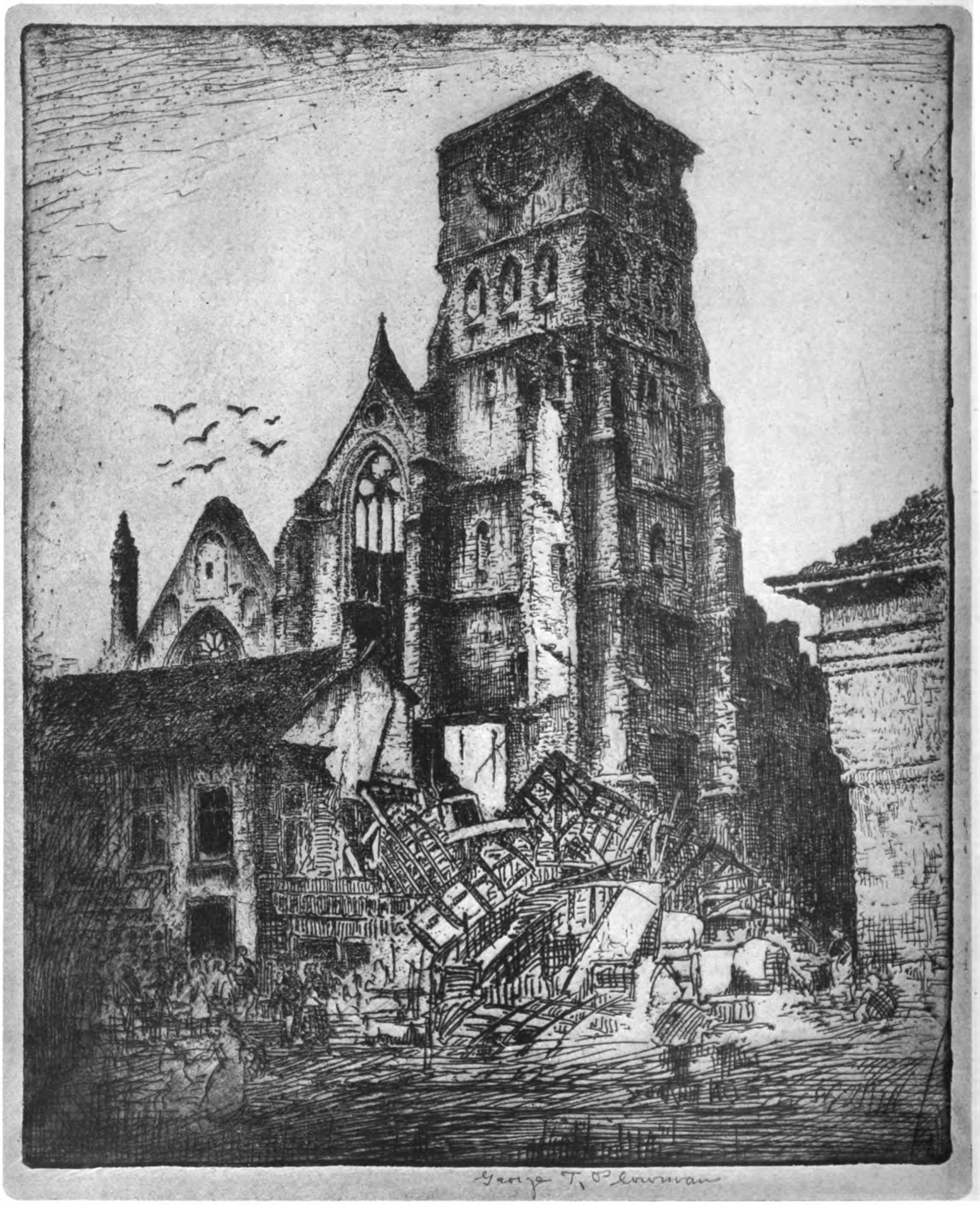


RUINS OF THE CHURCH OF ST. NICOLAS, DIXMUDE, BELGIUM

AFTER AN ETCHING BY GEORGE T. PLOWMAN

*Dixmude is a small Belgian town on the Yser, not far from the French border. St. Nicolas, the principal church, contained a number of valuable works of art, including a famous rood-screen, of which practically nothing now remains.*

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# THE ARCHITECTURAL FORUM

## FOR QUARTER CENTURY THE BRICKBUILDER

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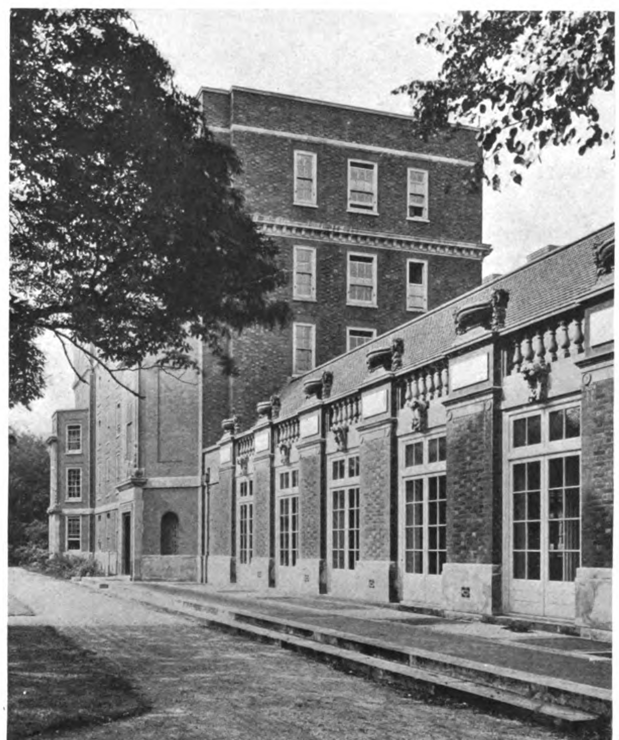
# A New Type of College for Women

H. PERCY ADAMS & CHARLES HOLDEN, ARCHITECTS

*By* R. RANDAL PHILLIPS

As with medical science and hospital practice, so our educational systems are constantly in a state of change, ever advancing to accord with fresh thought, new methods of teaching, and new requirements. Elementary class rooms, for example, have undergone radical alteration within the past twenty-five years, tending now to be very much smaller than they used to be, with a correspondingly smaller number of pupils, who are thus able to receive more individual attention. With secondary education there have been drastic changes, and the future will witness a tremendous development in this branch of training, in view of the fact that national progress to-day is based essentially on technical efficiency. But nothing perhaps in our newer methods of education has been so striking as the facilities provided for the training of women. We are now familiar with the ordinary schools for women, but these by no means fulfil all the requirements, for women are taking a place of ever increasing importance in the work-a-day world, and there is consequently a demand for the provision of all manner of new educational facilities to meet the growing scope of their activities. In England the very latest expression of this new phase of development is seen in the extensive college for women which has been built by King's College — a branch of the University of London — on a site at Campden Hill, Kensington, facing on Campden Hill Road.



Entrance Front, King's College for Women, Campden Hill, London

Before proceeding to describe the buildings, it may be explained that the lectures given in this college are expressly adapted to the needs of women wishing to prepare themselves for the efficient management of their own homes, and for stimulating that interest which knowledge and thought can develop in those subjects with which all women are more or less concerned. The training also fits them for posts as teachers, and for other spheres both professional and voluntary, including work on district councils and other public bodies, and especially for housekeeping on a large scale. There are also many openings connected with the interests of public health, the demand for trained social workers in connection with which is constantly increasing.

The grouping of studies within the courses now includes (three years' course) biology, chemistry, physics, and housewifery; economics (including a short course in bookkeeping and business affairs), ethics, and psychology. Thus it will be seen that this is an endeavor to treat all subjects connected with the household both scientifically and practically, and in every case to link up the practical arts with the scientific principles on which they are based.

This movement is thoroughly in accord with what may be called the ethics of knowledge in our own day — with the realization of our responsibility in applying knowledge, wherever possible, to practice. The application of science to household matters is only the natural outcome of an appreciation of the benefits which have accrued in all other departments of life where science has been intro-

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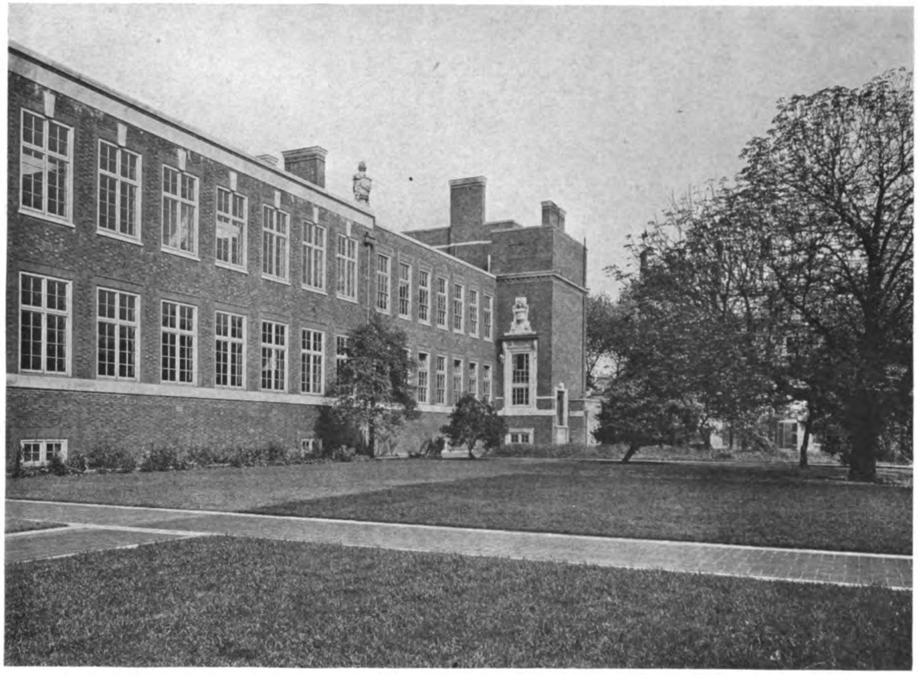


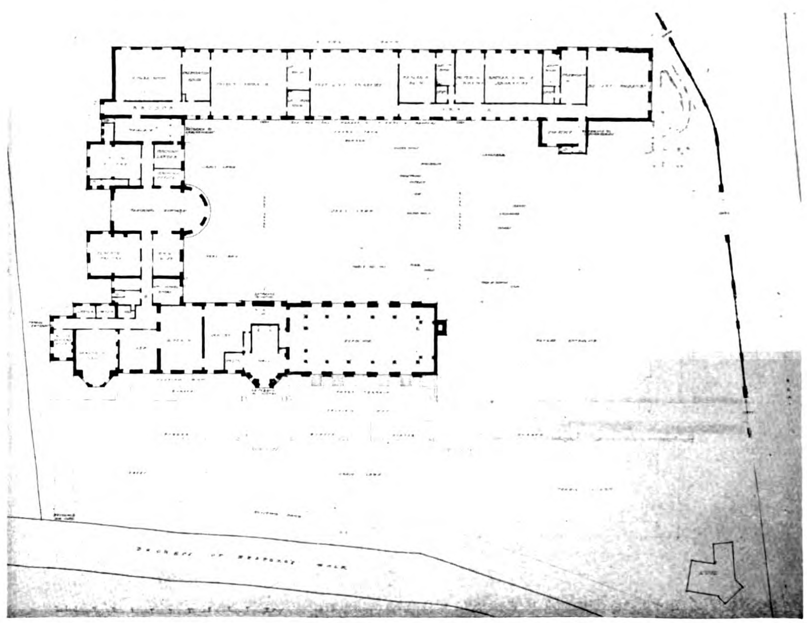
View of Laboratory Buildings from the Quadrangle

duced; and the introduction of a domestic science course into a University, though regarded by some as a revolutionary step, is no more so than was the inclusion of agricultural and engineering courses in the curriculum for men — an innovation that has already justified itself.

The organization of these courses is the outcome of a strong wave of public opinion which has recently become aware of the danger arising from the prevalent ignorance of such matters as economic household management, hygiene, and child-rearing; and it may be regarded as the special contribution made by women in recognition of the necessity for specialization in order to attain a high standard of national efficiency. Valuable work has already been done in this direction by the opening of domestic training schools and polytechnics throughout the country, and the introduction of a domestic science course into a University is, as it were, the crowning of the edifice which is being built up. It will ensure these subjects taking their proper place in public estimation, and will, it is hoped, lead to the elucidation of many of the complex problems continually confronting the household managers of the present time.

From the foregoing it will be realized that the scheme of this new college is of great interest from an educational point of view, and no less interesting is the architectural treatment of the buildings. These ultimately will form a complete quadrangle, but, as will be seen from the accompanying plan, the front block, comprising the administration offices, the college library, and various class rooms, has not yet been erected.

The college is entered from Campden Hill Road, where stand two finely wrought gates in iron, flanked by brick piers, those of the main entrance gate being crowned by carved stone urns. Entering by the lower gate, we pass along a carriageway to the entrance to the hostel, or residential portion of the institution. This block, like the rest of the college, is a straightforward piece of brickwork, carried out in bricks of excellent texture and color, with just enough stone dressings and carved enrichments



General First Floor Plan

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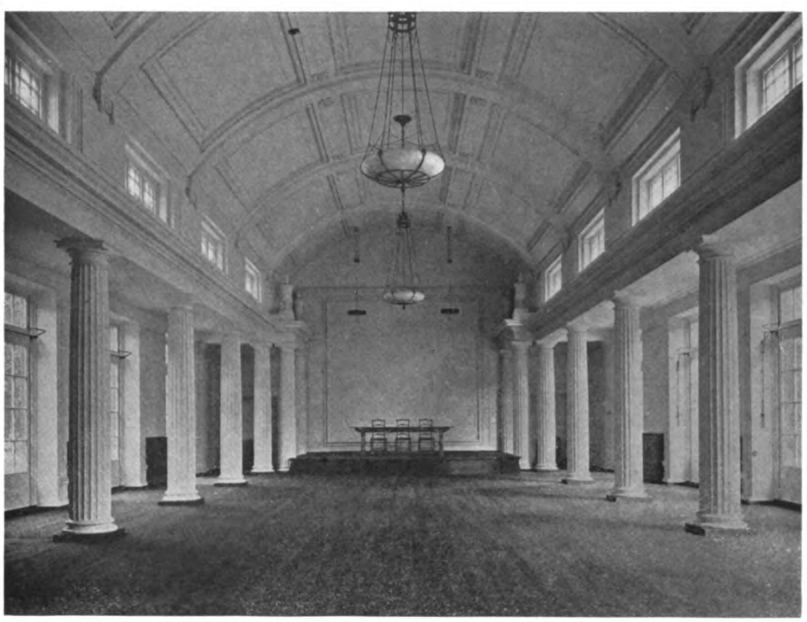
View in Quadrangle toward Teaching Kitchen

to enliven the whole and avoid all appearance of barrenness. The main entrance leads into a hall lined with Hopton Wood stone. To the right is the refectory, where the architects, Messrs. H. Percy Adams and Charles Holden, have had their chief opportunity for interior design, and have achieved an extremely pleasant result. The refectory is a room measuring about 76 by 35 feet, covered by a segmental barrel vault (in reinforced concrete) and lighted by French windows and by clerestory windows. A range of columns extends down each side, and at one end is a slightly raised platform for the high table. The architectural treatment of this interior displays a marked sense of refinement. The plasterwork on the ceiling, for example, is in just sufficiently high relief to emphasize the lines of the construction, while not being too insistent and heavy, as much decorative plasterwork unfortunately is; the mouldings are correspondingly delicate, and the electroliers graceful in character. The room is finished throughout in white.

To the left of the entrance hall are the kitchen offices, and beyond these, on the west side of the quadrangle, a series of rooms which are quite unique. They comprise a large teaching kitchen in the center, with a teaching pantry, a teaching scullery, a teaching larder, and a teaching laundry in conjunction. These rooms are equipped with every kind of apparatus and fitting for cooking and other domestic work, and practical instruction and demonstration are given in them. The kitchen, for instance, has different types of stoves for cooking by gas, coal, and electricity; there are meters with glass fronts through which the working of the apparatus may be studied; there are two long benches with tiled tops and with sheet-iron recesses covered by grids in which gas burners are fitted, and other apparatus appurtenant to modern methods of cooking. The equipment (at first sight rather luxurious) is all calculated to familiarize the student with different types of fuel, and to show how care in the arrangement of a kitchen may minimize work and promote efficiency. In every way provision is made



Interior View of Refectory

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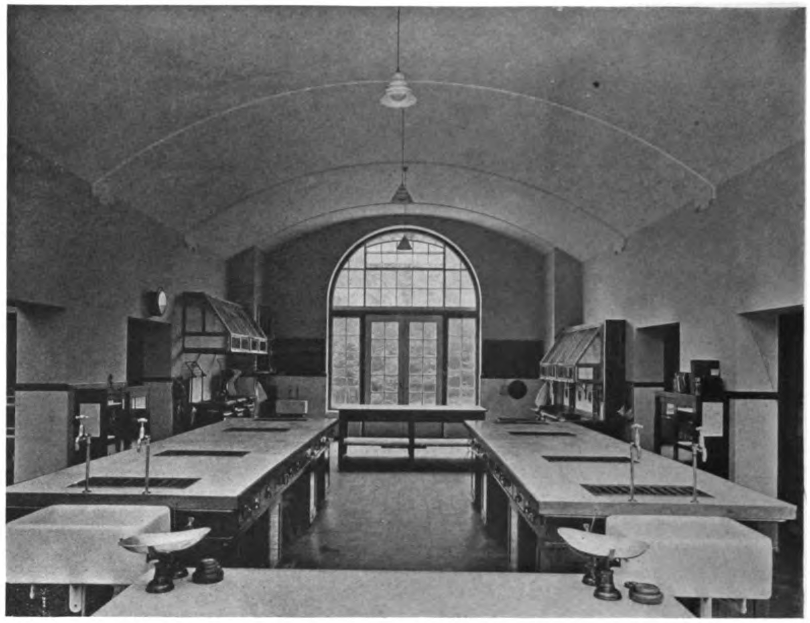
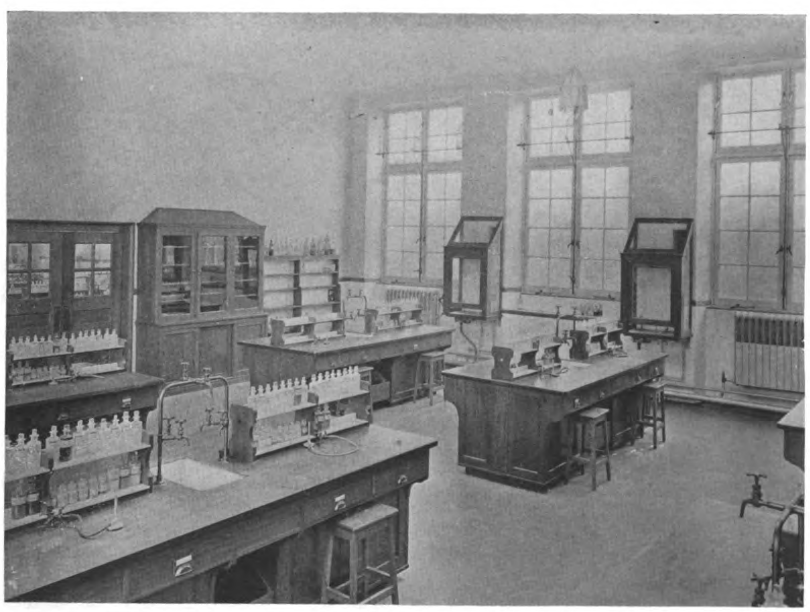


Interior of Teaching Kitchen

for individuality and resourcefulness to be developed, and there is no risk of students going away dependent on any one particular type of equipment: they have full opportunity to become practical housewives, with a reason "for the faith that is in them." In the teaching scullery one finds a similar complete equipment, while in the teaching laundry are appliances for ironing by gas and electricity, washing machines, mangles, etc. The floors of all these rooms, like the working kitchen offices themselves, are laid with red quarries, the walls having a dado of white tiles, finished above with white distemper. Everything is of excellent quality and finish. The rooms, moreover, are very spacious and well lighted.

The hostel proper is installed in the south and west blocks. There are fifty-seven bed-sitting-rooms, to each of which a dressing-room is attached, the remainder of the hostel being occupied by the common-rooms, isolation-rooms, and administration offices. The common-room on the first floor is an extremely comfortable apartment, furnished in good taste, and having a fine marble mantelpiece as a focus of interest, and in connection with it we may note an application of craftsmanship which is immediately pleasing — the cast-lead grilles covering the radiators, which are set in recesses. The treatment is inspired from Adam models.

The laboratory block is on the north side of the quadrangle. On the ground floor are four large laboratories for physics, physiology, bacteriology, and hygiene, respectively, and in connection with them a lecture-room, a research-room, preparation rooms, and lecturers' rooms; the first floor is mostly occupied by chemistry laboratories, with various rooms in connection with them. These laboratories, in their equipment and finish, show the same sound construction and careful attention to detail which is noticeable throughout the building. The fittings — benches, fume cupboards, etc. — are of oak, the bench tops being of teak, and the floors laid with wood blocks.



Interior View of Chemical Laboratory

In general architectural character the exterior design of the college is an individual treatment of the later Renaissance; the refectory, for example, and the main entrance to the hostel recall Wren's work at Hampton Court; but the whole has been given the touch of a modern artist, and the buildings thereby gain the interest that attaches to all personal work. The retention of some fine old trees, and the laying out of the quadrangle with grass lawns crossed by brick paths, serve to relieve the purely architectural effect, and when in course of years the buildings have become mellowed by exposure, the quadrangle will present a very delightful appearance.

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Tympanum, Royal Theatre, Toronto, Canada. Thomas W. Lamb, Architect

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# Modern Decorative Plaster Work*

*By* HARBOROUGH DESMOND UPTON

IN studying the field of modern plaster work, we must remember we are considering a material that can be put to almost any decorative use that the designer may require, and that because of there being practically no mechanical limitations to the casting of plaster, and of the readiness with which the material lends itself to nearly every form and treatment the mind can fancy, it has been extensively employed in a commercial age to imitate other and more expensive materials.

This adaptability is one of the greatest pitfalls in the use of plaster to-day — one of *les défauts de ses qualités*, as the French aptly express it — and it has possibly led to more architectural crimes than any other sham of modern days. If the designer must, for reasons of cost imposed by the owner, use plaster to imitate something else, he should keep clearly in mind the limitations or the characteristics of the material to be imitated. It is the disregard of this fundamental principle that is responsible for the shock we often have in entering a modern building; for in many cases, far too often to do credit to our artistic sense, the qualities and limitations of the material imitated are lost sight of, or frankly ignored in the design and handling of the imitation. The ornament is overdone, is too delicate or too complicated, the natural variations of texture and color are ignored or abandoned lest they be too pronounced in the effect, and we have in consequence an incongruous and false result in which the damning word "fake" shrieks at us with an insistence that cannot be downed, causing us to turn away with the feeling that the whole effect is cheap and tawdry.

On the other hand, there are many examples of modern imitation work which are so true to the characteristics of the material imitated that they do not offend the æsthetic sense at all, but if anything rather excite admiration for the study and skill that have produced such clever results. Most of our leading ornamental plasterers have display rooms showing the results of the combined study of their artisans and the architects under whose direction the work was produced. These "museums" are well worth visiting, and the plasterers are usually willing and glad to give the architect all the details of process by which the work was produced. Such a study would soon bear fruit, for the cost of production is not always responsible for poor results — it is usually poor taste or the lack of training on the part of the designer that is really to blame.

One particularly clever modern product is the "intarsia" work which has just been developed by a prominent ornamental plasterer. It is an adaptation of inlay work in Portland cement or in "Caen stone" plaster, except that the process of marquetry is reversed. The design is first cast like printer's type, about three-eighths of an inch high above a background which is later filled in, level with the design, with a cement or plaster of a different color, after which the entire surface is rubbed smooth to restore to the design any sharpness it may have lost. The result is similar to sgraffito in effect and has a permanent quality which sgraffito lacks. This work lends itself splendidly to panels, friezes, diaper wall treatment, or spandrel and tympanum designs. The example shown here is a tympanum for the Royal Theatre of Toronto, Canada, and is cast in three colors of Portland cement.

These careful imitations, true to the qualities of the material portrayed, would seem to justify the practice of sham which has come to play so important a part in the

*Articles on Ancient and Renaissance Plaster Work, by Prof. A. D. F. Hamlin, appeared in THE BRICKBUILDER for October and November, 1916.



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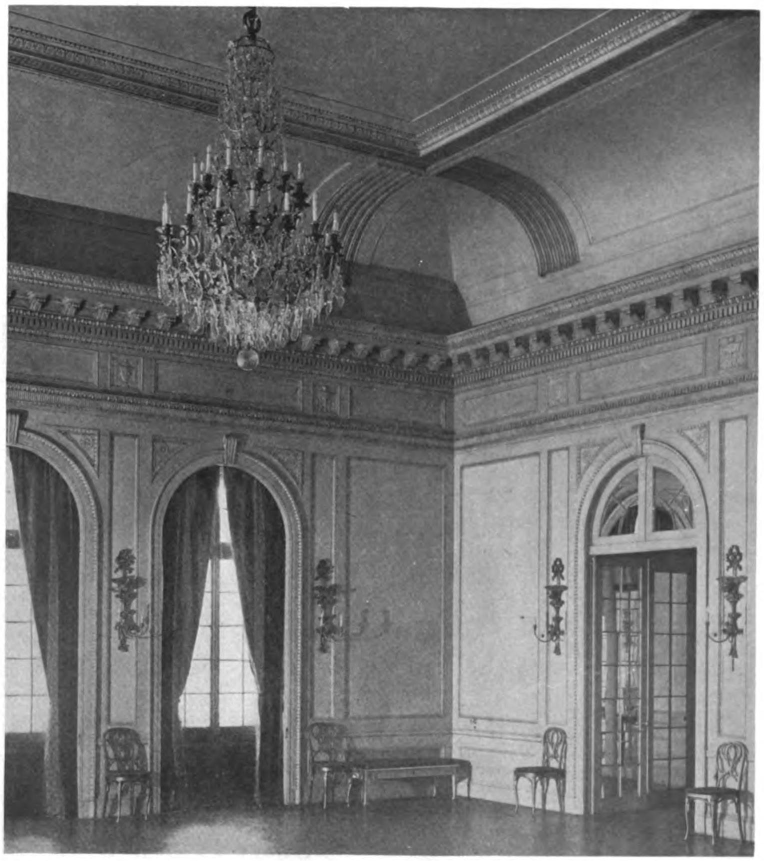
scheme of modern interior decoration, and we may argue, too, that modern conditions and requirements justify the deception thus practised; but the question presents itself to the honest mind: Why not abandon this pretense and use plaster *as plaster* and not *imitation something else?* Let us show by a truthful treatment of the material that plaster decoration properly designed and well executed is much more effective and pleasing than "near-marble" or imitation woodwork, which sooner or later will need renovating and will surely descend still further in the scale through an attempt to restore the first illusion by means of a coat of paint!

To turn our attention to *bona fide* plaster work which is not an imitation of something else, we find that due to the improvements in modern methods of manufacture and the higher quality of the materials employed there are scarcely any effects of texture, color, or ornamental treatment known to former centuries which cannot be attained or in many cases bettered to-day.

Stair Hall, Colony Club, New York City
Delano & Aldrich, Architects



Detail in Ball Room, Colony Club, New York City
Delano & Aldrich, Architects

Let us consider briefly a few of the essential principles to be kept in mind as a safeguard against some common mistakes found in current work. First and foremost is the question of scale. Then come style, ornamental extravagance (unless required by the character of the building or room), color scheme, treatment of surfaces or "texture," undercutting, and last, but not least, consideration of perspective and the foreshortening or distorting of the design caused by it. These may not be enumerated in absolute order of their importance, but let us consider them as we have cited them.

SCALE. Plaster being essentially a perishable material, it is only correctly used for interior work. All interior decoration, no matter how big the building or room in which it occurs, should be scaled down to a finer and smaller basis than exterior work. We have examples, it is true, by architects such as Michelangelo where the interior scale is a direct violation of this law,

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Main Dining Room, Ritz-Carlton Hotel, New York City
Warren & Wetmore, Architects

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but we feel a sense of being crushed by its size. Don't let us err, however, by becoming too "finicky," and get out of scale by using a furniture standard, unless the ornament is not higher above the eye than furniture height, and has enough contrast with the general scale of the ornamental work to take on its proper value as intentional "small scale."

STYLE. There is a great tendency to mix styles in interior work — why, it is hard to say, except that possibly the designer takes this problem less seriously than his exterior "architecture." A clearly intentional false note is often used to accentuate the otherwise purity of the style, and this, done with caution, may possibly be commended as good practice.

ORNAMENTAL EXTRAVAGANCE. This borders so closely on vulgarity of design that it hardly seems justifiable even for a *salle de danse*, a theater, or any other place the keynote of which is gayety. Here again we must beware of going to the other extreme and having a cold restraint which may border on bareness, but in general overornamentation is usually a cloak to cover up poor design.

COLOR. Polychrome decoration of plaster work is perhaps the most difficult problem the designer has to face. We have two distinct factors to consider: what colors to use and where to use them. The first of these is far too complex a subject to treat more than elementally in this article and it will suffice to say that in general the fewer colors used the better, and crude or inharmonious colors should be avoided absolutely. As to where the color should be used: it should serve only as a background for the ornament unless the designer is striving for a purely painted effect, in which case his ornament or design should be painted on flat surfaces and does not come under the head of ornamental plaster work. Gilt has its proper use where an effect of gayety or richness is desired, but care must be taken not to use so much that it kills the modeled ornament. Gilt as a background to a frieze or to emphasize mouldings and ribs, to bring out the motifs of the design, or to give strength to the projection of leaf ornament, if well done and *not overdone*, will enhance the value of the design. Too much gilt, like too much ornament, tends toward vulgarity of effect and should be avoided.

TEXTURE. This can be overdone only too easily, but by carefully combining different textures so that one gives value to the other monotony of surface can often be changed to a charmingly successful result. There are many little tricks that are used in connection with texture treatment. The designer must be careful to avoid too

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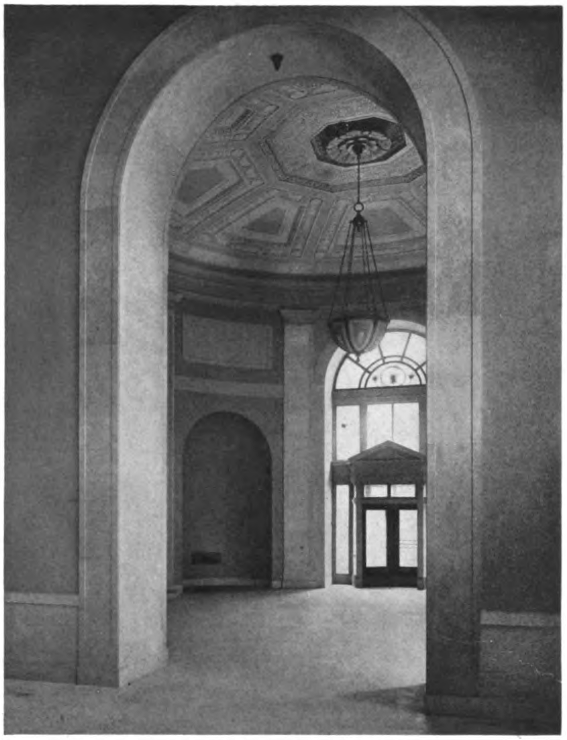

Detail in New General Post Office, New York City
McKim, Mead & White, Architects

or framing it, and that rough backgrounds are usually only pleasing in connection with ornament of a rather rounded and primitive character, such as is found in Early English work.

UNDERCUTTING OF ORNAMENT. In this as in everything else moderation should be the keynote, especially if the question of cost is to be at all considered. In ceilings, particularly, it is bad from the point of design, for too much undercutting gives an unpleasant feeling of insecurity to the observer. Undercutting should be used to keep the design from being monotonous and to give it character. A shadow from undercut work here and there gives accent to the design and relieves the flatness so often resulting from diffused or insufficient light.

PERSPECTIVE AND DISTORTION. Often an architect discovers too late that he has not considered the distortion due to perspective in making his design. Mouldings or ornament intended to count vitally in the design are perhaps suffocated and hidden from view by other and really secondary motifs when the work is in place. There is really little excuse for this if the models are carefully studied and viewed from all possible angles. Proportions of surfaces and mouldings and lines of curves should be carefully studied in the clay if possible ; or, if this cannot be done, the designer must bear in mind the possible distortion through perspective in making his drawings for the ornament to be used.

These elemental principles just stated are undoubtedly familiar friends to many readers, but they may serve as a guide to some who have not had occasion to study this subject, in which case they will have justified the space

violent contrasts and also too abrupt changes in texture. For example, a perfectly smooth surface with patches of rough finish would be absurd, and a spot of ornament in the middle of a smooth wall or ceiling would appear stranded. Let us, however, give a hammered or stippled treatment to the smooth surface immediately adjacent to the ornament, which gradually dies out into the smooth field, and the ornament is no longer a spot, but an integral part of the whole scheme of decoration.

Another maxim to remember in connection with texture treatment is that too much of even a good thing becomes monotonous, and the designer must be careful also not to fall into the error of making his surfaces so rough that all sense of refinement is lost in the result.

One other rule that may be followed with safety is that sharp, clear cut ornament requires a smooth treatment of the plain surfaces surrounding

Public Corridor, New General Post Office, New York City
McKim, Mead & White, Architects

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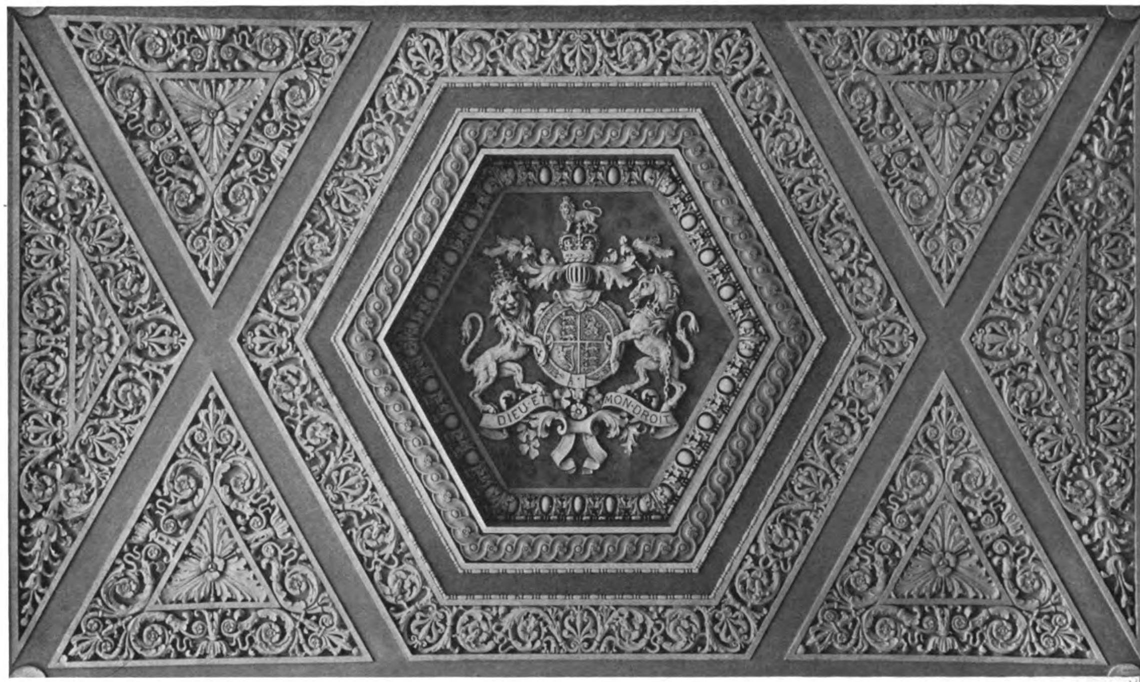

Detail of Ceiling in Public Corridor, New General Post Office, New York City
McKim, Mead & White, Architects

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taken up by this brief treatise on the theory of plaster decoration and the precautions to be observed in its use.

Fortunately the trend of modern designers, and also of a large percentage of the laymen, is toward simplicity of decoration. We have passed through many stages of cumbersome and unnecessary ornamentation, much of it so unpleasing to the eye that we wonder how any one could have perpetrated such ugliness. The element of cost for labor and material may have had some influence in this change to simpler design, especially in domestic work; but it would seem from a general analysis of modern decorative work in all branches of the arts or crafts that it is really an evolution of taste. Who of us does not prefer to live in a room that boasts of only a simple ceiling cove, with a delicate and well proportioned moulding where the cove dies into the ceiling, and an unobtrusive white picture moulding at the spring of the cove, than to have to gaze at one of those cumbersome and unlovely series of mouldings that were the pride of some twenty or thirty years ago? We even feel perfectly satisfied with the bare right angled intersection of walls and ceiling relieved only by a picture moulding, and we no longer feel the necessity of painting the cornice mouldings, if any are used, in the tawdry shades that were once considered perfectly good taste.

In architectural interiors also it would seem that the value of simplicity combined with well studied proportion is being more and more realized and appreciated by all classes. Our modern theaters, for example, are in many instances almost bare compared with the overdone and overloaded efforts of twenty years ago. Yet how much more pleasing the result and how much greater value is given to the decorative and scenic effect of the stage and the actors. We have begun to realize that everything we do should have its proper value and relation to the entire scheme. Just because we have a large wall surface does not mean that we must cover it with meaningless and useless decoration. How much more restful and pleasing is the effect of well proportioned paneling with simple mouldings than the elaborate festoons of architectural "garbage" that formerly were considered a necessary part of interior decoration.

Of course, all this does not mean that rich friezes and ceilings or decorative panels are to be eliminated. The point so well illustrated in our best modern work is that the most telling results are attained in emphasizing the richness of the ornamental work through having enough plain surfaces to give the ornament a chance to be seen and appreciated.

Our modern hotels are more and more demonstrating the fact that over-ornamentation is neither required nor desired by the majority of patrons, who, as a well known architect of to-day once remarked, prefer to pay for the food and the service rather than to pay for the chandeliers. It is true that this present age requires luxury, but not a senseless and meaningless ornamental extravagance which merely produces a confused and *nouveau riche* effect.

Excellent examples of modern decorative plaster work illustrative of the points we have just been considering are to be found throughout this country, and they embrace every style from ancient Greek to our own Colonial. *Art nouveau* has fortunately not been very popular in the United States. France tried it and soon discarded it as too bizarre except for jewelry or *objets d'art*. Italy evidently tired of it after the International Exposition of 1902 at Turin, which was a riot in animal, vegetable, and grotesque

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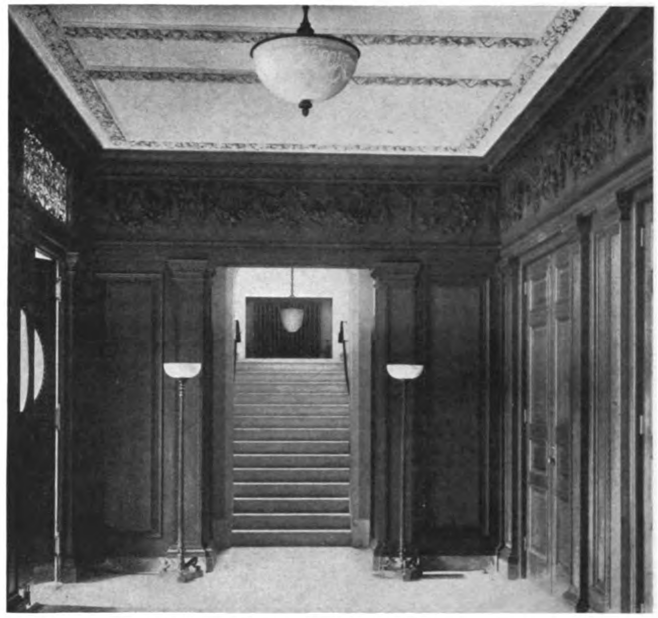
forms. Germany seems to be the only country where this unlovely architectural disease has gained a firm grip on current practice.

In each of the recognized styles or periods represented in modern work in America the examples vary from close copies of existing ancient buildings, or parts of buildings, here or abroad, to the use of historic elements of decoration to carry out the architect's own composition. This latter procedure is more acceptable to the trained eye, and furthermore the work receives the stamp of the architect's individuality and is free from the stigma of plagiarism. Archæology has its proper place as a study, but not as a part of the practice of architecture.

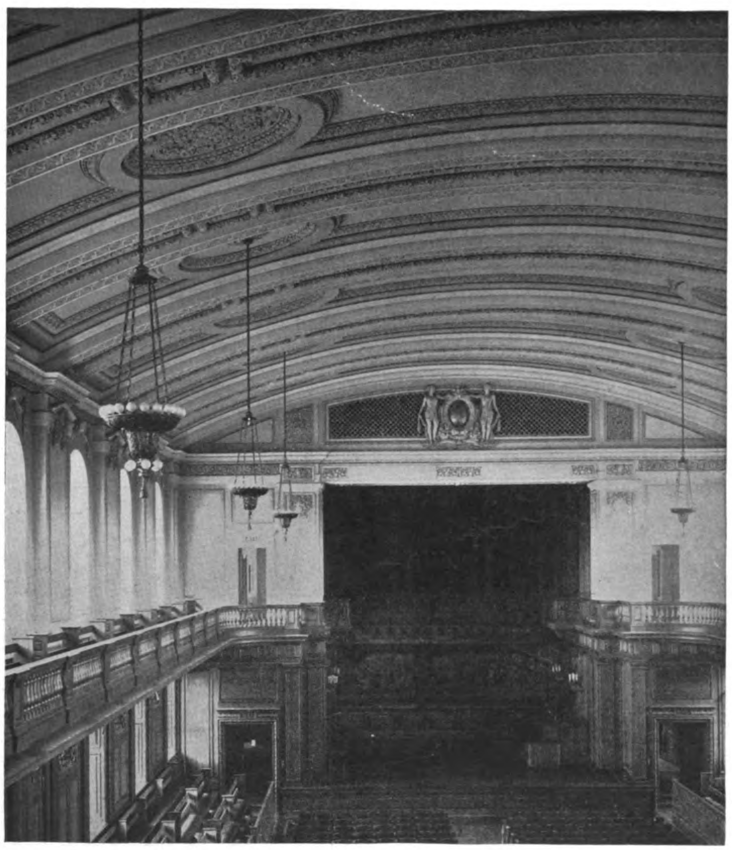
Accompanying this article are several illustrations of the recent work of some of the best known architects of to-day. In a large part of it may be seen the influence of the Adam period. The recent popularity of this style is due largely to the carefully studied interior decoration of the Ritz-Carlton Hotel in New York City. Actual examples of the Adam Brothers' work were studied in London before any drawings were made, in order to carry out the true spirit of the style, a practice adopted by many leading architects when the building appropriation permits, and in consequence of this care the Ritz-Carlton may be taken as a criterion for Adam design in this country. It illustrates in addition the acme of refinement and delicacy in ornamental plaster work.



Foyer, Grace Chapin Hall, Williamstown, Mass.
Cram & Ferguson, Architects

One architect who has specialized in Gothic and Early English styles has produced many charming examples of ornamental plaster design where well balanced ornament and splendid texture values are particularly demonstrated. We refer the reader to the interior views from the First Baptist Church, Pittsburgh; St. Thomas' Church, New York; and the architect's own office, also in New York.

The new Post Office Building in New York has some splendid Italian Renaissance ceilings, carefully studied and beautifully executed, all good examples of modern plaster work in this style. It will be noted that the ceilings in this building are in each case the one rich feature of the rooms in which they occur, and that the rest of the ornamental treatment is purposely simple in order not to kill the value of the ceiling decoration, and that the panels of ornament are also separated by plain, flat bands that give added value to the richness and beauty of the ornament.



Grace Chapin Hall, Williamstown, Mass.
Cram & Ferguson, Architects

The new Colony Club in New York has some excellent interiors that

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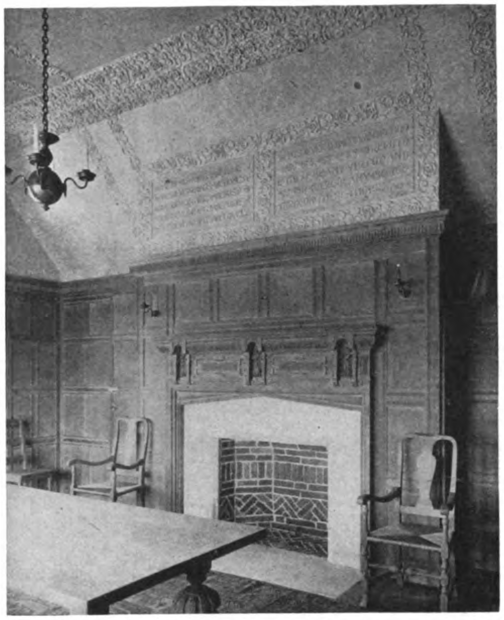
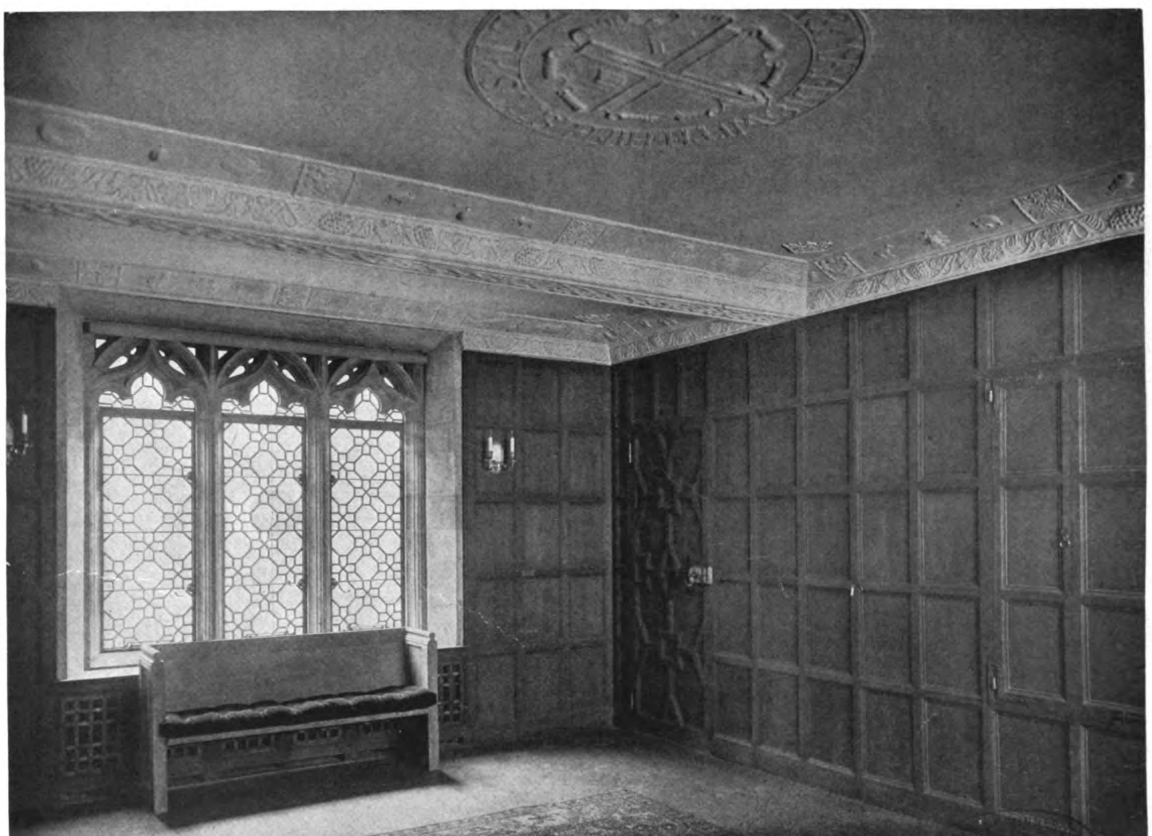
demonstrate how well the Colonial and Adam styles lend themselves to plaster decoration. In the rooms illustrated the composition, detail, and execution of the ornamental plaster work are all very successful, and the stair hall is especially good as illustrative of the charm of simplicity of design.

The ceiling of the Grace Chapin Memorial Hall at Williamstown, Mass., is an example of how the acoustic requirements of a vaulted room may be taken advantage of to give a decorative effect. The heavy ribs which serve a double purpose of giving a structural effect and of breaking up the sound waves that might produce an echo are here made the strong decorative feature and are properly relieved by the plain panel surfaces. The alternation of the rich and the comparatively plain circular panels is all part of the theory of contrast which we discussed earlier in this article, and the result is that while this ceiling is quite elaborate in detail, the *ensemble* does not appear to be overloaded. The ceiling of the foyer of the same building is an illustration of the value of a few bands of high relief ornament to give interest to a plain, flat ceiling crowning a rather elaborate wainscot and frieze.

If space permitted, many other illustrations could be cited or shown to prove conclusively the ability of modern architects and decorators to produce results equal to the best of former centuries; to prove also that while in



Ladies' Parlor, First Baptist Church, Pittsburgh, Pa.
Cram, Goodhue & Ferguson, Architects



Sacristy, St. Thomas' Church, New York City
Cram, Goodhue & Ferguson, Architects

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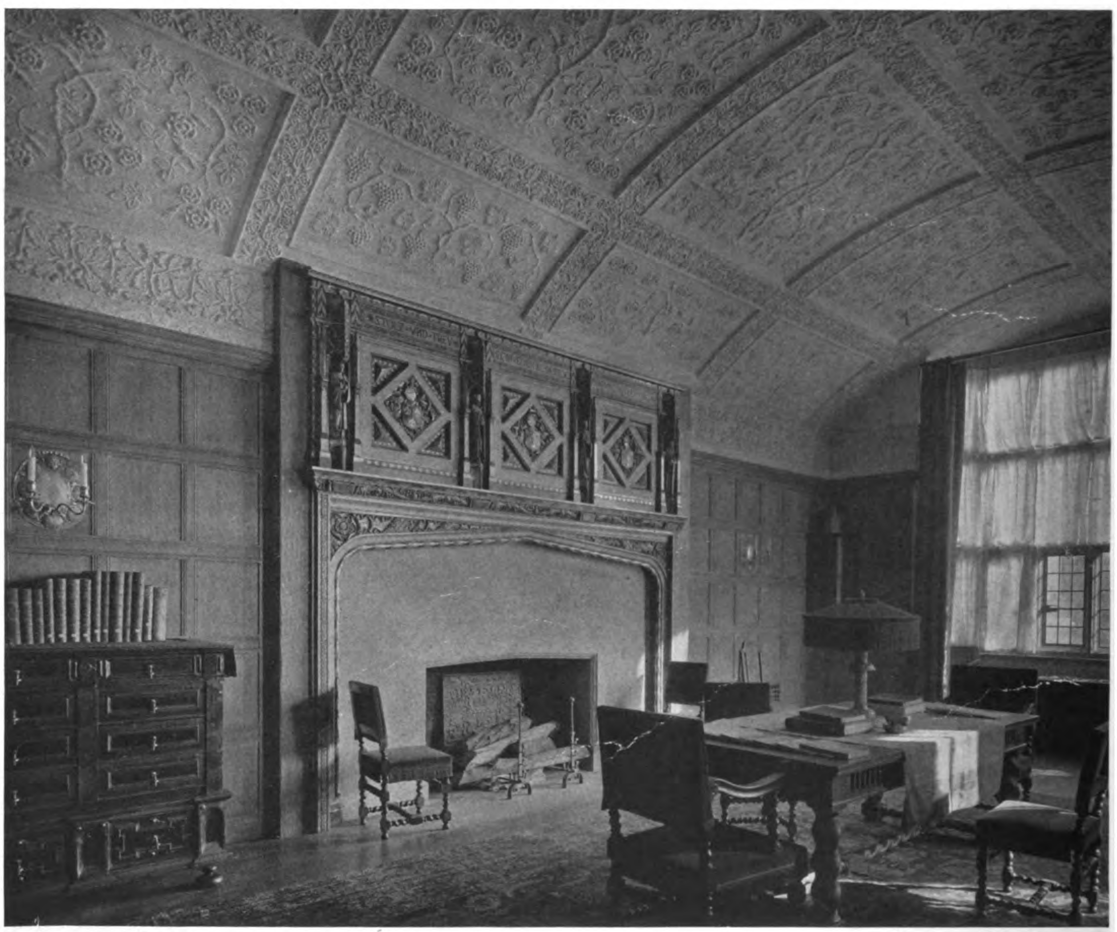
America we may have passed through an era of bad taste, there have always been some guiding lights who have shown us the way, either by criticism or created works, back to the paths of art and the appreciation of what is good and what is bad design.

Unfortunately it has not been possible to show color values or effects in the monotone reproductions, so this part of our subject will have to be left to the reader's observation of actual buildings that he may have the opportunity and inclination to visit and study.

So far as the development of any national style for interior design in America is concerned, travel and the study in foreign countries of examples of all styles and periods in art have tended to give a catholicity to our design that has prevented the development of any national style in a true sense of the word. While certain localities may have evolved some details or mannerisms that are peculiar to themselves, and individuals may have attempted to create new styles, modern designers as a rule have preferred to use the architectural and ornamental "vocabularies" that have stood the test of time. Our methods of construction and the *composition* of the design which they have brought about are all that we can boast of in the way of any national development — our style remains an adaptation or copy of the best that other countries and ages have produced, even as our delightful Colonial style was but an attempt to reproduce more or less from memory the work of the Georgian period which was the dominating spirit in England at and prior to the time the American colonies were becoming sufficiently settled to build anything architectural.

The subject of modern ornamental plaster work being so closely identified with the study of the architecture of which it is a part, it has been necessary to include a brief survey of the architectural development of to-day in order to show properly the resultant influence on plaster work. We have purposely avoided technical details of all the various processes of manufacture, believing that these, while interesting, have only played a secondary part in the development of ornamental plaster work from the view-point that properly lies within the scope of this paper, namely that of the architectural designer.



Reception Room, Office of Bertram Grosvenor Goodhue, Architect, New York City

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# THE FORUM COLLECTION OF EARLY AMERICAN ARCHITECTURAL DETAILS

PLATE THIRTY-NINE

*THIS doorway is remarkably fine in scale and adjustment of detail. None of the mouldings is unusual, though all are very handsome and well balanced. The panel treatment with double mouldings is rather uncommon. No attempt has been made to introduce any ornamentation into the spandrel above the arch. This plain spot, however, is pleasing in itself and quite in keeping with the general simplicity of the design. The house stands with its gable end toward the street, an indication that in period it stands on the border land of the so-called Colonial and at the threshold of the next phase—the Greek Revival.*

FRONT ENTRANCE OF HOUSE AT HAMPTON, CONN.

Built about 1820

MEASURED DRAWING ON FOLLOWING PAGE

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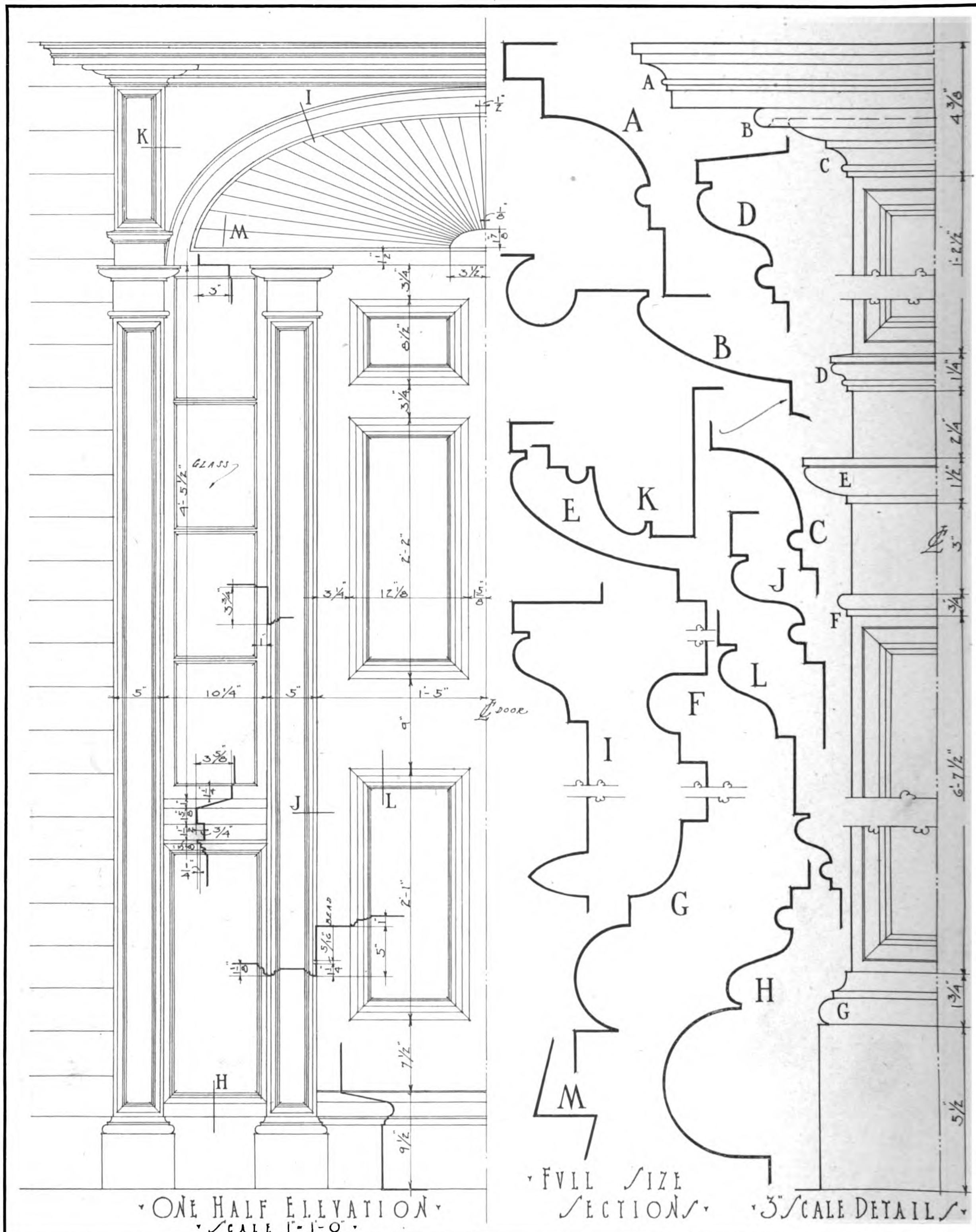


| PLATE 39<br>APRIL 1917 | HOUSE AT HAMPTON-CONN<br>FRONT ENTRANCE<br>BUILT CIR. 1820 | MEASURED AND DRAWN BY<br>J. FREDERICK KELLY |
|---|---|---|



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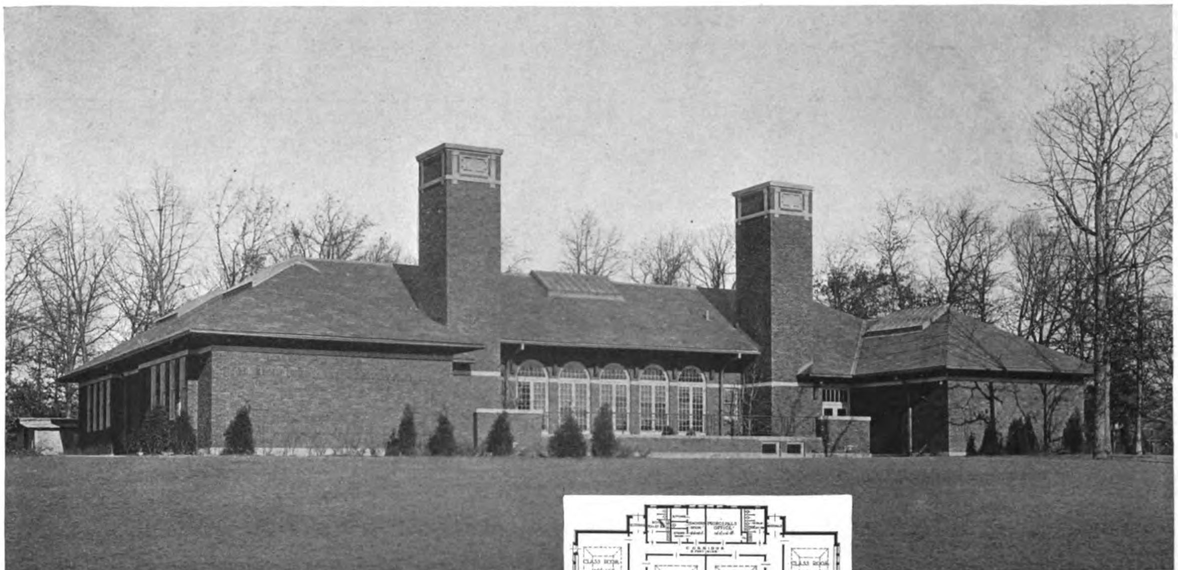

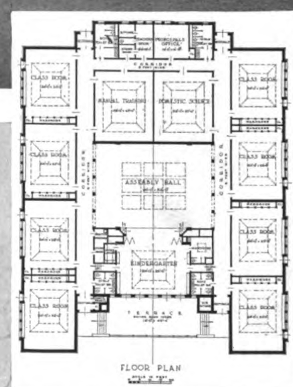


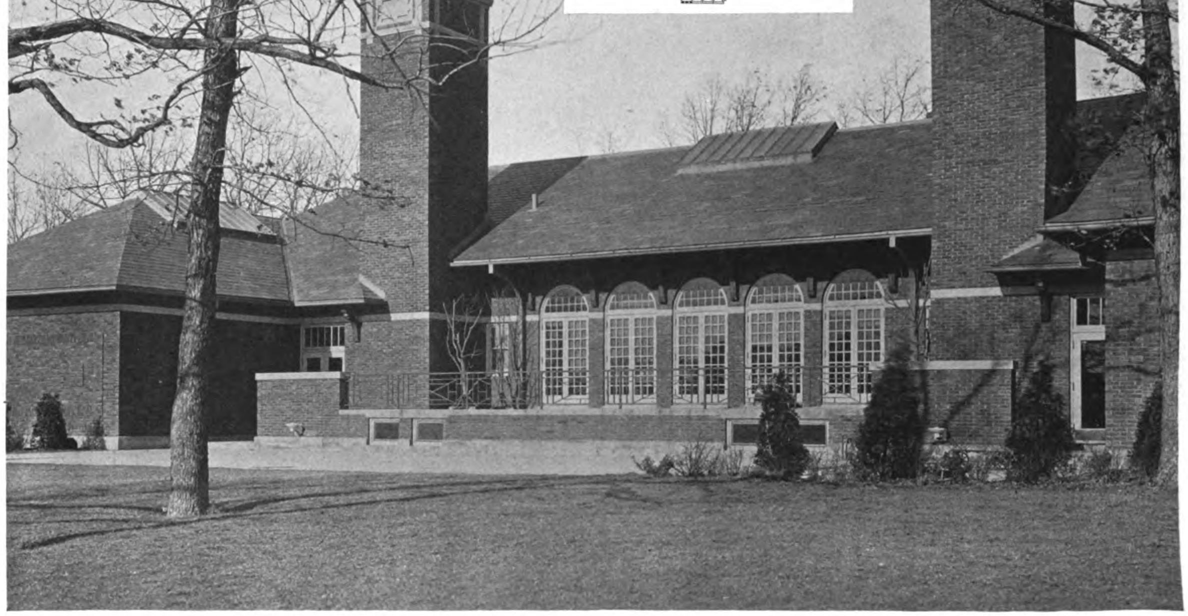

SKOKIE SCHOOL, WINNETKA, ILL.

PERKINS, FELLOWS & HAMILTON, ARCHITECTS

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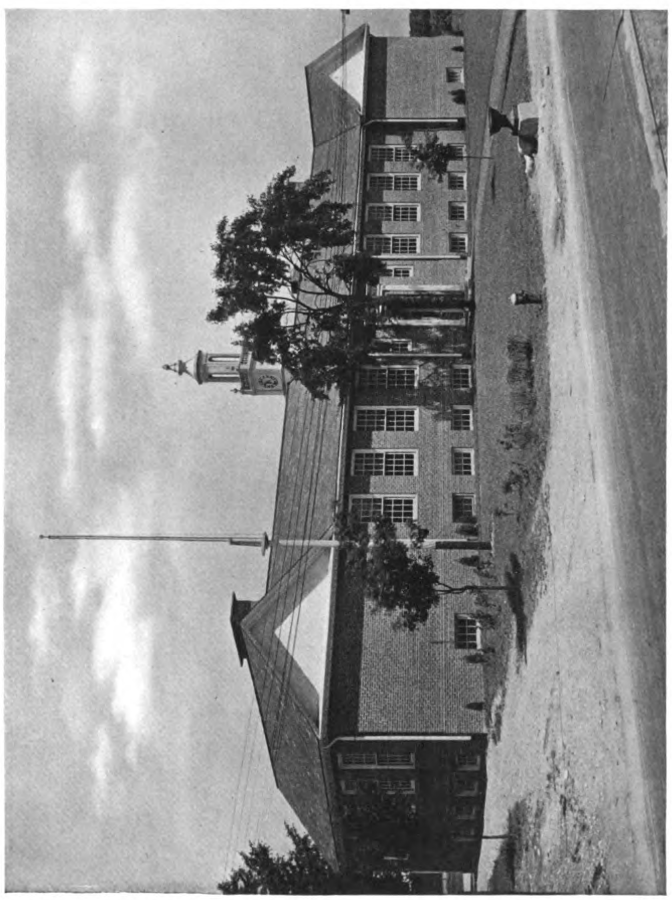
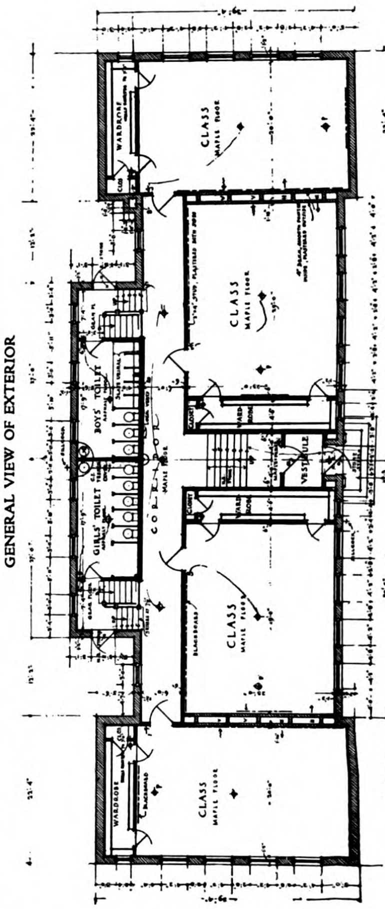
DETAIL OF ENTRANCE AND CUPOLA



GENERAL VIEW OF EXTERIOR




FIRST FLOOR PLAN

FISHER SCHOOL, NORTH WALPOLE, MASS.

R. CLIPSTON STURGIS, ARCHITECT

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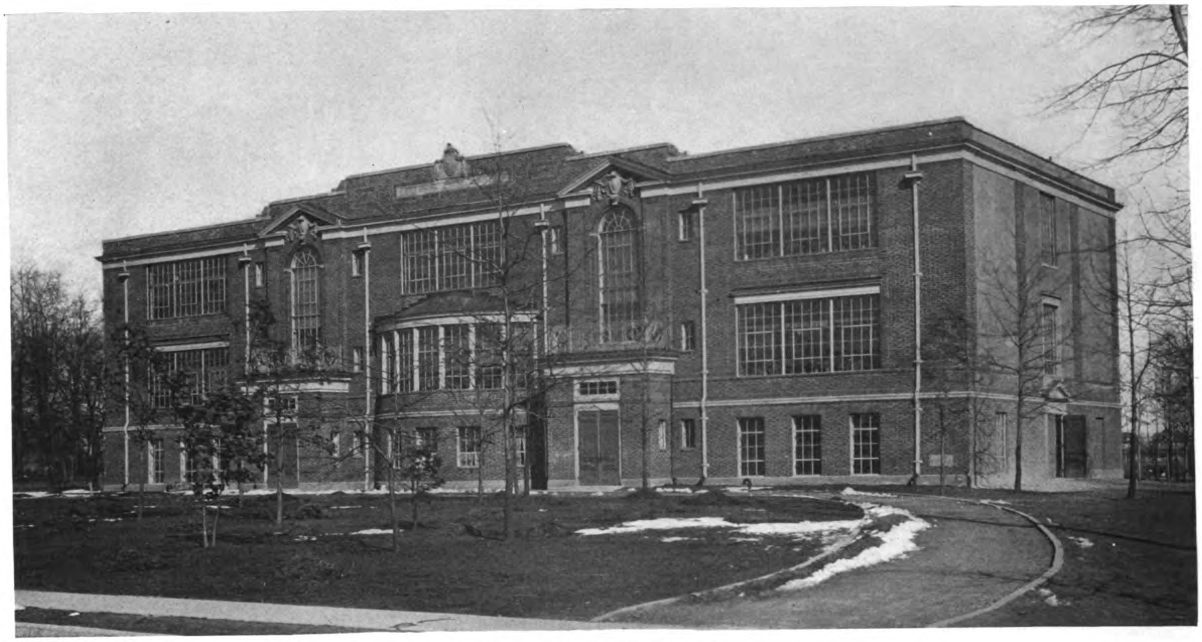

GENERAL VIEW OF EXTERIOR

DETAIL OF ENTRANCE FRONT

MORRIS SCHOOL, ROCKVILLE CENTRE, LONG ISLAND, N. Y.

BLANCHARD & BARNES, ARCHITECTS

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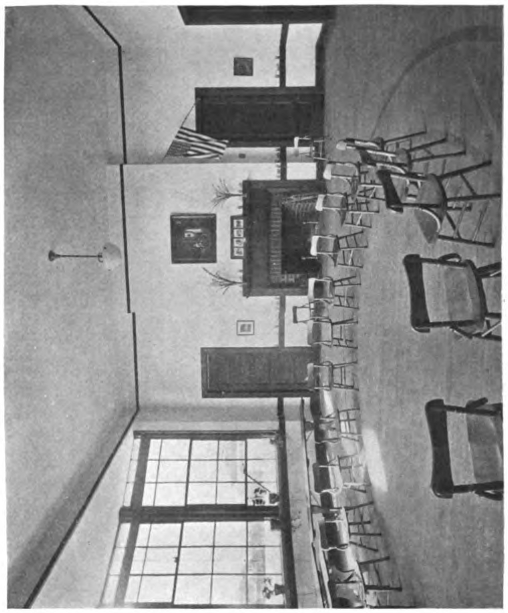
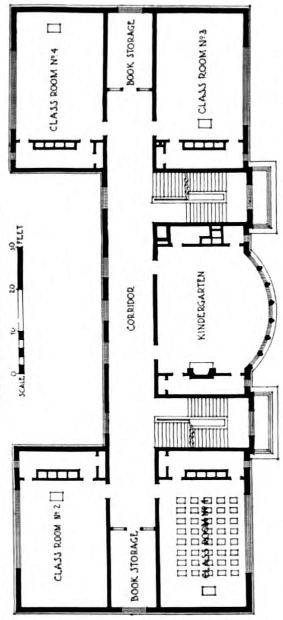


VIEW OF KINDERGARTEN

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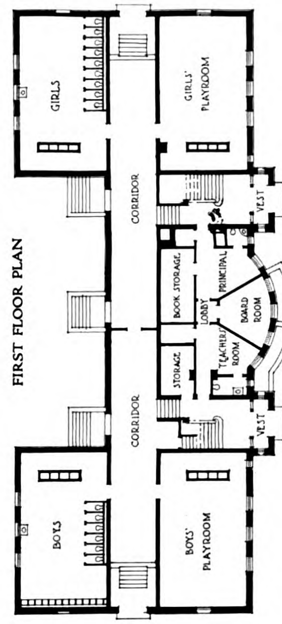


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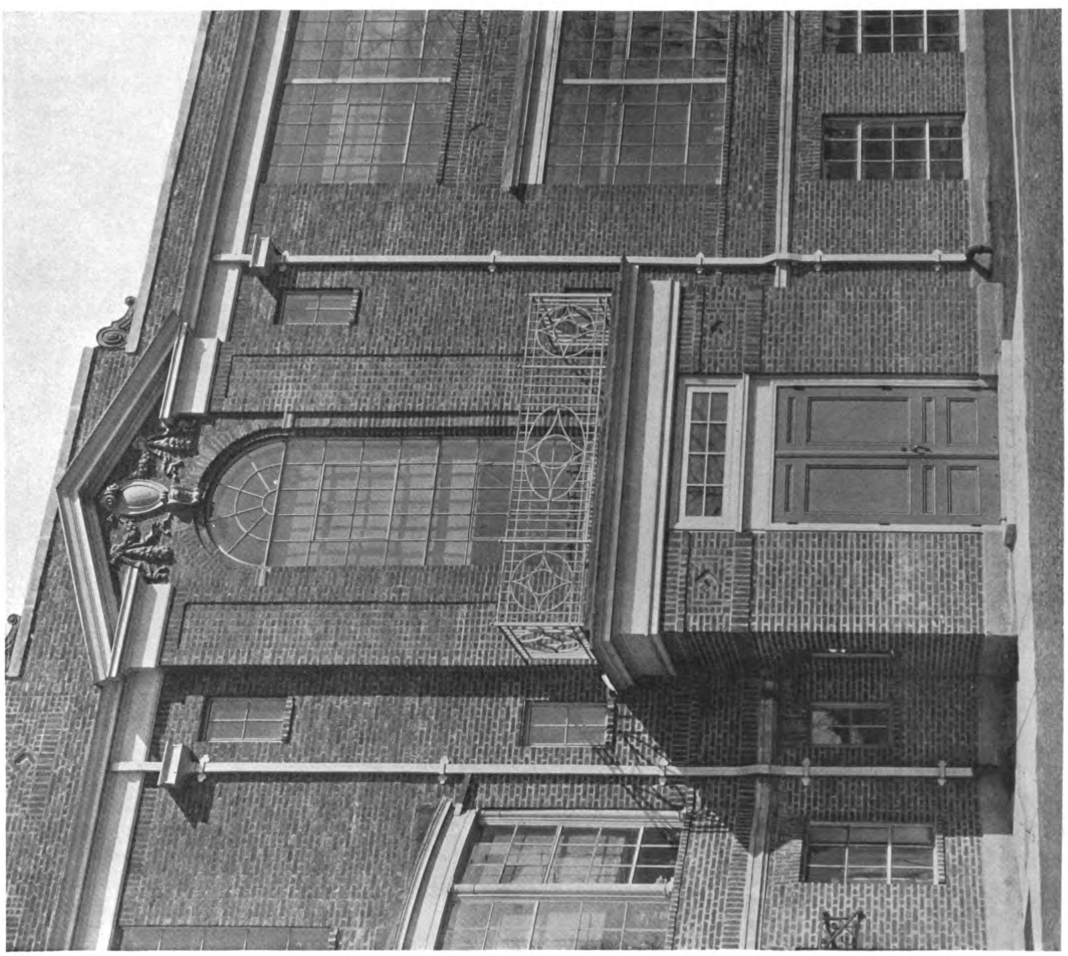

DETAIL OF ENTRANCE

MORRIS SCHOOL, ROCKVILLE CENTRE, LONG ISLAND, N. Y.

BLANCHARD & BARNES, ARCHITECTS

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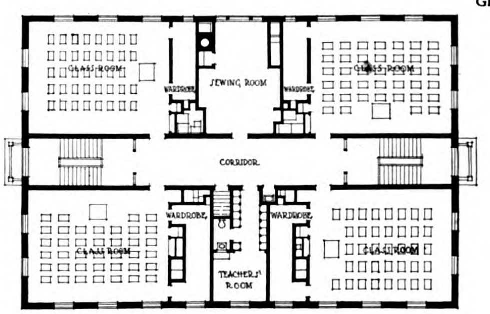
GENERAL VIEW OF EXTERIOR

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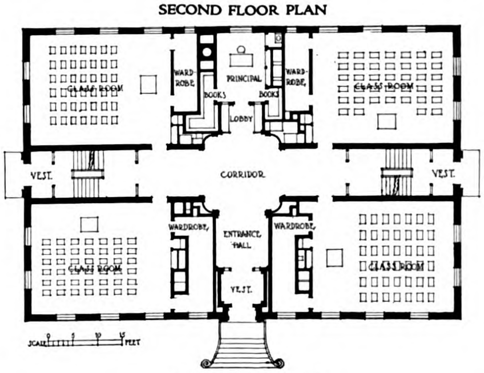


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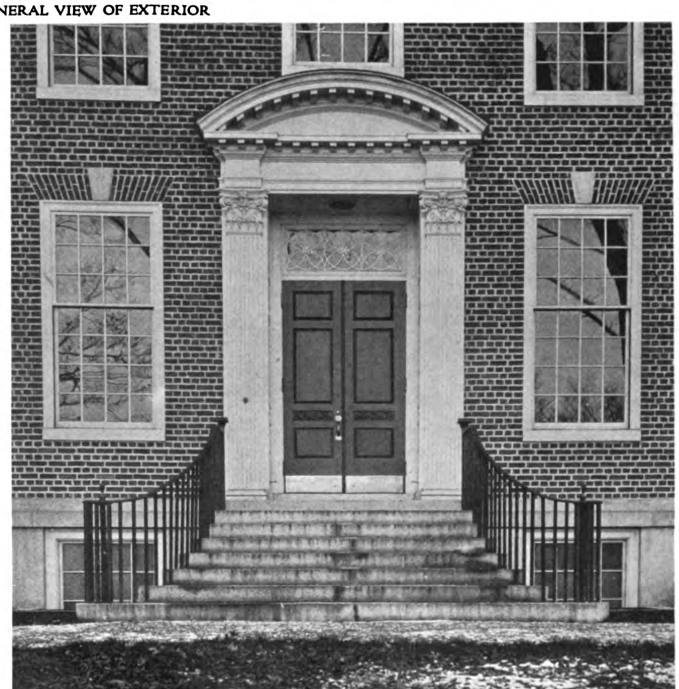

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GRADE SCHOOLHOUSE, NORTH EASTON, MASS.

CHARLES M. BAKER AND STANLEY B. PARKER, ARCHITECTS

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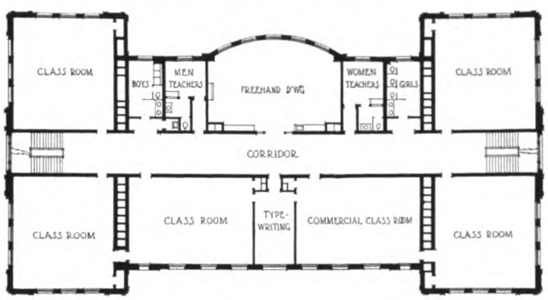


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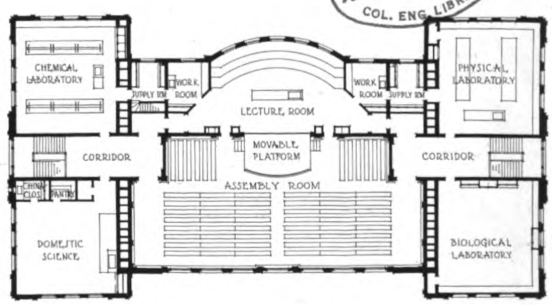


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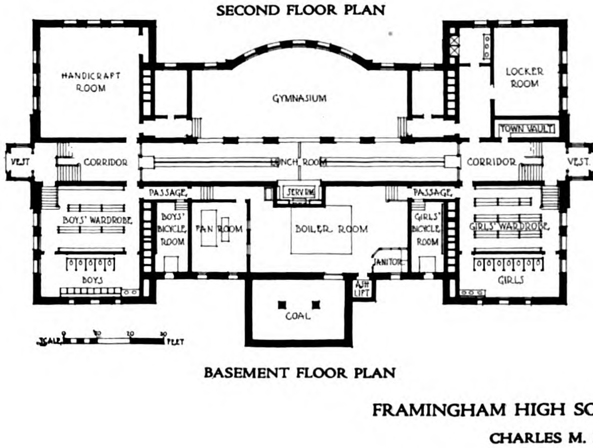


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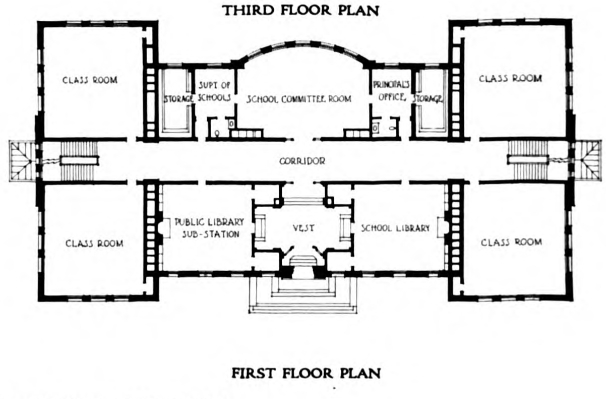


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CHARLES M. BAKER, ARCHITECT

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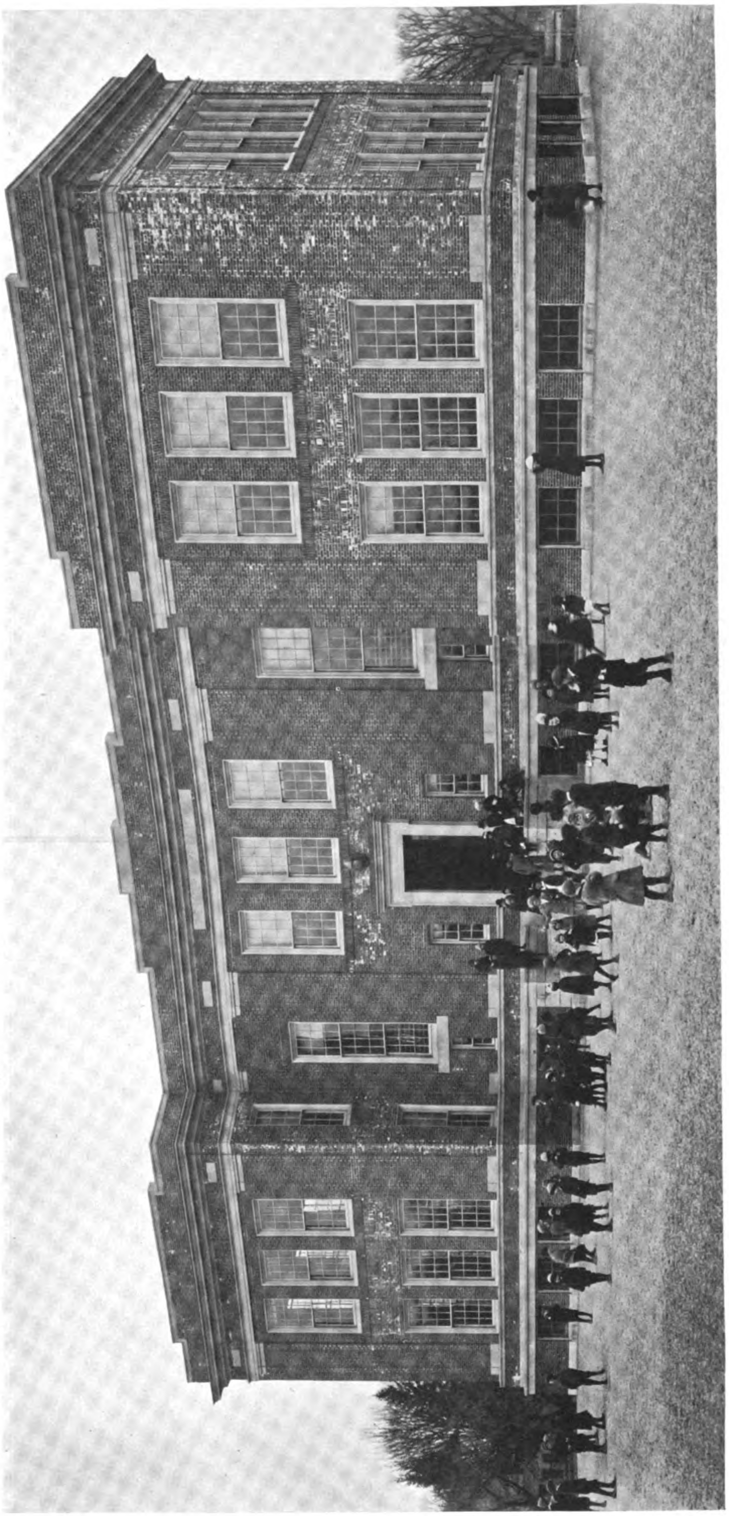

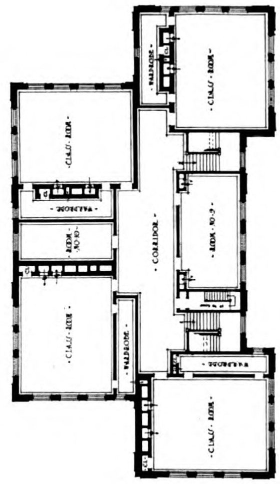

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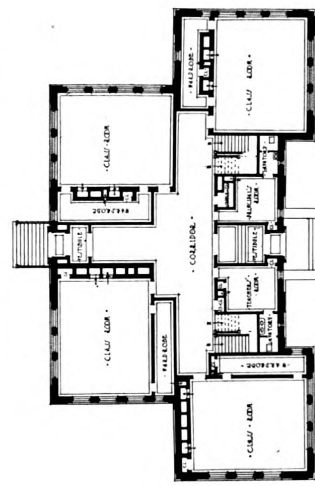

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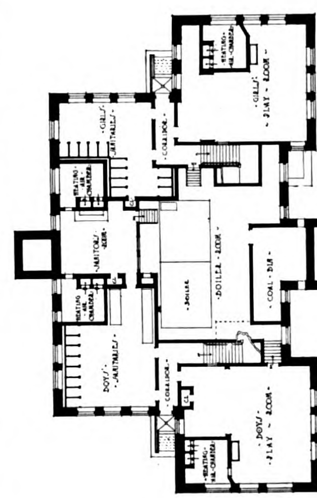
PETER BULKELEY SCHOOL, CONCORD, MASS.

DERBY & ROBINSON, ARCHITECTS



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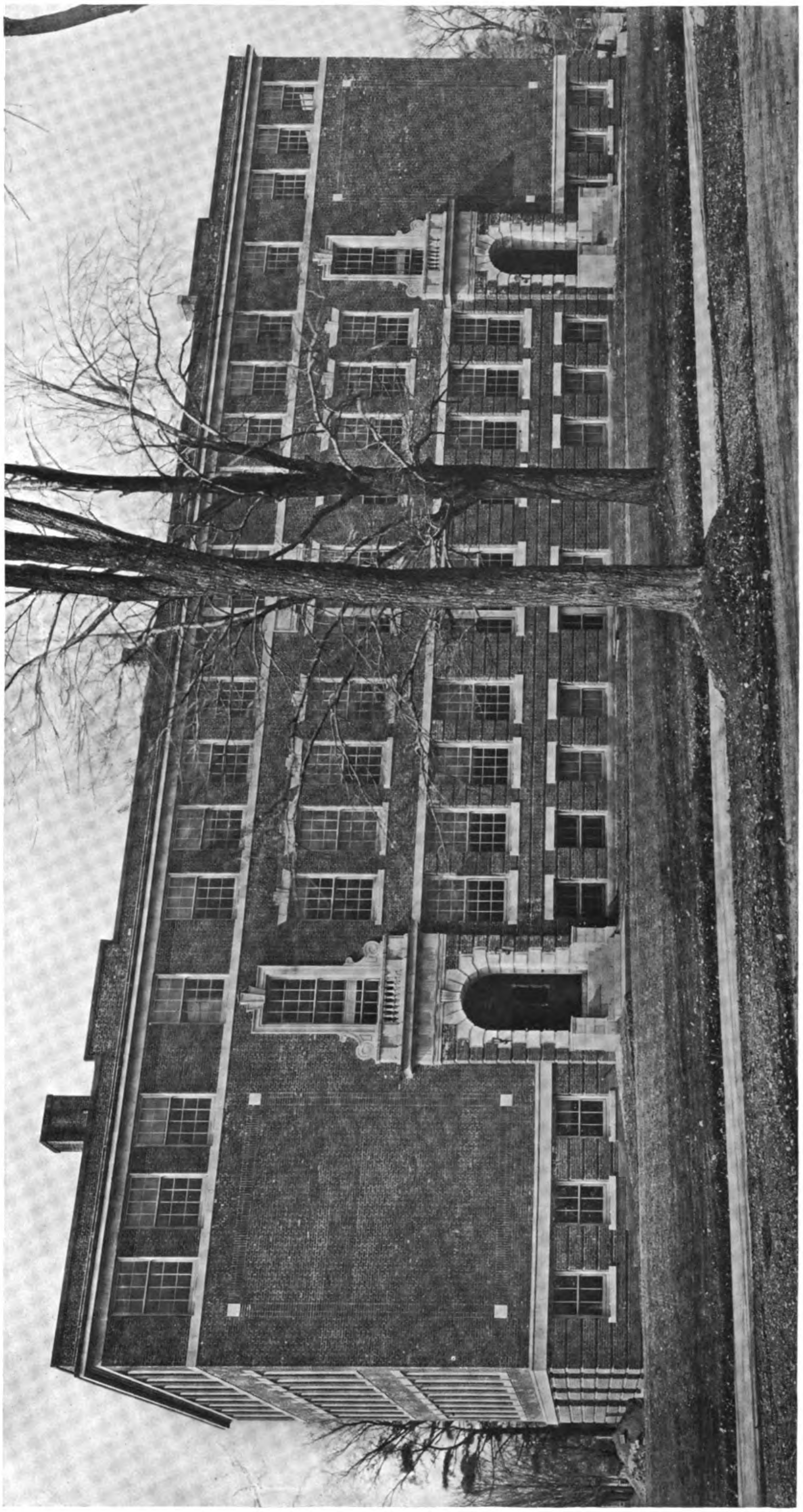

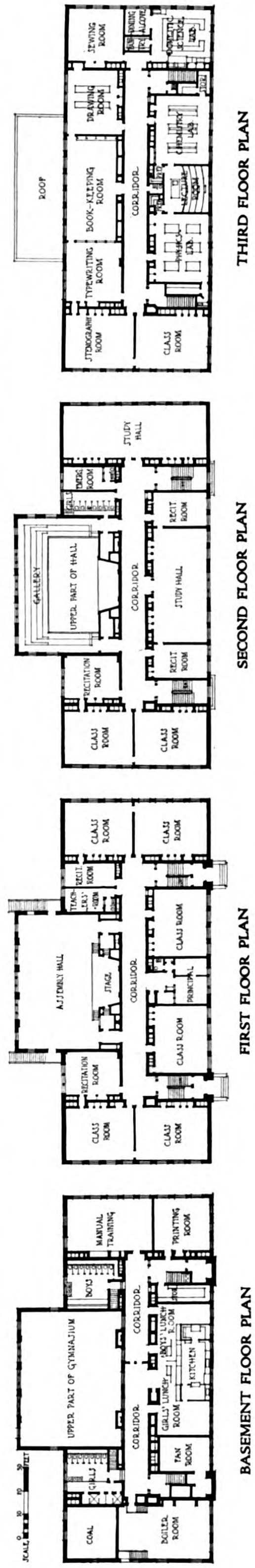


DEDHAM HIGH SCHOOL, DEDHAM, MASS.

KILHAM & HOPKINS, ARCHITECTS

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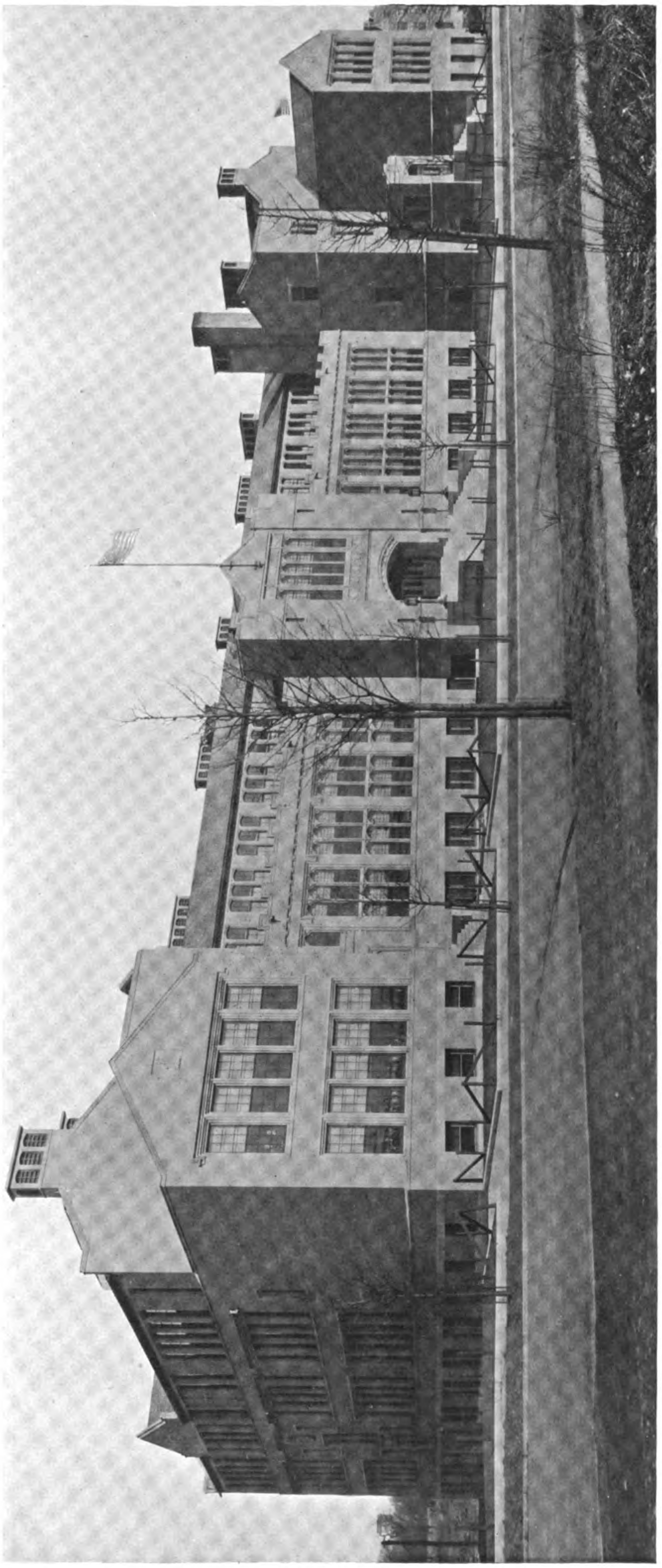

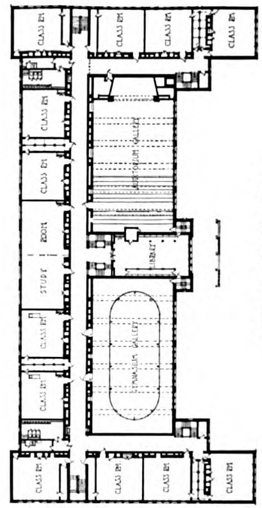

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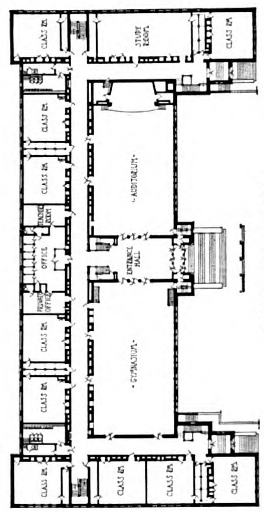

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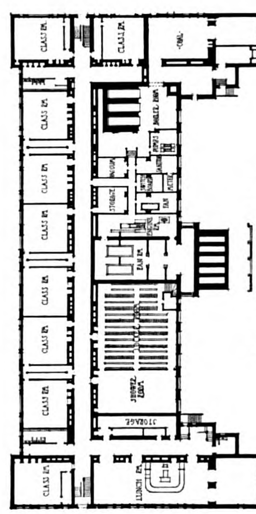

BASEMENT FLOOR PLAN

HIGH SCHOOL OF COMMERCE, BOSTON, MASS.

C. HOWARD WALKER AND KILHAM & HOPKINS, ASSOCIATED ARCHITECTS

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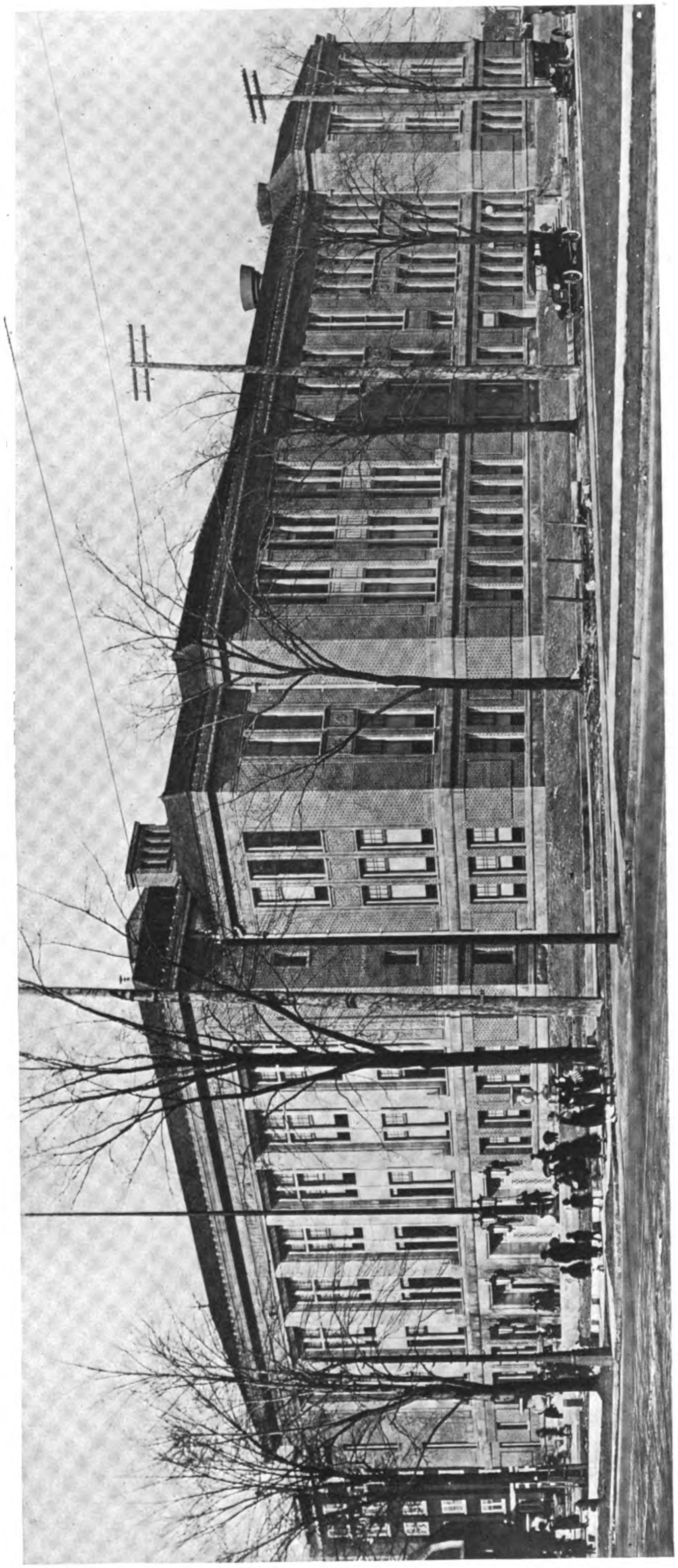

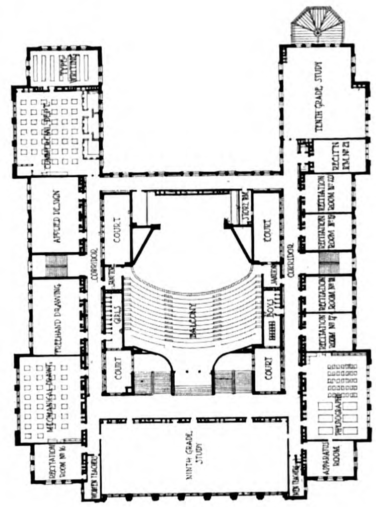

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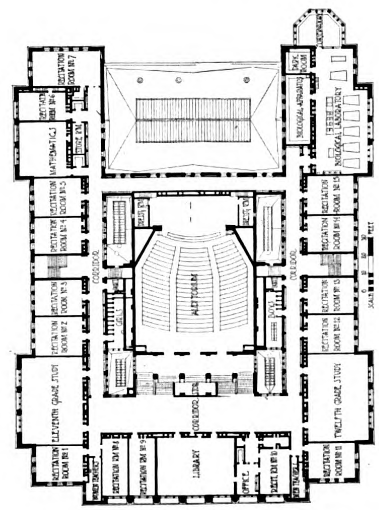

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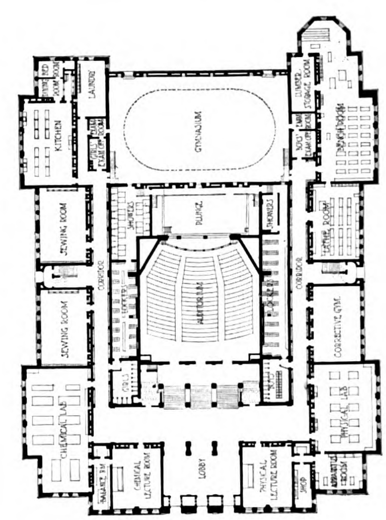

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NORTHERN HIGH SCHOOL, DETROIT, MICH.
MALCOMSON & HIGGINBOTHAM, ARCHITECTS

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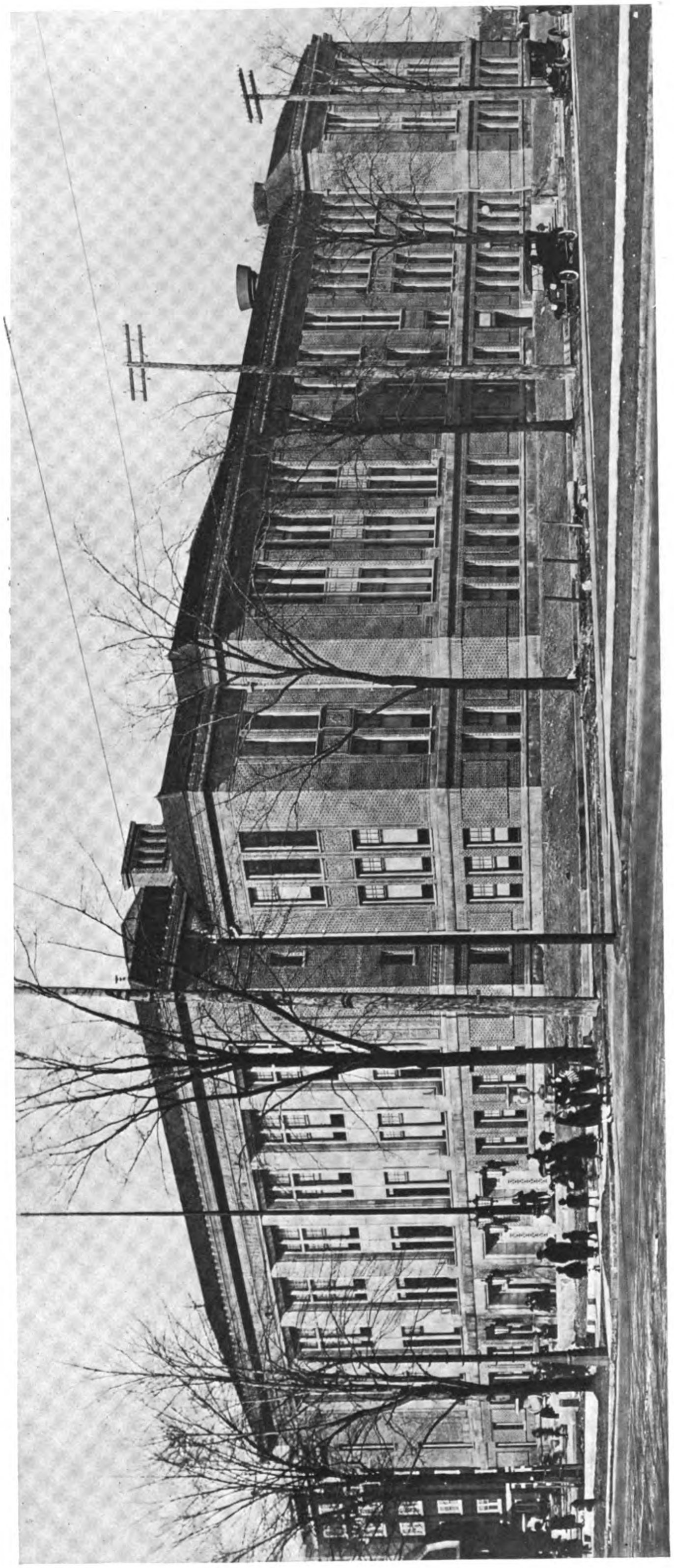
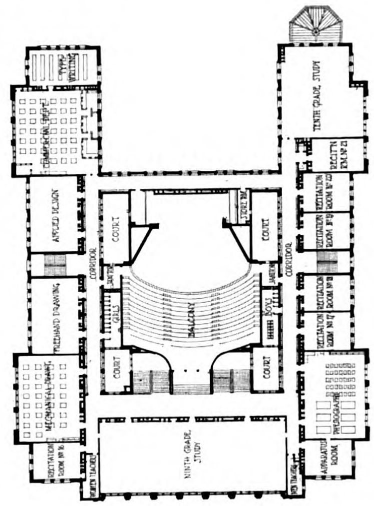
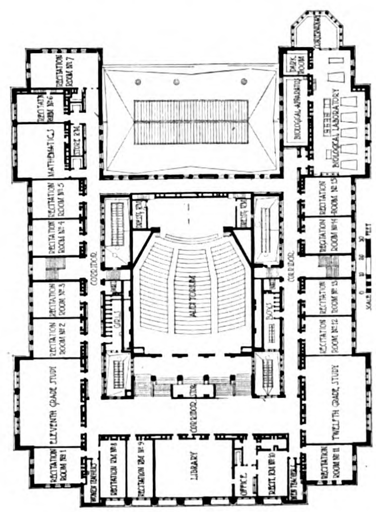
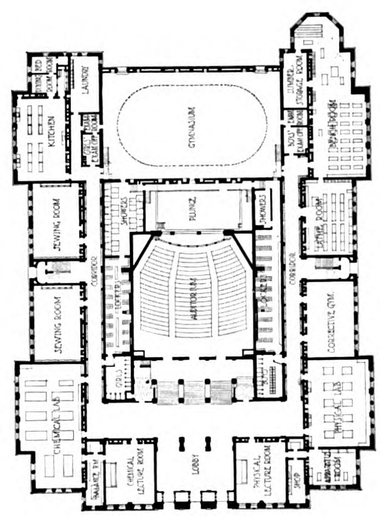




THIRD FLOOR PLAN



SECOND FLOOR PLAN



FIRST FLOOR PLAN

NORTHERN HIGH SCHOOL, DETROIT, MICH.

MALCOMSON & HIGGINBOTHAM, ARCHITECTS

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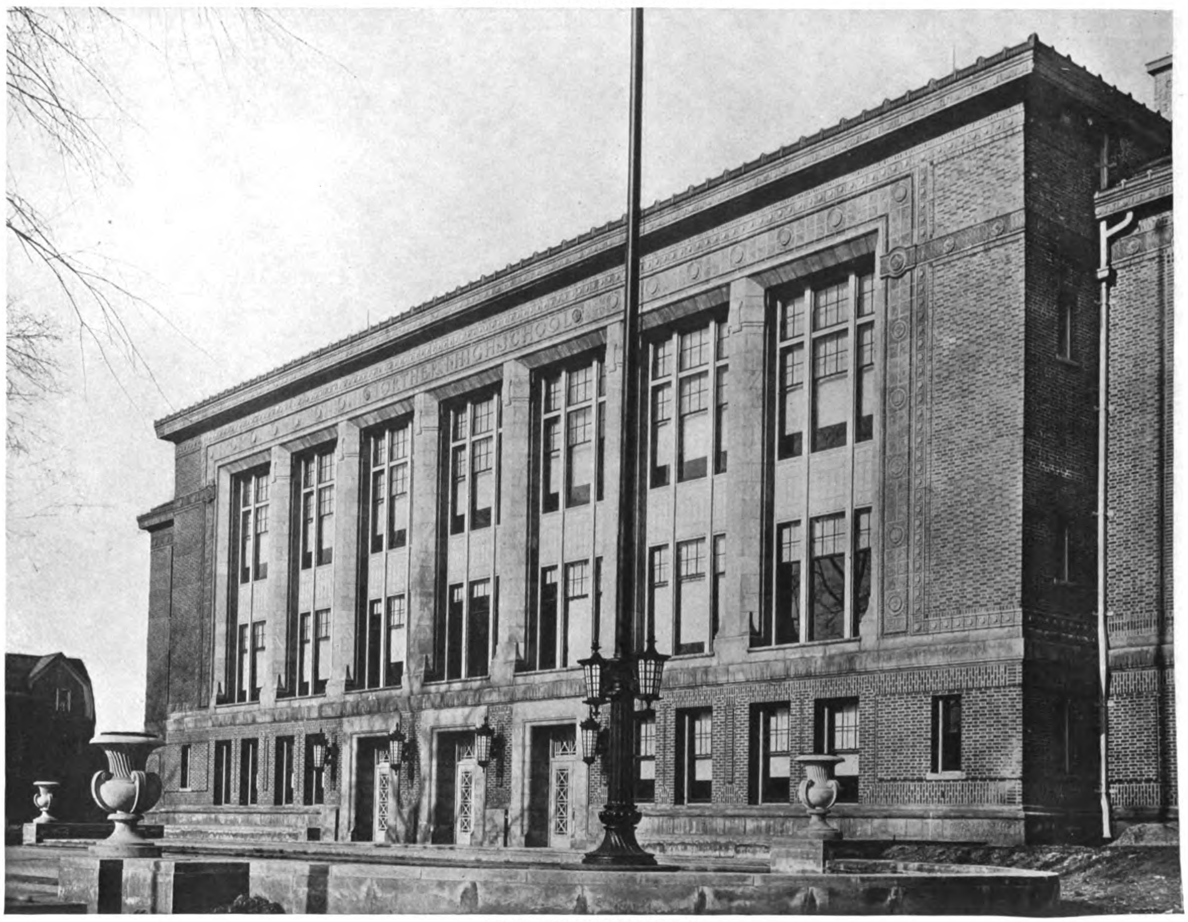
ELEVATION OF ENTRANCE SIDE



DETAIL OF ENTRANCE SIDE

NORTHERN HIGH SCHOOL, DETROIT, MICH.

MALCOMSON & HIGGINBOTHAM, ARCHITECTS

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GENERAL VIEW OF EXTERIOR

AUDITORIUM

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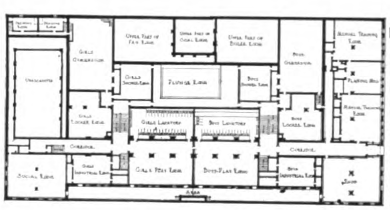
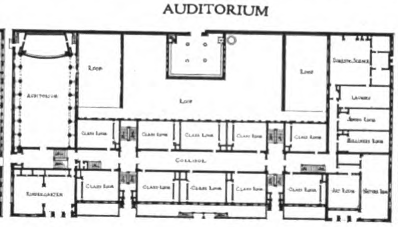
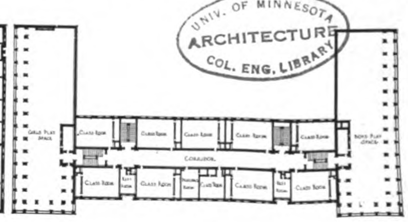


BASEMENT FLOOR PLAN



FIRST FLOOR PLAN



SECOND FLOOR PLAN

LAFAYETTE BLOOM SCHOOL, CINCINNATI, OHIO

GARBER & WOODWARD, ARCHITECTS

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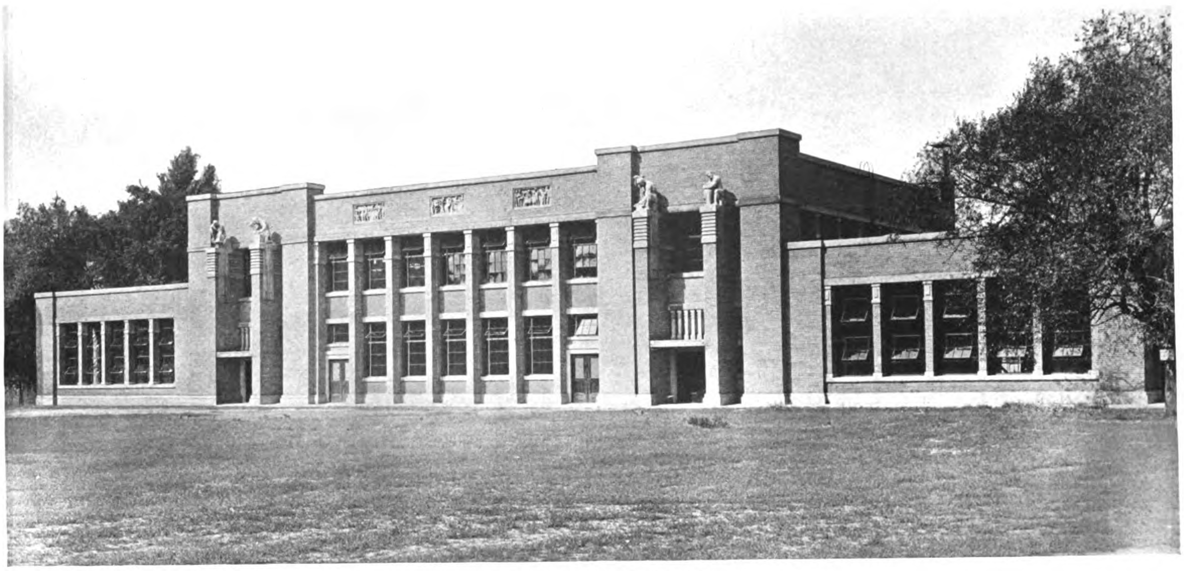
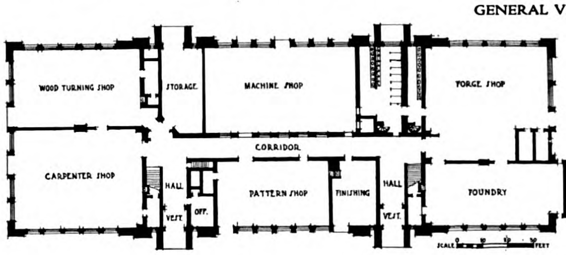


GENERAL VIEW OF EXTERIOR

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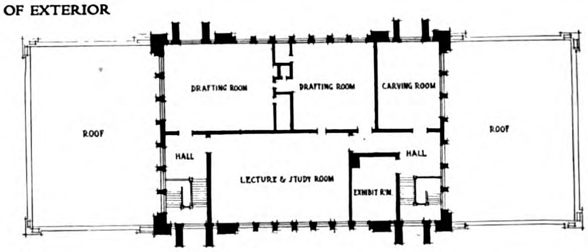
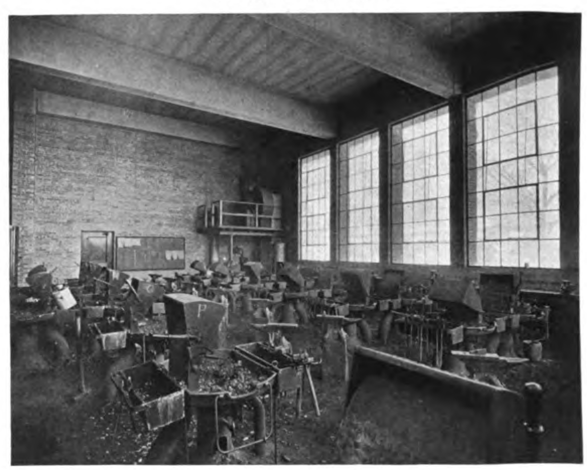



SECOND FLOOR PLAN

MACHINE SHOP



FORGE SHOP

TECHNICAL HIGH SCHOOL, SALT LAKE CITY

CANNON & FETZER, ARCHITECTS

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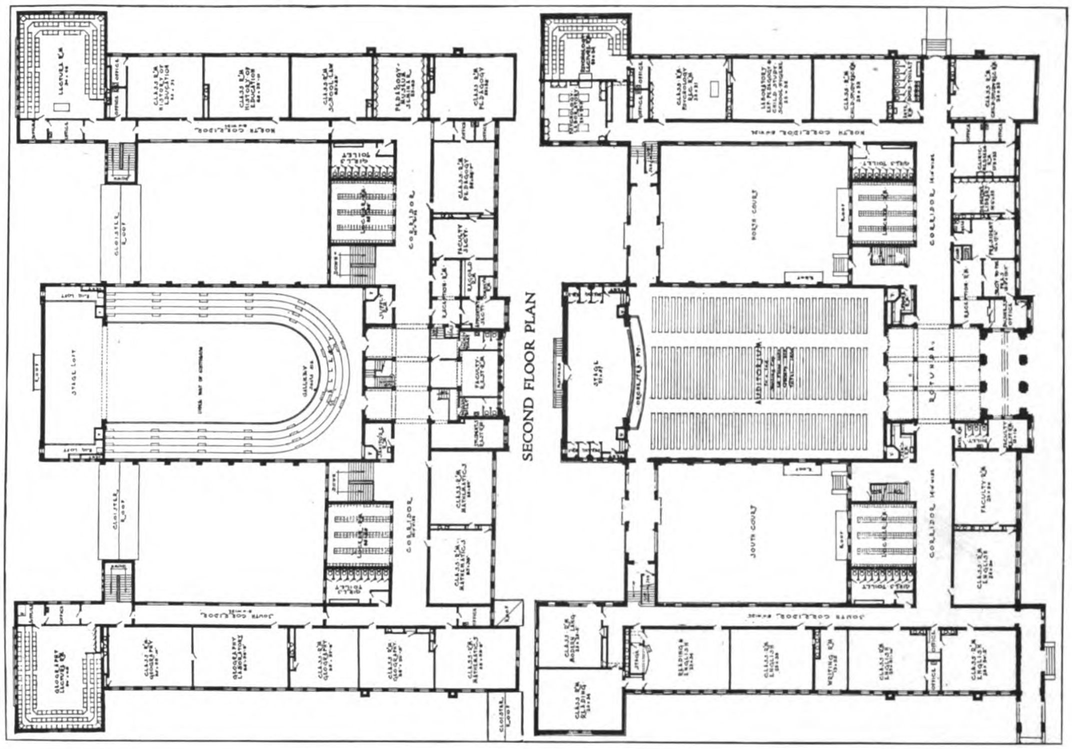

SECOND FLOOR PLAN

FIRST FLOOR PLAN

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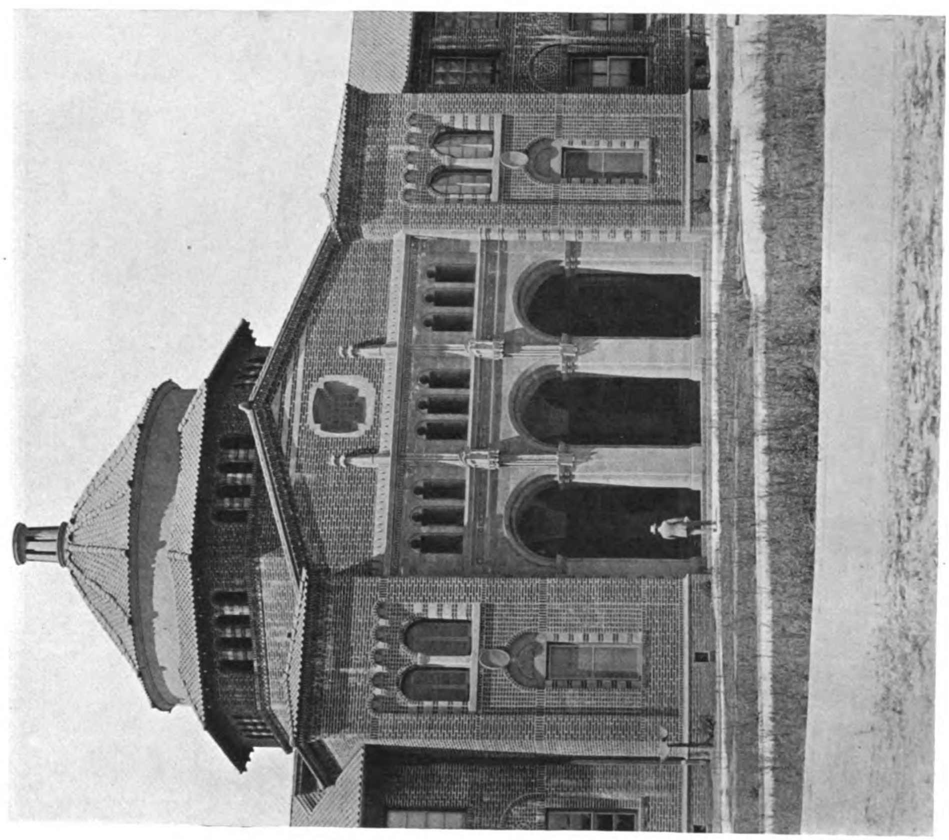

DETAIL OF ENTRANCE PAVILION

ADMINISTRATION BUILDING, STATE NORMAL SCHOOLS, LOS ANGELES, CAL.

ALLISON & ALLISON, ARCHITECTS

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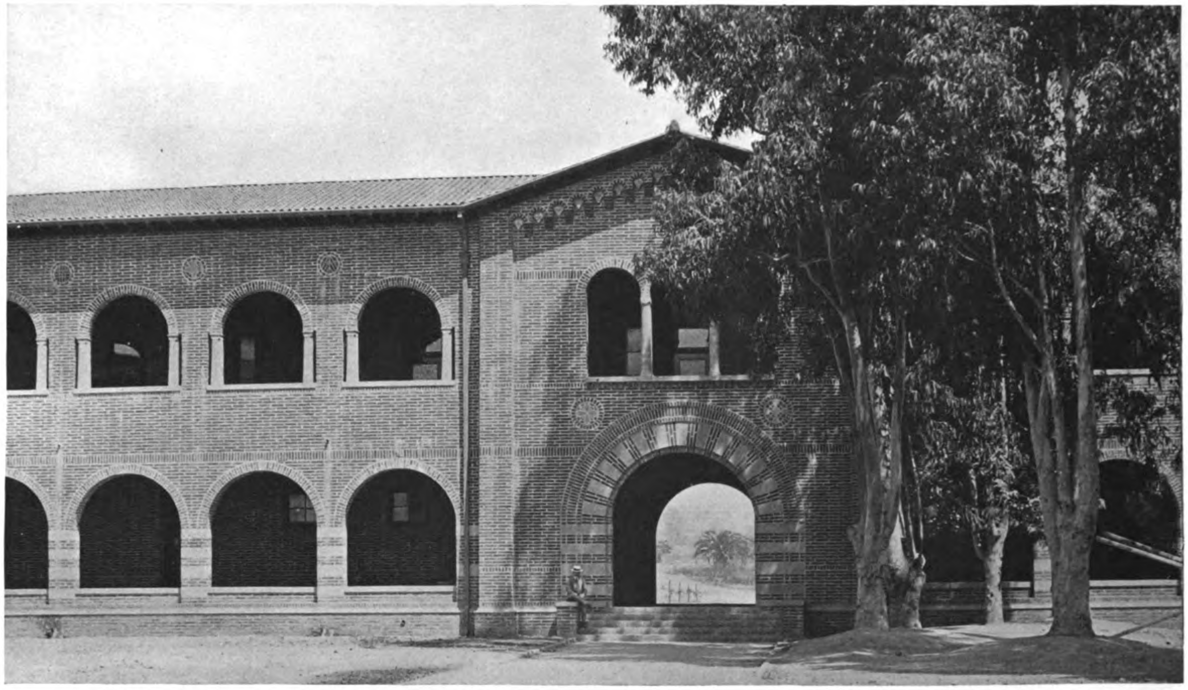
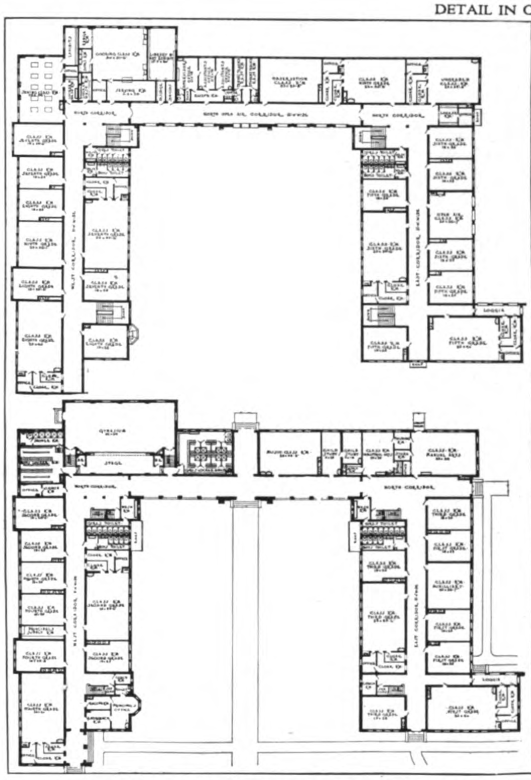
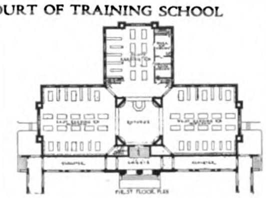


DETAIL IN COURT OF TRAINING SCHOOL



FIRST AND SECOND FLOOR PLANS OF TRAINING SCHOOL



ENTRANCE TO LIBRARY

STATE NORMAL SCHOOLS, LOS ANGELES, CAL.

ALLISON & ALLISON, ARCHITECTS

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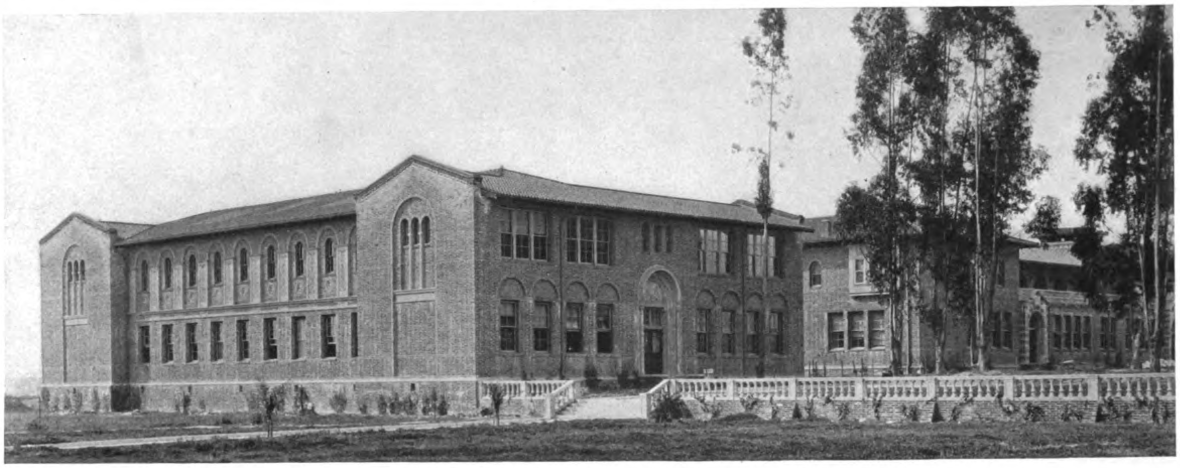
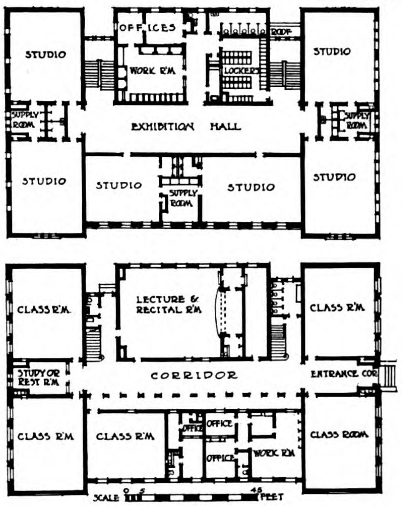
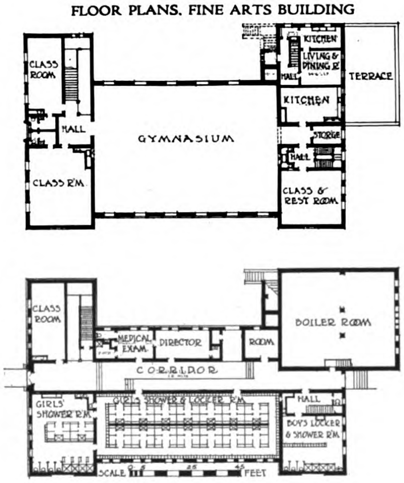


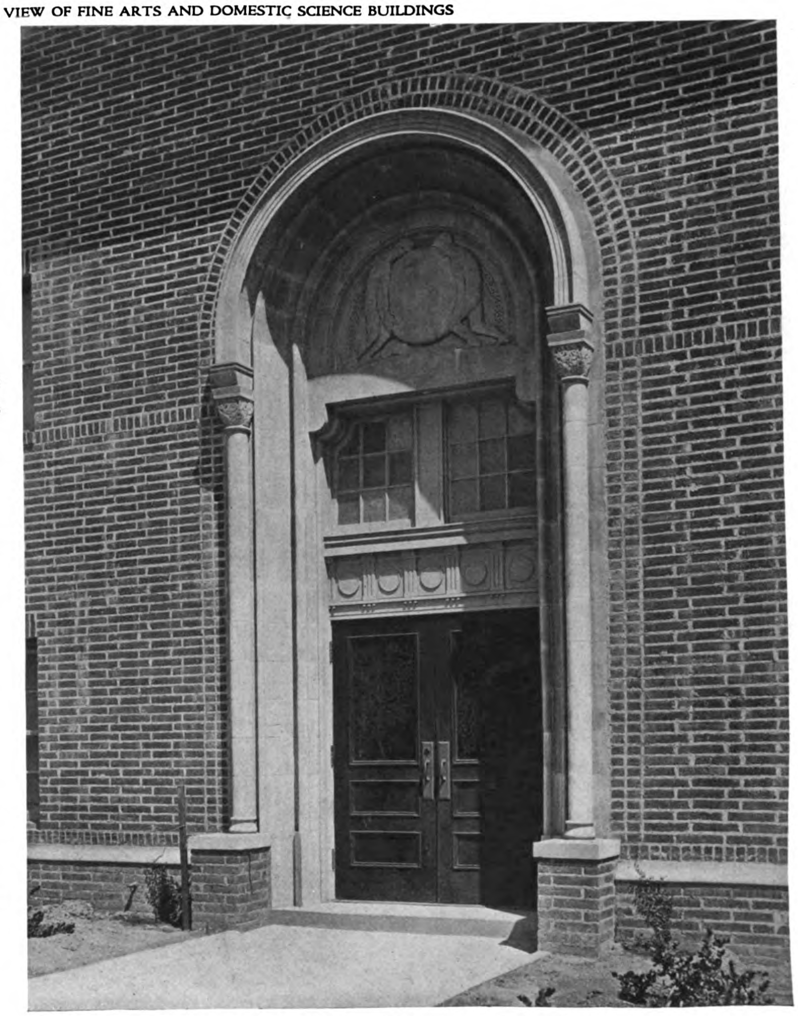
GENERAL VIEW OF FINE ARTS AND DOMESTIC SCIENCE BUILDINGS




FLOOR PLANS, FINE ARTS BUILDING




FLOOR PLANS, GYMNASIUM



DETAIL OF ENTRANCE TO GYMNASIUM

STATE NORMAL SCHOOLS, LOS ANGELES, CAL.

ALLISON & ALLISON, ARCHITECTS

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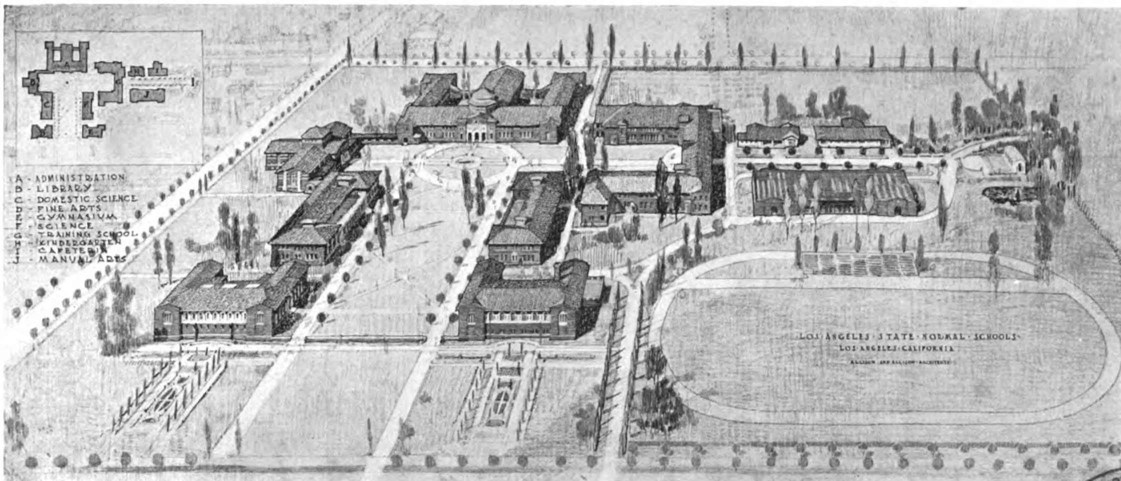


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# Los Angeles State Normal Schools, Los Angeles, Cal.

ALLISON & ALLISON, ARCHITECTS

THE site occupied by this group of buildings covers twenty-five acres, with frontages of 1,254 feet on Vermont avenue and Heliotrope Drive, and 800 feet on Monroe and Willowbrook avenues. The group is one of the largest on the Pacific coast and has been executed in a style of architecture inspired from the Lombard Romanesque of Northern Italy. The chief material is a dark red brick, with artificial stone trimmings and tile roofs. All halls and stairs have been constructed throughout of fireproof materials. The total cost of the work was about $550,000.

The Administration Building is 260 feet long by 202 feet deep, and contains offices and class rooms for the departments of Child Study, Psychology, Pedagogy, History of Education, School Law, Reading, History, Mathematics, English, Modern Languages, Geography, etc. There are also an auditorium, with a seating capacity of 1,650 persons, and various rest rooms, department libraries, health examiner's room, women's club rooms, and other minor rooms.

Entrance Detail, Domestic Science Building

The Library Building contains a general reading room, accommodating 350 readers, and a children's department. It has stack room for 50,000 volumes, with a librarian's room, a reception room, magazine rooms, class rooms, students' book store, printing office, store rooms, etc.

The Domestic Science Building accommodates classes in Leatherwork and Bookbinding, Clay and Concrete, Drawing, Weaving and Textiles, Cardboard Work, Sewing, Millinery, and Cooking. It also contains a model apartment for instruction in housekeeping, lecture rooms, rest rooms, and other conveniences.

The Fine Arts Building contains on the first floor class rooms for music, an auditorium and stage for musical productions, a library, and various offices and other minor rooms. On the second floor are studios, offices, supply rooms, and a large exhibition gallery.

The Gymnasium Building, which balances the Fine Arts Building in plan, contains the main gymnasium hall, with locker, shower, and dressing rooms, a living apartment for the caretaker, and a heating plant for the entire group of buildings. The heating is by steam, all air used in any of the buildings being mechanically washed and humidified.

The Training School Building contains departments for grade work, sewing and cooking departments, rooms for observation classes, supervisors' offices, principal's office, emergency room, and various minor study and rest rooms. There are also a complete gymnasium equipment for boys and girls, a library, and a manual training department.



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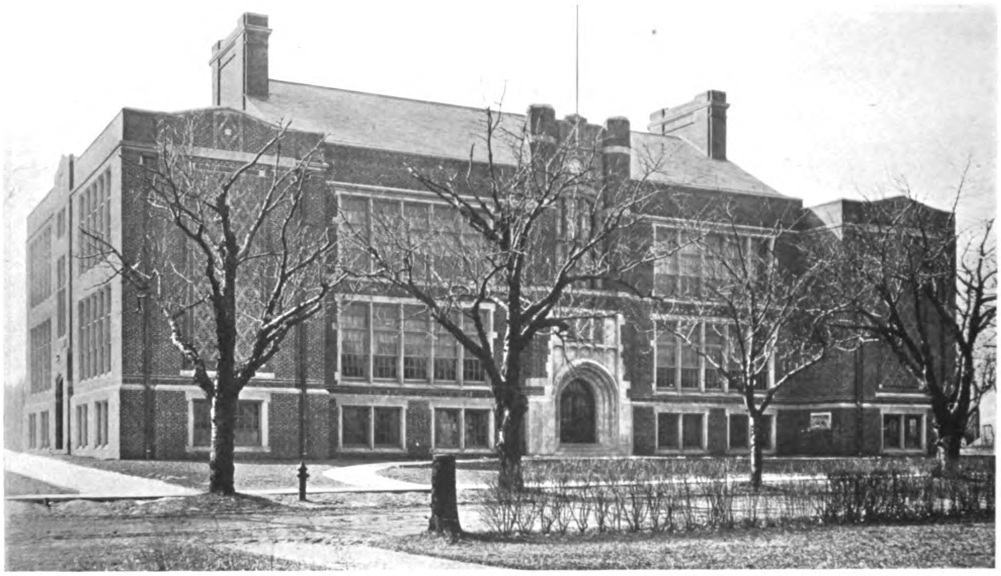
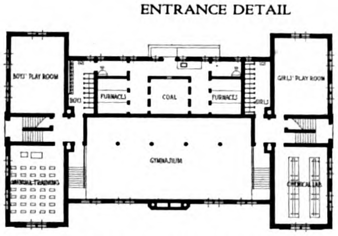
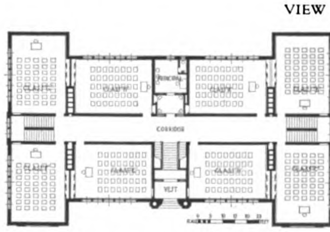


ENTRANCE DETAIL

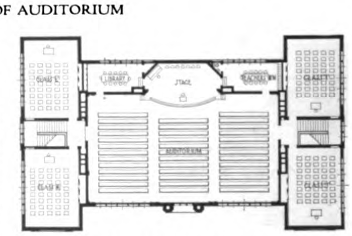
VIEW OF AUDITORIUM



BASEMENT FLOOR PLAN



FIRST FLOOR PLAN



SECOND FLOOR PLAN

MIDDLETOWN TOWNSHIP HIGH SCHOOL, LEONARDO, N. J.

BRAZER & ROBB, ARCHITECTS

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# Practical Perspective Methods for Office Use

*By* ROBERT FULLER JACKSON

SECOND PAPER

IN the perspectives made by architects it often happens that the vanishing points, or at any rate one of them, will not be on the board. The same may occur for measure points. When this occurs various devices are used to overcome the resulting difficulties.

INACCESSIBLE VANISHING POINTS. The most common device when the vanishing point is inaccessible is the use of a railroad curve, or a special curve cut out of wood or cardboard, as shown in Fig. 11. With this device the edge of the T-Square should be equally distant from the two ends of the head, in order that it may draw a true radius to the arc of the curve. If no such T-Square is at hand, small brads may be driven into the head of an ordinary T-Square at equal distances from the edge of the blade, so as to permit its use. Either the outside or the inside of the curve strip may be used to give the direction of vanishing lines, as shown in the figure, if the strip is so cut that each of the arcs has the proper radius, the respective centers being the actual V.P.'s, its two sides are based on different radii so as to be used for two different vanishing points as centers of the two circles.

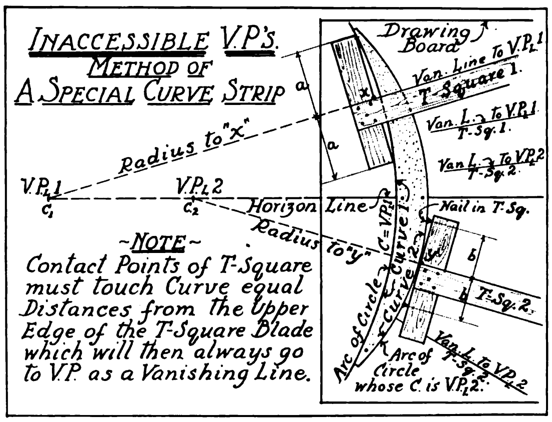


Figure 11

It is necessary, however, to know the location of the vanishing point in order that the curve may have the correct radius and be properly located on the board. Moreover, the cutting of accurate curves is a task of some difficulty. Figure 12 shows a little-known method for obviating these difficulties, by the use of a series of strips of lath, in place of the curve. To use them a single vanishing line must first be determined, preferably the highest in the picture. The T-Square blade is set on this line, and a lath nailed to the board, in contact with its head, as shown, care being taken to have the lower end of the lath coincide with that of the T-Square head. The T-Square is then placed with its blade along the horizon, and a second lath nailed to the board, with its upper end touching the lower end of the first lath, and placed so that the lower end of the T-Square head touches it. The length of this lath should be equal to that of the T-Square head. For lower lines a third lath is set in place, its angle with the second being equal to the angle between the second and first. The T-Square, sliding on these laths, always radiates to *very nearly* the same point. There is a slight error, as the series of straight lines does not coincide with the mathematically correct curve, but for architectural purposes it is inappreciable.

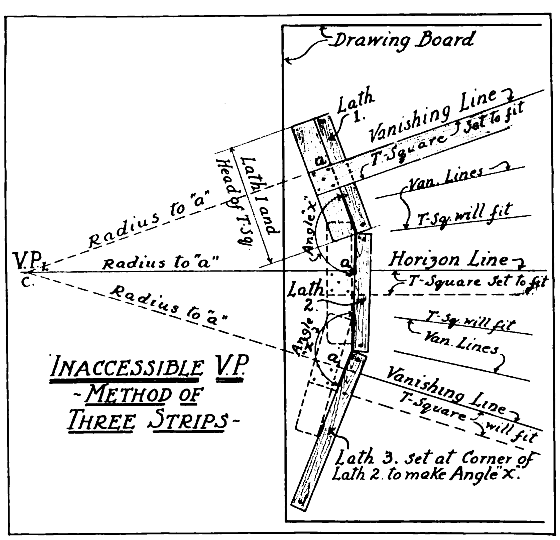


Figure 12

MEASURE POINTS. Where one of the vanishing points is inaccessible, its corresponding measure point may be found as shown in Fig. 13. One measure point having been found, by the use of an arc in plan, having its center on the vanishing point, and its radius equal to the distance from vanishing point to station point, the lines drawn from station point to the two measure points must make an angle of 45 degrees. The proof of the correctness of this construction is as follows:

$$\text{Angle } \alpha = 180° - 2\gamma$$
$$\text{Angle } \beta = 180° - 2\delta$$
$$\alpha + \beta = 90°$$

Adding,

$$360° - 2(\gamma + \delta) = 90°$$
$$180° - (\gamma + \delta) = 45°$$

But

$$\epsilon = 180° - (\gamma + \delta)$$
$$\therefore \epsilon = 45°$$

In practice, however, the measure points may be found even more simply. Given a horizontal receding line in perspective, extend this line to P.P. in



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a G.L. and draw to V.P. To measure this line or to lay off on this line any distance or measure, lay it off on G.L. at the same scale as the plan, and draw to M.P.; or if M.P. is inaccessible, or the measure on G.L. falls off the paper, lay off half or quarter the measure on G.L. and draw to a point on H.L. equal to half or quarter the distance from V.P. to M.P. and connect. These are "fractional" M.P.'s and the scales on G.L. are "fractional" scales to correspond. With this method, any scale may be used on G.L., larger or smaller than that of the plan. A smaller scale is often convenient, where the laying out of distances at full scale would make a measure line that could not be contained in the limits of the drawing. A variation in the scale used in measure lines will also in many cases give better intersections with the vanishing line.

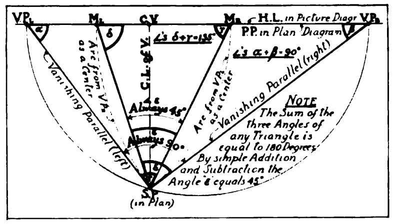


Figure 13

Change of Scale. It is often convenient to make a change in scale graphically, directly on a drawing. Lines drawn parallel to the base of a triangle will cut the other two sides proportionally (Fig. 14). If the free ends of two lines are connected by another line as a base, either of the first two lines, divided into any measures, can be transferred proportionally to the other line by lines drawn parallel to the third (base of triangle).

This principle can be used in making fractional scales for fractional points, and is used in Fig. 15 in establishing a definite "architectural" scale from a "nondescript," but proportionally correct, scale of the ground line and line of height in the "Inverse Process" of making a plan and elevation from a photograph.

Inverse Perspective. If a perspective drawing can be made from a scale plan and elevation of an object, the reverse should also be possible. Such is the case if the position of the S.P. is known, and it is nearly always possible to locate S.P. from some line in the perspective.

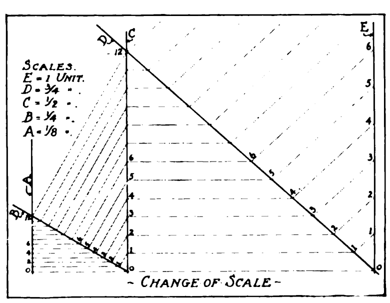


Figure 14

A photograph is a perspective projected upon a straight P.P., the film or glass plate being the P.P. behind the camera lens, just as the image formed on the eye's rétina is projected on a spherical P.P. behind the lens of the eye.

The distance from the lens to the P.P. is the distance from S.P. to the P.P., and the line drawn from the center of the lens (S.P.) perpendicular to P.P. is the center line of vision, corresponding to the "central direction of seeing." In a photograph or in a perspective drawing the C.L. of V. is not always the geometrical center of the picture. In a drawing it may be desirable to shift this C.L.V. to one side of the center of the "visual angle" or center of the limits of the picture in order to secure a better composition of lines, or to include some object of interest. In a photograph the print may be trimmed so as to make a better composition, thus throwing the C.L.V. to one side of the center of the finished picture, or the "back" or P.P. may be tilted so as to be vertical when the camera is pointed up or down, in order to avoid the appearance in the picture of converging lines which are really vertical in the object.

In any case, unless the exact position of S.P. and the C.L.V. is determined, the inverse (or reverse) process will not be accurate. For the whole process depends upon perspective positions of points (measurements on vanishing lines) being brought forward to the P.P. in lines of height or ground lines which can be measured, and unless the correct positions of M.P.'s are found, lines from these points to G.L.'s will not measure off true scale measures of points from vanishing lines. The position of the M.P.'s is always found on H.L. by laying off the distance to S.P. from V.P., so that the importance of fixing S.P. accurately is seen. When once the S.P. is determined, the rest of the reverse process is simple.

In the previous paper we found that the bisector of an angle of 90 degrees in plan was very useful in shortening perspective work. In "Inverse Perspective" the V.P. of this bisector (D.V.P.) is invaluable. For if we know the position of D.V.P. on H.L., we can find the S.P., the C.L.V., and then the M.P.'s. In any perspective (including a photograph) there is usually some "clue" or line which is the bisector of two lines which meet in plan at 90 degrees. This is all that is needed to establish S.P. The process is sometimes roundabout, but easy.

For example, if there is an object in the picture, with one or more lines in plan which are parallel to the central direction of seeing (C.L.V.), *i.e.*, perpendicular to P.P., the S.P. must be directly below C.V. on a line perpendicular to the H.L. (or line connecting the two V.P.'s and on the semicircle constructed upon it between the V.P.'s as a diameter).

Or there may be a square in the picture lying in a horizontal plane. The diagonal from the nearest to the farthest corner, extended, will cut H.L. in a point which is its V.P. (*the* D.V.P.). Referring to the drawing (Fig. 15) a line drawn at the center of the diameter $V.P._L$ — $V.P._R$ perpendicular to it will cut the great circle at its summit. A line from this point drawn through D.V.P. will cut the circle on the opposite side at S.P.

Figure 15 shows a problem which has no apparent "key line." But by observing carefully, we note that the roof hip, which we can assume is a bisector of the cornice lines in plan, being the intersection of two roof slopes making the same angle, is such a "clue" or "key line."

This "key" hip line is a start in this solution, but does not give us the D.V.P. directly on H.L. from which to find C.L.V. and S.P. and the M.P.'s. But a vertical plane passing through this hip line will vanish in the same vertical H.L. as its vanishing parallel plane through

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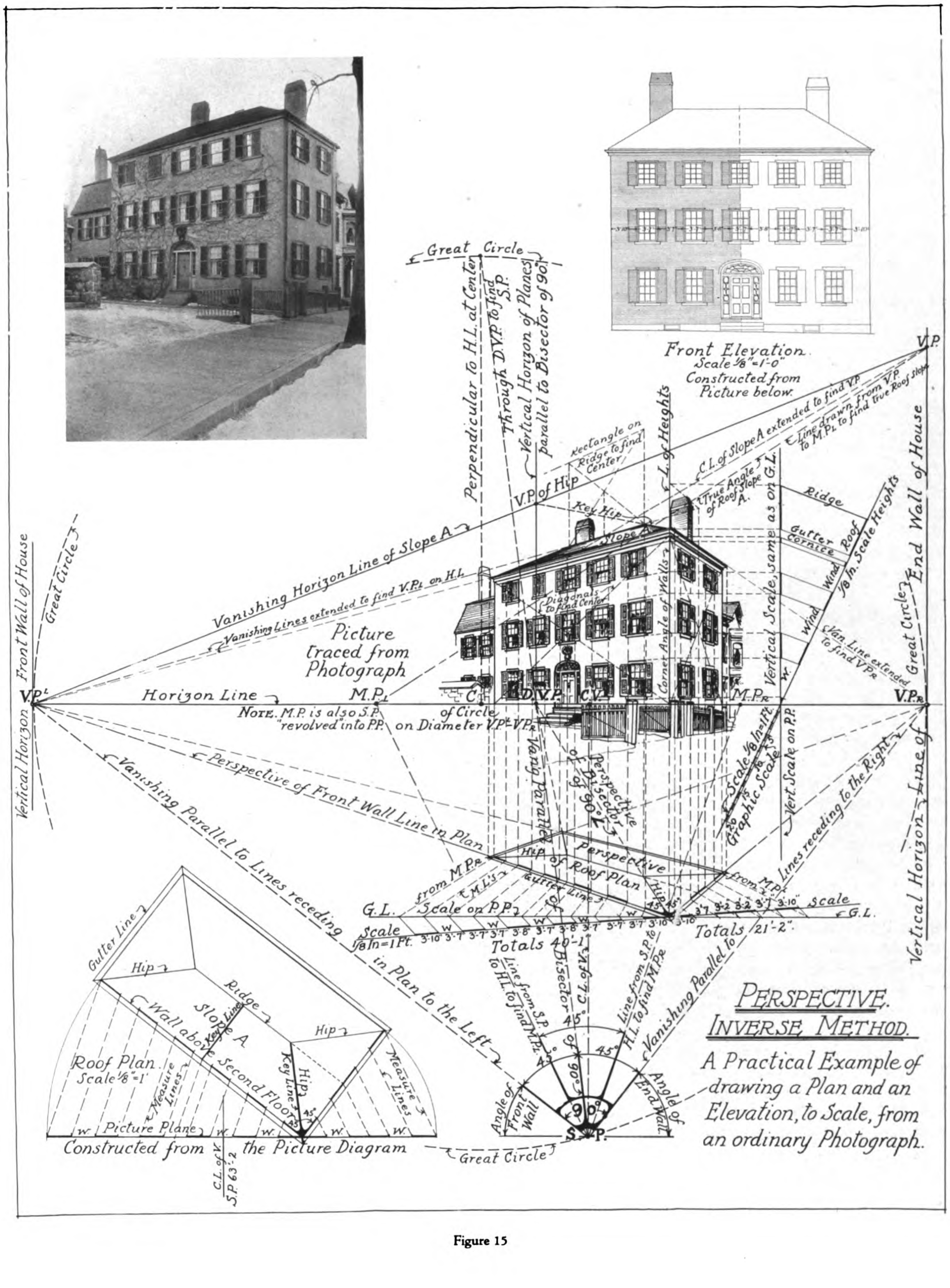


Figure 15

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S.P., and the V.P. of the key hip line and the D.V.P. of horizontal bisectors will both lie in this vertical H.L. If the V.P. of the hip is found, we can find D.V.P. by drawing a vertical line through it to H.L., and where it cuts H.L. will be D.V.P.

To find the V.P. of the hip it is necessary to find the inclined vanishing horizon of the roof slope "A" in which it lies. The point where the hip line, extended, cuts this roof H.L. will be its V.P.

To find the inclined vanishing H.L. of the roof; two V.P.'s in the roof plane "A" will determine it. One V.P. is already found at V.P.$_L$ for all horizontal lines, including those in the roof which recede to the left. The V.P. of one other line in the roof plane "A" is easily found by extending the line connecting the center of the ridge and the center of the lower edge of the roof until it cuts the vertical H.L. of planes parallel to the end wall of the house. This center roof line lies in a vertical plane which is parallel to the end wall of the house, and its V.P. must lie in the vertical horizon through V.P.$_R$.

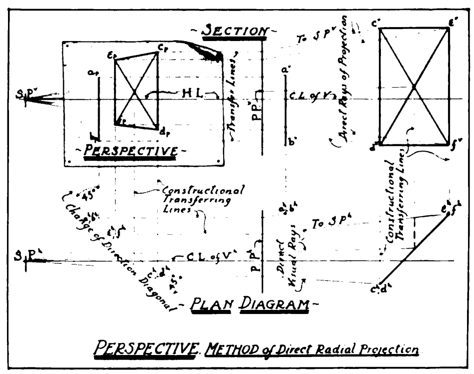


Figure 16

The rest of the process is simple and is obvious from the drawing, but a few points may be emphasized which are to be specially noted.

We call attention to the use of diagonals in finding centers of lines in perspective. The intersecting diagonals of the rectangle erected on the ridge and the diagonals of each wall of the house give perspective centers. Having fixed the working points (S.P., M.P.'s, D.V.P., and V.P.'s), we can assume a G.L. at any convenient height on which to construct a perspective plan from points in the picture vertically above or below it, and can then carry these perspective locations of points forward to the ground line by measure lines. The measures thus found on G.L. will be proportional measures, true to a scale, but the scale thus formed may not be one which is convenient to use. For example, in this problem the scale on G.L. (on the original drawing before reproduction) was a little greater than one-eighth inch to a foot.

If we know one dimension such as the total dimension of one wall, we can use the method shown in Fig. 14 for changing the "nondescript" G.L. scale to a definite scale used by an architect of (say) a quarter inch or an eighth inch to a foot, as was done in Fig. 15. The line of heights is always the same scale as that of the G.L., both being scale lines lying in P.P. In the problem (Fig. 15) the line of heights is the corner angle of the house. Where the perspectives of horizontal lines cut it will be the vertical dimensions at the same scale as the horizontal dimensions on G.L., so that these also must be changed to the definite eighth scale for measuring before a definite scale plan or elevation can be constructed.

Heights of chimneys, the ridge, etc., must be found to scale by a process exactly the reserve of that which would be used in making the perspectives of such features. Starting from a perspective point, we carry forward the point along some "path" vanishing line, zigzagging from one V.P. to the other if necessary, until the point reaches the P.P. in its proper L. of Hts. or G.L., where it can be measured at its time scale. The true angle of the roof slope "A" can be found from the construction of an elevation by points, but it can be found directly from the picture diagram and will serve as a check. The center line of the roof slope "A" makes the same angle with a horizontal plane that is made by a line parallel to it, drawn through S.P., and has the same V.P. on the vertical H.L. through V.P.R. If S.P. is revolved horizontally about V.P.R. as a pivot so that it is seen in section, its position will coincide with M.P.L., and the line connecting this point and the V.P. of the center line of roof slope "A" will be the true angle of the roof slope.

Method of Direct Radical Projection in Plan and Section. All perspective phenomena and perspective drawing result from the fact that direct rays or lines of light enter the eye from points in the object. These rays, in order to form an image or "picture" (perspective projection), must cut some surface. In the case of ordinary vision this surface is spherical, the retina of the eye being the inside surface of a sphere receiving the image or perspective of projection. Everything we see in nature is seen in "spherical perspective." The practical difficulties of making a drawing in spherical perspective with a concave spherical P.P. and the S.P. at the center of the sphere are so great, and the distortion resulting from a straight, vertical P.P. is so slight, that the latter is nearly always assumed in ordinary problems.

The principles of perspective drawing are most easily understood by referring to the two diagrams used in solving a simple problem by the method of Direct Projection in Plan and Section as shown in Fig. 16. Here the S.P. is shown in elevation or section, and also in plan. The objects and the P.P. are also shown in the same way, projected upon a horizontal plane (in plan) and upon a vertical plane (in elevation or section). In each diagram, direct radial lines of projection are taken from points in the objects to S.P. Where these rays cut P.P. are points which form the perspective image or picture in plan and section. The perspective is made by combining these projections thus found in plan and section. This perspective or picture diagram shows the P.P. revolved around so as to be seen from the front instead of "end on" (section) or "from above" (plan). This perspective can be made on a separate sheet by ticking off the points on P.P. from the plan and section, or as in Fig. 16 on the same sheet by using "transfer" lines drawn perpendicular to the P.P. in both diagrams in order to preserve the same relative positions of the points on the face of P.P. in the picture that they have on P.P. in plan and section. To save space the plan and section diagrams are sometimes combined, but this may cause confusion.

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# Description of School Buildings

ILLUSTRATED IN THIS ISSUE

Skokie School, Winnetka, Ill. Plate 53. This building was formerly called the Columbia School, its present name being derived from the Skokie marshes, a prominent feature of the landscape of the district in which it is located. Its plan is of the one-story neighborhood center type, with assembly hall and kindergarten, the stage being in the center and the class rooms along the sides. Only half the class rooms have as yet been built, the others, as well as the administrative department, being left for future addition. The building is of fireproof construction, except the roof. All rooms have exterior doors and windows within four feet of the ground. There is no basement or cellar. The floors are of concrete, the walls of brick and tile, and the ceilings of hard plaster on metal lath. The heating is by a combined direct and indirect system of steam heat and fan ventilation. All rooms have skylights, with control to eliminate glare from direct sunlight. The cost was 17½ cents per cubic foot. Allowing forty pupils to a room, this amounts to $176 for each pupil.

Kindergarten, Skokie School

Assembly Hall, Skokie School, Winnetka, Ill.
Perkins, Fellows & Hamilton, Architects

Fisher School, North Walpole, Mass. Plate 54. A one-story building was adopted for this school as being the best and safest type, in view of its rural location and moderate size. The main floor is raised sufficiently to give a well lighted basement, containing work and play rooms, as well as the usual plumbing and heating installation. This is a lower elementary school, with four rooms for classes of forty pupils each. The walls are of brick above grade and concrete below, but wood joists have been used, so that the building cannot be classed as fireproof. The cost was $18,500, which gave a unit cost of 16¼ cents per cubic foot, or $114 per pupil.

Morris School, Rockville Centre, N. Y. Plates 55, 56. Rockville Centre is a rapidly growing community about twenty-five miles from New York City, populated largely by commuters. The school has therefore been built with the idea of future enlargement by the addition of wings at both ends and a gymnasium and auditorium in the rear. The walls where these additions are to be made are stuccoed on the structural terra-cotta blocks, the basement and quoins being of brick, while those walls that compose the completed part of the building are faced entirely with red brick. The combination of the two materials has been skilfully handled, producing a most pleasing effect. The exterior trim is cast cement. Windows are made up of steel factory sash, and all stairs and corridors are of reinforced concrete construction. The wardrobes have natural light and mechanical ventilation. The second floor plan is similar to the first, but with one additional class room in place of the kindergarten. The total cost of the building was only 14 cents per cubic foot.

Grade Schoolhouse, North Easton, Mass. Plate 57. This building was a gift to the town by the children of Frederick L. and Rebecca Ames and was first occupied in September, 1916. The foundations are of concrete, basement walls above grade of cast stone, exterior walls above basement of water struck brick, laid in English cross bond and backed with terra-cotta blocks. The cornice and trim are of wood and the roof of slate. The interior partitions are of terra cotta, but floor joists are of wood. Interior trim is hard pine. The staircases are fireproof and are enclosed by fireproof walls. Heating is by steam, with a gravity system. The cost of the building was 15 cents per cubic foot.

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Dedham High School, Dedham, Mass. Plate 60. This school is intended to accommodate about 600 pupils. It is situated on a plot of about eight acres, the building being 157 feet long and 84 feet deep, including the extension at the rear. The exterior finish is of water struck brick, with granite and terra-cotta trimmings. The basement contains a lunch room, a gymnasium 43 by 58 feet, locker rooms, etc. On the first floor are six class rooms, two recitation rooms, the principal's office, and an assembly hall 35 by 58 feet, with a seating capacity of 550, including the gallery above. On the second floor are two study halls, three recitation rooms, two class rooms, an



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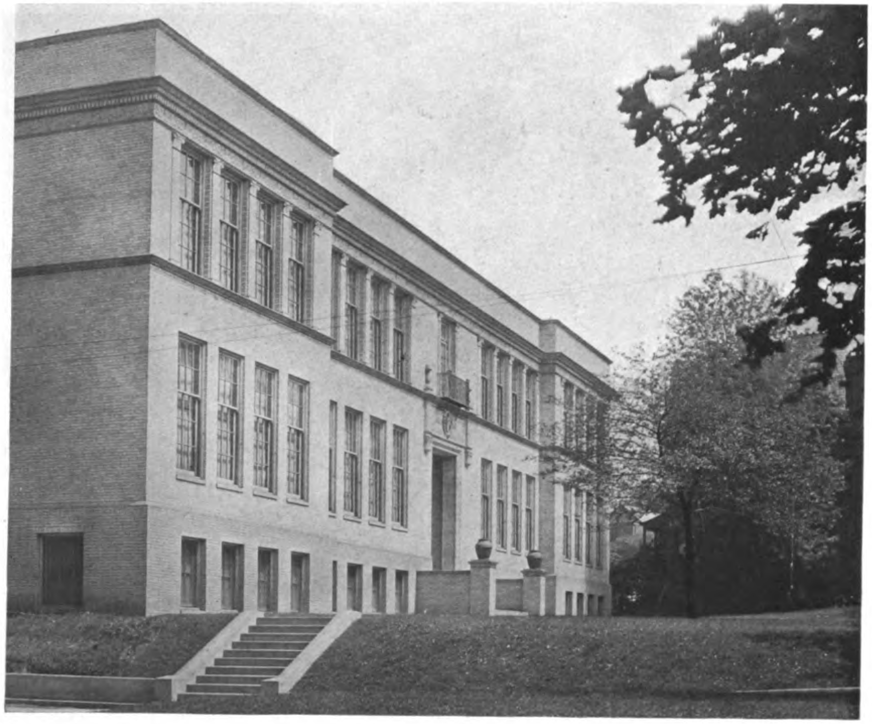
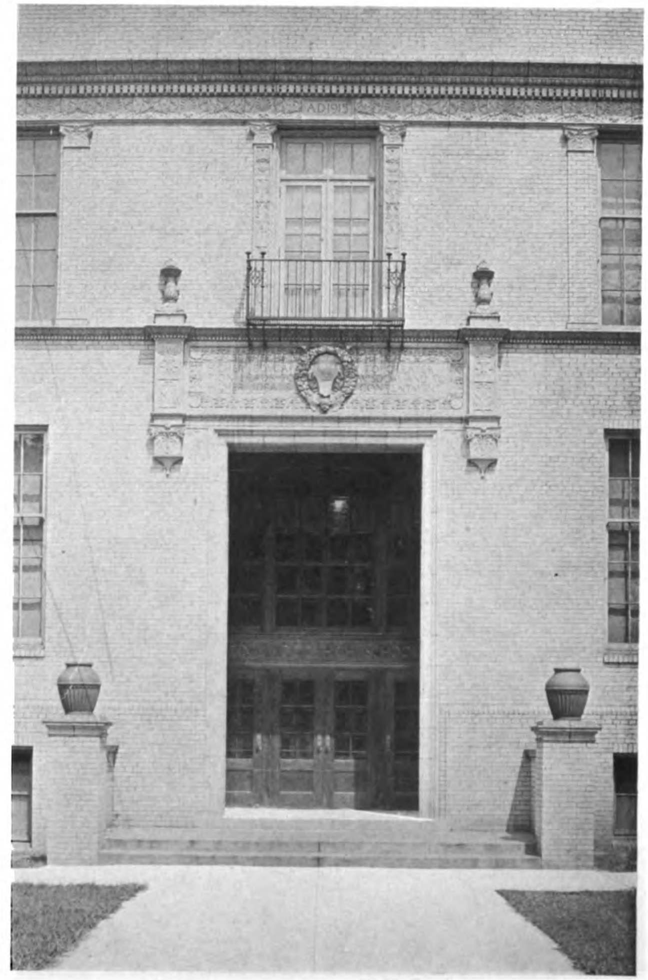
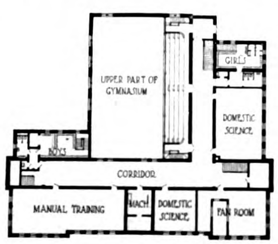




DETAIL OF MAIN ENTRANCE




BASEMENT FLOOR PLAN


FIRST FLOOR PLAN


SECOND FLOOR PLAN

EDGEWOOD HIGH SCHOOL, EDGEWOOD PARK, PA.
INGHAM & BOYD, ARCHITECTS

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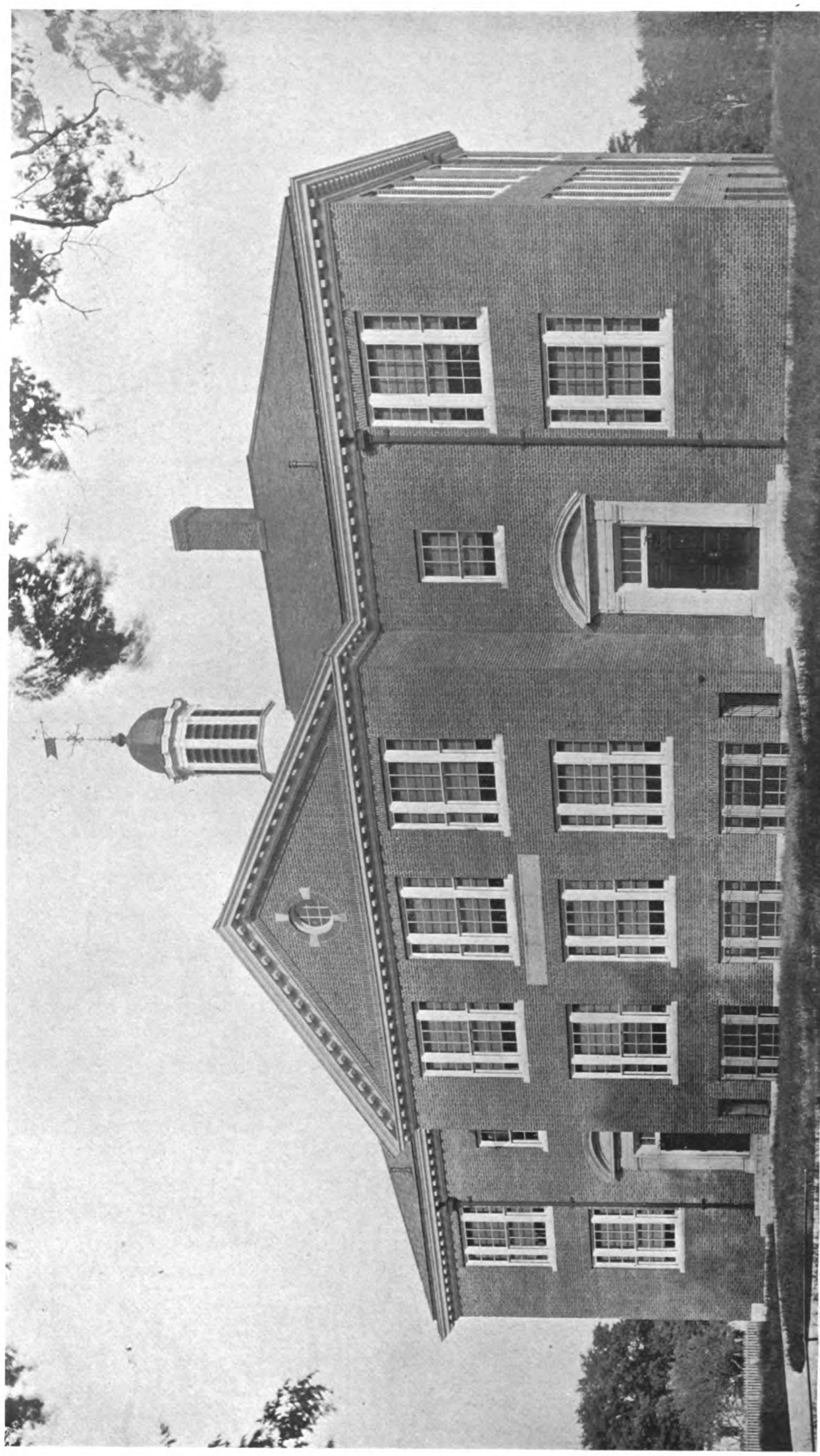

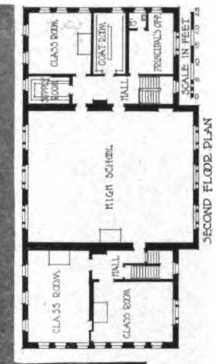


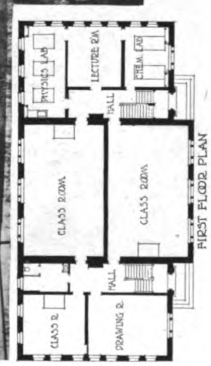


TUCK HIGH SCHOOL, EXETER, N. H.
CRAM, GOODHUE & FERGUSON, ARCHITECTS

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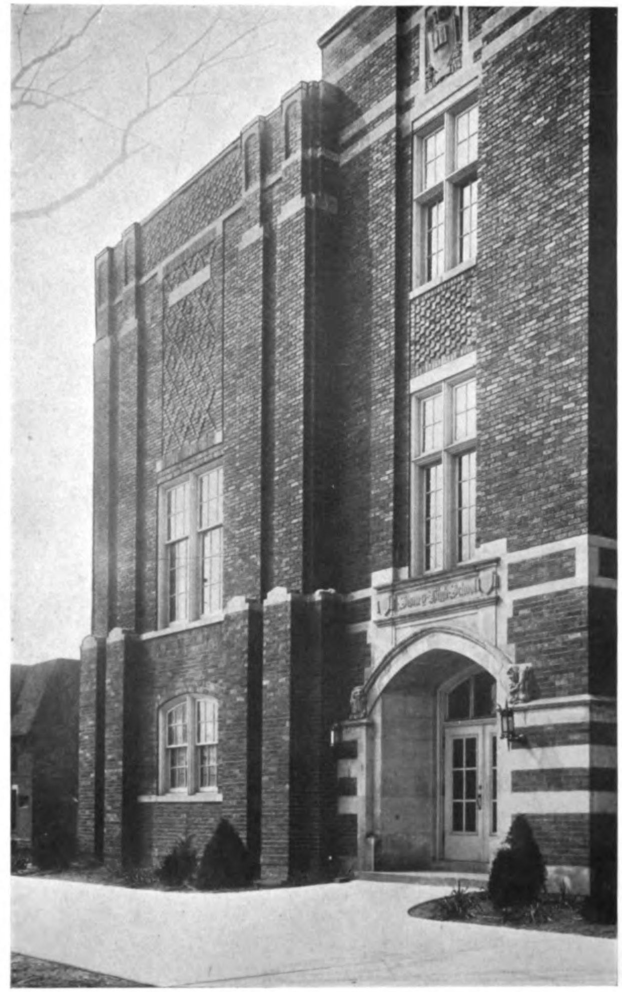
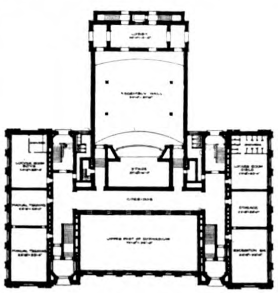
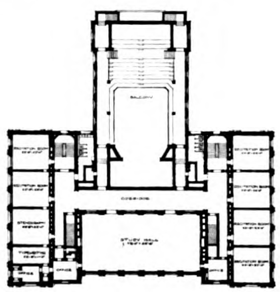
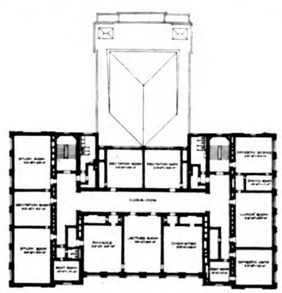




GROUND FLOOR PLAN



FIRST FLOOR PLAN



SECOND FLOOR PLAN

DETAIL OF ENTRANCE AND END PAVILION

SIDNEY HIGH SCHOOL, SIDNEY, OHIO

FRANK L. PACKARD, ARCHITECT; RALPH SNYDER AND E. F. BABBITT, ASSOCIATED

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Lecture Room, High School of Commerce, Boston, Mass.
C. Howard Walker and Kilham & Hopkins, Associated Architects

emergency room, and the entrance to the gallery of the auditorium. On the third floor are the physical and chemical laboratories, with lecture room and other accessories, a large and well equipped domestic science laboratory, sewing and drawing rooms, and rooms for bookkeeping, typewriting, and stenography. Each of the class rooms is of a size to accommodate 37 pupils, with light from one side only. The study halls will accommodate 144 each. The total cost of the building was about $125,000.

High School of Commerce, Boston, Mass. Plate 61. The outside of this building is constructed of gray brick with limestone trimmings. The design is in the English type. The building is 304 feet long by 140 feet deep, and its front is broken up into two wings and a central block. In the basement there is a large lunch room, equipped with counters with heating devices for food, etc., also large locker and shower rooms which connect with the gymnasium above. On the opposite side are the boiler and engine rooms. There are also nine class rooms in the rear of the building, which come above the ground, giving a lighting equal to any of the rooms above. The first floor is entered by the main central doorway, with a hall running through to a corridor parallel to the front. From this main hall the gymnasium opens on the right, and on the left the auditorium, which is arranged with a balcony and seats about 1,500. Directly opposite the main entrance hall are the offices of the head master and teachers. This floor also contains twelve class rooms and ample toilet facilities. The second floor consists of the upper portions of the auditorium and gymnasium, with a library directly over the main entrance hall. This floor contains fourteen class rooms. The upper floor contains laboratories and lecture rooms for both elementary and advanced chemistry, with demonstration rooms in connection with same. The commercial department is also on this floor, and is provided with a banking counter opening off the main corridor and into the advance commercial rooms. The laboratory equipment is most up-to-date in detail. All the work tables, etc., are made of oak, matching the general finish of the building. These tables are fully equipped with sinks, glass shelves, etc., and have gas and electric connections. On the walls in the large laboratory are hoods for special experiments. These are ventilated separately to the roof. The chemistry laboratory work tables are provided with separate lockers and two separate drawers above for each pupil in which to keep materials. The tops of these tables have an acid proof finish, with glass tops on the raised shelves above the sinks.

Northern High School, Detroit, Mich. Plates 62, 63. This is a building of considerable size, being planned to accommodate 1,200 pupils. A combined plenum and exhaust fan system is used for ventilation, the air being mechanically humidified and tempered, and the supply of air, as well as its temperature and humidity, being mechanically controlled. The walls are of rough surfaced brick, with terra-cotta trimmings and a tile roof. The corridor floors are of terrazzo, with plaster walls, while in the rooms hard maple floors are used. The interior trim is for the most part of oak.

Lafayette Bloom School, Cincinnati, Ohio. Plate 64. This school was erected in a congested district, a fact that has influenced the plan in several ways. The auditorium is of unusual size for a primary school, as there is no other public auditorium in the neighborhood. It has a seating capacity of about 450. In the north wing of the building are a series of special rooms, of a type usual in high schools, but not in elementary schools, including domestic science and art, as well as various workshops and manual training rooms. These were instituted for the benefit of children who must begin work at the earliest legal age, and have proved a great success. There are also very complete gymnasium facilities in the basement, while the second floor of the wings is used for

Chemistry Laboratory, High School of Commerce, Boston, Mass.
C. Howard Walker and Kilham & Hopkins, Associated Architects

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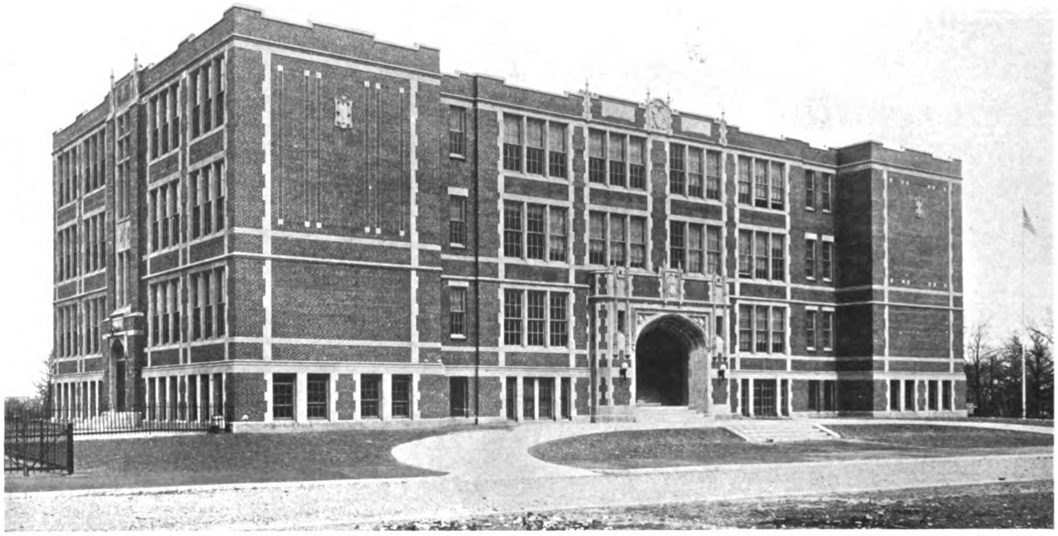
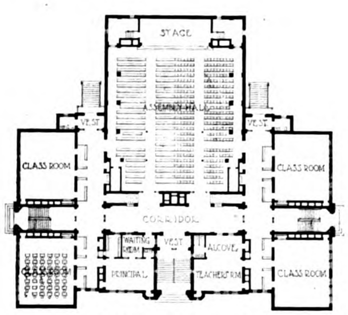
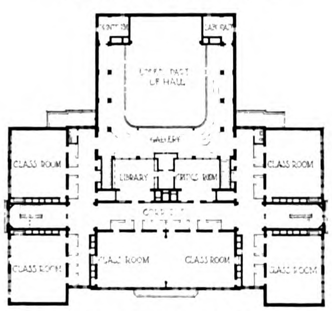


VIEWS OF ASSEMBLY HALL




FIRST FLOOR PLAN




SECOND FLOOR PLAN


THIRD FLOOR PLAN

BEAUFORT STREET GRAMMAR SCHOOL, PROVIDENCE, R. I.

MURPHY, HINDLE & WRIGHT, ARCHITECTS

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open air play space. The cost of the building was 19 cents per cubic foot.

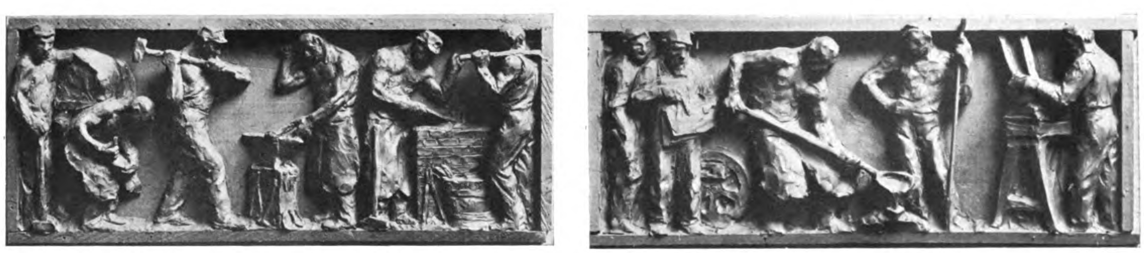
TECHNICAL HIGH SCHOOL, SALT LAKE CITY, UTAH. PLATE 65. This is one of a group of buildings known as the West Side High School, the total attendance at which is about 1,200. The building is of fireproof construction, the floors and roof being reinforced concrete and hollow tile, with wood floor surfaces in most of the rooms. The walls are of buff wire-cut brick, left visible inside and out. Steel factory sash are used in the windows, and all doors and frames are also of steel. Heating is from a central steam plant. The building contains a foundry, forge shop, machine shop, wood-working department, etc., and was built for a total of $90,000, or 17 cents per cubic foot, $25,000 additional being devoted to equipment.

MIDDLETOWN TOWNSHIP HIGH SCHOOL, LEONARDO, N. J. PAGE 96. This building is of dark red brick, with cast stone trimmings. Its cost was $57,300, or 12¾ cents per cubic foot, including heating and ventilating. A notable feature is in the ventilation of the rooms, the air being exhausted through the wardrobes. This dries any damp clothes and ventilates the wardrobe thoroughly, at the same time removing odors very effectively. The arrangement of these wardrobes was illustrated in THE BRICKBUILDER for March, 1915.

EDGEWOOD HIGH SCHOOL, EDGEWOOD PARK, PA. PAGE 102. The High School at Edgewood Park, Pa., is located adjacent to a grade school building, with which it is connected by a covered and enclosed passage, so that the grade school pupils may use the gymnasium and auditorium of the high school building, the connection being made through the first floor main corridor on the left of the plan. It is intended to enlarge the building, when necessary, by an additional corridor and class rooms at the rear of the auditorium, leaving one side of the auditorium and gymnasium free, the lighting being maintained substantially as at present. The exterior walls are of mottled gray brick and terra cotta. The floors and roof are built fireproof, of reinforced concrete and hollow tile. The floors of corridors and locker rooms are of terrazzo, tile being used in toilet rooms and maple flooring elsewhere in the building, except in the chemical laboratory, where the floor is of asphalt. The interior trim is of oak, except on the ground floor, where pine is used. The heating and ventilating are by a combined motor driven supply and exhaust fan system, supplemented by direct radiation. The steam plant is in the adjoining grade school. The class rooms seat from 35 to 40 pupils each, a total of 310. The cost of the building was 17 cents per cubic foot.

Library, High School of Commerce, Boston, Mass.
C. Howard Walker and Kilham & Hopkins, Associated Architects

THE SIDNEY HIGH SCHOOL, SIDNEY, OHIO. PAGE 104. This building has a frontage of 160 feet and a depth of 93 feet for the main block, the auditorium extending back 72 feet farther. The basement contains the heating plant and a gymnasium 35 by 72 feet, on the center of the main front, its upper part rising into the ground floor. On this floor are the auditorium, seating 800, manual training and recreation rooms, etc. On the first floor are eight class rooms, offices and rest rooms, and a large study room directly over the gymnasium and of the same size, seating 200. On the second floor are twelve class rooms, physical and chemical laboratories, lecture room, study, and the domestic science and art departments. The heating is by a warm air system. The exterior of the building is of rough brick, with Bedford stone trim. Glazed brick has been used on the walls of the gymnasium, corridors, toilets, etc. All wood trim is of oak. The floors of toilets and corridors are of tile and terrazzo, cement floors being used in some of the minor rooms. The auditorium is used not only for school purposes, but for various public gatherings as well, the city having no adequate auditorium facilities. The cost of the building was about $98,000, including the heating and ventilating system.



Bas-Reliefs, Technical High School, Salt Lake City, Utah
Cannon & Fetzer, Architects; Mahonri M. Young, Sculptor

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# EDITORIAL COMMENT AND NOTES FOR THE MONTH

ARCHITECTS of America have long felt a warm and friendly regard for the architectural profession of France. Many of our architects have been fortunate in receiving the training of the great Ecole, and countless others in our own universities and colleges have been inspired and encouraged in their student years by those well loved and talented French masters who have contributed so generously to the upbuilding of the American profession. It is therefore with a feeling of comradeship and loyalty to the ideals which we share with our brother architects of France and England that the architects of America view the entry of the United States into the world war.

We have regretted the unnecessary destruction of revered monuments which were not alone the architectural pride of the invaded countries, but of the whole world. Each new outrage directed against these buildings that were without any military advantage and had existed for centuries has caused us to stand awed at the obvious abandonment of all civilizing influences on the part of the enemy. We have now declared war against the Imperial German Government, and it is our hope that active participation by the United States will materially aid in bringing permanent peace to the war-stricken countries and the world in general.

In preparing to enter the conflict, the United States Government will need the resources of technically trained men and in this respect American architects have certain qualifications that should render them of special value to the government in time of war. Owing to the tremendous task of organizing British and French resources at the beginning of the war, those governments overlooked the value of utilizing the services of architects and many of their other technical men. When the help of these trained men was wanted to carry on important work, a serious thinning out of their ranks was found to have taken place because all available volunteers had been sent to the front. Only recently the British architects, after experiencing a complete curtailment of all building operations through government order, offered their services to the nation in a splendid patriotic spirit. In presenting suggestions for the use of their training, they acquainted the military authorities with the fact that many important duties of a military nature could be satisfactorily performed by architects, with the result that the British architects to-day are using their enforced leisure to the profit of the government.

The experience of the allied nations shows clearly that the trained man may be of far greater service to his country in a constructive capacity than on the firing line. Any architect moved by patriotism to serve his country should study his own qualifications carefully and then offer himself to that branch of the service where he thinks his abilities will be most productive of good.

The American Institute of Architects has already taken steps to coördinate the services of architects and has made its intention known to the government. In naming a central committee to investigate military matters so that a definite field of endeavor may be suggested for which special training adapts its members, it has demonstrated its desire to become an actual working unit in the era of preparedness upon which we have entered. This is constructive and patriotic action and deserves the commendation and support of every American architect. It places the architect in his true position of eagerness to serve at all times for the public good, and we hope that, in addition to producing tangible benefit to the government, it will aid in giving the general public a true and sympathetic conception of the architect's position which, unfortunately, has not been universal in the past.

## U.S. GOVERNMENT WANTS SHIP DRAFTSMEN

AN urgent call for ship draftsmen has been issued by the government, because all the shipbuilding work undertaken at navy yards is being retarded by a shortage of men in the drafting rooms. The Civil Service Commission, in making the call, asks that all persons qualified for such work communicate with its offices throughout the country, regardless of their private interest.

Applicants will not be assembled for examination, but will be rated upon the elements of physical ability and education, training, and experience. Those found qualified will be offered employment at once.

## WILLIAM ROTCH WARE

THE debt which the profession of architecture owes to William Rotch Ware is something which is best appreciated by those who knew him from the very beginning of his connection with *The American Architect*. For thirty-one years he was the editor-in-chief, giving his time, his thought, and often his money in the most generous manner and with a loftiness of aim and a singleness of purpose which the profession can never sufficiently recognize. When he began his career, architecture was a little less professional than the occupation of the house carpenter. When he retired from editorship, the architectural profession had grown to be one of the foremost in importance in the development of the country. The Boston Society of Architects, of which he was one of the original members, by this motion expresses its appreciation of the services he has rendered so freely to the cause of good architectural and public service—a service which involved a degree of self-sacrifice few are willing to accept, but which was always offered for the good of his generation in unstinting measure. He leaves a record of which the Society, the profession, and his friends and family may well be proud, and in extending to his family its appreciative sympathy the Boston Society of Architects honors the man who has helped to make the Society possible and to give it a place in the community.



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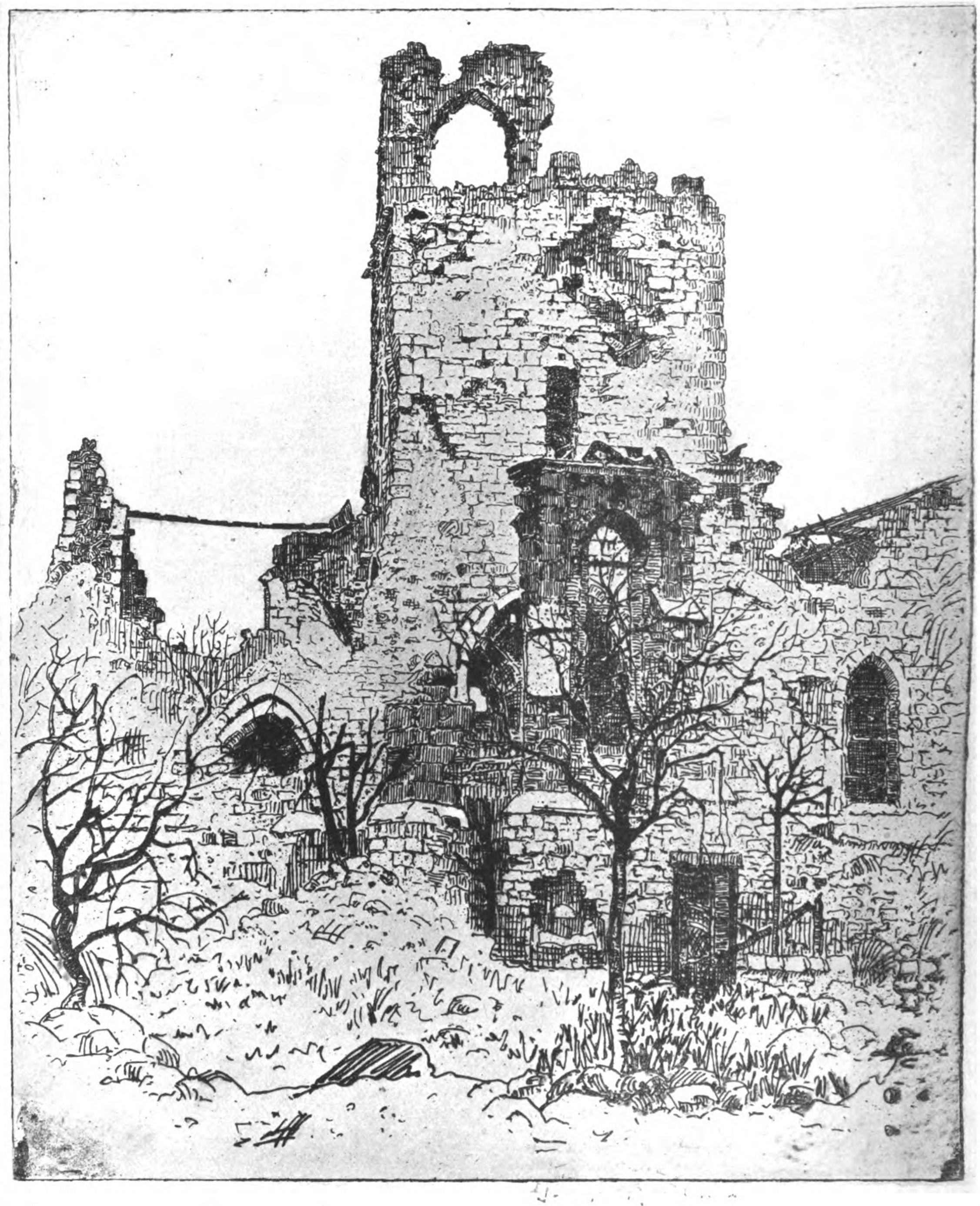

RUINS OF THE CHURCH OF BETHENY, NEAR RHEIMS, FRANCE

AFTER AN ETCHING BY GEORGE T. PLOWMAN

*This was one of the French parish churches located near Rheims to suffer destruction from the repeated shelling oj the city and its noted cathedral.*

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# THE ARCHITECTURAL FORUM
## FOR QUARTER CENTURY THE BRICKBUILDER

VOLUME XXVI | MAY 1917 | NUMBER 5

# Economy in Relation to the Plan, Design, and Construction of Small Country Houses

By FRANK CHOUTEAU BROWN

IT IS greatly to be regretted that the architectural profession has not more conscientiously given of its experience to study the problem of the low cost house, because nowhere are skill, efficiency, and commonsense more necessary than when dealing with the problem of providing for a family of small means, where the expenditure of every dollar is to be most carefully considered. Especially is this the case now, when the rapid growth in the cost of materials and the great increase in labor cost—along with corresponding decrease in efficiency—are such obdurate factors in the building situation.

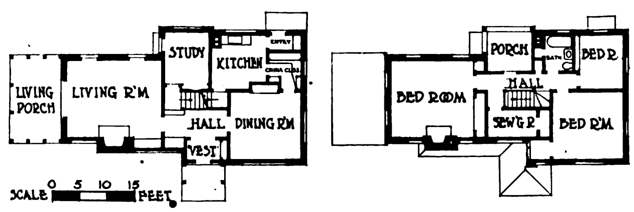


Fig. 1. Plan of good proportions having a floor area of 875 square feet, exclusive of living porch

No architect who has had the problem of providing living quarters for a normal American family in an area that cannot exceed 800 to 1,000 square feet but realizes the true value of niceties of arrangement where the variation of an inch is to be considered as of importance in reducing staircase, passageways, closets, and bathrooms to an irreducible minimum, without occasioning absolute loss of efficiency. A house of 800 square feet, for instance, cannot include much more than four bedrooms and bath upon the second floor, along with a living room, dining room, and kitchen and pantries on the first floor. Within this area, room spaces have to be kept at their smallest possible limits, and yet such a plan need not be hackneyed nor conventional, and variations that will help in the proportion and sightliness of the house without increasing its expense are soon found to be possible, as shown in the plan (Fig. 1).

While it has become almost a bromidium to state that the house of square outline is cheaper to build than the house of rectangular or unusual shape, yet careful analysis shows this statement to be only partially true. When it *is* possible to bring within a cube of nearly equal dimensions a convenient and satisfactory house arrangement, as in Fig. 2, it may be — other things being equal throughout—that, with the resultingly possible unbroken roof, certain essential savings would result, largely occasioned by the fact that the carpenters could then work with the least possible expenditure of time devoted to figuring out broken timber lengths, etc. Yet it should be realized that a house arranged as a thin and long rectangle, with a roof of but two slopes (as in the front portion of Duhring, Okie & Ziegler's side houses in the group shown on page 115), can be equally economical in the required expenditure of labor; and even the T-shape plan, as in Fig. 3, when comprised of similarly narrow elements, grouped under as simple an intersecting roof, could also be handled with equal economy.

The group of six houses, previously referred to, by Duhring, Okie & Ziegler, furnishes, in those at the side, an interesting and suggestive combination of the long narrow plan and the square cube, which latter arrangement is practically duplicated in the plan of the semi-detached house at the rear.

The only element of additional cost in the oblong plan would come from any additional amount of exterior wall construction; yet, when it is realized that the square cube of a house contains just as many running feet of wall construction for enclosing the same number of rooms as the long rectangular plan, the only difference being that in the one case the walls are interior walls and in the other case exterior, it can readily be seen that the net difference in cost between surfacing both sides with lath and plaster, and surfacing one side with lath and plaster, and the other with exterior plastering, clapboarding or whatever, must differ, if at all, by only a comparatively narrow margin.

Indeed, a plan of irregular contour, even of irregular angles, as in Fig. 4, can yet be planned so as to be as economical as the simpler rectangular structure, especially if by this arrangement obvious savings in hall or other waste spaces inside the house plan can be secured, besides obtaining by this means a better, more healthful, and more sightly exposure for the various rooms. This is especially true of the L- or T- shape plan, for instance, which makes it possible to give each important room exposure, light, and air upon three of its four sides, as in Fig. 5. The net increase in livableness in the house

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that results, is also *quite* worth while being stated in terms of dollars and cents. Of course, it is essential, in any plan of inexpensive type, to reduce window and door openings to the minimum, and to plan all partitions without irregular breaks and eccentricities, and also arrange them so that the bearing partitions shall be equally consistent and simple throughout, as in Figs. 1, 5, and 13. A further due consideration for the lengths of lumber used, both floor joists and studs, with a realization of those points where the price increases out of due proportion with the increased length obtained, is also advisable, and a similar knowledge in regard to standard sizes of doors, windows, and glass areas should not be neglected by the designer conscientiously striving to obtain the utmost of return upon his client's investment.

The writer is convinced that, difficult as it is to estimate the matter of cost on a plan, the ordinary basis of a square foot area or cube is a crude, and often misleading, method of approximation, only to be availed of in the most snapshot judgment, or when more exact methods are, for one reason or another, incapable of application. To recognize the fallacy of the method based on the square foot unit, for instance, it is only necessary to consider increasing the same plan by 300 square feet added area to realize that, while the area has been increased perhaps by 25 per cent, the actual cost has only been increased by about 10 per cent, because the same number of angles, partitions, doors, windows, etc., are still retained. The cubic foot price is equally misleading, because it includes the cellar and the attic or roof space — both sections where ordinarily the least expense enters into the cost of the small size dwelling. And both methods are deficient in that neither takes into consideration the type or quality of the finish, interior or exterior.

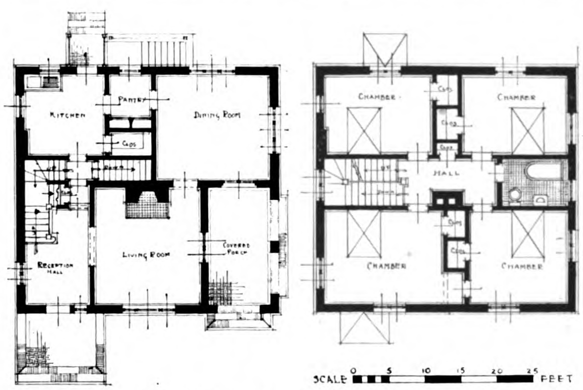

Fig. 2. House of A. E. Lindan, Jr., Esq., St. Louis, Mo. A compact square plan having an area of 1,224 square feet, including porch
Roth & Study, Architects

Considerable experience serves to convince one that far more can be done to keep the price of a house down if, in the first place, the greatest *possible* simplicity in the plan arrangement itself is maintained, with the fewest possible number of partitions, angles, window and door openings; the span of the rooms kept as moderate as possible, bearing in mind the thickness and size of the required floor joists ; the story heights kept low ; the finish and painting simple ; the plumbing restrained to one perpendicular stack taking care of all the stories, and the chimneys limited to two, or, where possible, one. And yet, after all, the *arrangement* of the floor plan, bearing in mind always the ease and rapidity with which the frame can be laid out and erected, is the predominating feature. With the partitions arranged in a simple and direct manner, it does not make so much difference whether they are inside or outside partitions. If the exterior wall is faced with an expensive material, it is merely necessary to reduce its lineal running feet as much as possible in relation to the plan that is desired ; and if of masonry, requiring lintels for supports over openings, to lower the eaves and roof to a point where the second story lintel over all openings becomes unnecessary (as in the house shown on page 135). The allowable grouping of the openings throughout is also important, with other elements, in simplifying the construction and correspondingly reducing the cost.

In the small house of frame construction, money can be saved in labor by framing the elevations with studs running from sill to plate, using a ledger board to support the second story joist, or employing some variation of the "balloon frame" type of construction prevalent in the West and Middle West. Despite its ill name, the "balloon frame," provided the house is not over large and sufficient braces are placed in the corners, is an economical and not unsatisfactory method of framing woodwork. Experience has shown, indeed, that when the exterior of a house is plastered, it is preferable to run the studs through from sill to plate without break, rather than interpose a wide girt at the second floor (as is required by many building laws), thus introducing a structural, and most unnecessary, element of shrinkage. If the third floor joists can also be so planned as to rest directly upon the plate, a further saving in labor is effected, and it is almost as cheap, though hardly as good construction, to frame the attic floor joists on the plate topping the partition and cut another plate to carry the roof rafters into the top edge of the same joists, the objection again being the element of shrinkage introduced in the thickness of the joists. Yet with certain types of cornices the connection with the wall could be provided for in the

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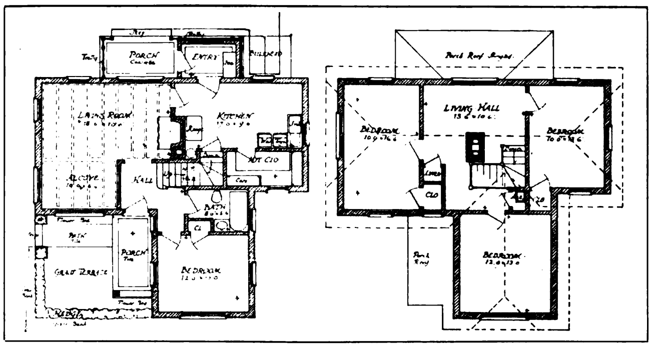

Fig. 3. T-shaped plan of simple elements having an area of 940 square feet, exclusive of porches

design, so that even this need not be considered as an objectional feature. When rooms can be so dimensioned as to permit the use of floor joists of exactly 10, 12, or 14 foot lengths, including their bearings on partitions, that will help to hold down the expense — just as story heights that make use of studs of the regular dimension lengths between partition cap and sill also help in saving expense. In order to accomplish these results, it is merely necessary for the designer to work out his construction sections first, and then figure his lengths and heights, rather than follow the more customary reverse process.

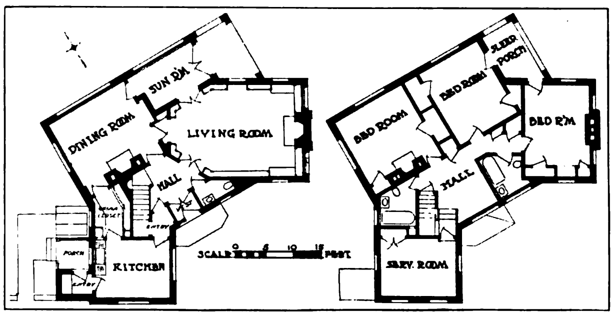


Fig. 4. An irregular angle plan having an area of 1,316 square feet, including porches

In a house of masonry wall construction, especially when employing terra cotta blocks, it should be possible to base the heights of the stories and the window openings on the natural joints between these block units. It is also desirable to bear in mind that, with exterior masonry wall construction, economy can always be effected by certain means. First, the grouping of windows; second, the elimination — where possible in the design — of masonry lintel supports over wall openings; and also the necessity for always keeping the masonry wall heights as low as possible, — by lowering the eaves, omitting gables, and even bringing parts of the second story into the roof, with dormers, or by some other means.

The structural employment of terra cotta blocks is good practice and furnishes a wall having many distinct advantages. In small house work it is essential to select a mason contractor who is familiar with the material, if the cost of this construction is to be kept to the lowest figure. The combination of stucco with concrete block is an unusual method, and one that hardly seems to be justified by most conditions. If a concrete block is to be employed as a base for stucco, by giving it a proper texture in the first place it might as well be left for the finished surface; and if a different color is desired, it can most easily and cheaply be obtained by using an exterior plain or tinted lime wash to effect that purpose, as is so often done in England on stone or brick masonry walls.

It is also obvious that, whether the walls are of masonry or wood, the fewer angles in the construction required by the plan (and especially the fewer angles other than right angles) the cheaper will be the labor bill on the dwelling. This is, of course, one of the economies of the square or rectangular house plan. Variable as are building costs at the present time, it can yet be stated generally that the cost of the frame-and-shingled and frame-and-clapboarded house wall is now more nearly equal in most localities than it was a few years ago, the difference being either made up or overcome by the item of painting necessary for the maintenance of the clapboarded wall.

It is also coming more and more to be recognized that the shingled wall is more appropriate to the summer cottage, just as painted clapboarding is more appropriate to the suburban house. In fact, the shingled wall in the suburb depreciates the investment more rapidly than any other element in the design, because it marks the house, from the very day of its closing in, as belonging to a period of some ten or twelve years ago; whereas, if properly designed, a stucco house will not even begin to acquire age for several years after it has been built. Frame and stucco, provided the architect has taken into account the element of cost and so arranged his plan and exterior details as to make for economy in the use of the material, now costs but very little more than any exterior wooden treatment of the

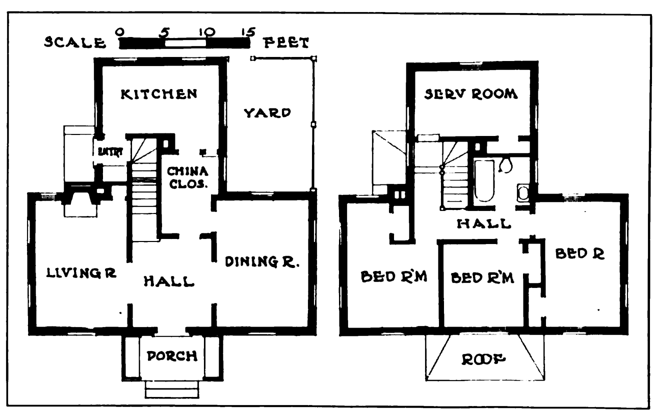


Fig. 5. T-shaped plan in which principal rooms have exposure on three sides
Floor area 750 square feet

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house wall. On the very small house this difference may reach as much as 4 per cent; on the larger house, with simple wall surfaces, it can probably be reduced to 2 per cent, or even less.

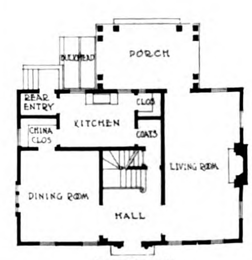
Where brick is an essential element in the exterior design of the house, it can still be cheapest used as an applied veneer outside the face of the frame, when it need cost no more than a plaster stucco face, and its intelligent employment in this way can give all the character of the solid brick wall and increase the investment value for the owner proportionately. The material has to be properly used, however, and it is still surprising to find so little intelligence exercised, either on the part of the general public or the architect, in employing brick as an element in the design of a house. It is unfortunately still true that the majority of brick houses are just soggy lumps of inanimate clay, with no interest of texture, jointing, bond or color indication to show their real value or express the human interest of the material. All these factors can be included in the house design without introducing any new element of expense, excepting only some of the more complicated bond arrangements that do require additional labor and more pains and skill on the part of the masons.

Tile, brick, or concrete can be substituted for the ordinary wooden porch floor at but slight additional expense if it is possible to lay them upon a cinder or gravel fill. A concrete floor, at least, costs practically no more than wood under these conditions, although it has generally but little beauty and, on certain exposures in summer, is likely disagreeably to reflect the sun into the interior of the house. Tile and brick can be used for borders, or mixed into a pattern with concrete squares or surfaces, and this will help materially in its appearance and also serve the structural purpose of taking care of the expansion and contraction of the material, thus eliminating unsightly cracks. The brick floor, laid in its simpler forms of basket or herringbone pattern inside a border of brick or tile, is the next cheapest form, except that sometimes panels of concrete can be incorporated into the brick design at some slight saving, and, of course, beyond this point there are many varieties of tile that can be employed to obtain many beautiful effects at a ratio of cost increasing as constantly as it is allowed.

The roof can itself be a considerable element in the cost of the building, particularly if it is much broken up by gables, dormers, etc., requiring much flashing and labor in cutting around and making tight these angles. Even the breaks in the gambrel roof at last are being recognized as representing an element of added cost only excused by the saving generally effected by substituting shingles for some more expensive wall material on the second story. The cost of this labor increases with the inflexibility of the material; where shingles can be fitted rather inexpensively, slate and tile cost more the thicker and larger they are. Inasmuch as the simple roof with long, unbroken lines is always the cheaper (and, generally, the more attractive), it should be employed by the designer, except in those situations where it is possible to save expense in the construction of second story masonry walls by extending the roof down to a lower eaves line.

This latter method is one that is little understood or utilized by American designers, although it is the method that has been employed most constantly by English architects — sometimes, it is to be confessed, to an extent that has a tendency to become both nervously overemphasized and to introduce an element of expense rather than economy into the whole design. It is, of course, allowable only with the house of English Tudor or Baronial descent and does not apply to the Georgian house design. And here, also, England furnishes us with a number of charmingly simple and interesting brick houses of the later Georgian period that have in some cases been used as models by English architects, but are as yet rarely appreciated in America, perhaps because of the very modest simplicity and unpretension of their exterior design. Yet


Second Floor Plan




House of Dr. Roger B. Taft, Belmont, Mass. Louis Grandgent, Architect

First Floor Plan

Walls of stud construction with siding on ends and stucco on front and rear. Floor area 925 square feet, exclusive of porch
Cost $7.00 per square foot

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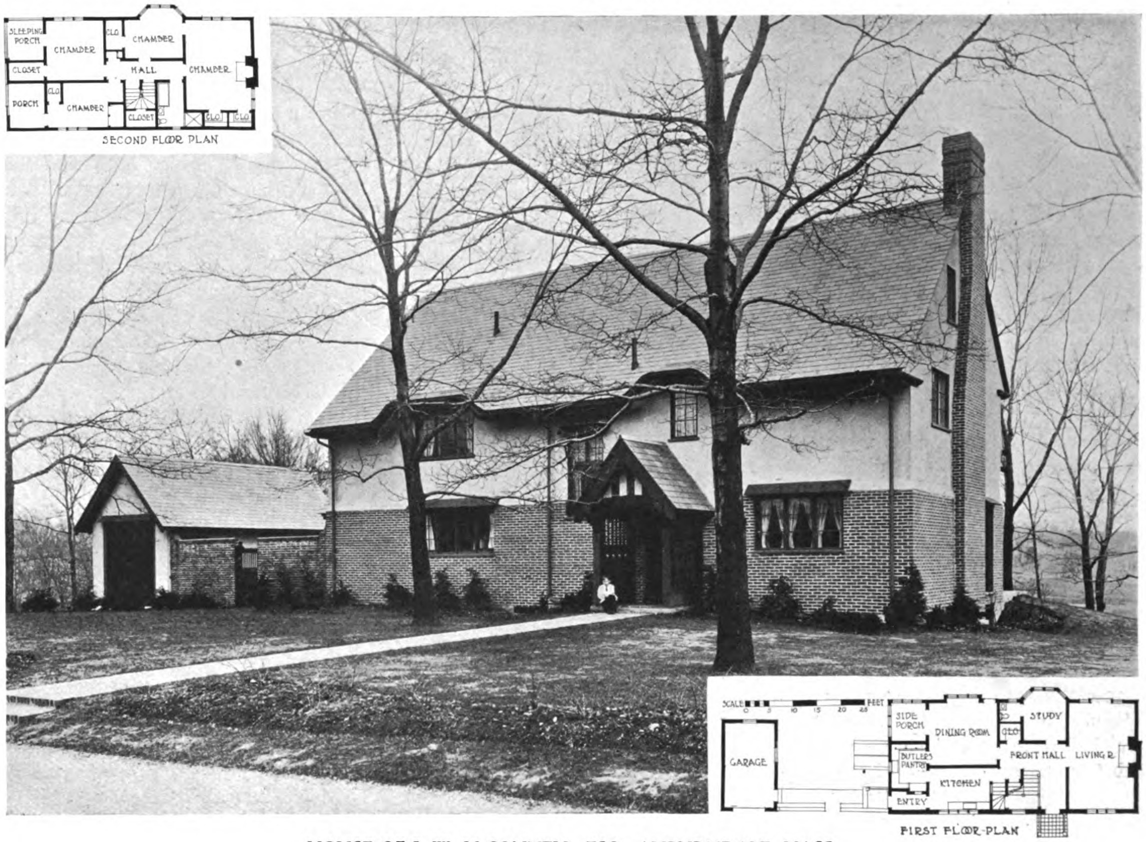
SECOND FLOOR PLAN

FIRST FLOOR PLAN

HOUSE OF JOSEPH R. DYER, ESQ., MILWAUKEE, WIS.

H. W. BUEMMING, ARCHITECT

Walls of frame construction, veneered with brick and 1½ inch thick stucco. Floor area, including sun room, 2,340 square feet. Cost $6.40 per square foot




HOUSE OF I. W. McCONNELL, ESQ., AUBURNDALE, MASS.

ALLEN W. JACKSON, ARCHITECT

Walls of frame construction with brick and stucco on wire lath veneer, roof of slate. Floor area including garage, 1,452 square feet. Cost $7.00 per square foot

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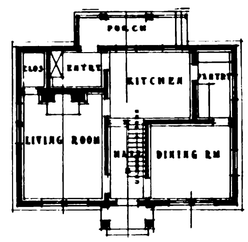


Fig. 6. Central hall plan of minimum area

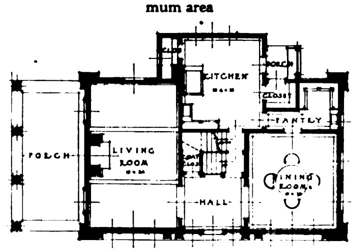


Fig. 7. Central hall plan enlarged by small extension at rear. Floor area 1,152 square feet, exclusive of porches

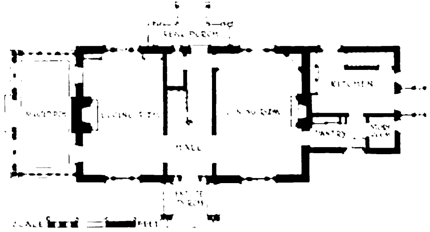

Fig. 8. Central hall plan having extension at side. Floor area 1,118 square feet, exclusive of porches

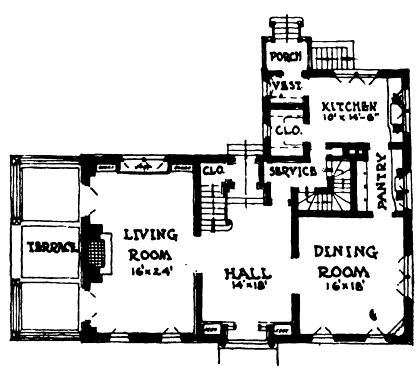


Fig. 9. Plan with rear extension providing more service space. Area 1,480 square feet, exclusive of terrace

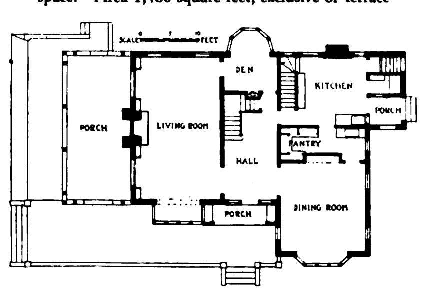


Fig. 10. Plan showing projection of dining room wing Floor area 1,385 square feet, exclusive of porches

these houses, using the simpler, more direct brickwork of the late Georgian period, similar to one or two of the houses around the Close at Salisbury, for instance, suggest nearly as inexpensive employments of this building material in an appropriate style as the radically different yet inexpensive use of brick modeled on some of the more modest cottage styles of English Tudor work which are perhaps the least expensive of available design. Illustrating the possibilities of this style are the attractive yet simple house designs by Duhring, Okie & Ziegler, Edward Palmer, Jr., and W. D. Lamdin that appear in this issue on pages 115, 147, and 160, respectively.

The cost factor introduced by the style selected for the building is an important one. Colonial finish, requiring delicate and especially fine mouldings around windows and doors and for cornices, is now regarded as introducing an item of added cost. In fact, it is difficult even to plan room interiors along the lines usually accepted by American householders without going into a very considerable element of expense in this matter, because we are not yet accustomed to eliminate this wholly unnecessary if customary, finish, and get down to the fundamental essentials of the construction, employing them with sufficient skill and feeling for proportion to depend upon them alone for the attractive appearance of our house exteriors and interiors; as is so generally done in the better class of English work, for instance. By eliminating the conventional and customary finish around doors and windows, necessary only in the wooden frame dwelling, it might conceivably be possible to build a fireproof wall and finish it inside and out at a cost no more than the same wall built of wood, plaster, and stucco, *plus* the cost of the finish and its carpenter labor and painting; just as, under normal conditions, it might be possible, by reducing the customary size of our windows to the net area actually used by the owner (after he has finished draping and shading his windows — in what is also the customary manner!), to get a metal frame sash for a price approximating the cost of the larger wood window opening, of which so small a proportionate amount is usually actually utilized.

We have said, the small house must have a simple plan. One of the simplest, though not necessarily the least expensive, is the plan with the living room on one side of an entrance doorway, the dining room upon the other, as in Fig. 6, with a kitchen and pantry located at the rear. Such a house can be easily contained within a parallelogram. The staircase can be variously arranged to run either at right angles with the door; to be recessed to one side, or run directly back to a rear window on the second floor, and either a three or four room second story plan and bath is equally available and obvious.

In enlarging this plan the first step is to project the service portion into a slight ell at the side, as in Fig. 8; or rear, as in Fig. 7; or in a more elaborate form, as in Fig. 9; or throw out the dining room in a projecting bay at the front of the house, as in Fig. 10, or both, as in the plan on page 150. If additional area permits, a study can be added at the back of the hall, thus increasing the house plan, as in Fig. 12. From then on the elaboration of the plan generally extends into ramifications running into ells or wings of various proportions and treatments, diverting from the central structure in one or another direction, according to the points of the compass and the conditions imposed by the site. Yet how conventional and restricted are the possibilities of this plan! To be sure, it is based in the main upon an evenly balanced façade, with the center door and porch that was originally imposed by the Colonial tendencies of the American householder. Once give the designer a chance to locate his entrance off the center of the house front, and many possibilities are open to him. Yet one of the most difficult problems remaining to be solved is the narrow suburban lot, requiring a house of correspondingly narrow frontage. When associated with the desire to maintain this frontage and outlook for the principal rooms, it at once becomes necessary to place the entrance part way down the side of the house, as in Fig. 11, for example.

An English Tudor exterior treatment makes it possible to simplify

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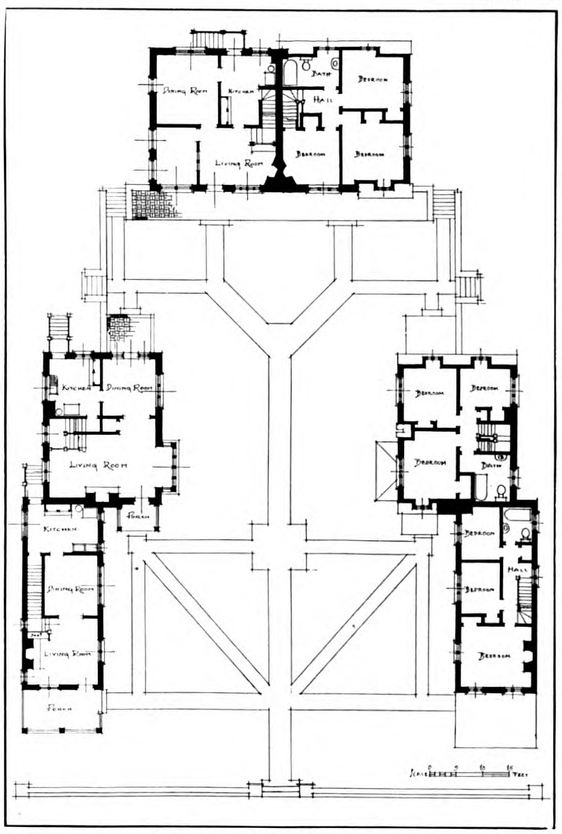
GENERAL VIEW FROM STREET




FIRST AND SECOND FLOOR PLANS

VIEW OF SIDE HOUSE

VIEW OF CENTER HOUSE

First floor area of front portion of side houses, 468 square feet; rear portion, 634 square feet; and half of house in center, 675 square feet

GROUP OF HOUSES, WILLOW GROVE AVENUE, PHILADELPHIA, PA.

DUHRING, OKIE & ZIEGLER, ARCHITECTS

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the entrance by avoiding an elaborate porch, such as is usual in Colonial work, and substituting for it a simple hood, a recessed or arched vestibule, or some other unobtrusive or appealing motive appropriate to the design. The most interesting and best of the small houses seen in American suburbs are easily those of this English type of inspiration, just as the more commonplace are generally those based upon the Colonial type of plan previously described.

It is interesting to note that, where the Colonial plan with a central hall and stairs running from front to back of the house has long been a favorite, and often an unintelligent and thoughtless, arrangement, the plan of the small house is now receiving more attention, and new and very interesting variants are accordingly being discovered. One of these tendencies is to run the stairs at right angles to the entrance, as in the house at Framingham, shown on this page; or to go back to a favorite scheme of thirty or forty years ago and place them as part of a more spacious staircase or reception hall, as in Mr. Fowler's and Mr. Palmer's schemes (see pages 146 and 147); or that receives an even more typical treatment in Mr. Lamdin's diversified, and accordingly *not* inexpensive, plan (see page 160). Mr. Palmer's house also shows a type of plan that has recently become rather a favorite, with living room and dining room together extending across the entire back of the house. This is especially true where the house faces the north, as in this case; yet this logical solution, requiring the location of the kitchen on the street front of the house, however, has been long and determinedly resisted by many owners because of that very fact. The modern plan also calls for more and more bathrooms upon the second floor, thus introducing an element of expense in the plumbing that a few years ago did not enter materially into the house problem.

But the architect is not the only person to be held responsible for the intricacy and expense of the dwelling house plan. The owner is here equally, if not even more, at fault. In how many small American houses, for instance, where the matter of expense is considered by the owner to be

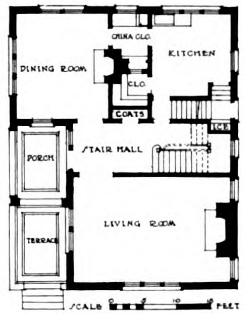



Fig. 11. Plan for lot of narrow frontage. Floor area 1,200 square feet

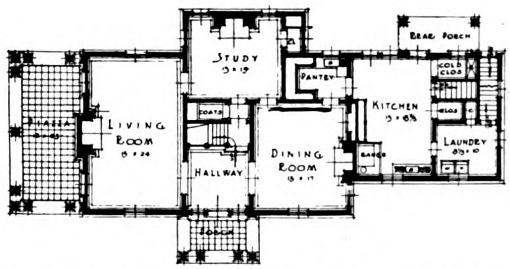
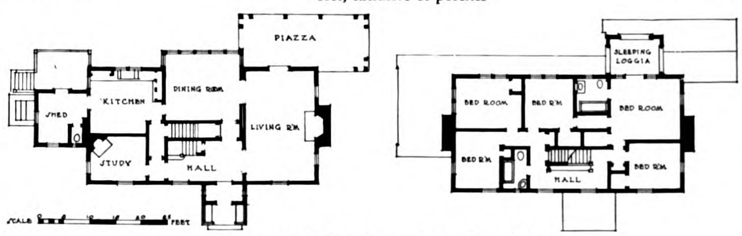



Fig. 12. Plan showing study added at rear of hall. Area 1,650 square feet, exclusive of porches




First and second floor plans of house shown below

House of Wm. E. P. How ell, Esq., Framingham Center, Mass. Charles M. Baker, Architect
Walls of stud and siding construction, roof of shingles. Floor area, exclusive ot porches, 1,220 square feet. Cost 19 cents per cubic foot

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HOUSE ON PEACHTREE ROAD, ATLANTA, GA.

A. N. CANTON, ARCHITECT

HOUSE OF A. A. BEEBE, ESQ., WINNETKA, ILL.

PERKINS, FELLOWS & HAMILTON, ARCHITECTS

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of prime importance, is he yet found willing to eliminate unnecessary rooms and concentrate the space where it is most needed and most used in his family life? Once in a *long* while the owner can be persuaded to eliminate hall area, outside of the absolute space required for staircase, passageway, and entrance vestibule; yet he nevertheless persists in stipulating such conventional elements as the dining room, china closet, and kitchen pantry; and seldom can he be brought to realize the great economy in space possible from arranging the living room so that one end may be used as the dining room, as in Fig. 13, with a substitution of cupboard space — properly designed to be interesting elements in the decoration of the room — to open directly into the dining room or into the kitchen, or to communicate with both, thus saving the area of the dining room and much corresponding partition work and plastering. Yet the original English cottage, from which our present house plan derives, made these savings, along with the substitution of cupboards for closets upon the second floor, with their added greater convenience and saving of at least 50 per cent floor area, both important elements in the economy of the English cottage plan.

To recapitulate, the principal elements in the inexpensive house are, first, the planning of its arrangement; second, the exterior and its design (with which is associated, of course, the "style" of the house to be adopted), the simplifying and location of the chimneys, the location of plumbing, the roof arrangement, and, finally, the finish and painting. The latter is an important factor in these days, and one of the elements that does much to run up the expense of building the Colonial house, with its necessary requirements of many coats of white paint on elaborate finish; whereas the English type of cottage is appropriately finished with simple woods, left in the natural color or stained, with an exterior surface of wax, thus saving both expensive labor and material as well. The plan once simplified, the area of the house cut down (the plan in Fig. 13, it should be noticed, nevertheless supplies even this small house with one large and livable room), the height of the story reduced to a comfortable proportion to the rooms' floor areas, saving the expense of construction, and, in winter, coal for heating bills — and we have laid the basis for a more economical type of dwelling than is usual, or customarily considered possible, by the small American householder.

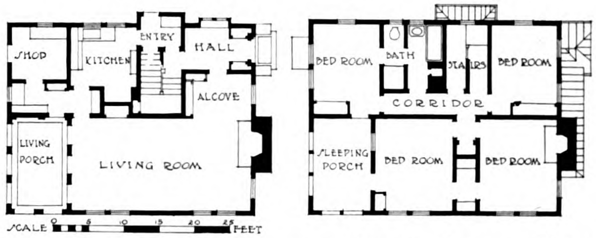


Fig. 13. Plan showing convenient arrangement with omission of conventional dining room. Area 945 square feet, including porches

There remains but one further economy to be practised, and that is to work, through co-operation, to subdivide and concentrate the profits — now necessarily to be secured on each building constructed by a contractor in scattered locations — that would practically be possible if one contractor could be carrying on, at the same time, a number of constructions of one architect in a group, and of different designs, in which case it would become possible for the architect to standardize many of his details so that much labor and shop work would be saved, with no loss of distinction to the individual houses. Here is the principal economy of building the low cost house, as the problem has been faced, and solved, in England.


Second Floor Plan


First Floor Plan

House of Mr. L. S. Dickey, Jr., Morgan Park, Ill. Chatten & Hammond, Architects
Walls of hollow tile with brick and stucco veneer. Floor area 1,947 square feet, including porches. Cost $7.75 per square foot

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# THE FORUM COLLECTION OF EARLY AMERICAN ARCHITECTURAL DETAILS

PLATE FORTY

*THIS handsome china closet is hidden by a solid paneled door, which must be opened to reveal the beauty of the work behind it. No glass was used, in order that it might balance a similar door on the opposite side of the fireplace, giving to that end of the room a symmetrical composition.*

*The fluted shell is entirely of wood, as well as the semicircular wall in back of the shelves. The central projection of each shelf, in order to give added space, is interesting. The six-petaled rose carved in the key over the door is no doubt a survival of the Tudor rose tradition.*

CHINA CLOSET IN THE WEBB-WELLS HOUSE, WETHERSFIELD, CONN.

Built in 1753

MEASURED DRAWING ON FOLLOWING PAGE



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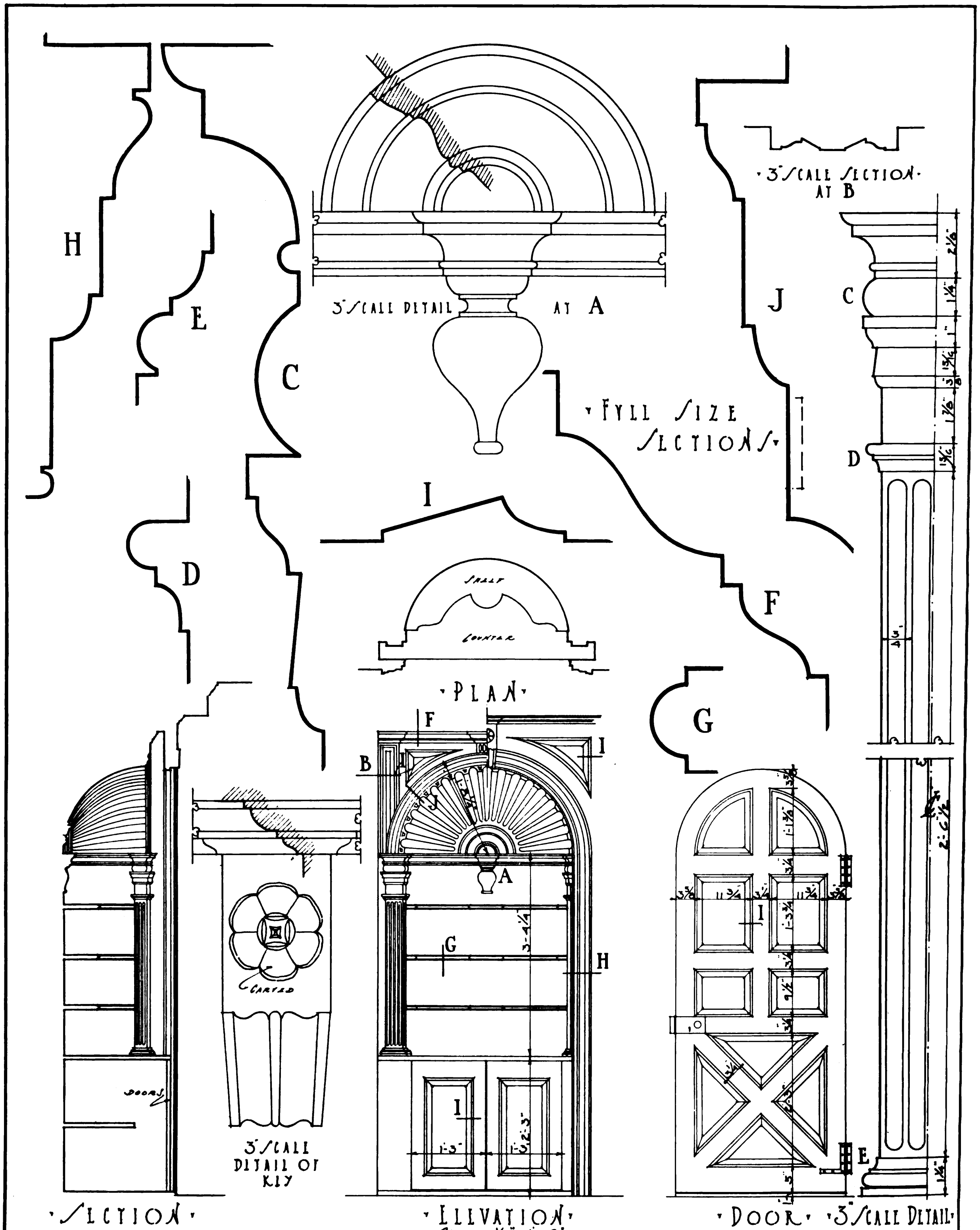


| PLATE 40<br>MAY 1917 | WEBB-WELLS HOUSE<br>CHINA CLOSET<br>WETHERSFIELD-CONN. BUILT 1753 | MEASURED<br>AND DRAWN BY<br>J. FREDERICK KELLY |
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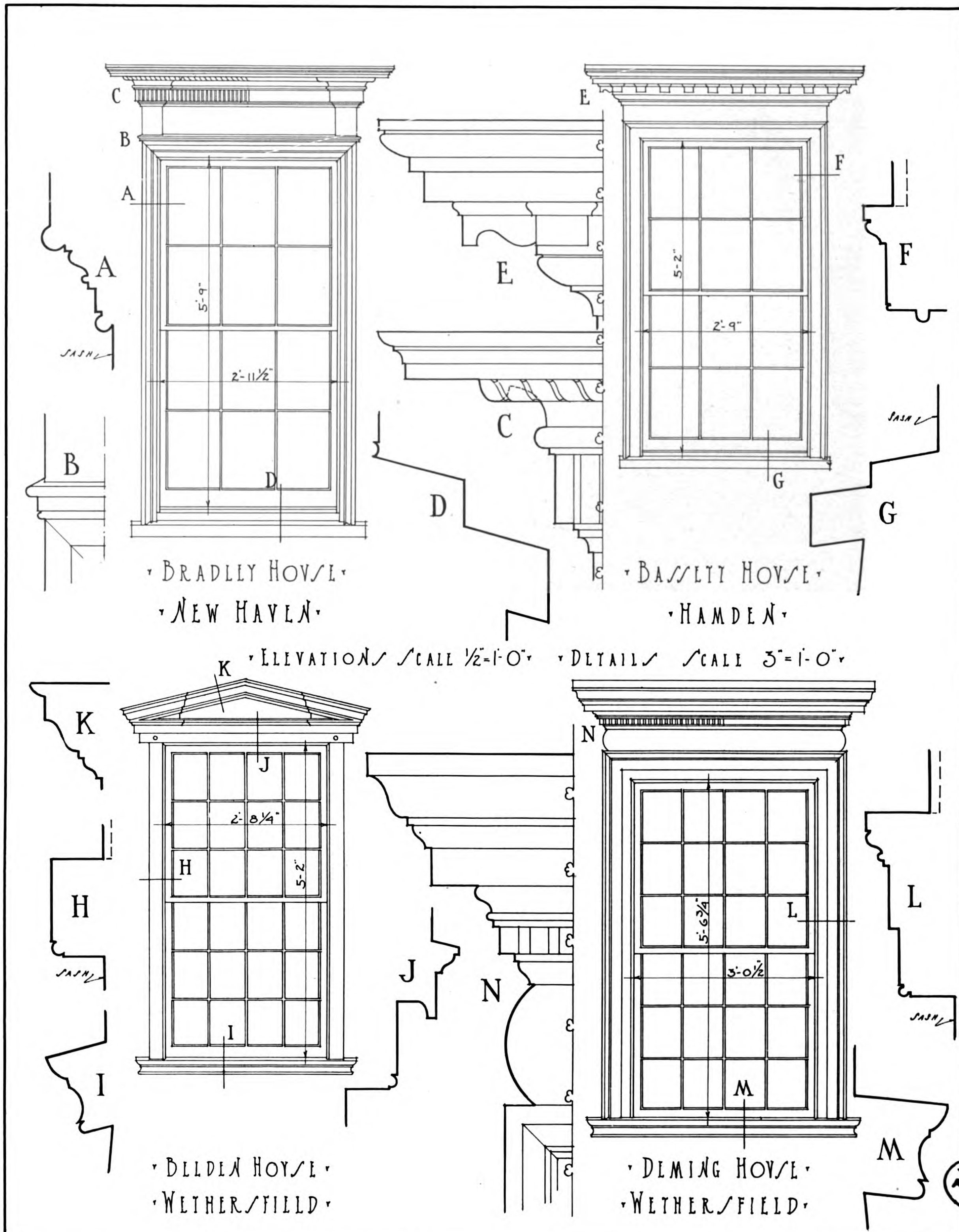


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| | | |
|---|---|---|
| PLATE 41<br>MAY 1917 | TYPICAL WINDOWS<br>FROM<br>CONNECTICVT HOVSES | MEASVRED<br>AND DRAWN BY<br>J·FREDERICK KELLY· |



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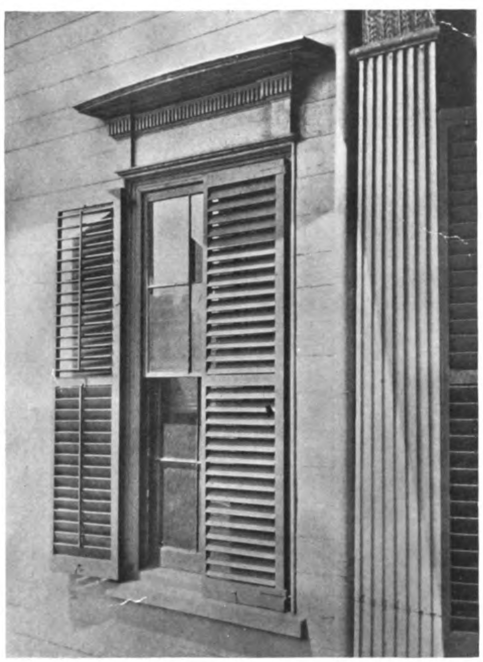
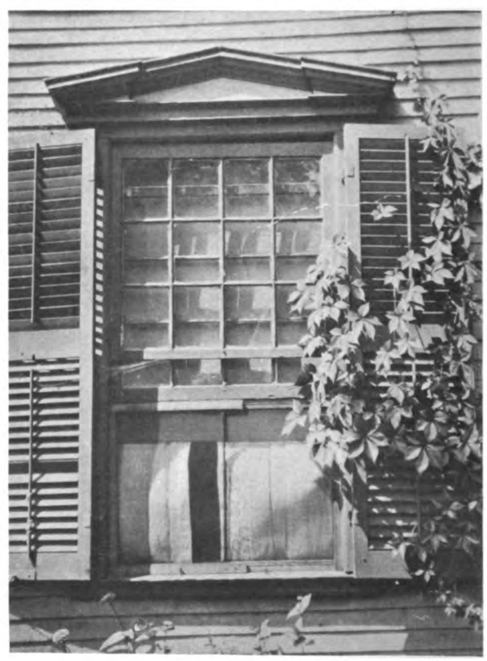
## PLATE FORTY-ONE

FROM THE DEMING HOUSE, WETHERSFIELD

FROM THE BASSETT HOUSE, HAMDEN



FROM THE BRADLEY HOUSE, NEW HAVEN



FROM THE BELDEN HOUSE, WETHERSFIELD

*THE window from the Bradley house is work of a late date. The detail and ornament of the once elaborate house is Adam — and very late Adam — in period. The rope moulding is repeated in the main cornice of the house, which is denticulated also. The exterior trim is decidedly unusual in section.*

*The Bassett house window, also of late date, is classic in its conception. Architrave, frieze, and cornice in regular proportion accentuate this impression. The exterior trim, or architrave, is extremely simple, but pleasing, while the double sill — as in the Bradley house window — is not common.*

*The window of the Belden house is the earliest of the four. Its frame of plank, fastened with wooden pins, alone indicates this. The sill section is interesting and unusual; while the breaks in the pediment are common in windows of this period and type.*

*The Deming house window, handsome in its proportion and detail, is somewhat similar in type to that of the Bassett house, though of earlier date. As the sill section is nearly similar to that of the Belden house window, it is quite possible that both houses were built by the same carpenter.*

## TYPICAL WINDOWS FROM FOUR CONNECTICUT HOUSES

MEASURED DRAWING ON PRECEDING PAGE



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# Private Water Supplies for Country Estates

*By* SAMUEL A. GREELEY
*Hydraulic and Sanitary Engineer, Chicago, Ill.*

THERE is a growing realization amongst architects and owners that the problem of securing an ample supply of pure and soft water at country houses and estates is one of importance requiring special study. Probably the particular reason for this feeling is the increasing knowledge of the dangers of pollution reaching wells and other sources of supply. But there is also a growing demand for soft water and for waters free from color, taste, and odor, as well as for sufficient supplies of water at ample pressure to afford adequate fire protection. At large stock farms the water supply problem is particularly important.

Such private water supplies cover a variety of conditions, from the needs of small houses of 10 or 20 persons up to the requirements of large estates having activities ranging from stock watering to laundrying. Sometimes the water supply is taken from deep wells, in which case it may be hard and unsatisfactory for washing. In other places the water may come from surface storage, in which case it may be subject to pollution and require filtering. A number of interesting special problems along this line which have been called to the writer's attention for solution are briefly summarized herewith.

Quantity. The first point to fix in planning a water supply is the quantity of water required. The actual needs of a single person can be amply met by an average daily allowance of 30 gallons of water. However, this water will not be used uniformly throughout the 24 hours, and will be subject to loss through leakage during its delivery from the original source to the point of use. Therefore, a more liberal per capita allowance is usual. In some instances records indicate that 50 gallons per capita is a sufficient allowance. However, it is wiser to develop a supply of 100 gallons per capita as a minimum, with reserve storage to meet higher rates for short periods. An additional quantity of water must be provided for the laundry. A number of gaugings indicate the average daily requirements for laundry purposes to be about 10 gallons per capita. For stock farms, surprisingly large quantities are needed. It is estimated that stock will drink the following amounts of water daily:

| | |
|---|---|
| Cows | 10 to 15 gallons |
| Horses | 10 to 12 gallons |
| Sheep | 0.5 to 1.5 gallons |
| Hogs | 0.5 to 2.0 gallons |

In addition to the water actually needed for drinking, a supply must be provided for washing the barns. Gaugings at stock farms indicate a consumption for all farm purposes of 25 gallons per head of stock per day.

Finally, provision must be made in the supply for sprinkling gardens and barns and for fire protection. These two uses must be estimated for each particular case, guided by experience elsewhere. Usually the fire protection element must be partly covered by the stored water. For a stock farm having an area of 1 square mile and 100 head of cattle with an estimated population of 50 persons, the writer developed a water supply on the basis of 7,000 gallons per 24 hours. The estimated rate of consumption of this water through the 24 hours is shown in Fig. 1. Fire protection was provided in two storage reservoirs, having a combined capacity of 14,000 gallons.

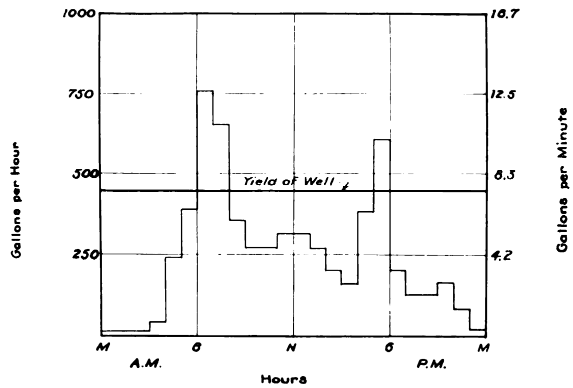

Fig. 1. Diagram showing estimated daily rate of water consumption for stock farm having 100 head of cattle

Quality of Water. Water which falls as rain is practically distilled water, is soft and pure, colorless and tasteless. Some of this water flows over the surface of the ground into streams and lakes, and in so doing takes up in solution or suspension more or less foreign substances. From some surfaces the water is colored, from others, mineral salts are added which make the water hard. All surface waters may take up harmful disease, producing bacteria. When water is stored in ponds or lakes, organisms grow which may impart to it a decidedly unpleasant taste or odor. Such organisms are the minute algæ, crustacea, diatoms, and the like. Surface waters must usually be suspected, and the consumers must be protected by treatment of the water or by safeguarding the source.

Development of Water Supply. From the estimated quantity of water required and from investigations of the available sources, the works for the water supply can be planned. Usually a comprehensive plan should be prepared to meet all reasonable future requirements. The works can, however, be developed progressively from this plan as the actual present needs justify. A frequent trouble is the installation of too small distribution pipes. These serve satisfactorily for a few years, but as the use for water increases, or plumbing fixtures begin to leak, or because of sudden large demands during fires, the mains are found to be inadequate. It is frequently found that the actual quantity of water developed is excessive, while the mains to distribute and the plants to treat the water are inadequate. It is desirable to procure a proper balance between these two elements. The safe construc-



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tion of dams, the proper size and placing of wells, the selection of economical pumping machinery and such technical matters, all determine the efficiency of the operation of the water supply which, of course, is the final test. In one instance coming to my attention, the pumps were driven by belt connected engines. The loss of power in the belts was so great as to warrant the installation of entirely new direct connected equipment. Troubles from frozen and air bound pipes must also be prevented.

Shallow wells in particular are subject to surface pollution and are not a safe source of water for domestic consumption. The following quotation is from the Tenth Annual Report of the Chemical Division of the Indiana State Board of Health for the year ending Sept. 30, 1915: "Of the 9,030 well supplies (in Indiana) 3,891 are derived from so-called deep wells and 5,139 from dug or shallow driven wells. Records of the laboratory show (10,957 samples) that 17.8 per cent of all deep wells and 58.4 per cent of all shallow wells are unsatisfactory as water supplies."

The water which does not run off as surface water percolates into the soil and reappears as well water. In percolating through the soils these ground waters take up substances, usually by solution, which often make the water hard. Sometimes this hardness adds a pleasant taste to the water or a medicinal quality. In other instances the water is hardened and made unsatisfactory for washing. Thus the quality of the water may be predicted after an examination of the available sources.

Treatment of Water. To remove from the water various foreign substances taken up by it, after it reaches the earth as rain, some special method of treatment must be applied. Thus turbid and polluted waters must be filtered and hard waters softened. It is sometimes thought that household filters are an ample protection against bacterial pollution. In this connection it is interesting to summarize the investigation of the efficiency of household filters made by the chemists of the Sanitary District of Chicago. They tested twelve different types of household filters, operating on Lake Michigan water, and as a conclusion state "that small amounts of turbidity are removed satisfactorily, but that the bacterial efficiency cannot always be depended upon."

Removal of Color. In some country districts the only available sources of water are surface supplies from swampy regions, which at times produce colored water. The color of water can be removed largely in connection with filters by coagulating the water with minute quantities of alum. In some instances clarification can be accomplished by agitating the water with sufficient quantities of finely divided clay. This method is a well known household remedy. Thus drinking water for farms has been clarified by shaking with clay in large bottles and allowing the clay to settle out. A modern explanation of this action is that the coloring matter in water is due to particles in the colloidal state, which are merely minute

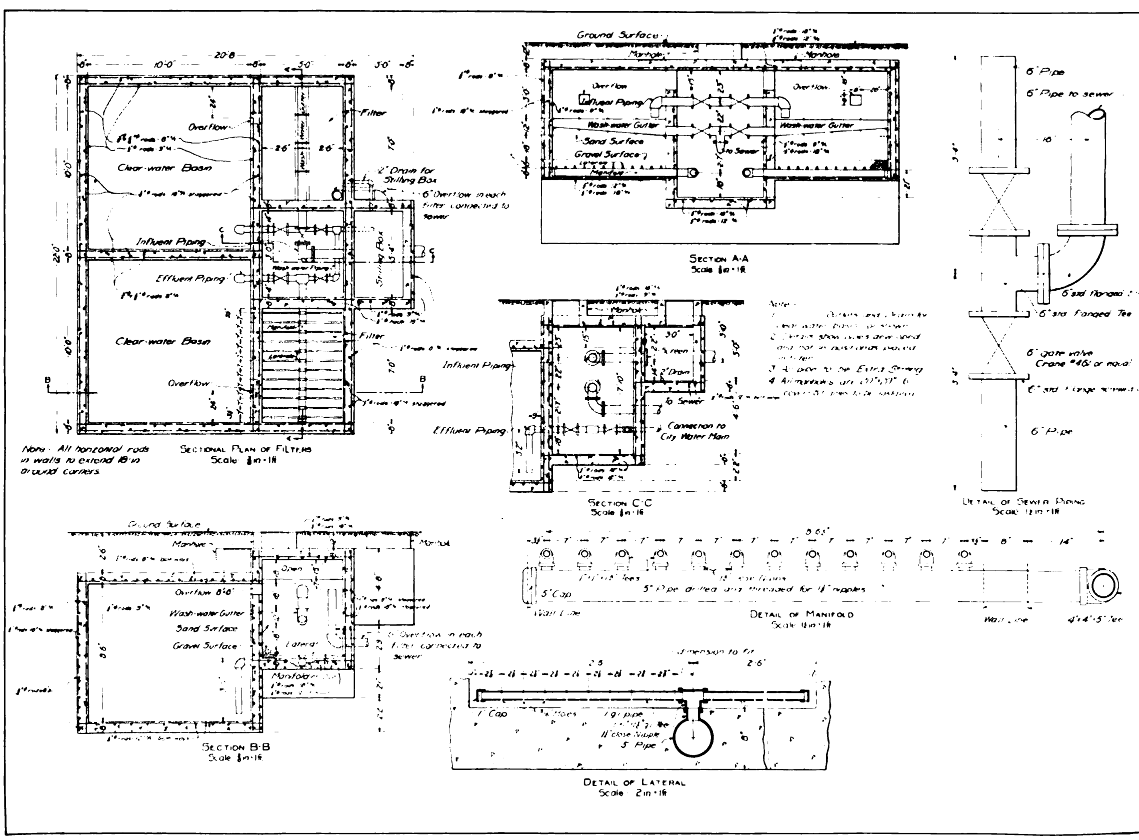


Fig. 2. Details of soft water filter plant

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particles in suspension. They are, as it were, swept out of the water by the finely divided clay or alum added to the water. Examinations and tests of each water are needed to determine the actual treatment in each case.

Waters of this character also usually contain considerable amounts of organic matter which render the water difficult to use in boilers because of foaming. This objectionable quality of the water is also modified by treatment with alum.

REMOVAL OF TASTES AND ODORS. Waters having tastes and odors due to excessive growths of microscopic organisms or to special foreign substances may frequently be much improved in quality by simple aeration. This can be accomplished by cascading the water over concrete steps so that it falls in fine drops. If sufficient fall is available, the water may be sprayed through a special nozzle from one basin to another at a lower elevation. The amount and character of aeration must be determined for each particular case.

DEVELOPING SOFT WATER. One of the characteristics most frequently sought for in the private water supplies is softness; that is, freedom from hard mineral constituents such as the salts of lime, magnesium, and iron. These salts make the water undesirable for washing and for use in boilers. They reduce the capacity of pipes by incrustation. The salts of iron stain articles with which they come in contact. The hard waters are usually those from deep wells. Hard waters can be softened by treating the water with lime or soda or both in small quantities, coupled with sedimentation and filtration. Plants in small units for easy operation can be designed.

A somewhat simpler method of softening certain hard waters is by the use of some zeolite. A zeolite is a mineral which has the power of exchanging its base for that of another salt. Artificial zeolites are prepared for such use, usually as a form of hydrated sodium silicate. When hard water is passed through this compound, the lime and magnesium in the water are taken up in exchange for the sodium of the zeolite. Sodium (or salt) does not harden the water and is not present in sufficient quantities to affect the taste.

A preferable means of developing a soft water is by storing rain water in sufficient quantities to tide over dry seasons of little rainfall. Frequently water from roofs and yards can be collected and stored in a cistern of sufficient capacity to provide a moderate supply at all times. Under other conditions small streams can be dammed up to provide sufficient storage. In such cases it is necessary to filter the water before using it in order to remove the dirt washed off the roofs, yards, and fields. Such a filter built for a residence in Lake Forest, Ill., is shown in Fig. 2. Unfortunately a photographic illustration cannot be shown, as the whole filter is set underground. A small area of filter is possible because of the provision for washing the sand at frequent intervals, thus maintaining an effective filtration volume.

At a country estate near Pottstown, Pa., the water supply was taken from deep wells and pumped to an elevated tank in a water tower attractively designed of brick and field stones. Below the storage tank, provision was made for a zeolite softening apparatus housed in the tower.

An interesting feature of the use of hard waters relates to their effect on the disposal of sewage. In one instance brought to the attention of the writer for correction, decided odors resulted from the sewage treatment plant. The decomposition of the sewage, which was not properly controlled, produced hydrogen sulphide from the sulphates in the water, with the consequent objectionable nuisances. Sewage disposal requires special attention where hard waters are used.

WATER FILTRATION. The most useful form of plant for treating water is a filtration plant, because of its wide range of application. In some favorable localities existing sand beds can be used as filters by the construction of proper infiltration galleries. These infiltration galleries collect the water as it filters through the sand from some adjacent pond or river. They are in effect large well points built of masonry and set horizontally. Special filters can also be built for treating the water. Two types are used, — one is the so-called rapid sand filter and the other the slow sand filter.

A slow sand filter is a bed of sand of proper size and construction about 3 feet deep. The water is distributed over the surface and collected in proper underdrains below. Water can be filtered at the rate of about 3,000,000 gallons in 24 hours per acre of filter. Where there is not sufficient area for this type of filter, the rate of filtration can be largely increased by applying small quantities of alum or sulphate of iron to the water. Standard apparatus of tried worth is available for applying the chemicals and controlling the various parts of the filter. At many large country estates filter plants of this type have been installed for treating the general water supply.

LOCATION OF WELLS. Where well waters are to be used, and in particular shallow wells, special care should be exercised in the location of the well, especially with reference to the location of cesspools or sewage disposal plants. At Huron Mountain, Mich., the water supply was taken from well points driven 3 to 5 feet into the sandy bottom of a lake. The sewage from a number of cottages emptied into cesspools. These cesspools were located at distances varying from 12 to 50 feet from the bank of the stream discharging into the lake, from whose sandy bottom the wells were supplied. A considerable number of cases of intestinal disease pointed to the water supply as being subject to pollution from the cesspools.

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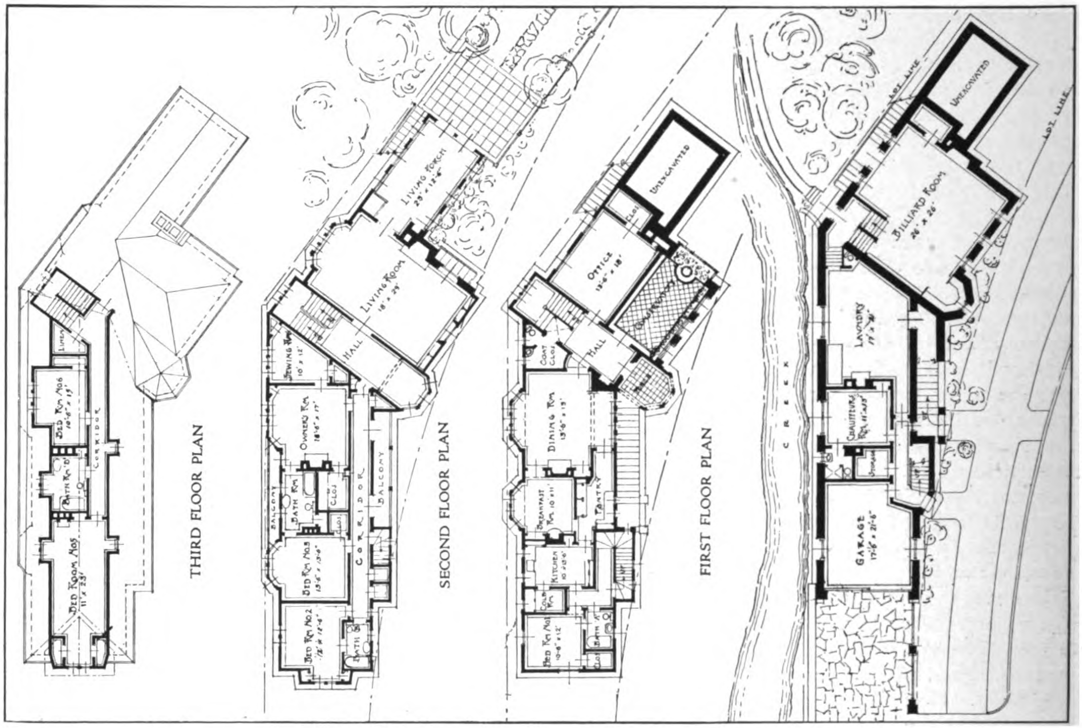


DETAIL OF ENTRANCE FRONT

HOUSE OF B. R. DEMING, ESQ., CLEVELAND, OHIO
HOWELL & THOMAS, ARCHITECTS

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DINING ROOM

BREAKFAST ROOM

ENTRANCE HALL

HOUSE OF B R. DEMING, ESQ., CLEVELAND, OHIO

HOWELL & THOMAS, ARCHITECTS

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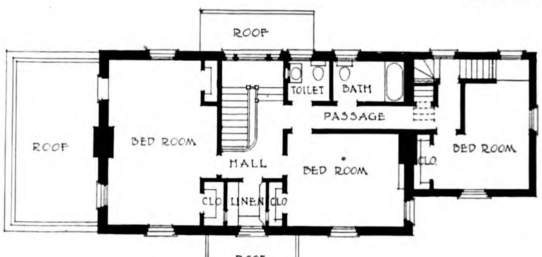
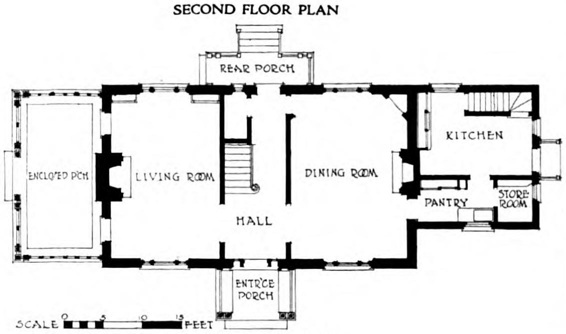
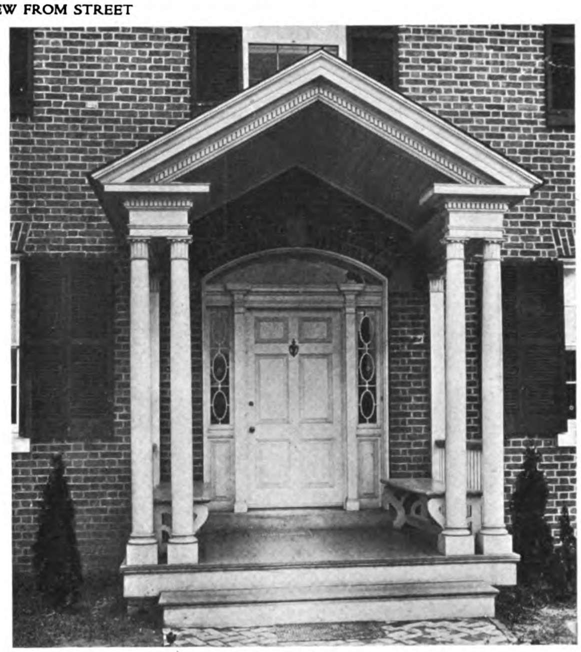
GENERAL VIEW FROM STREET




SECOND FLOOR PLAN




FIRST FLOOR PLAN



DETAIL OF PORCH

HOUSE OF R. E. ACTON, ESQ., ROSEMONT, VA.

DONN & DEMING, ARCHITECTS

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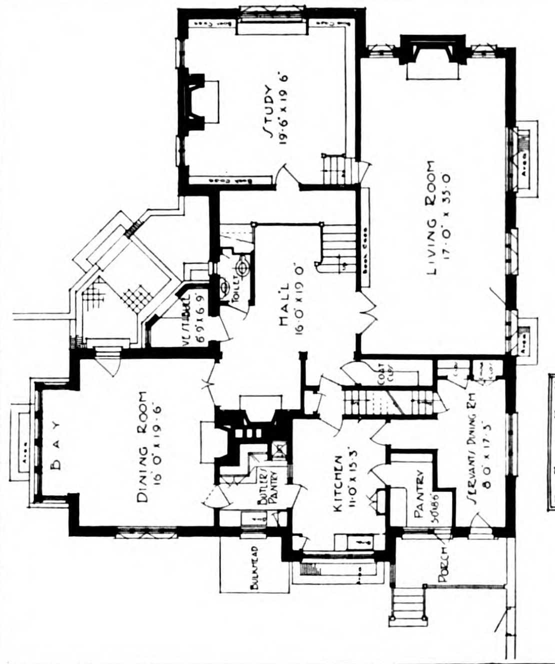
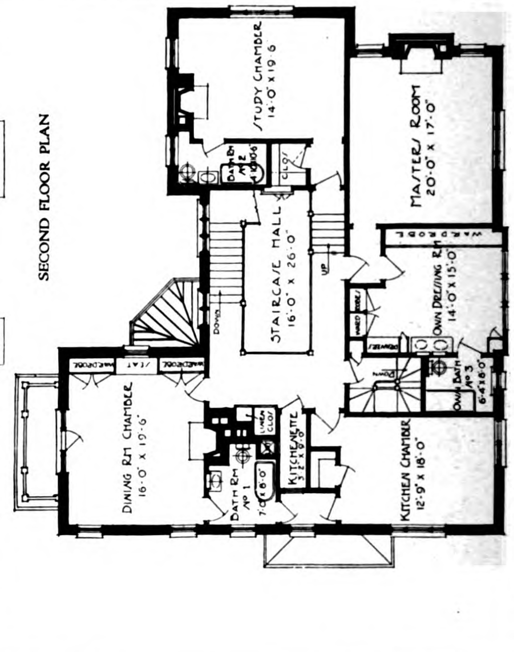
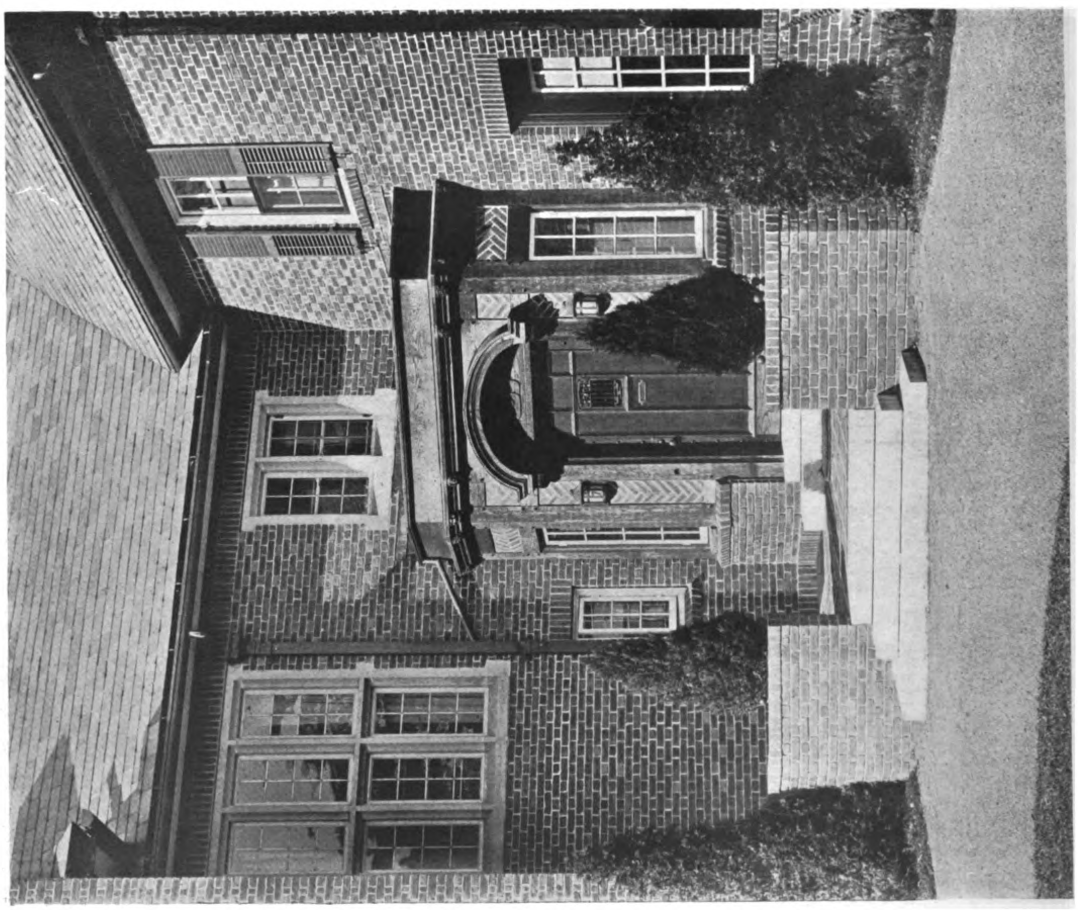



SECOND FLOOR PLAN




FIRST FLOOR PLAN



DETAIL OF ENTRANCE

HOUSE OF PROF. A. M. TOZZER, CAMBRIDGE, MASS.

KILHAM & HOPKINS, ARCHITECTS

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ENTRANCE FRONT

GARDEN FRONT FROM STREET

HOUSE OF PROF. A. M. TOZZER, CAMBRIDGE, MASS.
KILHAM & HOPKINS, ARCHITECTS

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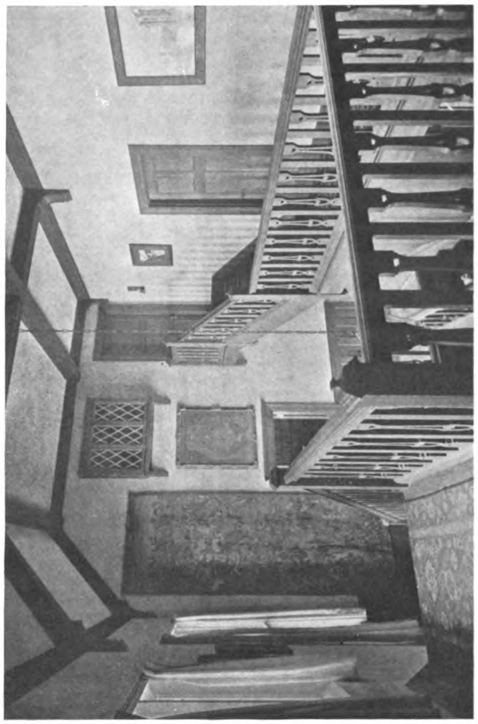
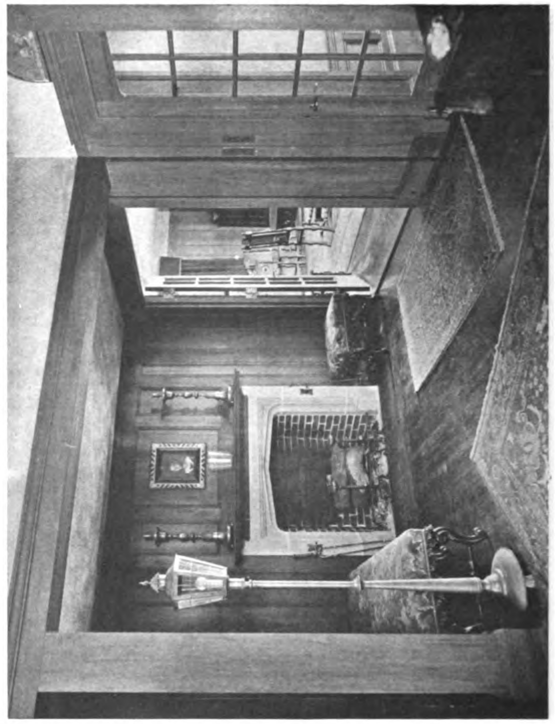


SECOND FLOOR HALL



FIREPLACE IN HALL

VIEW OF FIRST FLOOR HALL

HOUSE OF PROF. A. M. TOZZER, CAMBRIDGE, MASS.

KILHAM & HOPKINS, ARCHITECTS

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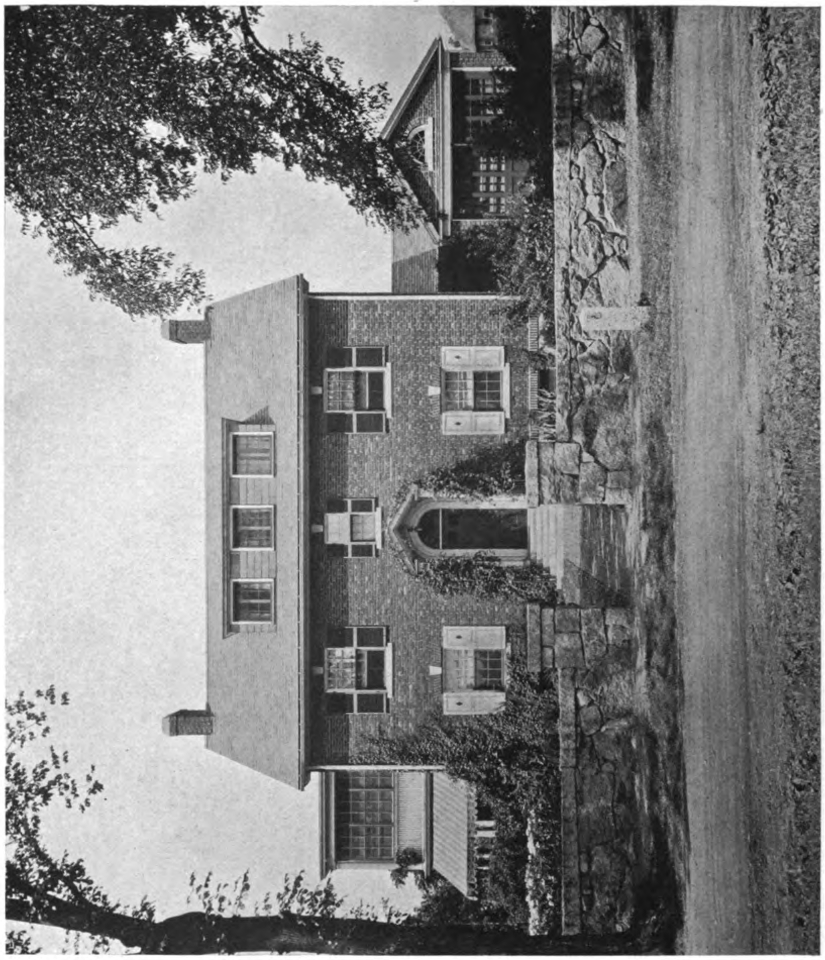

GENERAL VIEW FROM STREET

SECOND FLOOR PLAN

FIRST FLOOR PLAN

HOUSE AT BRAINTREE, MASS.

COOLIDGE & CARLSON, ARCHITECTS

DETAIL OF DOORWAY

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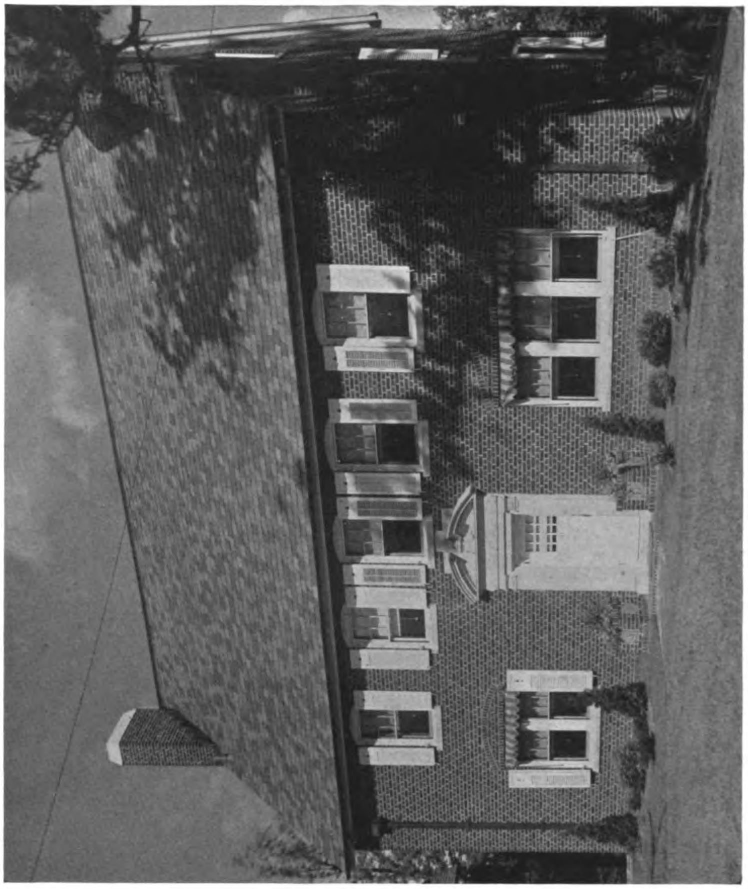
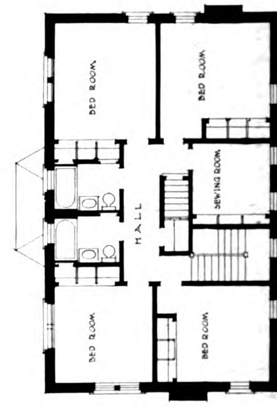
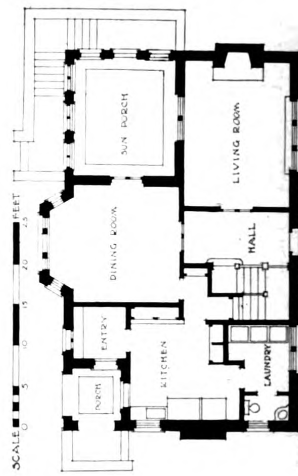




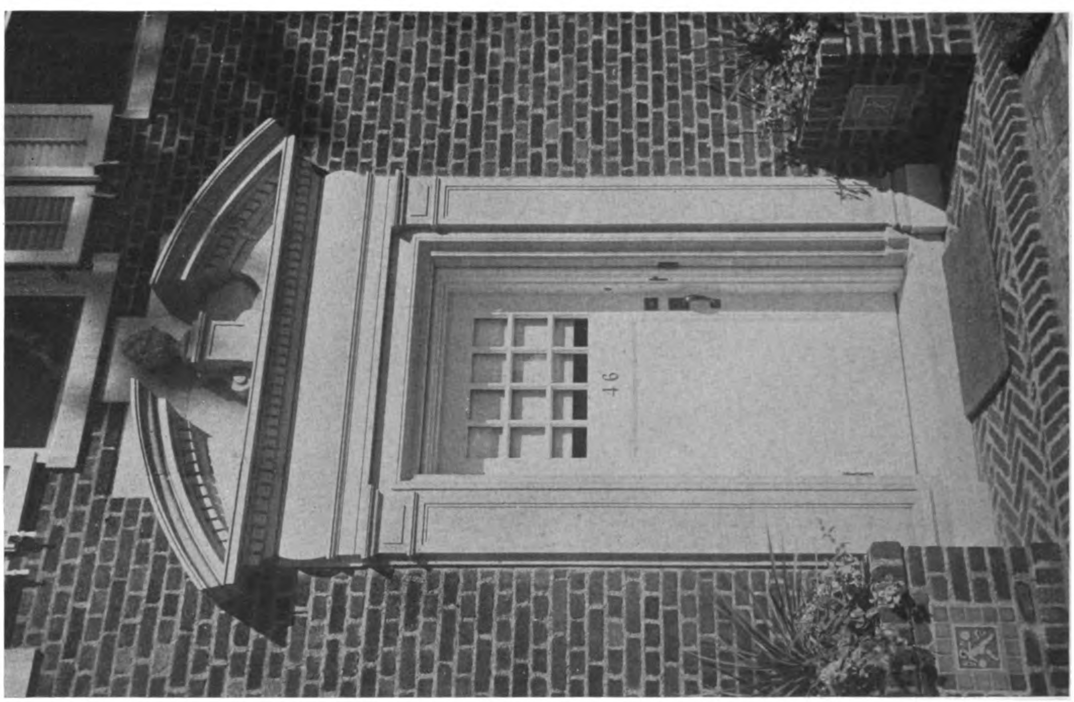

SECOND FLOOR PLAN




**FIRST FLOOR PLAN**

HOUSE OF CHARLES OTTO, ESQ., SCARSDALE, N. Y.

TOOKER & MARSH, ARCHITECTS



DETAIL OF DOORWAY

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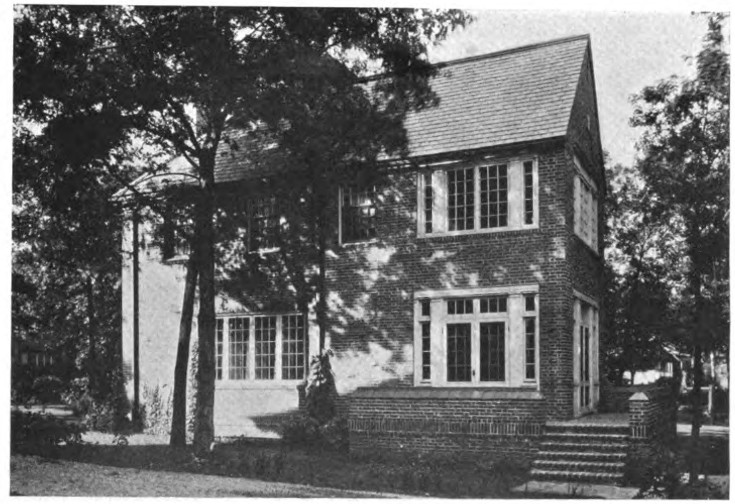
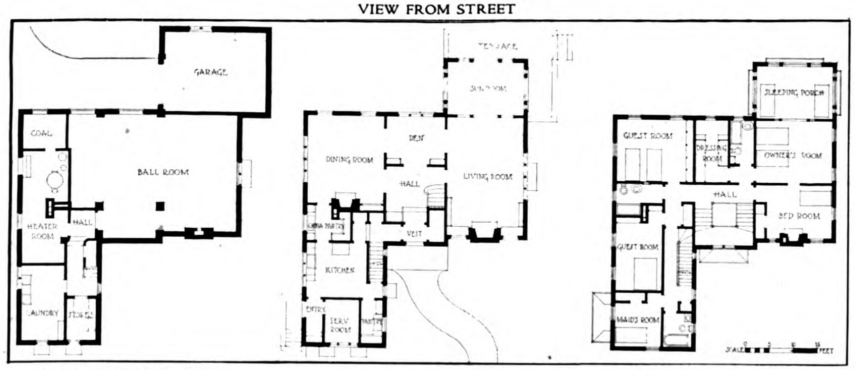
VIEW FROM STREET

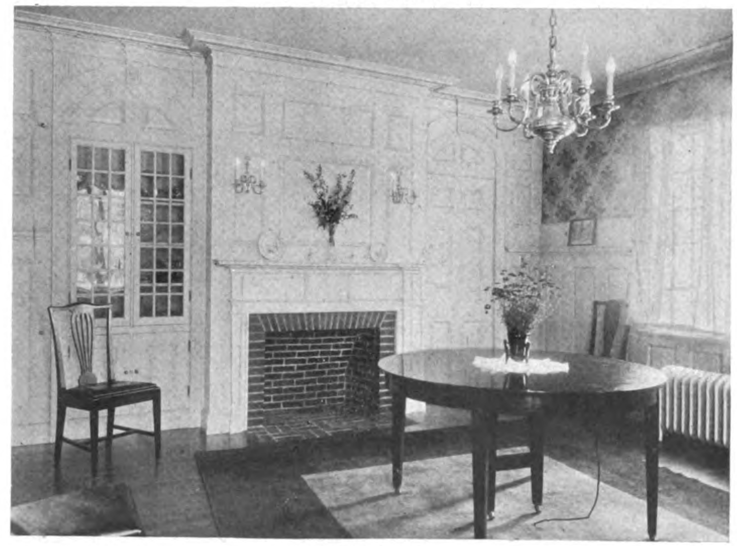


VIEW FROM SIDE





BASEMENT FLOOR PLAN FIRST FLOOR PLAN SECOND FLOOR PLAN



DINING ROOM

HOUSE OF M. E. GRUSH, ESQ., WINCHESTER, MASS.

DAVID WITMER, ARCHITECT

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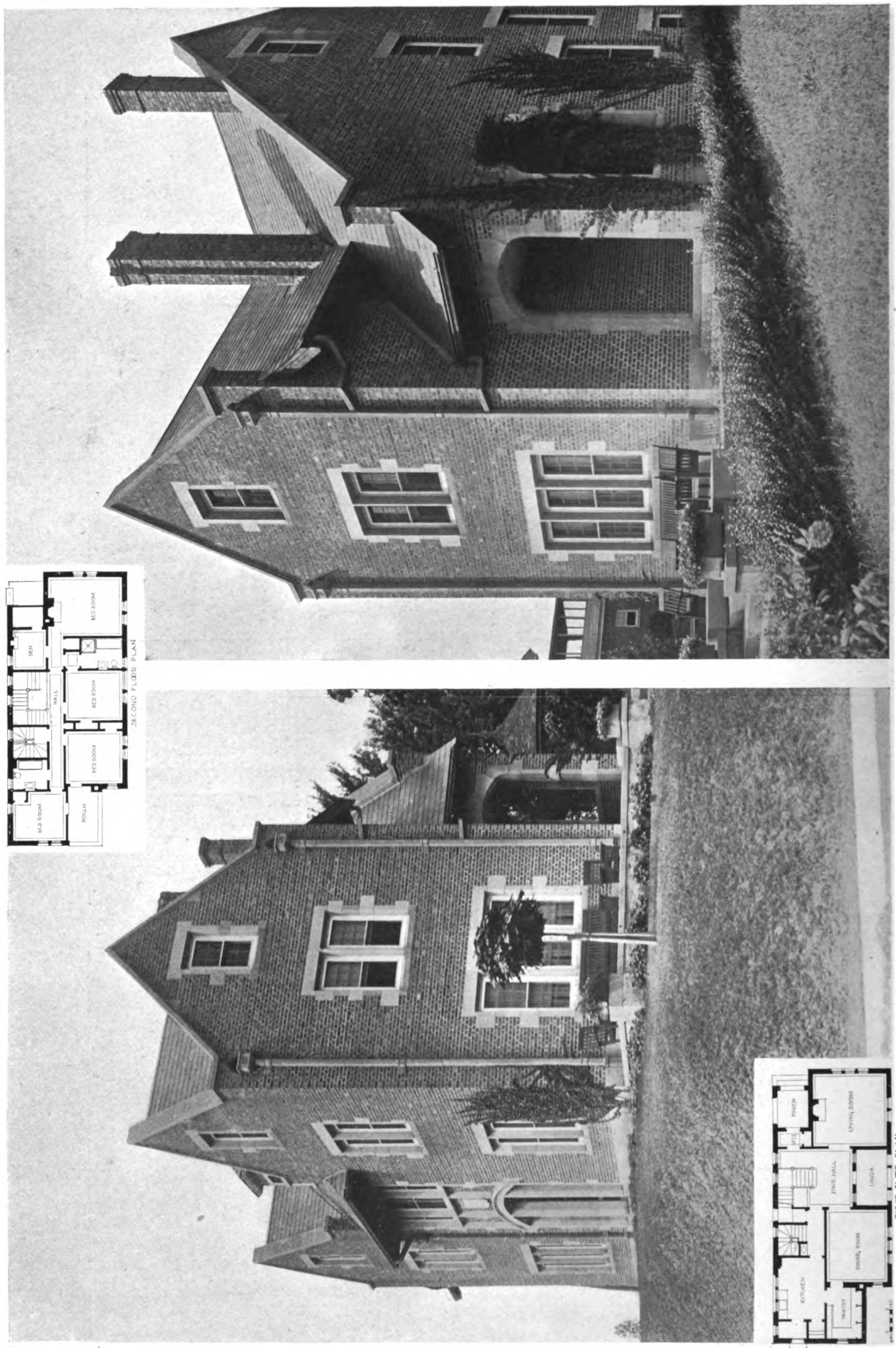


HOUSE OF MAJOR JOHN M. FRAZIER, ST. JOSEPH, MO.

ECKEL & ALDRICH, ARCHITECTS

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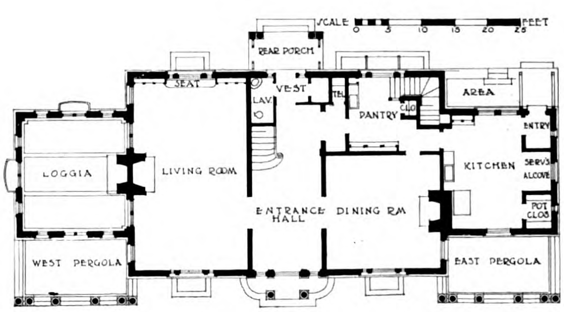
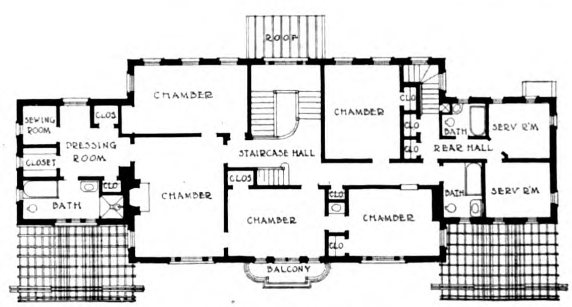



FIRST FLOOR PLAN




SECOND FLOOR PLAN

HOUSE OF E. IRVING HANSON, ESQ., NEW ROCHELLE, N. Y.

LUDWIG LINDENMEYER, ARCHITECT

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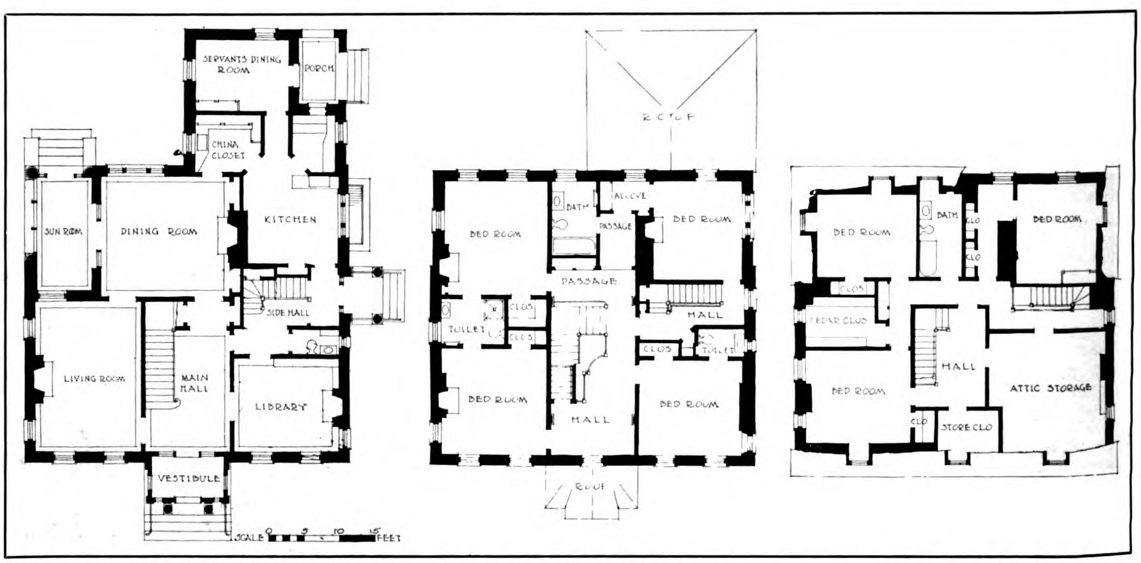


FIRST FLOOR PLAN SECOND FLOOR PLAN THIRD FLOOR PLAN

HOUSE OF HENRY BATCHELDER, ESQ., SALEM, MASS.

LITTLE & BROWNE, ARCHITECTS

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SECOND FLOOR PLAN


FIRST FLOOR PLAN

DINING ROOM

HOUSE OF A. B. McCLURE, ESQ., COLUMBUS, OHIO

HOWELL & THOMAS, ARCHITECTS

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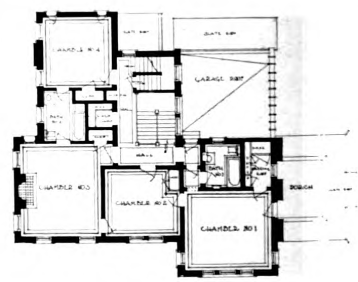
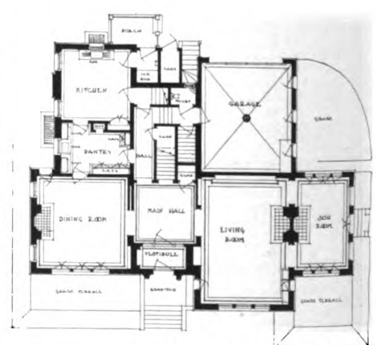
GENERAL VIEW FROM PORCH SIDE

VIEW FROM STREET



SECOND FLOOR PLAN



FIRST FLOOR PLAN

HOUSE OF F. B. EISEMAN, ESQ., ST. LOUIS, MO.

LaBEAUME & KLEIN, ARCHITECTS

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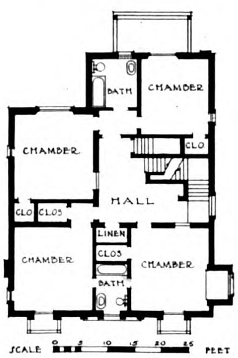
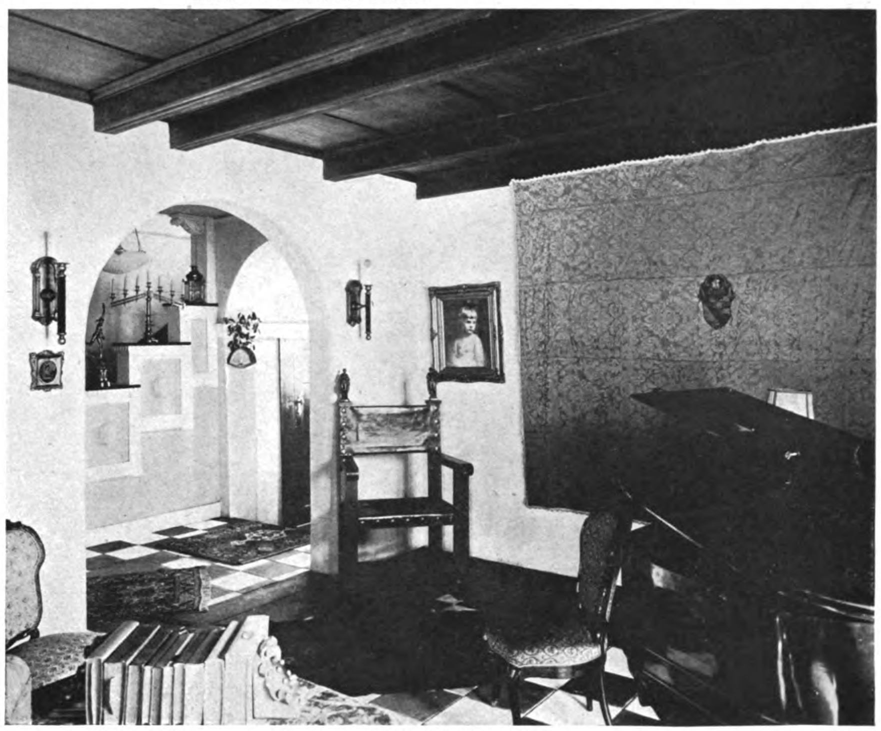
GENERAL VIEW FROM STREET




SECOND FLOOR PLAN


FIRST FLOOR PLAN



END OF LIVING ROOM

HOUSE AT EVANSVILLE, IND.

F. MANSON GILBERT, ARCHITECT AND OWNER

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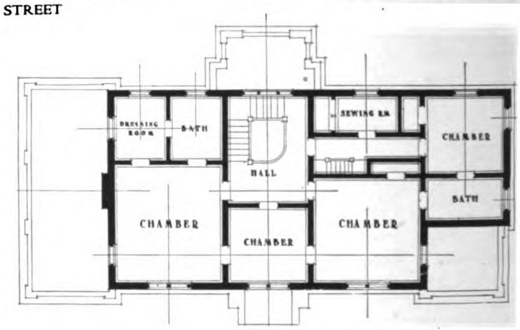
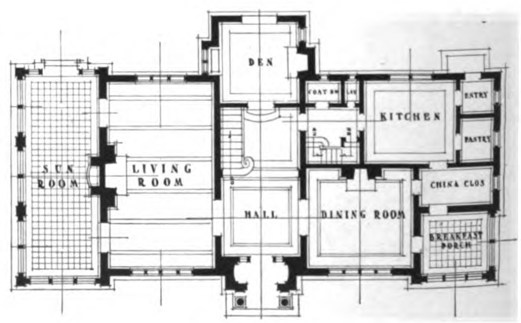
GENERAL VIEW FROM STREET

DETAIL OF DOORWAY




SECOND FLOOR PLAN




FIRST FLOOR PLAN

HOUSE OF MRS. E. J. ABBOTT, NEWTON, MASS.

JAMES PURDON, ARCHITECT

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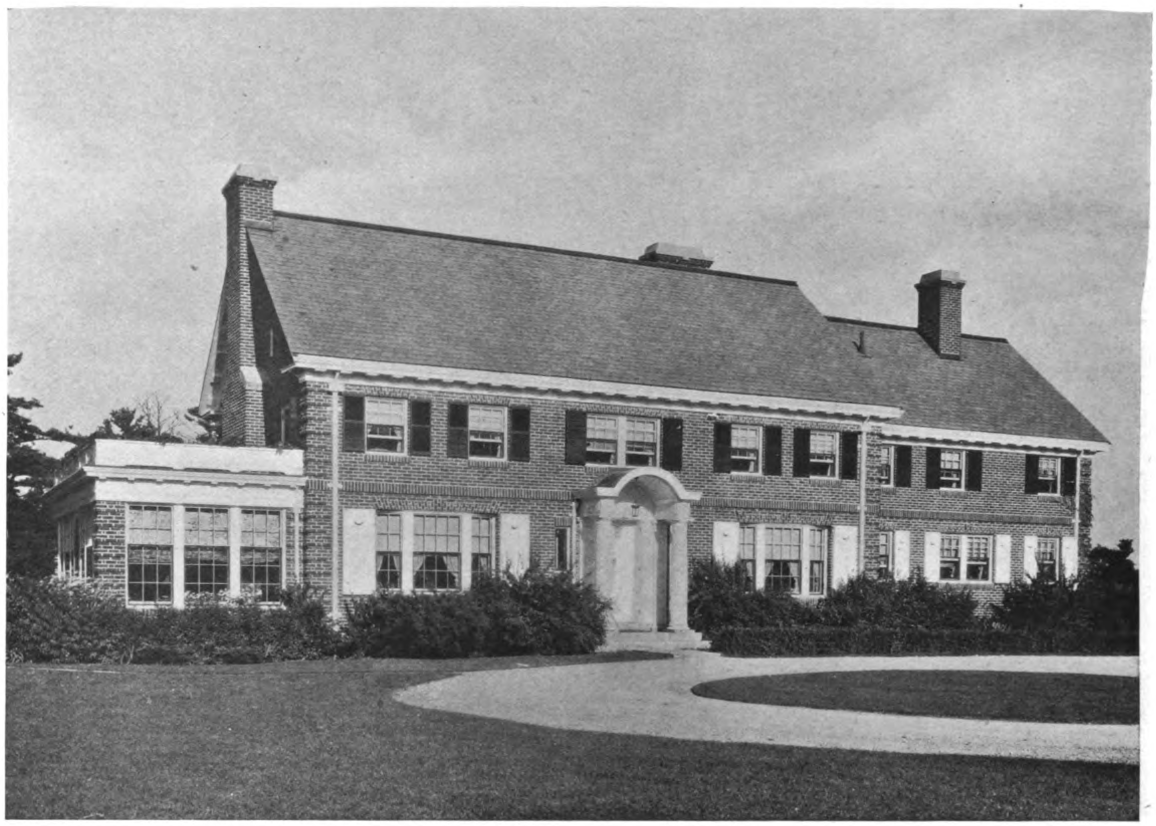
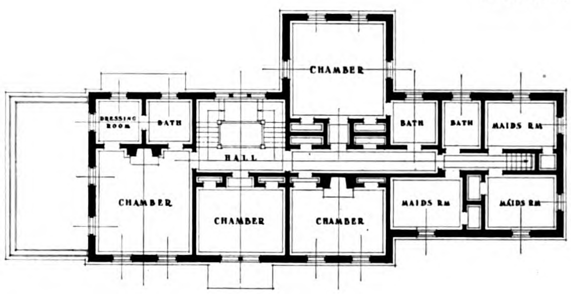
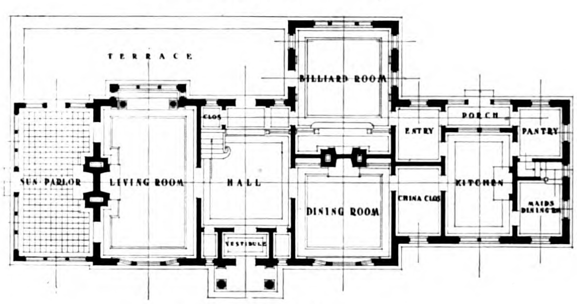


GENERAL VIEW OF FRONT




SECOND FLOOR PLAN




FIRST FLOOR PLAN

DETAIL OF DOORWAY

HOUSE OF A. E. THAYER, ESQ., DEDHAM, MASS.

JAMES PURDON, ARCHITECT

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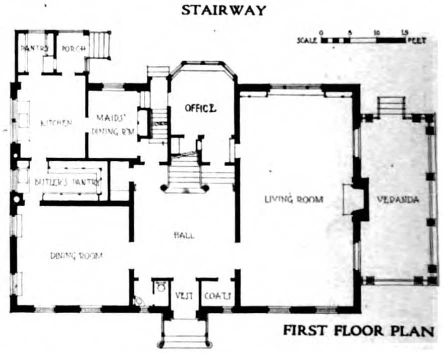
GENERAL VIEW FROM STREET

DETAIL OF DOORWAY

STAIRWAY




FIRST FLOOR PLAN

HOUSE OF FRANK KUHN, ESQ., DETROIT, MICH.

ALBERT KAHN, ARCHITECT; ERNEST WILBY, ASSOCIATE

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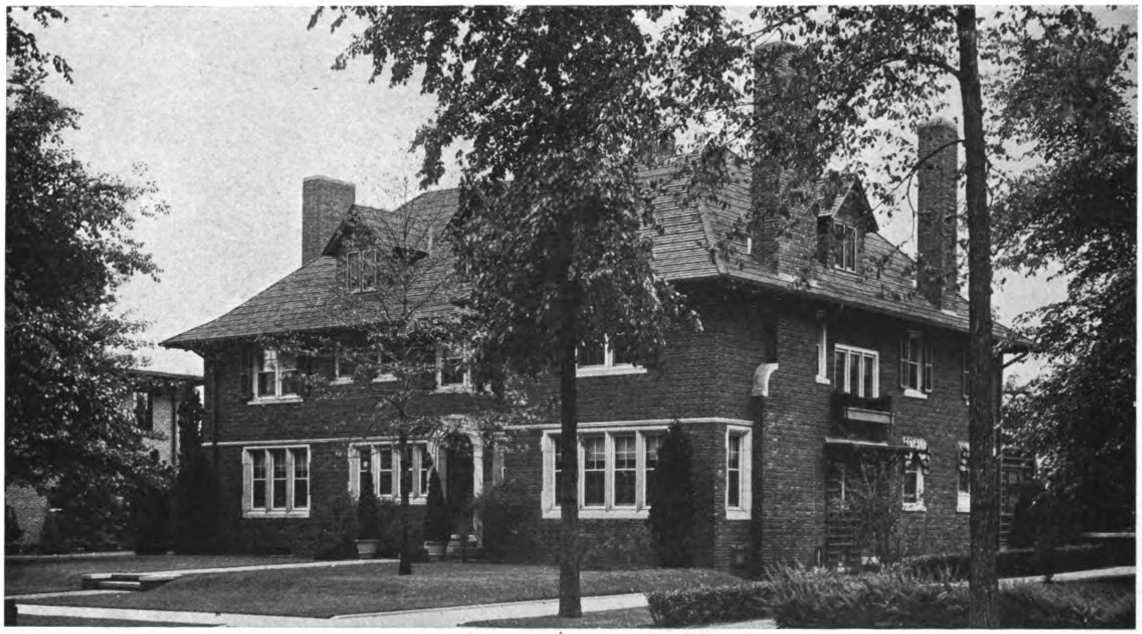
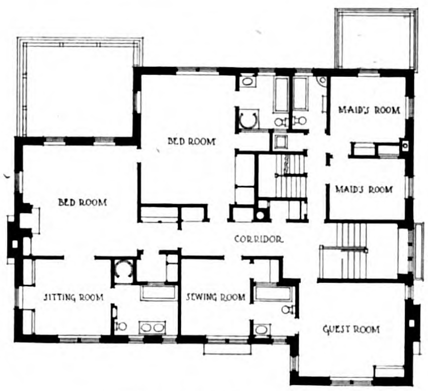
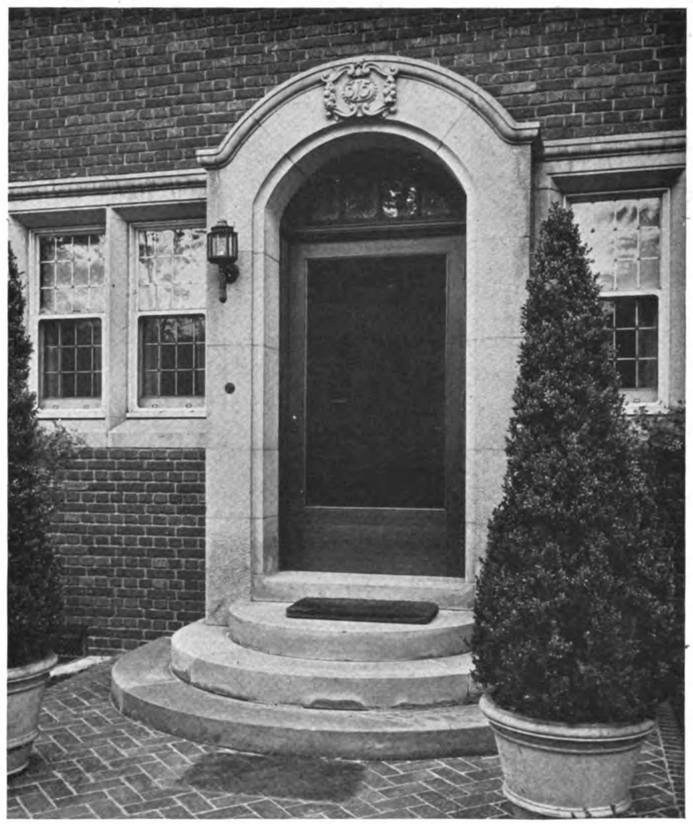


GENERAL VIEW FROM STREET




SECOND FLOOR PLAN


FIRST FLOOR PLAN



DETAIL OF DOORWAY

HOUSE OF C. J. BUTLER, ESQ., DETROIT, MICH.

ALBERT KAHN, ARCHITECT; ERNEST WILBY, ASSOCIATE

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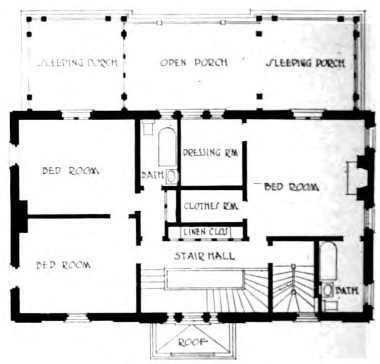
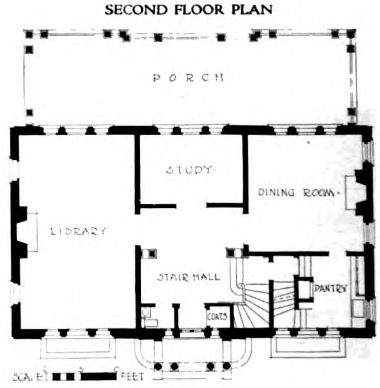
GENERAL VIEW FROM STREET

DETAIL OF ENTRANCE




SECOND FLOOR PLAN




FIRST FLOOR PLAN

HOUSE OF DR. GORDON WILSON, GUILFORD, BALTIMORE COUNTY, MD.

LAURENCE HALL FOWLER, ARCHITECT

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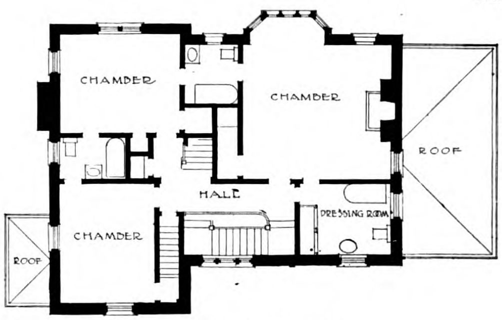
GENERAL VIEW FROM STREET

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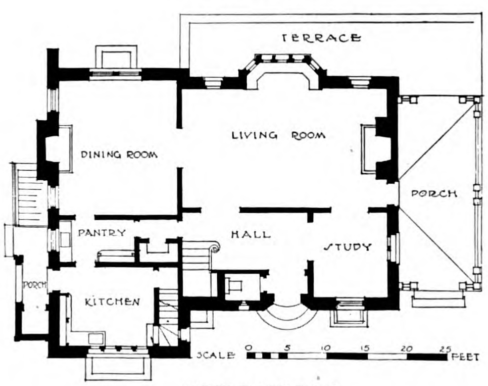
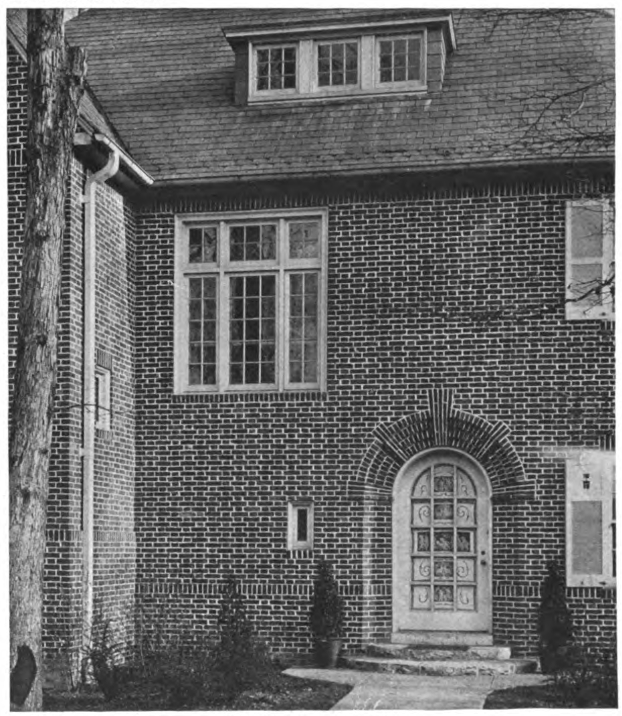



FIRST FLOOR PLAN



DETAIL OF ENTRANCE

HOUSE OF W. GRAHAM BOWDOIN, ESQ., GUILFORD, BALTIMORE COUNTY, MD.

EDWARD L. PALMER, JR., ARCHITECT

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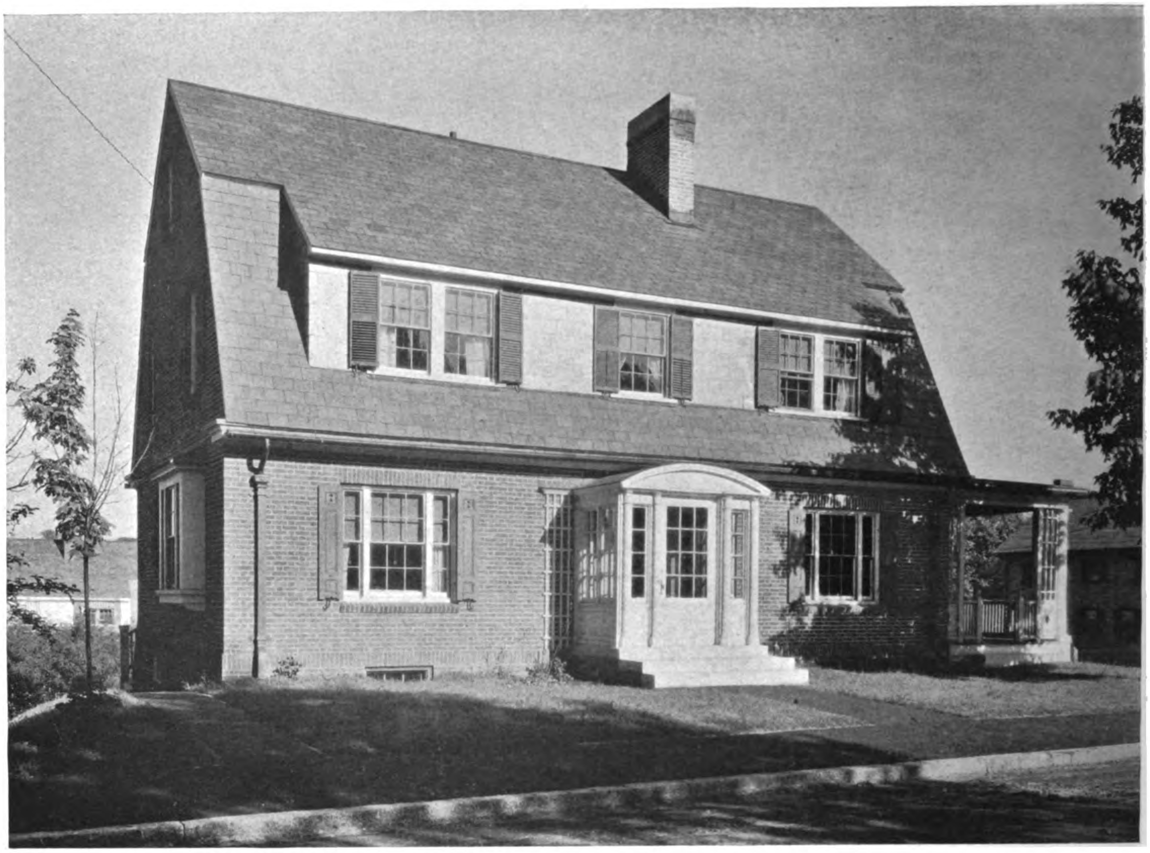
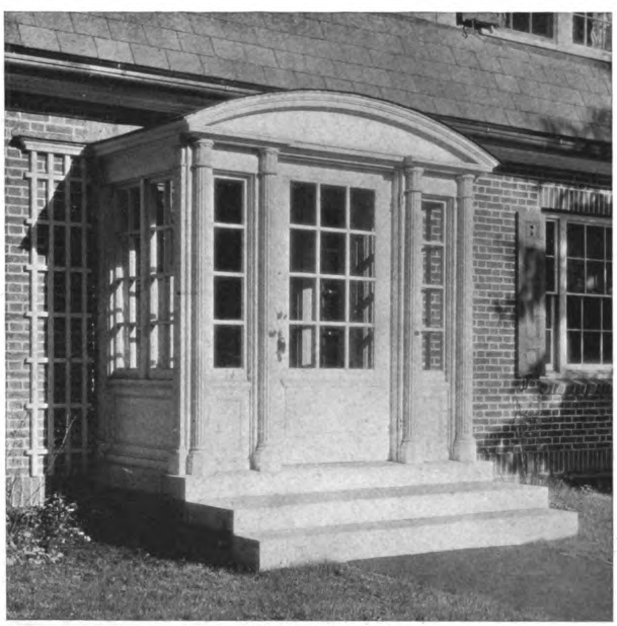
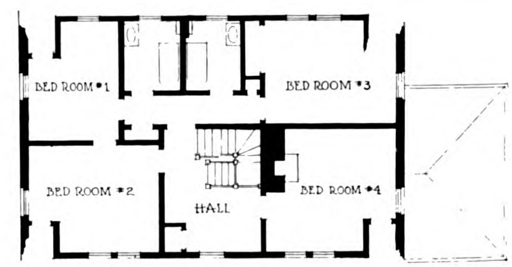
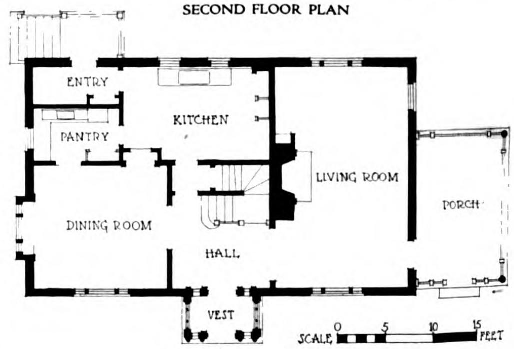




DETAIL OF ENTRANCE




SECOND FLOOR PLAN




FIRST FLOOR PLAN

HOUSE OF MISS NANCY S. HOOPER, BROOKLINE, MASS.

KILHAM & HOPKINS, ARCHITECTS

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SECOND FLOOR PLAN

FIRST FLOOR PLAN

LIVING ROOM

HOUSE OF JUDGE HAUSE, WEST CHESTER, PA.

DUHRING, OKIE & ZEIGLER, ARCHITECTS

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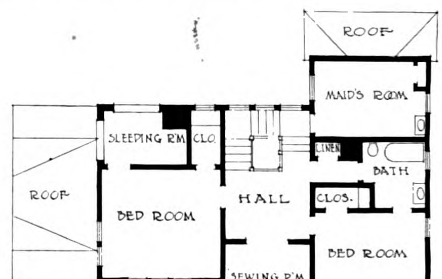
GENERAL VIEW FROM STREET

DETAIL OF PORCH

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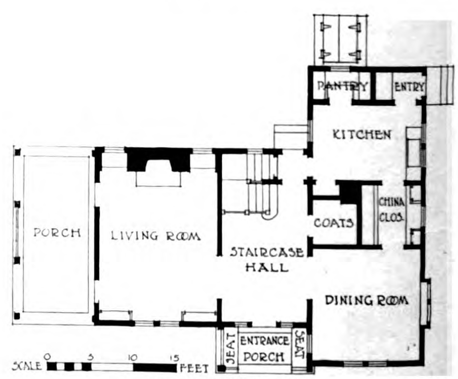


FIRST FLOOR PLAN

HOUSE OF MRS. ALICE J. MELCHER, NEWTON CENTER, MASS.

FRANK CHOUTEAU BROWN, ARCHITECT

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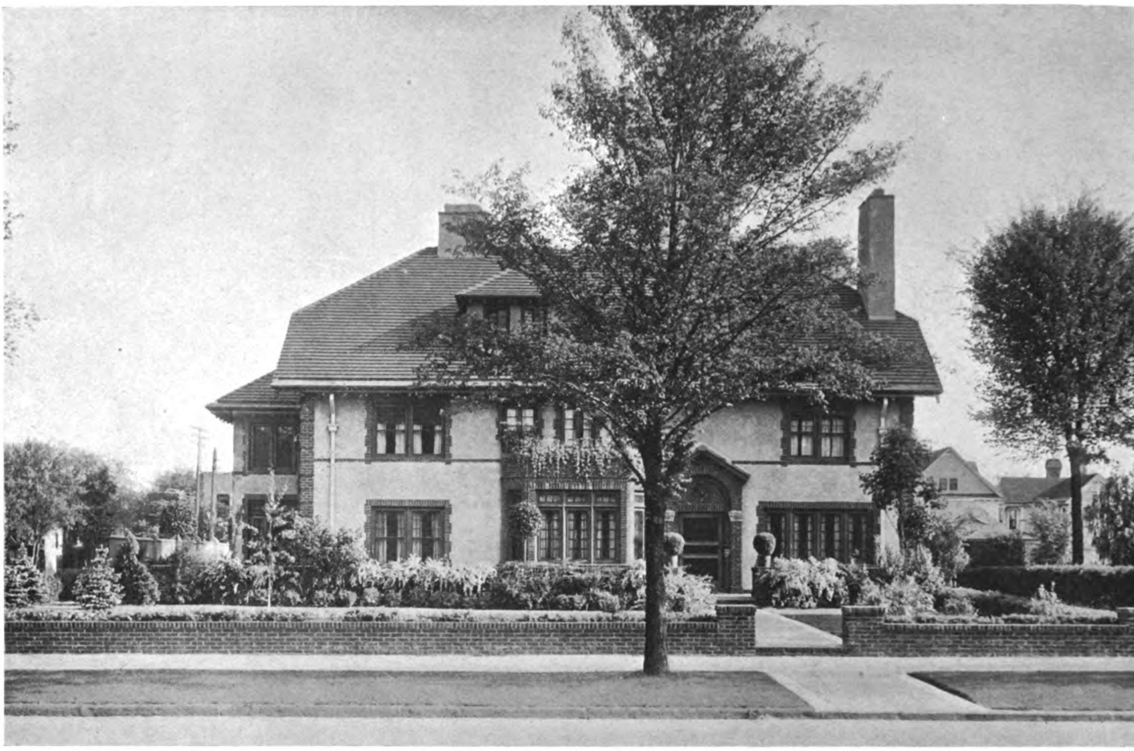
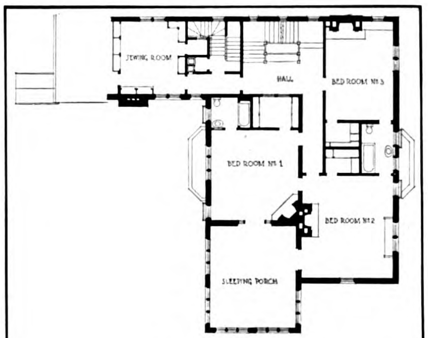


GENERAL VIEW FROM STREET




SECOND FLOOR PLAN


FIRST FLOOR PLAN

DETAIL OF ENTRANCE

HOUSE OF E. N. SAUNDERS, ESQ., ST. PAUL, MINN.

A. H. STEM, ARCHITECT; B. W. DAY, ASSOCIATE

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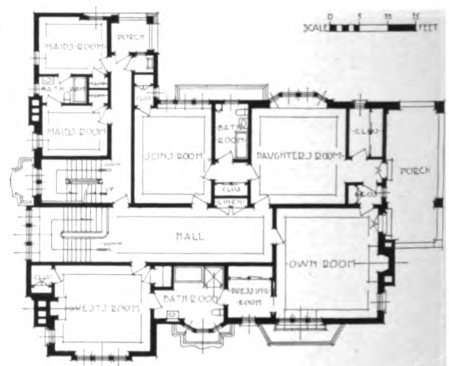
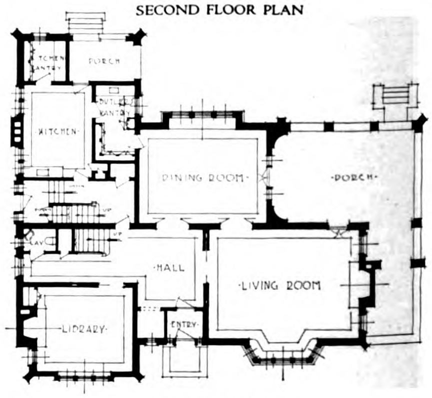
GENERAL VIEW FROM STREET

DETAIL OF PORCH




SECOND FLOOR PLAN




FIRST FLOOR PLAN

HOUSE OF A. STEARN, ESQ., CLEVELAND, OHIO

FRANK B. MEADE AND JAMES HAMILTON, ARCHITECTS

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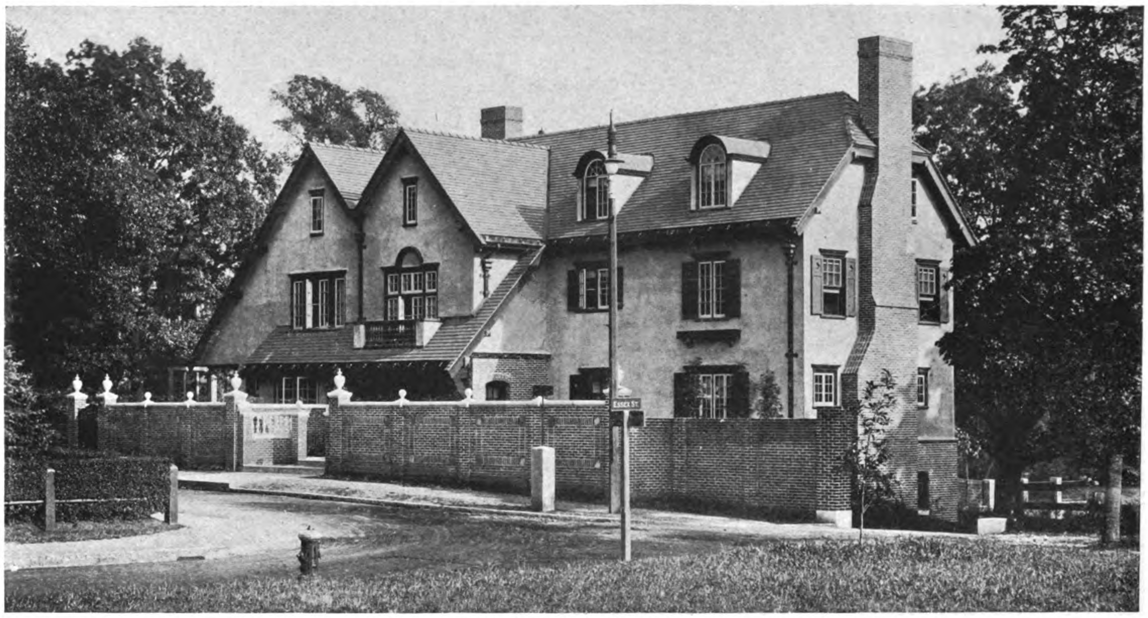
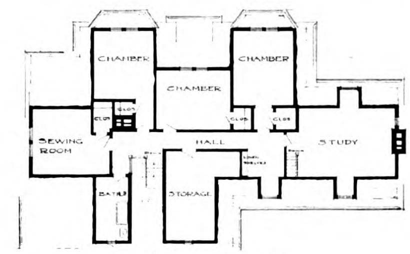
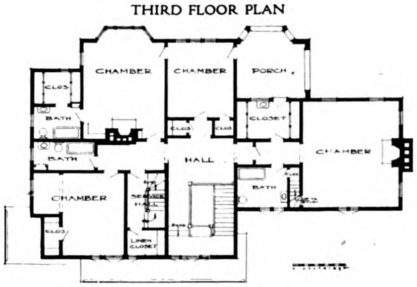


GENERAL VIEW FROM STREET




THIRD FLOOR PLAN

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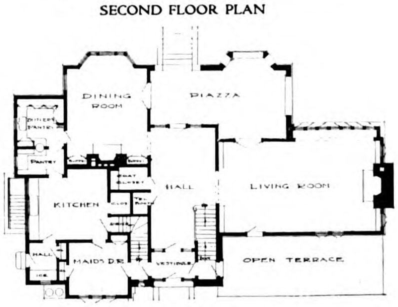


FIRST FLOOR PLAN

DETAIL OF ENTRANCE

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HOUSE OF RENTON WHIDDEN, ESQ., BROOKLINE, MASS.

ARTHUR H. BOWDITCH, ARCHITECT

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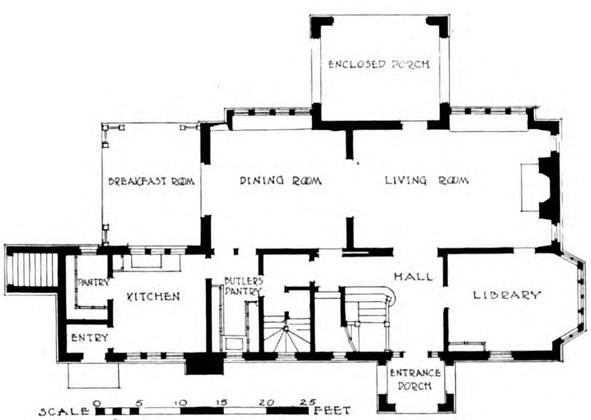


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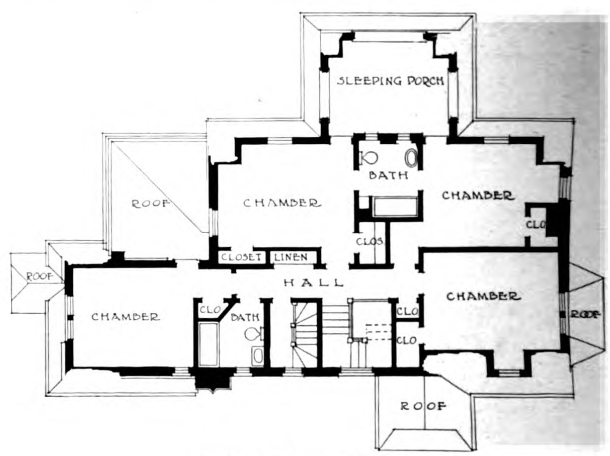


SECOND FLOOR PLAN

HOUSE OF FREDERICK J. DAGGETT, ESQ., WINTHROP, MASS.

CLINTON NOBLE, ARCHITECT

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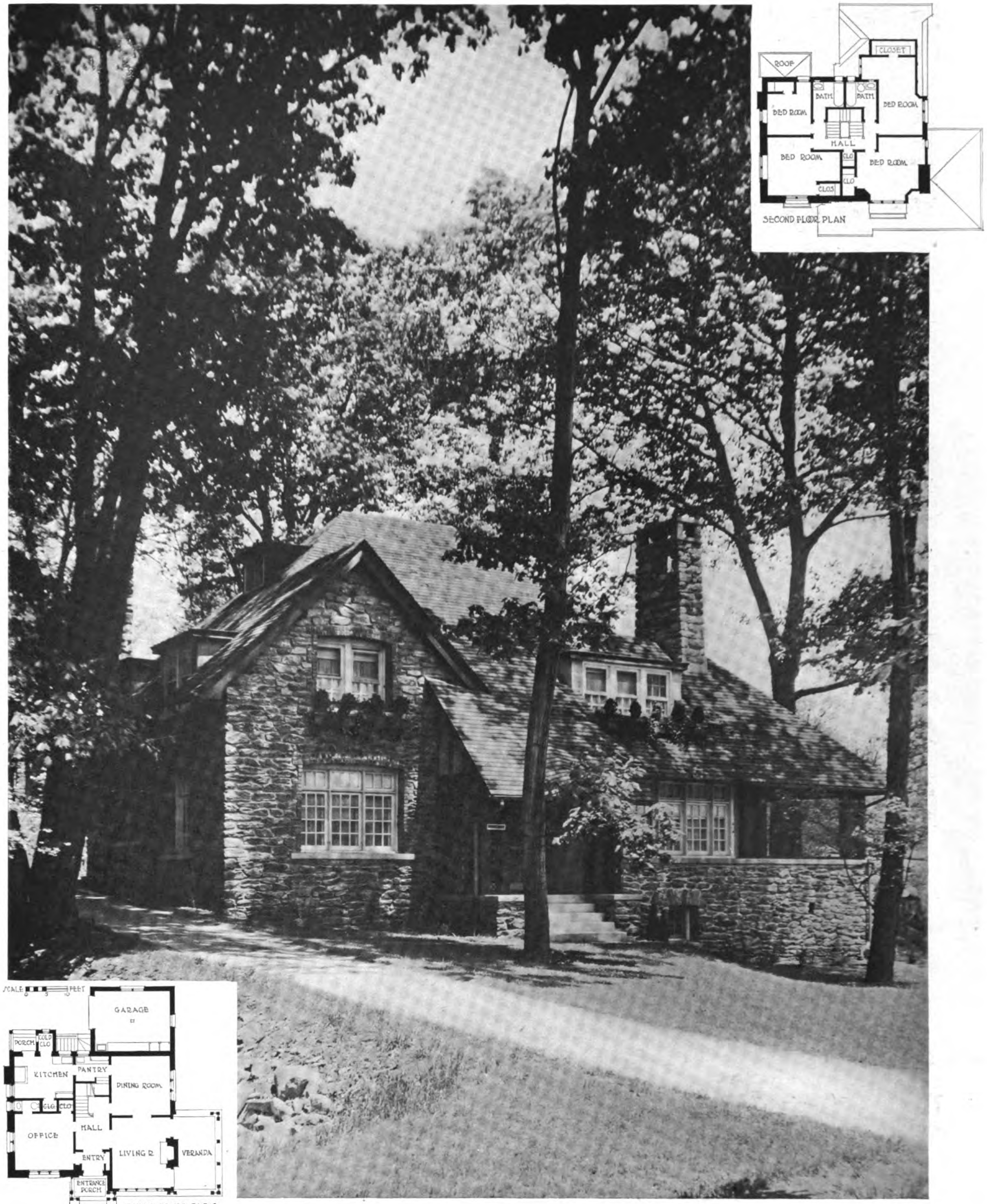


HOUSE OF DR. P. R. HEATON, FIELDSTON, N. Y.

MANN & MacNEILLE, ARCHITECTS

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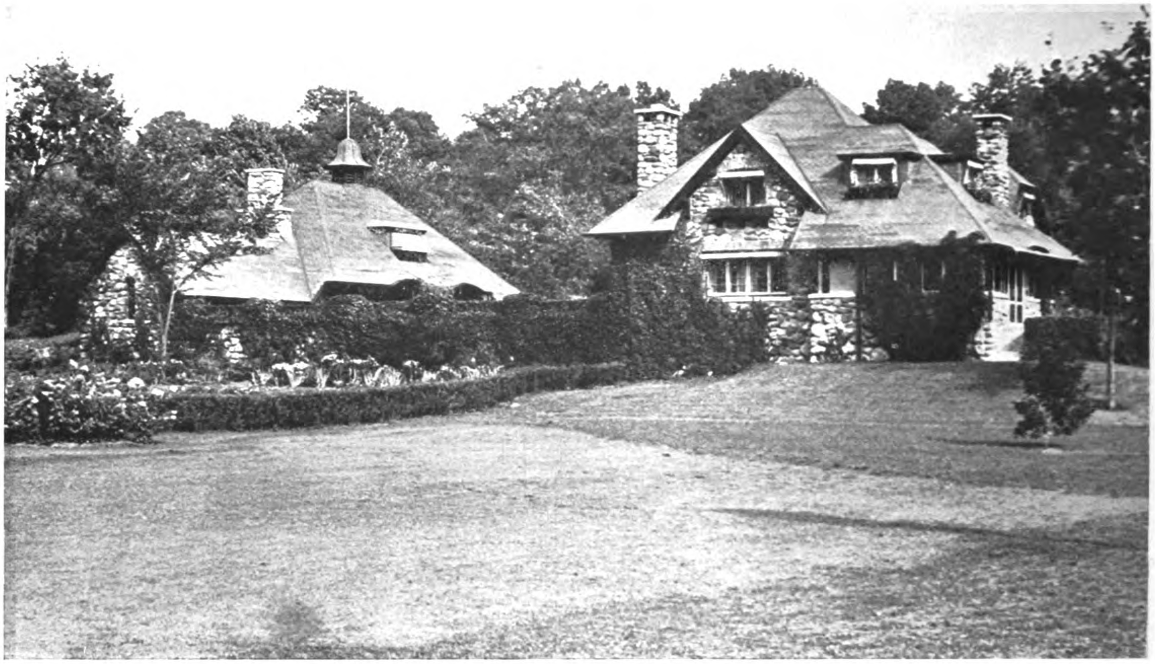
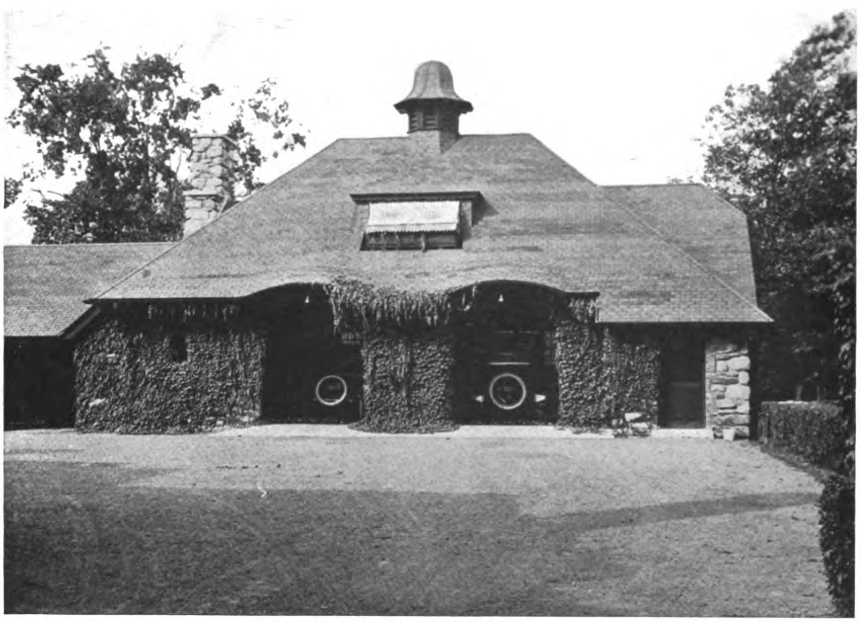


GENERAL VIEW OF COTTAGE AND GARAGE



FRONT VIEW OF GARAGE


SECOND FLOOR PLAN


FIRST FLOOR PLAN

COTTAGE AND GARAGE OF W. D. BALDWIN, ESQ., GREENWICH, CONN

MANN & MacNEILLE, ARCHITECTS

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HOUSE OF EDWARD PITCAIRN, ESQ., PITTSBURGH, PA.

HOUSE OF GEORGE J. SCHMIDT, BEN AVON, PA.
JANSSEN & ABBOTT, ARCHITECTS

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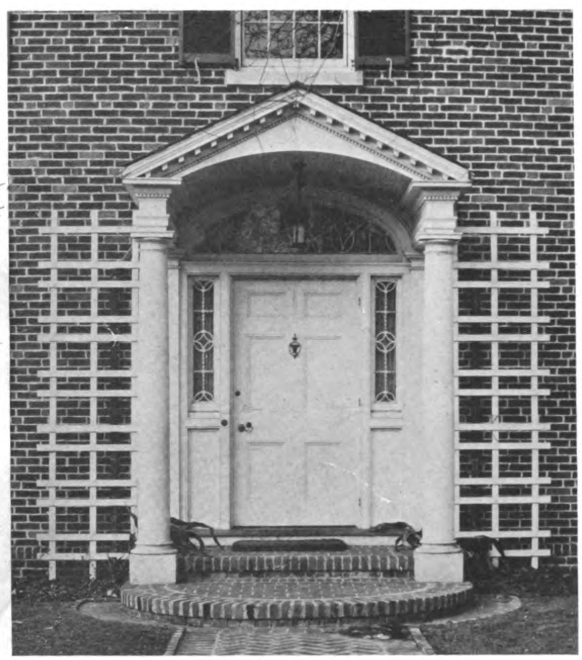
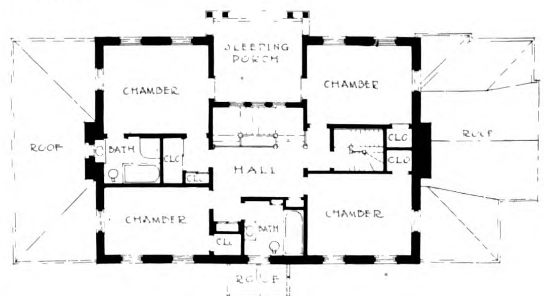
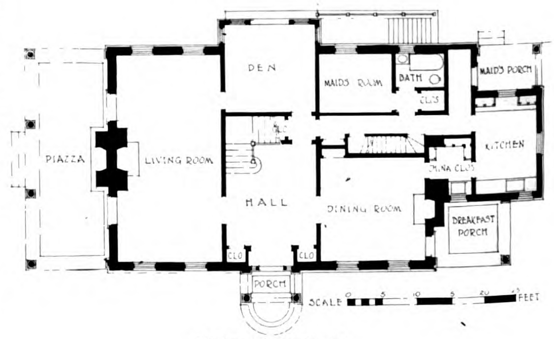
GENERAL VIEW FROM STREET



DETAIL OF PORCH




SECOND FLOOR PLAN




FIRST FLOOR PLAN

HOUSE OF F. W. NORRIS, ESQ., CAMBRIDGE, MASS.

CHARLES R. GRECO, ARCHITECT

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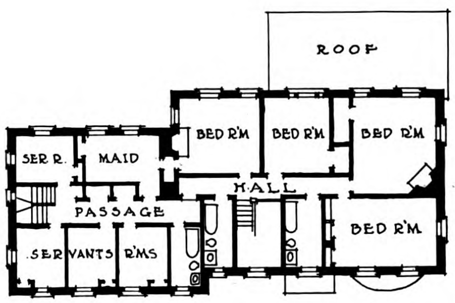
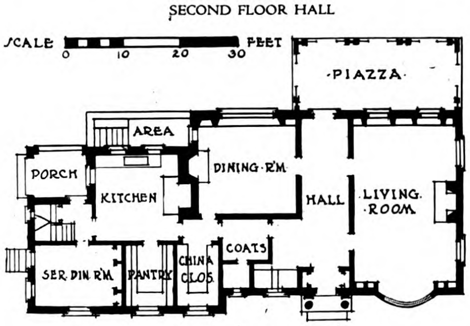
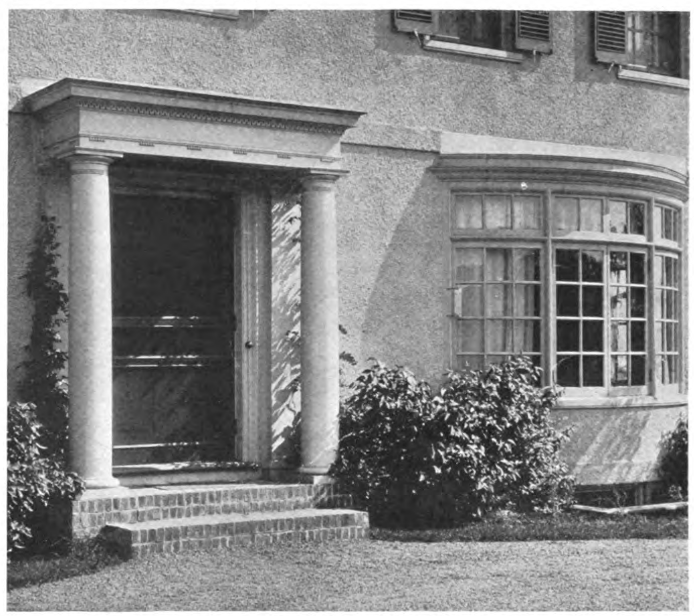
GENERAL VIEW OF ENTRANCE SIDE




SECOND FLOOR HALL




FIRST FLOOR PLAN



DETAIL OF DOORWAY

HOUSE AT BEVERLY FARMS, MASS.

WILLIAM G. RANTOUL, ARCHITECT

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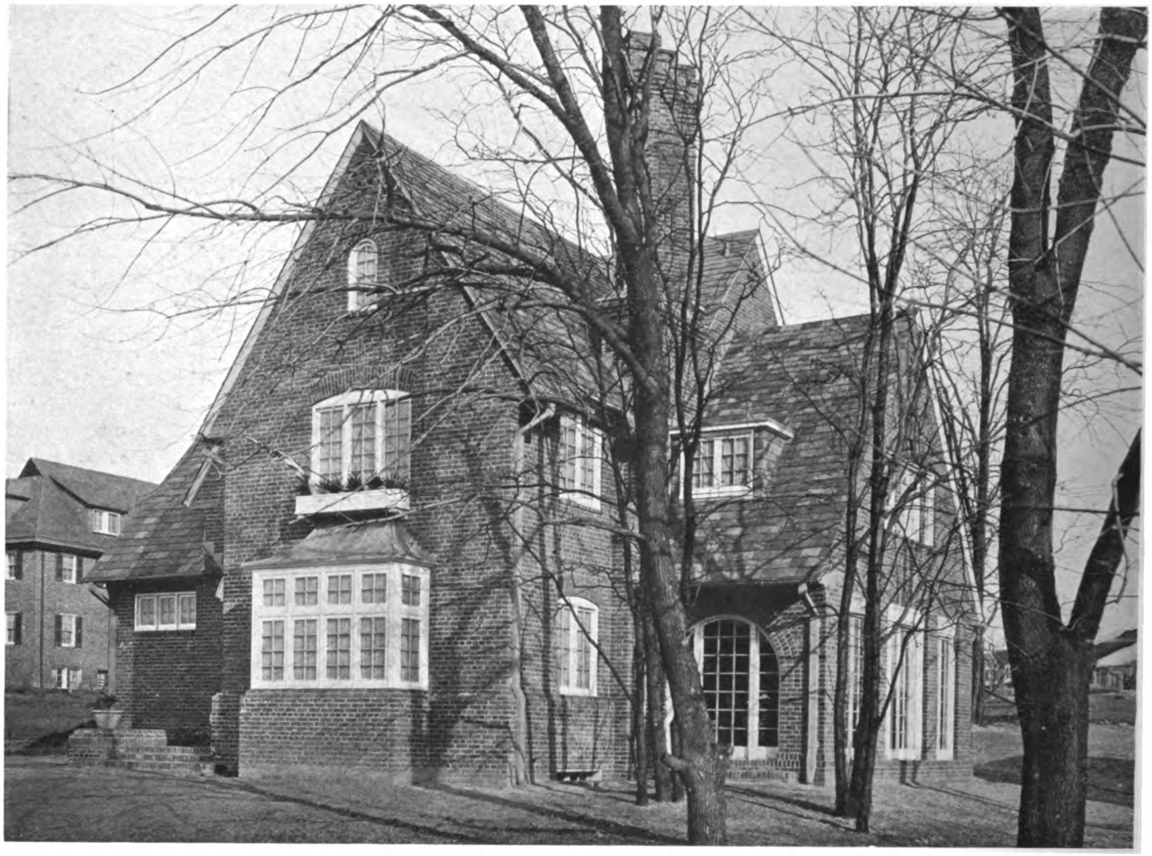

GENERAL VIEW FROM PORCH SIDE

VIEW OF ENTRANCE FRONT


SECOND FLOOR PLAN


FIRST FLOOR PLAN

HOUSE OF J. WOODELL KENNY, ESQ., GUILFORD, BALTIMORE COUNTY, MD.

WILLIAM D. LAMDIN, ARCHITECT

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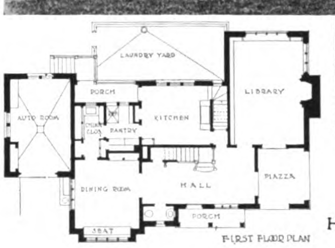
GENERAL VIEW FROM STREET




VIEW OF END AND FRONT

HOUSE OF B. A. BEHREND, ESQ., BROOKLINE, MASS.

CHAPMAN & FRAZER, ARCHITECTS

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# Description of Houses Illustrated in This Issue

HOUSE OF B. R. DEMING, ESQ., CLEVELAND, OHIO. PAGES 126–128. This house was built in 1915 and occupies an irregular site, which dictated the unusual plan arrangement. The exterior stonework of the lower story was taken from the excavation. The upper stories are of stucco and half timber with a shingle tile roof. The interior is finished in white painted wood, except the living room and hall, which are in natural finished gum wood. The cost of the house was $30,000.

HOUSE OF PROF. A. M. TOZZER, CAMBRIDGE, MASS. PAGES 130–132. This house is constructed of red brick laid in Flemish bond with random black headers. The half-timber work is of oak, pegged together and lightly stained so as to weather. A small amount of limestone finish is used, and the roof is of purple and green mottled slate. The carved ornament as well as the wrought iron work around the doorway follows ancient Maya motifs, recalling the owner's collection of Mexican antiques. The interior finish is principally in gum wood with limestone fireplaces and a gallery around the main hall. The basement contains a fireproof garage which is given the necessary height by raising the floor levels of the rooms above it. The garden is enclosed with brick walls. The cost was about $11 per square foot of first floor area.

HOUSE AT BRAINTREE, MASS. PAGE 133. This house was built with concrete foundation walls and hollow tile blocks above faced with rough textured, vari-colored brick. The roof is of random slate, ranging from purple to green in color. The house is distinguished by its simplicity of treatment and the carefully detailed Colonial doorway.

HOUSE OF MAJOR JOHN M. FRAZIER, ST. JOSEPH, MO. PAGE 136. The exterior of this house is of mixed shades of red brick, trimmed with buff Indiana limestone. The roof is of slate. The interior throughout is finished in pine stained, with the exception of the bed and bathrooms, which are enameled white. The floors in the first story, stair halls, etc., are quarter cut white oak, and those in the bedrooms on the second and third floors are quarter cut pine. The house is equipped with a vacuum steam heating plant and modern plumbing. The plot on which it is located has a very narrow frontage, and this determined the scheme of the plan. The house was built in 1912 and cost approximately $14,000, or 20 cents per cubic foot.

HOUSE OF F. B. EISEMAN, ESQ., ST. LOUIS, MO. PAGE 140. This house was recently erected in a suburb immediately west of the chief residence district of St. Louis. It is built of rough textured red brick, the roof being of green slate. The interior finish is simple, the trim, mantels, stairs, etc., being of birch painted white, except in the living room, where the finish is stained a walnut brown. The floors throughout are of oak with the exception of the service portion, where yellow pine is used; the sleeping-porch, which has a composition flooring; and the sun room, which is floored with alternating squares of black and white tile. The bathroom floors are tile and the walls wainscoted in marble. The house cost complete $19,434 exclusive of architects' fees, or 28½ cents per cubic foot.

HOUSE AT EVANSVILLE, IND. PAGE 141. This house is the home of an architect and is an adaptation of the house in which he lived while a student of architecture in Venice. It is built of interlocking hollow tile covered with plain cement and sand stucco. It is practically fireproof, the first story floors being of concrete construction and the upper floors of mill construction, the heavy timbers encased in plank and mouldings, with the spaces between paneled, giving all the main rooms beamed and paneled ceilings. Over this heavy ceiling construction fireproof deadener was laid, on top of which the finished hardwood floors of the second story were placed. The first story floors are finished with black and white tile and dark red marble. The entrance hall has a barrel vaulted ceiling of plaster with stucco relief. The walls of the hall and living room are of Caen stone. The house was built at a cost of about $8,000, including all interior finish and decoration.

HOUSE OF DR. GORDON WILSON, GUILFORD, BALTIMORE COUNTY, MD. PAGE 146. The lot on which this house stands is 78 feet wide by 200 feet deep. The front quarter is nearly level, but the remainder consists of a very steep wooded hillside. This fact made it possible to utilize the rear of the basement for service quarters, thereby permitting more space to be given to the living rooms on the floors above, with a minimum increase in cost. The basement, the rear of which is entirely out of ground, contains besides the boiler and coal rooms the kitchen, laundry, storeroom, servants' dining room, and a garage and man's room. The exterior walls are of hollow tile faced with a large red brick laid in Flemish bond. The interior partitions are frame. The house is heated with hot water. The cost per cubic foot was approximately 25 cents.

HOUSE OF W. GRAHAM BOWDOIN, ESQ., GUILFORD, BALTIMORE COUNTY, MD. PAGE 147. This house is built of red brick with wood trim and slate roof. It faces north and has a sightly view to the south, which explains the position of the kitchen on the plan. The interior finish is poplar painted white. The house is heated with hot water and has three bathrooms. It contains approximately 59,000 cubic feet and cost about 21 cents per cubic foot, which includes the cost of a small detached one-car garage.

HOUSE OF MISS NANCY S. HOOPER, BROOKLINE, MASS. PAGE 148. This house is built of red brick laid in Flemish bond. The interior finish is mostly in white with Colonial details, except the dining room which is paneled in oak. The whole house forms a good solution of a modern type of dwelling on a small suburban lot. The cost was about $9.50 per square foot of first floor area.

HOUSE OF E. N. SAUNDERS, ESQ., ST. PAUL, MINN. PAGE 151. The architect of this building has met the problem of placing a rather large house on a narrow lot in a successful manner. The exterior design shows a pleasing combination of brick and stucco, the wall construction being of solid brick. The rough dash stucco, gray in color, is set off by the dark red brick which was used for trim around all window and door openings as



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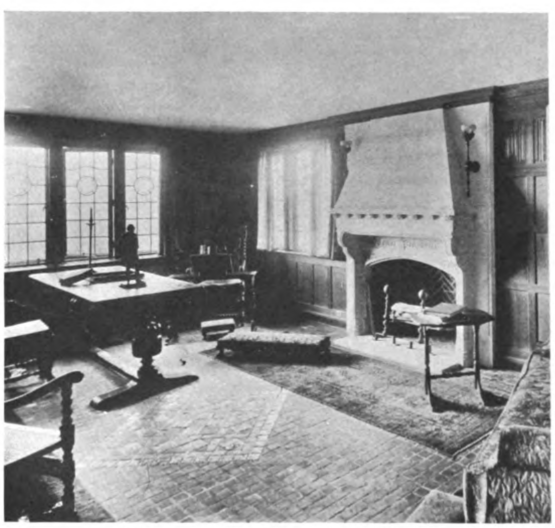
well as at the corners of the building, all being laid up in the form of irregular quoins. The terrace across the front is of brick with quarry tile floor. Shingle tile matching the brickwork in color was used on the roof as well as along the top of the walls at the rear of the property. The detail of the doorway is carried out in brick and tile. The interior is in keeping with the exterior design. The large entrance hall is finished entirely in oak with paneled walls and beamed ceiling. The other rooms are quite English in character with ornamental plaster ceilings. The sun parlor is finished with brick walls, having colored tile inserts, the floor also being of tile. The total cost of the house, including garden walls, driveway, and small detached garage, was $42,000. The house proper cost 28 cents per cubic foot, exclusive of interior decoration.

House at Beverly Farms, Mass. Page 159. This house is situated on a large plot of ground overlooking the Atlantic Ocean. It was originally planned for frame construction with the usual metal lath and stucco exterior covering. At an additional cost of $500 over the frame construction price it was built with outside walls of 8-inch hollow tile blocks with stucco applied direct. The interior partitions are of stud and plaster. The roof is covered with dark brown tiles.

House of J. Woodell Kenny, Esq., Guilford, Baltimore County, Md. Page 160. This house is built of 9-inch brick walls laid up with a fairly dark mortar with a raked joint. The roof is mottled green and purple slate of random widths and graduated exposure. The exterior woodwork is painted deep ivory with blue green shutters and metal work. The house contains two main bathrooms with tile floors and wainscots, servants' bathroom in the third story, and toilet in the basement. The house is heated by hot water. It was completed in the fall of 1916 and cost $12,000, including grading and walks, or about 23 cents per cubic foot.

House of B. A. Behrend, Esq., Brookline, Mass. Page 161. The first story walls are of dark red water struck brick with flush joints, every fifth course a Flemish bond course, and walls above cream colored stucco. The roofs are covered with fire flashed red shingle tiles. Exterior woodwork is cypress stained brown, and framing of porch and piazza solid rough sawed cypress, framed and pinned. Piazza and porch floors are paved with red bricks in cement with wide joints. Leaded casement sashes hinged to swing out are used in all windows, except service portions. Walks and runway to garage are paved with blue stone flags in irregular shapes, laid in cement mortar. The garage is of fireproof construction with floors above and below of reinforced concrete. The floors elsewhere are hard pine, the construction supported with steel girders and columns in the basement.

The interior is consistently carried out in the English style of the Jacobean period and simply and suitably furnished in the same spirit. The principal rooms on the ground floor are wainscoted to the ceiling in plain oak with moulded stiles and stopped chamfers, pegged with wood pins after the manner of genuine Old English paneling. The ceiling in the hall is of adzed oak beams with rough plaster showing between. In the dining room, opening from the hall by glass doors, the same style of paneling is repeated, and the ceiling is carried out in geometrical design in plaster, modeled after the ceiling in the famous Elizabethan Feather's Inn at Ludlow, England. This ceiling is kept very flat and delicate in relief, as the rooms are quite low, only 8 feet in the clear. All the interior oak is finished in a brownish gray color. The furniture is finished to match, and in the dining room a sideboard of Jacobean detail is made a feature of the design. The floors in the first story are of rich red tiles with dull glazed colored tiles sparingly introduced in borders and medallions, and a base of black slate. The kitchen floor is of vitrified white tiles with sanitary base, and all bathrooms have tile floors and walls tiled 7 feet high. Heating is by a direct hot water system with thermostat control and radiators concealed in principal rooms in recesses behind specially designed oak grilles.



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DINING ROOM

HOUSE OF B. A. BEHREND, ESQ., BROOKLINE, MASS.

CHAPMAN & FRAZER, ARCHITECTS

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## EDITORIAL COMMENT AND NOTES FOR THE MONTH

THE splendid spirit manifest among the people of this nation to do their share in the work that lies ahead is nowhere more enthusiastic and sincere than within the ranks of the architectural profession. Already many of the younger men are in camps training to become officers, while others are preparing themselves individually or organizing collectively to render some helpful service. Preparation for war in a country which has been fortunate in having years of peace, and composed of groups of people with such diverse antecedents as is the United States, must of necessity be a slow operation. The work to be done by particular bodies of trained men cannot be determined at once, and many adjustments will be necessary before a complete organization, in which every loyal citizen will do his part, can be perfected. It is of great satisfaction to note that architects are keenly cognizant of the efforts which must be made, and are not waiting at one side to be told their duty, but are keen to see a need and to use their ingenuity to meet it with splendid vigor.

The Architectural League of New York has indicated its eagerness to serve by organizing a Food Battalion for the cultivation of about fifty acres of vacant land at Forest Hills, Long Island. This work is to be carried on with the co-operation of the Mayor's Food Committee of New York and under the direction of the Agricultural Department of the Long Island Railway. The battalion will be made up of volunteers from the members of the League and their office assistants. It is expected that there will be at least two hundred volunteers.

The organization will be managed by an executive committee, each member of which will be chairman of some subcommittee. The battalion will be divided into squads of twelve or fourteen men each, operating under the direction of a corporal. Each corporal is provided with a card for every member of his squad, and each member is likewise provided with a card upon which is kept a record of his time spent in actual work and which is O.K.'d at the end of the month by the corporal. It is expected that the work of the battalion will produce not only a good sized crop, but give the men the benefits of outdoor exercise and considerable practical knowledge of agriculture. The men are to give one week of their vacations, the time to be distributed over three and one-half months, each man working one day in each alternating week during this period with the usual salaries continued by employers during this period.


ATTENTION is called to the fact that the New York state law regulating the practice of architecture has recently been amended.

One of the amendments extends the exemption period, whereby certificates of registration may be issued to architects who were in practice previous to the enactment of the original registration act, namely, Apr. 28, 1915. Any architects who were in practice in New York state previous to that date may now secure certificates provided their applications are filed before Jan. 1, 1918, and provided such applications are approved by the Board of Examiners. Application blanks may be secured by addressing the Department of Education, Educational Building, Albany, N. Y.

One of the amendments of interest to architects of other states reads as follows:

"Any architect who has lawfully practised architecture for a period of more than ten years without the state shall be required to take only a practical examination, which shall be of the nature to be determined by the state board of examiners and registration of architects."

Another amendment of interest to those of other states contemplating similar legislation is:

"but this article shall not be construed to prevent persons other than architects from filing applications for building permits or obtaining such permits."



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THE ARCHITECTURAL FORUM

VOLUME XXVI NUMBER 6

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## PLATE ILLUSTRATIONS



## LETTERPRESS



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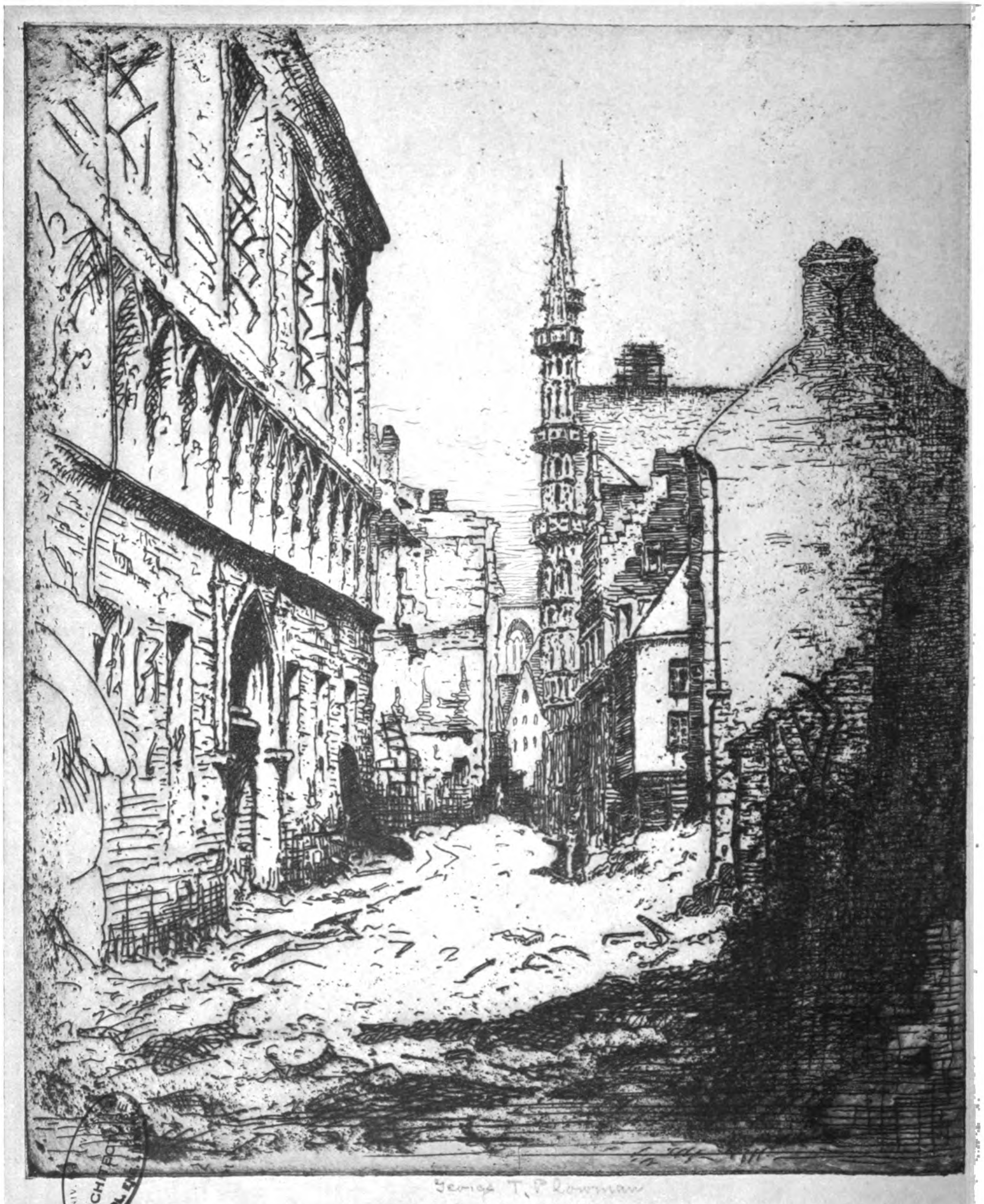


RUE DE NAMUR, LOUVAIN, BELGIUM, SHOWING RUINS OF UNIVERSITY LIBRARY

AFTER AN ETCHING BY GEORGE T. PLOWMAN

*Louvain was one of the first Belgian cities destroyed by bombardment and fire. It is located near Brussels and was noted for its ancient buildings, particularly the University Library, shown at the left, and the Gothic Hotel de Ville, fortunately spared, of which a turret is shown in the background.*

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VOLUME XXVI JUNE 1917 NUMBER 6

# The Plan and Construction of Military Hospitals

By CHARLES BUTLER

THE term "War Hospital" covers a multitude of varying types of building with varying destinations, from the hole in the ground in the front line trench to the great physical re-education centers in the rear, and includes canal boat, railroad train hospitals, hospitals for contagious diseases, rest camps, etc.

The hospitals, however, to which I refer especially in the present article, are those for the general care of wounded and sick, and it may, perhaps, be easiest to classify them by their geographical relation to the front. I speak, I may say, entirely of the French front, as my experience at the British front is extremely limited.

I should perhaps preface my remarks with an explanation of just what my relation to the French army was, and how I happened to have the opportunity to gain some knowledge of French War Hospitals.

As a member of the American Relief Clearing House I was at work in Paris in the fall of 1915 when Dr. Carrel, who knew of my having made a special study of hospital planning in America, asked me to prepare for him the plans for a small 100-bed unit, to be erected closer to the front than his hospital at Compiègne, then under shell fire and likely to be evacuated any day.

Administration difficulties in regard to the admission of foreign nurses to the advanced zone of the army prevented the erection of this hospital, and the destruction of the 380 mm. gun which was shelling Compiègne ended the necessity of evacuating, so the project was dropped; but the Deputy Minister of War in charge of the Medical Service (there are three assistant Ministers of War in France for Munitions, Supplies, and Medical Service) expressed his interest in the plans and asked me to bring them to him. It turned out that it had been planned to hold a competition for a model portable house type of hospital to be erected near Paris and to serve as a type for future base and home hospitals; but after looking over our plans the minister remarked that a competition did not seem necessary, and I volunteered my services to work out this model plan. A very excellent site was selected just outside the Bois de Vincennes, the great park to the east of Paris corresponding to the Bois de Boulogne on the west. At my request, M. Pellechet, a former fellow student at the Ecole des Beaux Arts, was to his considerable annoyance dug out of his second line trench and brought back to help me on the work. Dr. Dumont, a prominent young civilian surgeon, similarly mobilized for the war, was shortly after added to our combination, and we three working together have since very considerably influenced the design of French War Hospitals.

All France is divided into two parts, the army zone—and the rest. The zone is a strip, on the average, 30 miles wide, parallel to the front, into which one only penetrates by the permission of the Grand Quartier Général. In this zone lie the front line hospitals, ambulances, dressing stations, etc.

The grouping of these services is about as follows: In the front line trench is what is known as the *Abri du Blessé*, a hole in the side of the trench, where the wounded man is put to get him as much as possible out of danger till he can be moved to the advanced dressing stations which lie 50 yards or so behind the front line trenches. This dressing station or *poste de secours* is presided over by an assistant surgeon, probably a medical student when war began. From the dressing station, which is always underground and contains perhaps a dozen bunks, the wounded man is transported, as soon as the firing slackens sufficiently, through the *boyau*, or communication trench (*boyau* means bowel, and the convolutions of the communication trench for the purpose of localizing the effect of bursting shells fully justify the name), back to the battalion dressing station, perhaps a mile away.

You can imagine just how painful is the trip through this mile of winding trench. Various types of stretchers are used, perhaps the most satisfactory being the hammock stretcher hung from a pole carried on the shoulders of the bearers and more easily maneuvered in the winding trench than the ordinary side pole stretcher. There are also chair stretchers for seated cases, etc.; but any way you take it, it is a hard trip for a wounded man. At the battalion dressing station is a full fledged surgeon and there are facilities for operating — as always underground. This dressing station is generally accessible for motor ambulances, at least at night.

The advanced dressing station is located so that one end is in direct communication with the *boyau* through which the wounded are transported. It is underground and fairly heavily protected and contains beds in two tiers, with a small space at one end for emergency dressings and stores. The wounded reach this post in about six minutes, and from there are carried in ordinary stretchers about a mile to the end of the military road, the farthest point to which ambulances can go.

These subterranean posts are made about 10 feet wide at the ceiling, with walls of planks sloping slightly in toward the floor. Log posts support the roof and are spaced about every 5 feet.

The lower beds are for the more seriously wounded, the upper ones for slightly wounded. The former are

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removable for cleaning; the latter hinged at one end to allow swinging for cleaning. The construction of the roof is interesting in showing the provision made for exploding shells. An explosion chamber is built immediately above the ceiling over one layer of logs. Above the chamber there are generally at least four layers of logs, each layer placed crosswise of the preceding one and large stones and earth above these to a depth of at least 5 feet. For absolute protection against shells up to and including 220 mm., experience has shown that 15 feet should be provided. Against 380 mm. and 420 mm. shells, experience has as yet shown no satisfactory method of insuring protection.

The battalion dressing stations are located underground and heavily protected from shell fire. They contain an operating room at one extremity, provided, as always, with two exits. Beds in two tiers accommodate about twenty-four wounded. Living quarters for orderlies, surgeons, etc., are provided above ground. The wounded arrive at these stations in about one hour from the front.

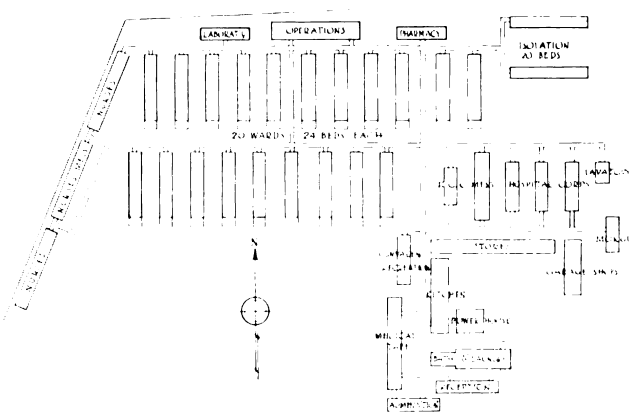
The next station, called an ambulance, is located about two miles from the front and comprises a number of buildings underground. The operating room is about 8 by 17 feet, with an arched roof of corrugated steel, the crown of which is about 7 feet 4 inches above the floor. The haunches of the arch are filled with earth up to the level of the crown, above which is a thin layer of cement and a course of tree trunks about 8 inches in diameter. Above these is the first explosion chamber about 20 inches high, again two or three courses of logs, another explosion chamber and additional logs covered with earth and rocks, making a total thickness from crown of arch to the surface of about 12 feet.

The explosion chambers are designed to counteract the effect of the type of high explosive shells which are fitted with a delayed fuse that, ignited by impact, allows the shell to penetrate the earth before exploding.

The operating room is reached by a *boyau* leading from an examination room, also underground with heavy protection, and placed at the edge of the road by which the ambulances arrive. From the operating room another *boyau* continues to a waiting space, where, after having their wounds dressed, those who are to go to the hospitals can wait in security for the ambulances to carry them away.

This description might be extended to greater length, but will serve to give a fair idea of the dressing stations and ambulances lying in the advanced zone, the first two or three miles back from the front, where shells may always be expected and danger is at all times present.

The French Medical Corps has devised a most ingenious unit for use in connection with these ambulances — what is known as the Ambulance Chirurgicale Automobile. This consists of a unit construction portable building, comprising a waiting room about 10 by 16 feet, a sterilizing room about the same size, and an operating room about 20 by 16 feet, all of which can be packed on two motor trucks. Another truck contains a very complete sterilizing outfit, a fourth the X-ray equipment with electric generator, while the fifth serves for general supplies and transport of personnel. These buildings are now being erected with double walls and steam heat, and can be quickly transported to the point on the front where they are most needed.



Plan for 500-Bed Base Hospital, Vincennes, Paris, France

We now come to the field hospitals lying a little farther back, and in which men can be cared for who need a few days' treatment before being sent on to the rear. They are a cross between the ambulances and the base hospitals and are either in existing buildings, in tents, or in portable barrack buildings, but more and more in barracks and with more and more of the conveniences and comforts of the base hospital.

Back of the field hospitals lie the great centers such as Revigny and Bar le Duc to the rear of Verdun, Belfort in Alsace, Bray and Amiens in the Somme, where the wounded are counted by thousands instead of by hundreds, and where the final sorting out is done.

At Bray, which I visited in October, the group contains 3,500 beds, divided into a hospital of 1,000 beds for the seriously wounded who are not transportable, a *dépôt d'éclopés* of 1,000 beds for the slightly wounded and slightly ill, and an evacuation hospital of 1,500 beds for those who are to continue to the rear on hospital trains. The hospital proper is of the unit construction, portable house type, equipped for giving first class surgical treatment.

It was a hospital of this type which I was asked to design to be erected as a model just outside of the gates of Paris.

This plan will serve to show the special requirements of War Hospital planning. They are in relative importance as follows:

1. Reduction of road building to minimum.

2. Complete intercommunication between buildings by wheeled cars. Patients, food, linen, and supplies of all sorts are carried on wheels, and all buildings must be connected by galleries uninterrupted by steps.

3. Grouping of wards for easy service and with proper north-south orientation, and south end unobstructed.

4. Grouping of administration, technical and general services for easy communication and supervision.

5. Grouping of dwellings for staff, nurses, and orderlies for convenience and supervision, and with sufficient separation from patients' quarters.

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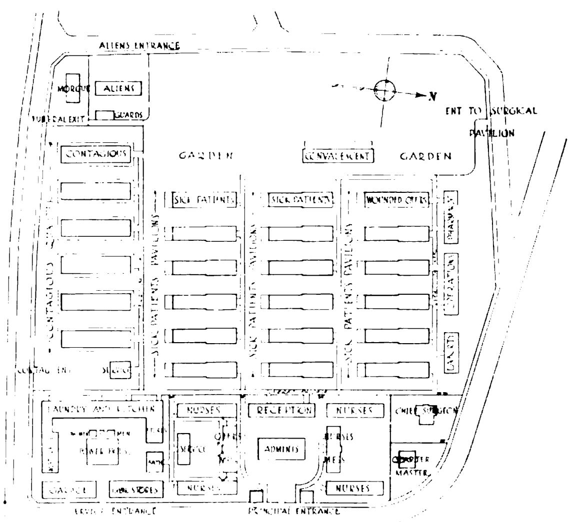
Although, as a result of certain governmental changes, the plan for the hospital at Vincennes was never executed, it has served as the basis for the plans of many other hospitals to be built all over France, which were submitted for criticism to our committee.

An interesting development of the work of our committee is the plan for the permanent military hospital at Issy les Moulineaux. For this hospital complete plans had been prepared and approved just before war broke out; but as a result of the modifications caused by war experience, we were asked to completely replan the hospital, which in its general scheme of arrangement follows the war hospitals, but is executed in permanent materials.



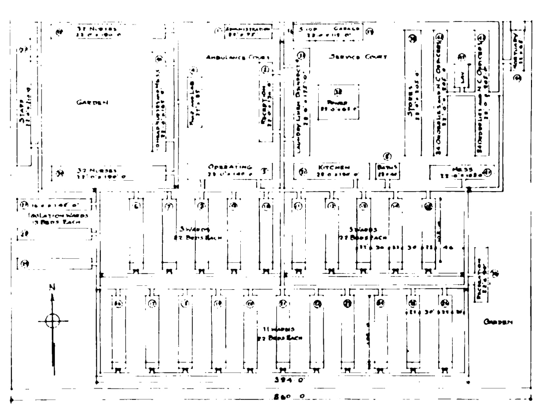

Permanent Military Hospital at Issy les Moulineaux, France

On my return to the United States last winter I was asked to assist the Committee of Directors of Red Cross Base Hospital Units of New York, and the following plans for typical base hospitals show the result of our work in France as adapted to American requirements.

The site selected is assumed to be on the south side of a road, with the ground sloping slightly toward the south. The grouping of administrative and technical services around the ambulance court and the general services around the service court are to be noted, with the orderlies' quarters at the east and the nurses' and doctors' quarters at the west. The only road building required is in the two courts, while the wards lying to the south are connected to the administrative and service buildings and dwellings by covered wooden walks.

The wooden slatted walkway, covered or uncovered, is as much of a necessity in a war hospital as it is in a trench, as mud is the bane of the front, and the slat walk which permits of its elimination, so far as the interior of the hospital is concerned, is invaluable, and as all differences of level are taken up by ramps in place of steps, every part of the group may be reached by food trucks, wheel stretchers, and chairs.

The details of the plans follow in general the ordinary practice, with the necessary modifications to fit military needs. The reception building in its present form is, however, a very definite product of the war. As it must be assumed that every wounded man is filthy, even though not necessarily vermin infested, it is essential that he be thoroughly cleaned before being admitted to the ward. The need of storage rooms for men's uniforms, boots, underwear, etc., and the necessary space for clean linen, surgeons' and clerks' offices, has led to the plan shown on the next page.



General Plan for Base Hospital Adapted to American Conditions
Butler & Rodman, Architects

In the center is the receiving room into which the ambulances discharge their loads. In this room the surgeon on duty makes a hasty examination, picking out those most needing prompt transport to the wards. They are then taken in order into the wash room, where their pedigrees are taken, their valuables checked, and where after receiving their ward assignments they are cleaned in the table baths, put in clean hospital clothes, and wheeled away to bed, while their soiled clothes go to the disinfecting plant.

After being washed, disinfected, and repaired, their effects return to the building for storage, where their records and valuables are also kept. When the wounded man is finally convalescent, and ready to be discharged, he comes back to this building, turns in his check, and receives his uniform and personal possessions and, after signing off, is discharged. The advantage of concentrating in one building the receiving and discharging of patients, together with the filing of their records and the storage of their effects, is obvious.

The administration building contains the usual general waiting room and offices, but is considerably less important than the corresponding service in a civil hospital.

The operating pavilion is naturally of especial interest in a war hospital. The plan shows two entrances — one being reserved for patients, while the other permits the orderlies to reach the dressing preparation room and secure their provision of sterilized dressings for the wards, without penetrating into the rest of the building. Other points to be noted are the two operating rooms, the larger planned to accommodate three tables if necessary and the smaller reserved for uninfected cases.

Easy access is afforded to the plaster and X-ray rooms by the corridor 7 feet wide. It is to be noted that for the operating pavilion, the 20 or 24 foot unit, used for most of the buildings, is insufficient, and the 28 foot unit has therefore been adopted for this building, as well as for kitchen and laundry.

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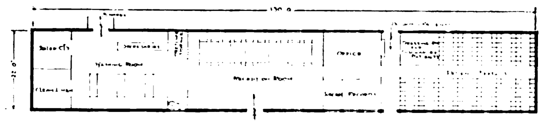
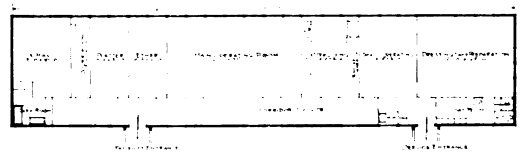
The pharmacy and laboratory building presents no peculiar features.



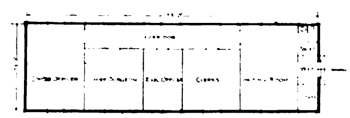
Reception Pavilion

The plan of the kitchen is of interest, with its space reserved for the food cars adjacent to the scullery, all dishes being kept in the building between meals and the cars being loaded at a counter which extends the full length of the bakery and kitchen proper and serves as a barrier to prevent the orderlies from entering either room. The main entrance for supplies is on the court side of the building, with an office for the receiving clerk and vegetable and grocery storage, refrigerators, meat room, and vegetable preparation room.



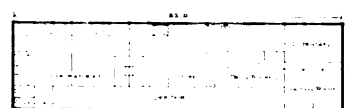
Operating Pavilion

In view of the fact that much of the linen and clothing is contaminated, the laundry has two receiving rooms, — one for ordinary soiled linen and one for linen, clothing, mattresses, etc., requiring sterilization; these pass either through the sterilizing washer or the steam and formaldehyde sterilizer into the laundry proper, where they join the other linen and are thenceforth treated no differently from the rest.



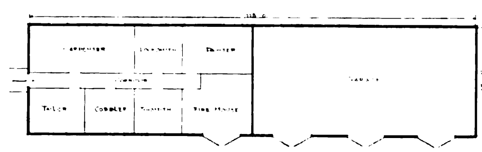
Administration Pavilion

The storage space for mattresses and pillows and for clothing awaiting condemnation should also be noted, and the size of the repair room and general storage rooms, also the distribution counter in this last room, which prevents orderlies coming with their requisitions for clean linen from entering the storeroom.



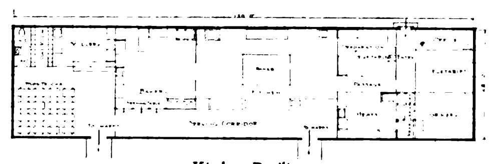
Pharmacy and Laboratory

The ward buildings, containing each twenty-four beds in the open ward and one in an isolation room, show the consistent development of the war hospital toward the standards of civil practice.



Workshop and Garage

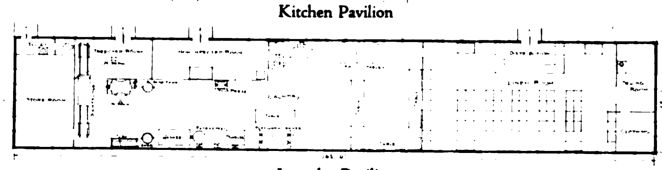
Base hospitals are being planned more and more with sewage disposal systems, and in the case in point complete service is provided with toilets, bed pan and housemaids' sinks, lavatories, kitchen sinks, etc. As relatively few wounded can be bathed in the ordinary tub there are no bath tubs in the ward buildings, but instead a small central bathhouse is provided, thus materially reducing the expense. An isolation room is provided in each ward unit, also a surgical dressing room, diet kitchen, and nurses' office and linen closet.



Kitchen Pavilion

Following the custom of civil hospitals the wards are oriented north and south, and the south end is composed entirely of windows so as to permit the greatest possible amount of sunlight to enter. At this south end is placed, on a level with the ward, a terrace, on to which the beds may be wheeled in clear weather, for experience has shown that fresh air and sunlight are as good for wounded as for tubercular patients. The beds must therefore be provided with large rubber tired casters to permit easy rolling.

A large recreation building is provided, which may also serve as convalescent mess — it must be borne in mind that in the average war hospital there are many men who except for a local wound are quite well and active, who would be difficult to handle if provision were not made for their distraction in a building specially set apart for this work, usually divided into reading room and room for games.

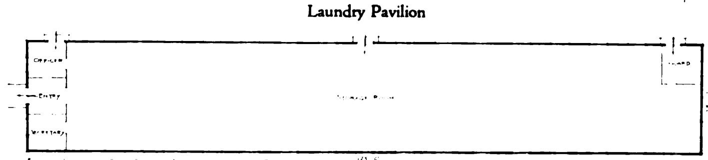


Laundry Pavilion

The French authorities have solved the problem of drinking by providing a canteen, at which each convalescent patient may buy drinks to the extent of one drink per day — a simple method when there is but one source of supply. No treating is allowed.

The isolation buildings are designed merely to care for contagious cases which may develop in the hospital, until such time as they may be evacuated to the contagious hospitals.

Individual rooms or cubicles are provided for the medical staff and for the nurses, while the orderlies are grouped in dormitories.



Storage Pavilion

Almost as important as the planning of a base or field hospital is the choice of materials and type of construction, and here we have much to learn from the experience of our Allies. On the British and French fronts portable house unit type construction is employed almost to the exclusion of other types, the theory being that these buildings will pretty cer-

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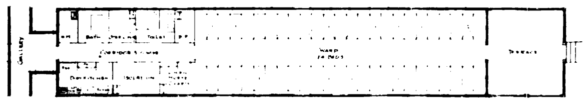
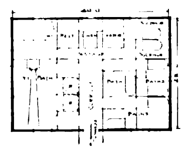
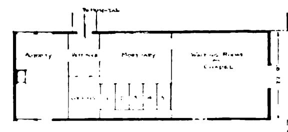
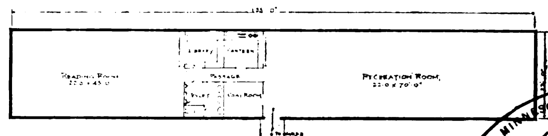
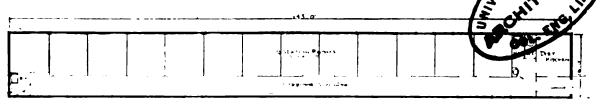
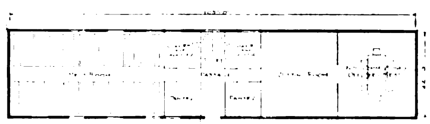

Ward Pavilion

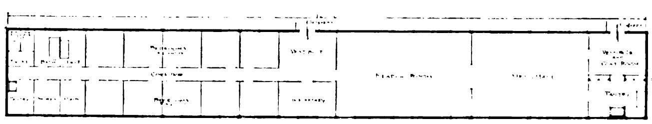

Bath Pavilion

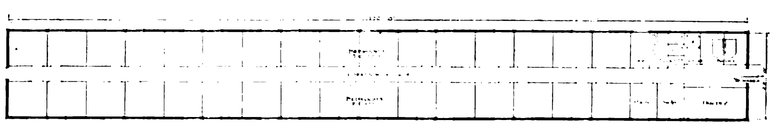

Mortuary Pavilion


Recreation Pavilion

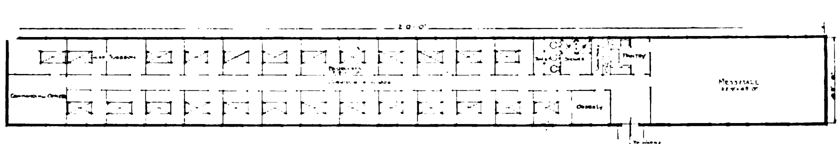

Isolation Pavilion


Orderlies' and Non-Commissioned Officers' Mess


Head Nurses' and Mess Hall Pavilion


Nurses' Dormitory Pavilion


Dormitory for Orderlies and Non-Commissioned Officers


Staff Pavilion

tainly be moved at some stage of their career; there is also the thought that the unit construction building may be of service after the war for temporary use in the regions so completely devastated in France and Belgium. Portable house construction is not used with the idea that hospitals will be taken down and reërected in three or four hours, as some manufacturers claim for these buildings; but it does seem advisable to use a type of building which may be transported and reërected if desired.

The English, French, and Belgians have all worked out types of buildings which are far superior in their practical workableness to any of our types; this is natural, in view of the fact that these countries are erecting buildings of this type not by hundreds, but by thousands, but it would be well if we could learn from their experience and avoid their mistakes. A very striking characteristic of the types used abroad is the small size of structural timbers. Europe has never had the immense timber supply which we have been for years wasting, and has always been economical; and the further fact has been realized that it was not necessary to design buildings which should have a life of a generation—on the contrary, all that was needed was a building which could last five or six years; floors are calculated not for stiffness but for strength, and all sections are reduced; 1½ by 3 inch floor joists, 16 inches on centers, with span of 5 feet, are used in one system, and studs are two inches square.

In all of the European systems, after experimenting with single walls, the double wall with an air space has been adopted as being an absolute necessity for hospital wards.

While in general these buildings are heated by stoves, in many steam heat is being installed; some have plumbing, and all electric light. A necessity for wooden buildings is an efficient layout of water supply to hydrants in ample number, for the buildings will burn quickly.

EDITORS' NOTE. — Some confusion of terms seems to exist concerning branches of war hospital work, and a brief explanation may be of service. The military units which the Red Cross is authorized by the War Department to create are base hospitals, hospital units, surgical sections, and general hospitals. The work is divided into three zones: the first being the service at the front; the second, the military base to which the wounded are brought and where, in the *base hospital*, the first complete equipment is found; the third, the home country, where military hospitals, called *general hospitals*, are created from existing civil ones. Hospital units are organized groups of physicians, nurses, etc., assigned to military hospitals or hospital trains and ships. Surgical sections are special detachments to reinforce the operating staffs in time of emergency, and consist of four surgeons, seven nurses, two orderlies, and a clerk. The hospital units, surgical detachments, and base hospitals are movable units, each with individual equipment, and available for service wherever the government may designate.

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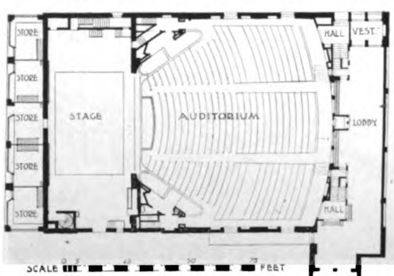
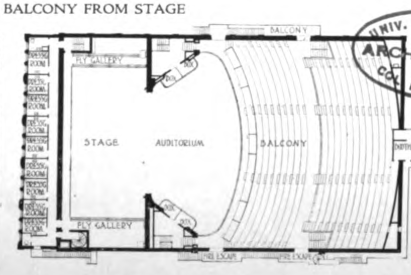
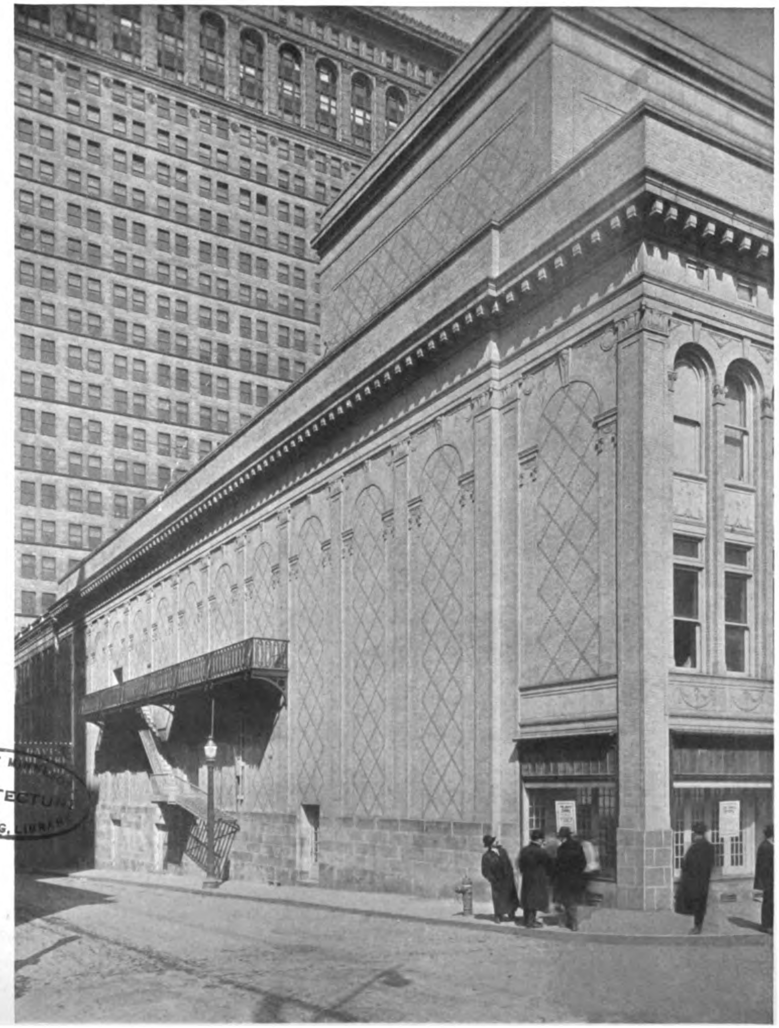
VIEW OF BOXES AND BALCONY FROM STAGE




FIRST FLOOR PLAN




BALCONY FLOOR PLAN



SIDE VIEW OF EXTERIOR

DAVIS THEATER, PITTSBURGH, PA.

H. E. KENNEDY CO., ARCHITECTS

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# The Motion Picture Theater

## I. COMPARISON OF TWO TYPES OF PLAN

*By* CHARLES A. WHITTEMORE

THE motion picture theater of to-day bears very little resemblance to the type which was developed soon after the "movies" became a popular form of entertainment, and the motion picture theater of to-day may possibly develop into as obsolete a type as the picture theaters of ten years ago are now. With the development of projecting machines, with the development of pictorial subjects, with the development of the art of photography in motion pictures, and with the advent of good color photography which in motion pictures is likely soon to be developed, there have been corresponding changes in the character of the theaters themselves.

About eight years ago a building was being remodeled for a motion picture theater. The owners were spending approximately $20,000, while the seating capacity was only 325 seats. The owner of a competing picture theater then in operation made the statement that the people who were investing so much money in a motion picture enterprise were very foolish, as the life of the motion picture business was then limited, in his mind, to a period of three to five years longer. How inaccurate his guess was, we all know, and as in the science of electricity so in the science of motion pictures — the surface of the subject has been barely scratched.

Originally motion picture theaters were developed from stores which were vacant or were obtainable on a short term lease at little expense. In places of this character the entertainment was carried on, although the conditions were far from ideal either as to projection or comfort of patrons. From this small beginning the business has developed to such a point that at the present time there are in contemplation plans for theaters to seat in excess of 10,000 people. This to us at the present time may seem to be the ultimate limit, and still with the new developments possible in the field it is not unreasonable to think that theaters of even greater seating capacity than 10,000 people will make a profitable investment.

Street Facade of Corridor Leading to Davis Theater

Motion picture theaters may be roughly divided into three general classes: first, the "store show," or the picture theater which is made in the course of remodeling a store property; second, the type which has come to be known as the "bleacher" type (Fig. 1); and third, the legitimate theater type (Fig. 2). Either of the latter types may or may not have a fully equipped stage.

With the first type we need not concern ourselves, as there is nothing in its construction which requires much study. A comparison of the second type with the third shows some very interesting phases of the problem. This type, as illustrated in Fig. 1, shows the motion picture principle adapted primarily to inexpensive property, such as suburban property, or where the maximum seating capacity with the least possible cube of building is desired.

It will be noticed that in this type there is no balcony or gallery, but that the floor from the orchestra pit to the back row of seats is practically one continuous sweep. The rear section, as will be observed, is raised at a faster pitch than the usual gradients allowed in aisles, in order to accommodate lobbies, vestibules, foyers, coat room, check room, etc., underneath.

In this plan the entrance to the auditorium comes approximately in the center of the interior, so that all seats throughout are equally accessible. The entrance from the street to the lobby may or may not be in the center.

A comparison of the cube of the type illustrated in Fig. 1 and that in Fig. 2 will, without doubt, be interesting to those who have never considered the differences between the two developments. In Fig. 1, for instance, the theater proper covers 8,900 square feet on the ground and has a seating capacity of 1,400 seats. The total cubical contents, including the basement under the stage and the stage, as well as the entrance lobbies, etc., is 429,500 cubic feet, which is approximately 193 cubic feet per seat. Fig. 2 has a seating capacity of 1,400



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seats also. The area in this particular case is 9,500 square feet. The cube is 736,000, and the cubic space per seat is 527 cubic feet. The cost of the theater as indicated in Fig. 1 is approximately $70,000, including the seats and equipment, or at the rate of $50 per seat. The cost of the type shown in Fig. 2 is $237,000, or $170 per seat. Both theaters are furnished with a completely equipped stage of the same general character, the seats are of the same general type, and the equipment throughout is almost identical in so far as relates to the various parts included in the theater construction. It will be seen, therefore, that Fig. 1 shows not only the same seating capacity at a very much less expense, but also an infinitely better auditorium from the standpoint of acoustics, ventilation, and sight lines.

The type shown in Fig. 1 also has an additional advantage in that the administration is very much simplified, requiring fewer attendants and affording greater ease in handling the patrons. In case of an emergency the entire audience in Fig. 1 could be discharged from the house probably in less than three minutes, while in the case of Fig. 2 it would be some considerable period before the last patron in the audience would be able to find an exit to the street. This is not, however, to be construed in any way as an argument against the type shown in Fig. 2.

There are certain locations where the type shown in Fig. 1 is not applicable. For example, in a piece of property in the central part of the city where the land values are high and where, in order to show a good development and a satisfactory return on the investment to the owners, it is necessary to develop to the limit each square foot of property. In this instance Fig. 2 would be far more applicable than Fig. 1. It is easy to see that within a given area the number of seats to be obtained can be far greater in the type using balcony and gallery than in the so-called bleacher type.

The name "bleacher type" is a misnomer and to a certain extent is a detriment to the theater to which it is applied, as it immediately creates in the minds of the patrons, who are not thoroughly familiar with the situation, an idea of a house which is roughly divided into two classes, similar to the orchestra floor and the gallery of another type of house. This, however, is not the case with the type shown in Fig. 1, as the seats throughout the entire section are equally desirable, and the vision from one seat is as good as that from any other. This is obviously not always true of the type shown in Fig. 2.

In many of the theaters throughout the country and Canada in recent years the type shown in Fig. 1 has been developed quite extensively. The Regent Theater, Pitts-

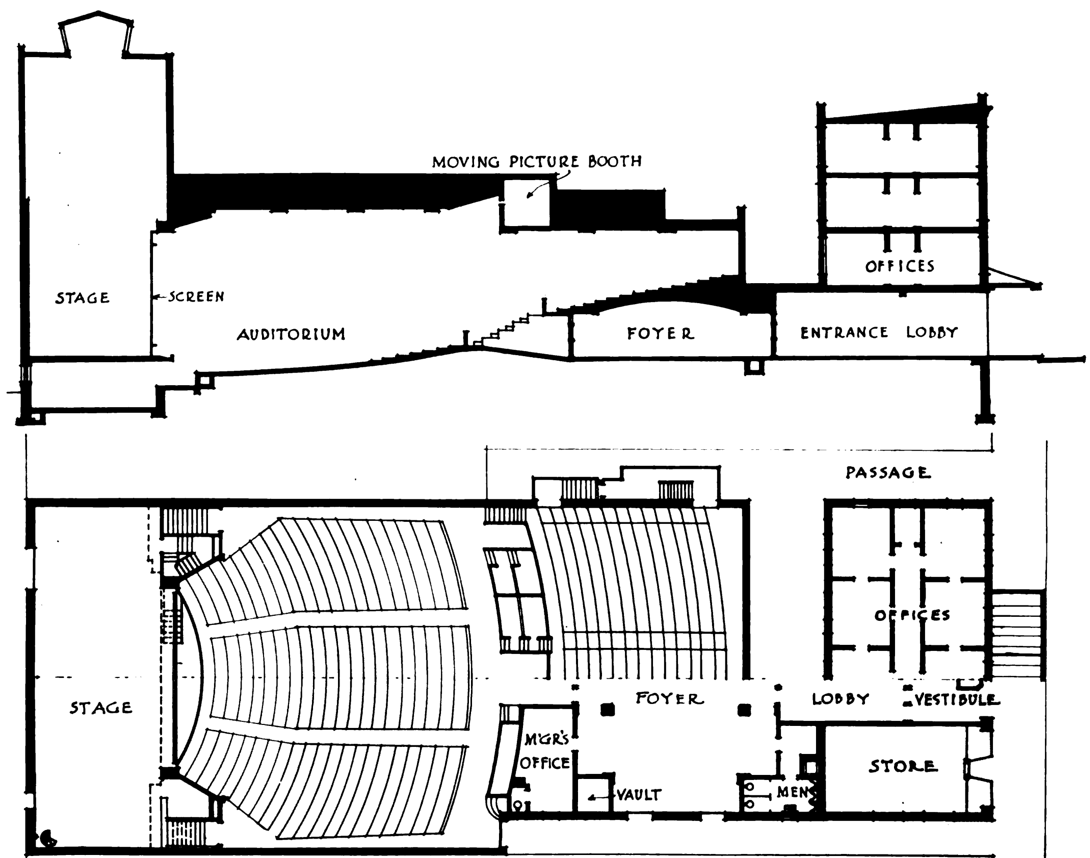


Fig. 1. Floor Plan and Section of "Bleacher" Type of Motion Picture Theater

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burgh, the Majestic Theater in Detroit, Keith Theater in Montreal, are on this same general plan.

There is a tremendous advantage in the type illustrated in Fig. 1, which has been called the bleacher type, over any other type of construction, with the exception of the plain single floor house, and this is due, under the present conditions, to the high cost of certain of the materials.

The elimination of large fabricated girders and expensive riveted columns, and of large unsupported spans in the construction of a balcony in the multiple type of house, as well as the shortening of the spans and girders in case of a second class constructed house, are points of particular interest in the examination of the relative merits of the two types illustrated.

In many cases of this type of construction the spans may be longer as far as distance between the walls is concerned, but even where this condition prevails, the only construction necessary to make the complete span without obstructions is in the roof, and here light iron trusses can be used, arranged in such a way that the exterior walls need not be carried to the level of the top chord, which, as can readily be seen, reduces materially the cost of construction. The construction of the rear portion of orchestra floor can be carried out on the supports which may easily be provided for through the room arrangement, etc., and through the lobbies which occur directly beneath.

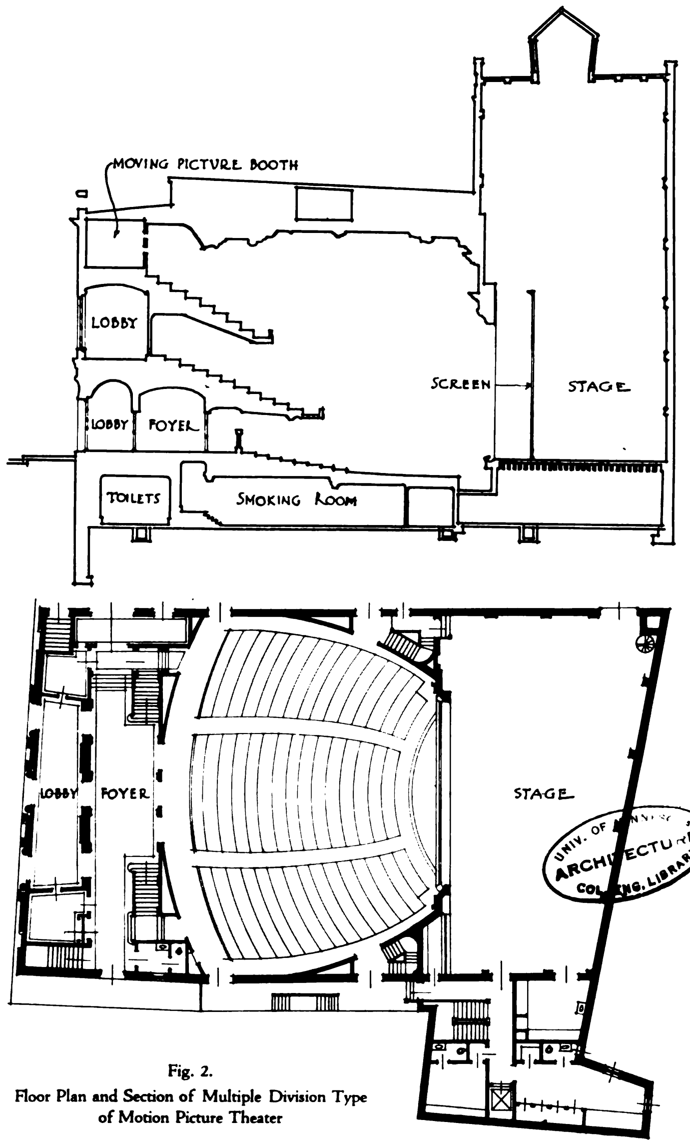


Fig. 2.
Floor Plan and Section of Multiple Division Type of Motion Picture Theater

As another illustration of the relative cost of these two types of plans, it may be well to give an approximate cost per cubic foot for types in Fig. 1 and Fig. 2. In the first type the estimate is of very recent date based on drawings almost identical with Fig. 1 and shows a construction the cost of which would probably not exceed 15 cents per cubic foot, if the rear of the orchestra be of second class construction, and 18 to 26 cents if it be constructed entirely of reinforced concrete and steel.

The type represented by Fig. 2 would cost, on the basis of same materials used, from 18 cents for second class construction to 30 cents for steel and concrete.

In localities where second class construction may be used and inexpensive back land may be developed, Fig. 1 shows a very economical type of motion picture theater.

There are also other advantages in the single division type of house which will be apparent upon examination of the two plans. Each architect will differentiate between the two types according to his own judgment, but it may be well to point out a few considerations which all will agree are in favor of the type of building shown in Fig. 1.

The single division type (Fig. 1) shows a plan which can easily be developed so as to have coat rooms as well as manager's office, ushers' rooms, etc., opening on the foyer, but located in the less valuable space under the overhead seats.

In the multiple division type (Fig. 2) this is manifestly impossible and necessitates provisions elsewhere for these conveniences. These rooms in the majority of theaters of this type are placed either in an extension of the building, in the mezzanine floor, or in the basement, and in either case necessitate far greater expense as to construction than if placed as shown in the other plan. The other locations also are not so convenient or accessible, and it has been a matter of serious study for managers of various picture houses to properly provide for women's coat rooms,

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rest rooms, and toilets, and a coat room, retiring room, and toilet for men for the various divisions of the house. Where there is but one division and where the patrons are all on the same plane, the problem is obviously simplified.

In case of the location of the women's rooms and general lobbies in the basement, as must necessarily be the case where an extension to the theater front may not be possible, the construction below the ground is of considerable expense, as in many instances it means excavation to such depth as to require the use of waterproofing methods. The type as illustrated in Fig. 1, however, requires no elaborate layout or expensive construction in the basement, and simple provisions for heating plant, coal, and janitor's closet are all that need be arranged to meet ordinary demands.

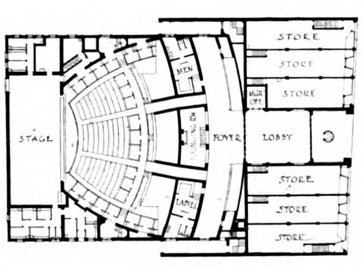
View of Foyer of Majestic Theater, Showing Ramp to Upper Level

It has been found in the majority of theater developments that where money is to be raised on a mortgage, the money is far more readily forthcoming if there may be provided "sub-rentals." These may be in the form of stores or offices, and in the case of the two types under contemplation it will be at once seen how much more readily the type proposed in Fig. 1 lends itself to this form of development than the type proposed in Fig. 2.

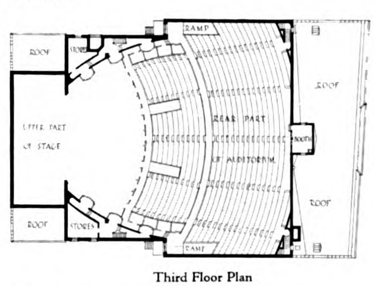
In the plans illustrated in Fig. 1 the stores shown at either side of the main entrance indicate the possibility of arranging for sub-rentals, and the arrangement of ladies' rooms, toilets, etc., is one susceptible of easy change. For example, if it were deemed advisable to arrange for deeper stores, the men's and women's rooms could be rearranged in connection with the lobby or placed in a basement a little below the level of the main floor. Under these conditions the additional income available as rent from the stores would more than offset the additional expense of the basement construction.

Theater managers nowadays are insistent upon keeping the people as close to the ground as possible, as they say it is almost impossible to make the patrons climb stairs. For this reason a large number of the more modern motion picture houses have been constructed with but a single balcony instead of the usual two balconies; but this type does not so readily meet the approval of the patrons occupying the rear seats as the type shown in Fig. 1. Here it will be readily seen that when all the patrons use a common entrance to the auditorium proper, the effort necessary to reach the rear row of seats at the upper level is no greater than would be required in going from the front to the rear of a balcony, and in addition the patrons are spared the necessity of climbing


General View of Exterior




First Floor Plan




Third Floor Plan

Majestic Theater, Detroit, Mich.
C. Howard Crane, Architect

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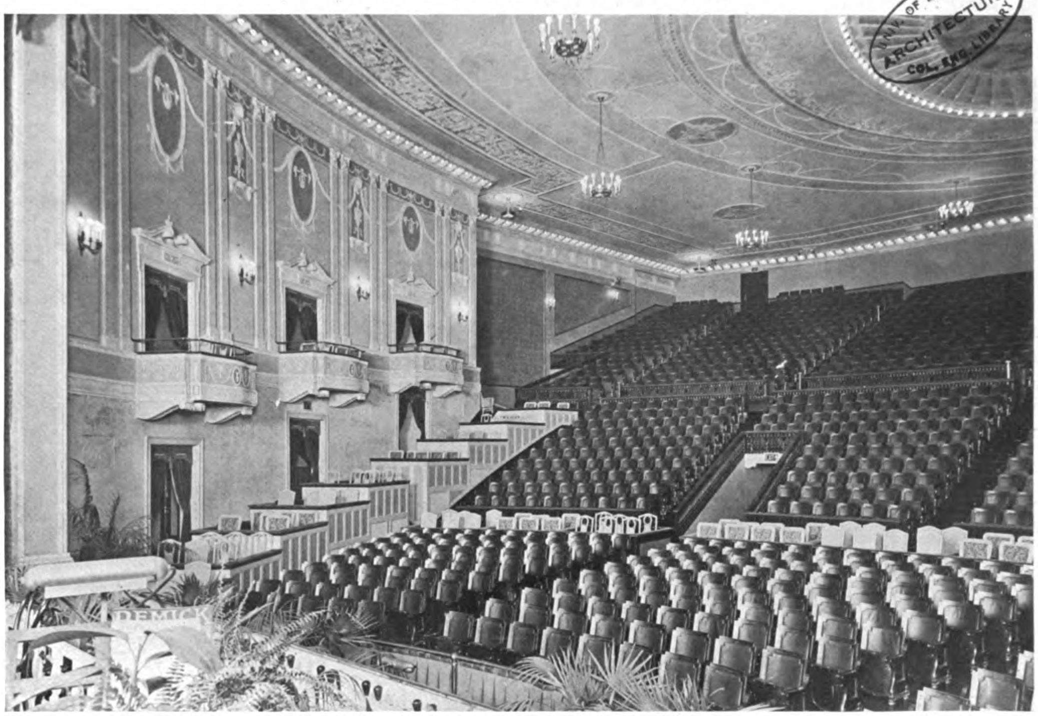
VIEW OF AUDITORIUM AND STAGE FROM THE REAR



VIEW OF AUDITORIUM AND BOXES FROM THE STAGE

MAJESTIC THEATER, DETROIT, MICH.

C. HOWARD CRANE, ARCHITECT

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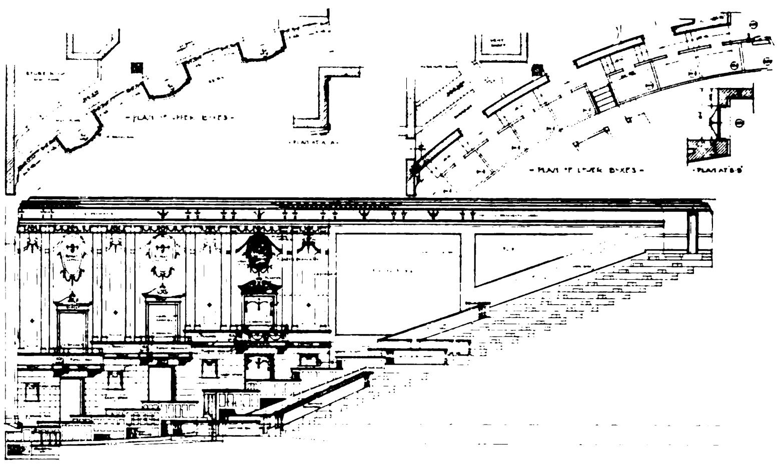
stairs up to what would be the first row of seats in the balcony in the multiple division type of theater. It will be seen, therefore, that the advantages of administration, convenience to patrons, and economy of construction are all on the side of the single division type where such a form of building can be economically placed.

The location of the motion picture booth is of vital importance in every theater in which this form of entertainment is to be carried on, and there are several essentials which must be carefully studied in this connection.

The angle of the ray of light, the distance of the projector from the screen, the arrangement of the apertures, the location of the booth with reference to the seating levels—all must be carefully studied and properly correlated in order to assure satisfactory results.



Longitudinal Section, Majestic Theater, Detroit, Mich.

The vertical ray of light should never be greater than 25 degrees from a horizontal line taken at the center of the picture screen. This in itself is of considerable importance and will be discussed more fully in another article. This angle, however, does determine the relation of the picture booth to the seating levels and immediately establishes a zone beyond which the booth should not be placed. The lateral angle also must be maintained within the same limits. Usually the booth is located almost directly opposite the center of the screen and as a result the lateral angle does not enter into the problem.

In the multiple division type of house the booth is frequently placed at the upper balcony level or at the gallery level. In many instances this may be productive of satisfactory results. If, however, the auditorium is so arranged as to have a number of rows of seats in both balcony and gallery, the angle of the ray of light from the upper level is quite likely to exceed 25 degrees.

In the single division type of house the angle from the level of the highest row of seats would hardly be more than 15 degrees. In speaking of the level with reference to the seats, it must always be borne in mind that the lowest aperture level should be not less than 7 feet above the seat level so that patrons walking into the seats will not interfere with the light rays, and it is to this position that the reference is made in this discussion. There is another location which has been frequently adopted with considerable success, and that is directly over the seats in the balcony of the two division house or in the ceiling of a single division house.

The type illustrated in Fig. 1 shows this construction in reference to single division theater. The angle of the average ray of light to the center of the screen is approximately 18 to 20 degrees. Assuming that the light conditions and the construction and the mounting of the machine is correct, such a location would be a guarantee of satisfactory picture projection. One can readily see the difficulty attendant upon an attempt to locate a projecting machine in the same relative position in the multiple division type of house.

It is always possible in any type of theater to arrange the motion picture booth at the rear of the auditorium. This can be accomplished by projecting beyond the rear wall with the construction of the booth or by constructing the booth entirely within the theater. In the first case, there is no loss of seats, but the construction is expensive. In the second case, the construction is inexpensive, but there is a considerable seat loss. This point is one which must be carefully weighed as to whether the income from the seats will give a sufficient return upon the added investment due to the expensive construction of the booth outside the walls or whether it is better to sacrifice the seats.

If the booth be placed at the rear of the auditorium and the auditorium be so arranged that the depth is, say, 150 feet from the screen, the additional expense due to the increased intensity of the light necessary to give a clear projection is an item which materially affects the maintenance cost. In the single division type of house with the booth over the ceiling, as shown in the illustration, these considerations are not of particular importance as the length of the projection can be readily arranged within the 25 degree limit, and in no case except under extraordinary conditions need length of throw of the ray of light be more than 90 feet.

## DOORWAY TO OLD BRICK HOUSE ON FREDERICK TURNPIKE, CARROLL COUNTY, MARYLAND

*THE measured drawings on the two following pages show the detail of a doorway which is one of an original three in a very plain brick front of seven bays, the other four openings being windows alternating with the doors. The main cornice follows the same detail as that on the doors, and the proportions are likewise the same, but the size is just twice that of the cornice to the doors. The doorways are so overgrown with Virginia creeper that they are quite completely hidden, making it impossible to show a photographic view. The house is known to be at least 150 years old, and the state of preservation of the woodwork, which has had but a passing acquaintance with paint, is quite remarkable.*

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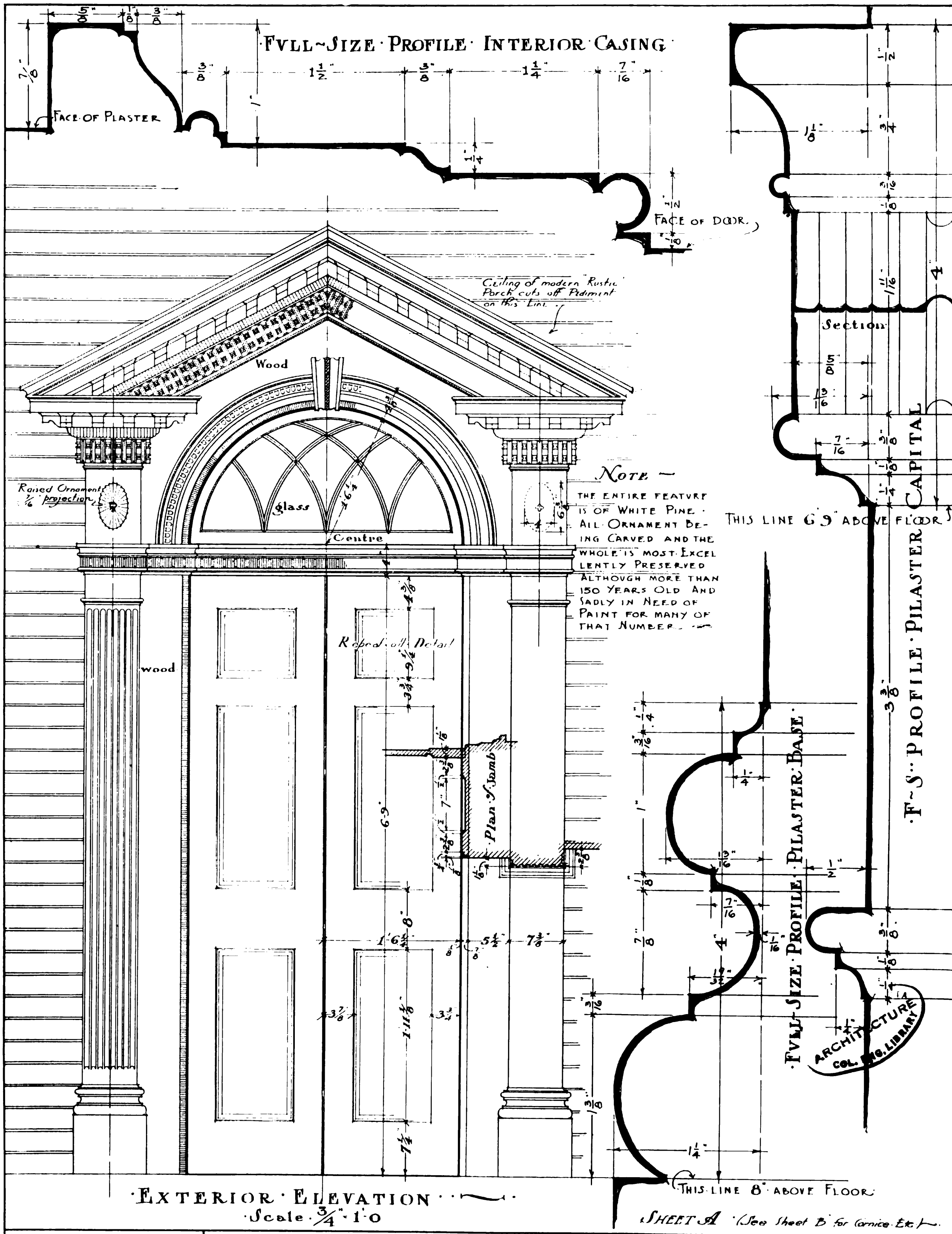


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| PLATE 42. JUNE 1917 | DOORWAY TO OLD BRICK HOUSE ON FREDERICK TURNPIKE Carroll Co. MARYLAND | MEASURED and DRAWN by HARRY F CUNNINGHAM assisted by E. L. Bullock jr Wm E. Humphrey jr. and Y. Ogawa A° D: 1916 |
|---|---|---|



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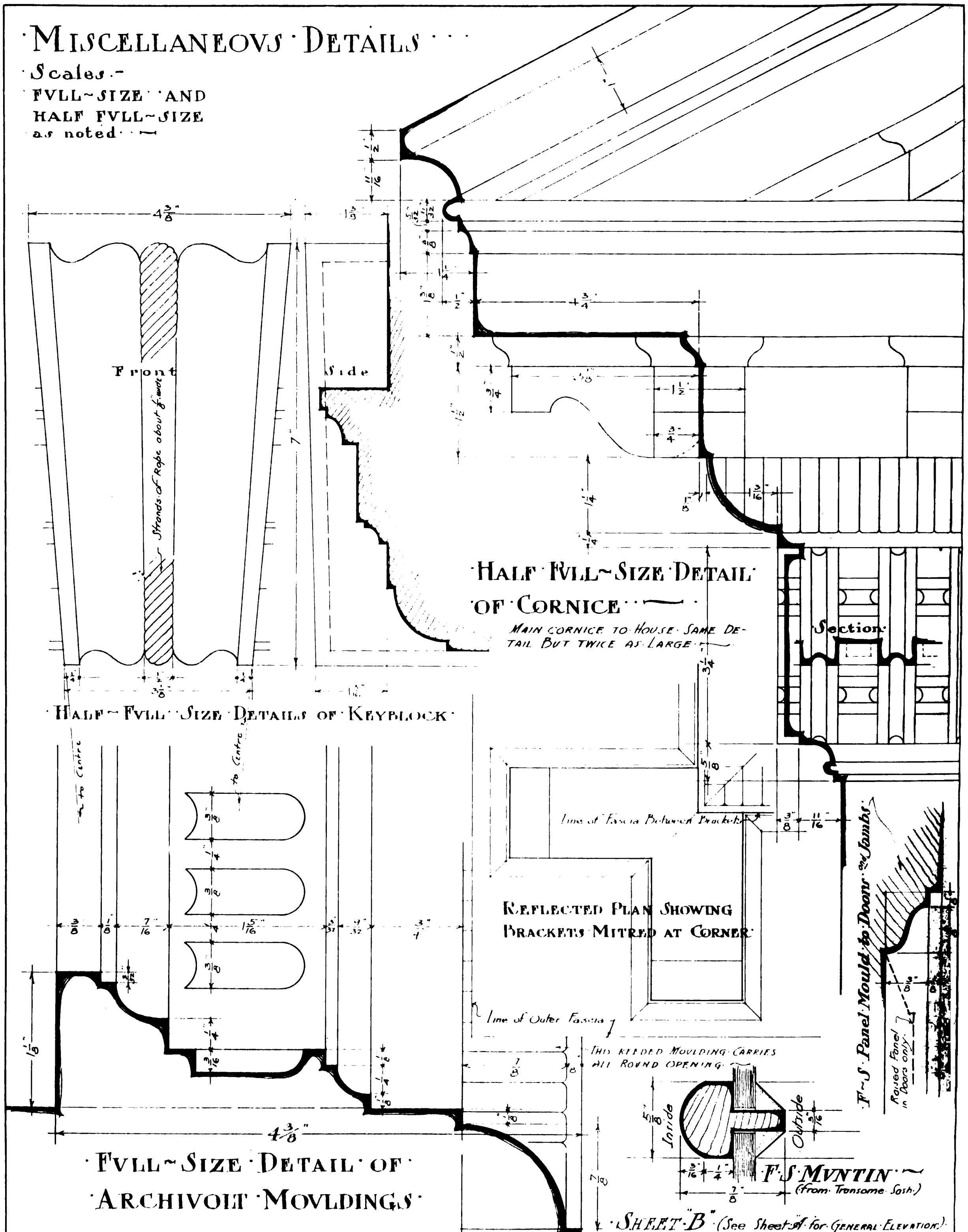


PLATE 43
JUNE 1917

·DOORWAY·TO·OLD·BRICK·HOVSE·
·ON·FREDERICK·TVRNPIKE·Carroll·Co·MARYLAND·

MEASVRED and DRAWN by
·HARRY F·CVNNINGHAM
·assisted·by·E·L·Bullock·jr.
Wm·E·Humphrey·jr·
·and·Y·Ogawa·
A·D· ·1916·



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GENERAL VIEW FROM THE NORTHEAST

FIRST PRESBYTERIAN CHURCH, OAKLAND, CAL.
WILLIAM C. HAYS, ARCHITECT; CRAM & FERGUSON, CONSULTING ARCHITECTS

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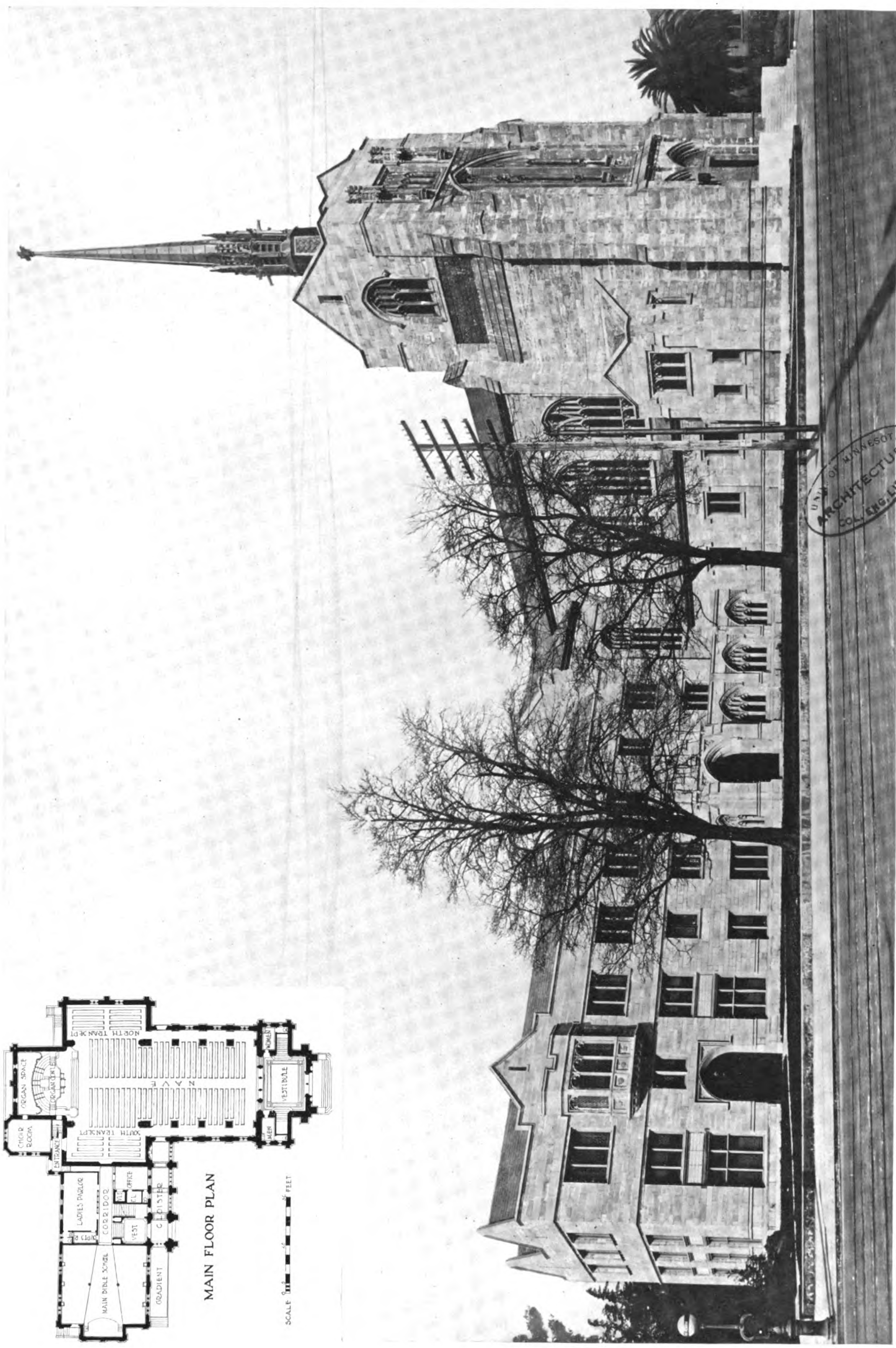


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GENERAL VIEW OF CHURCH AND PARISH HOUSE

FIRST PRESBYTERIAN CHURCH, OAKLAND, CAL.

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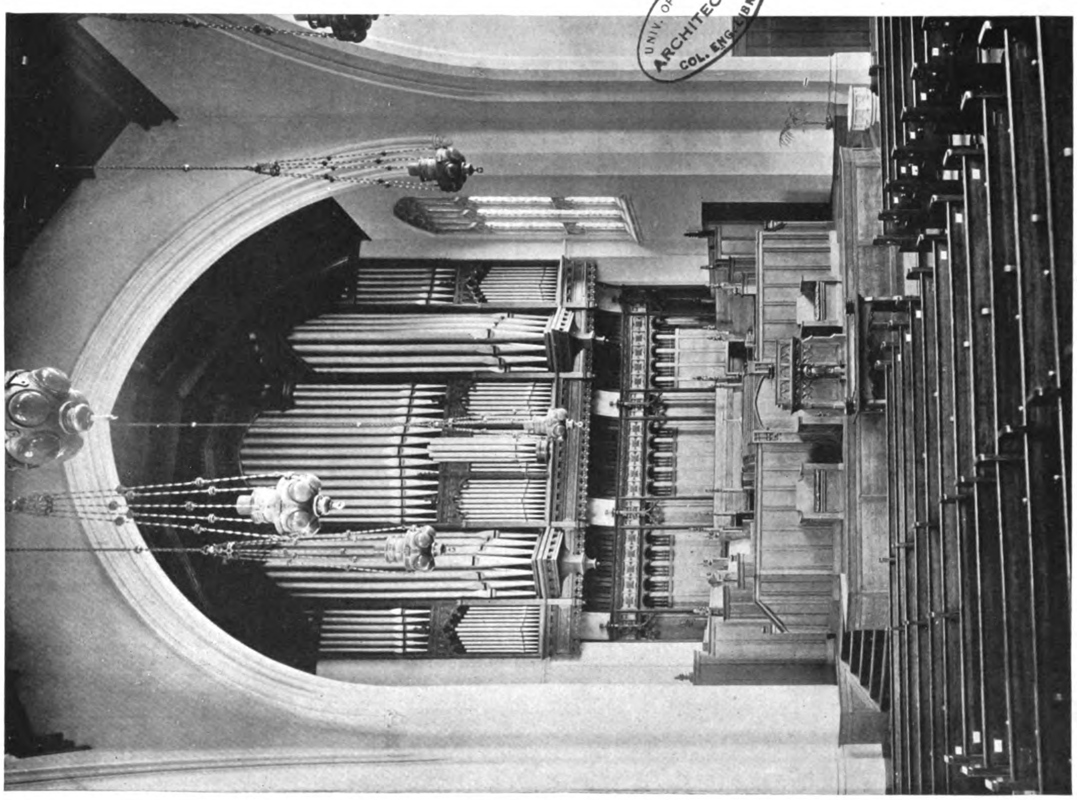
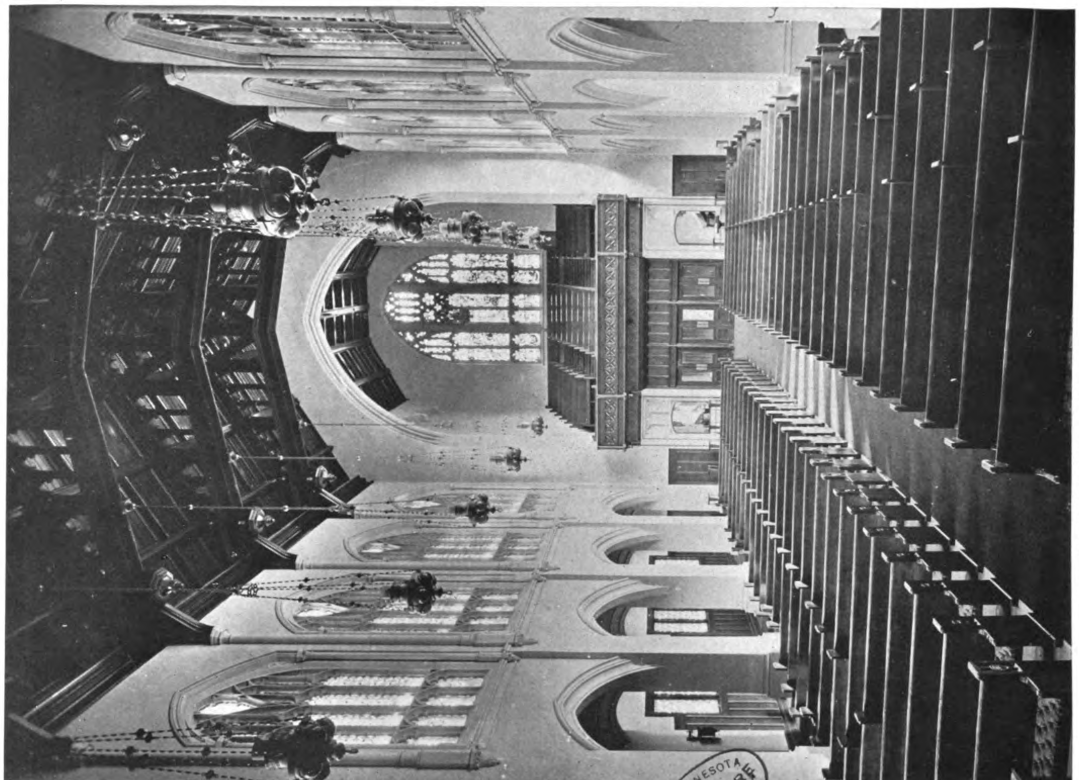


DETAIL VIEW OF CHANCEL AND ORGAN SCREEN



INTERIOR VIEW LOOKING EAST TOWARD GALLERY

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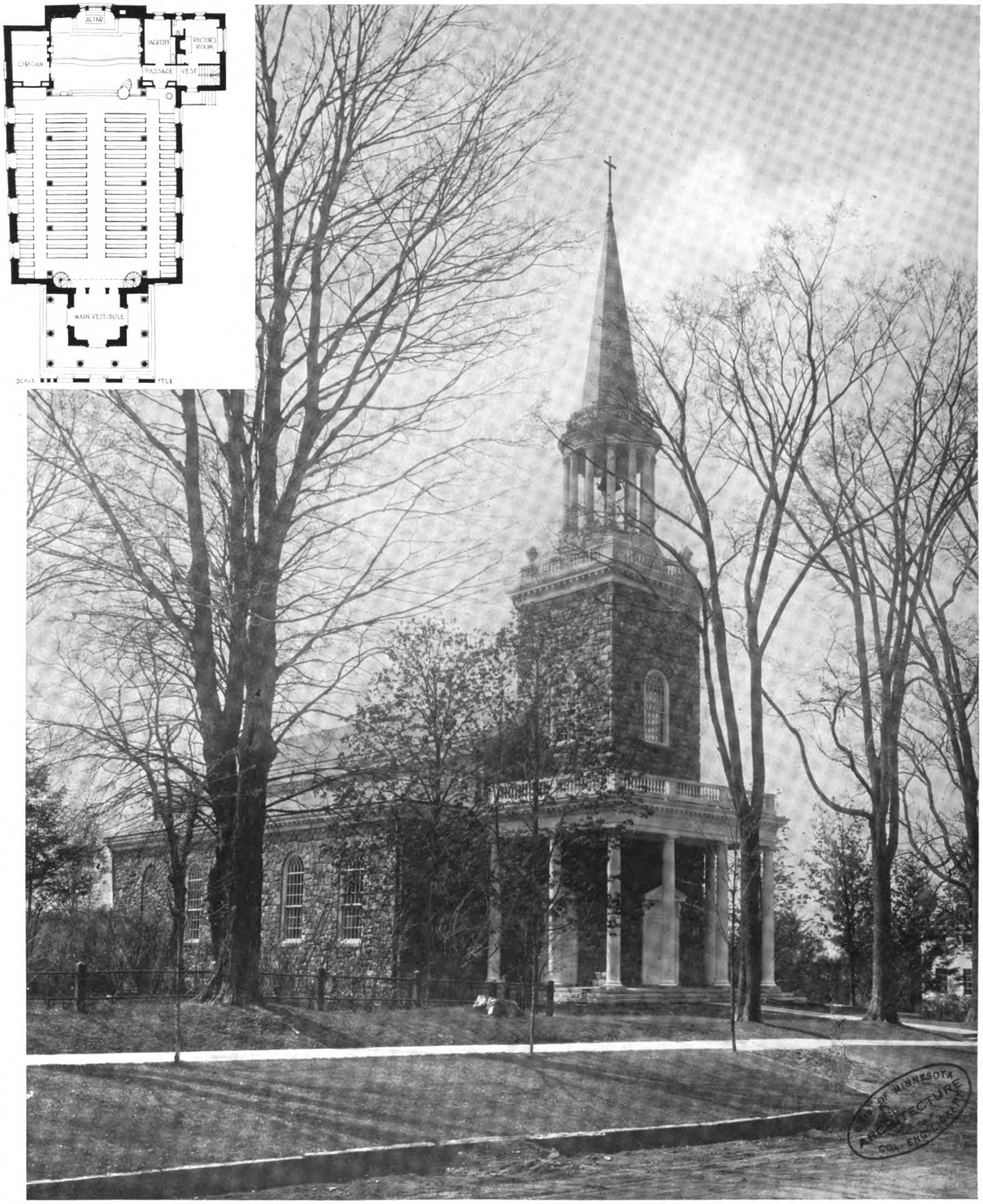


ST. STEPHEN'S EPISCOPAL CHURCH, RIDGEFIELD, CONN.

W KERR RAINSFORD, ARCHITECT

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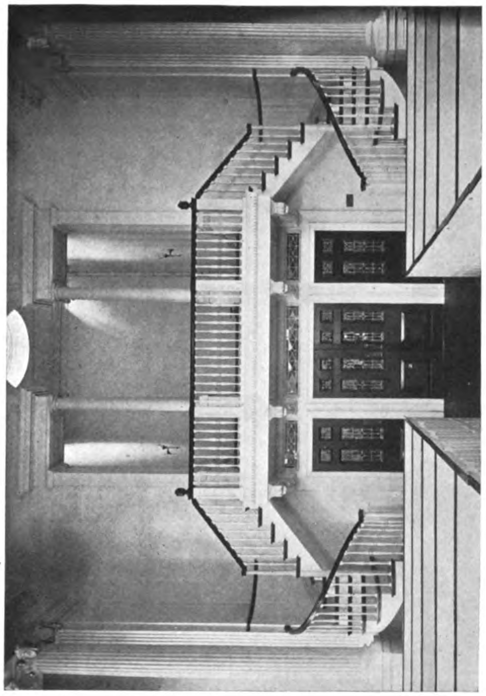
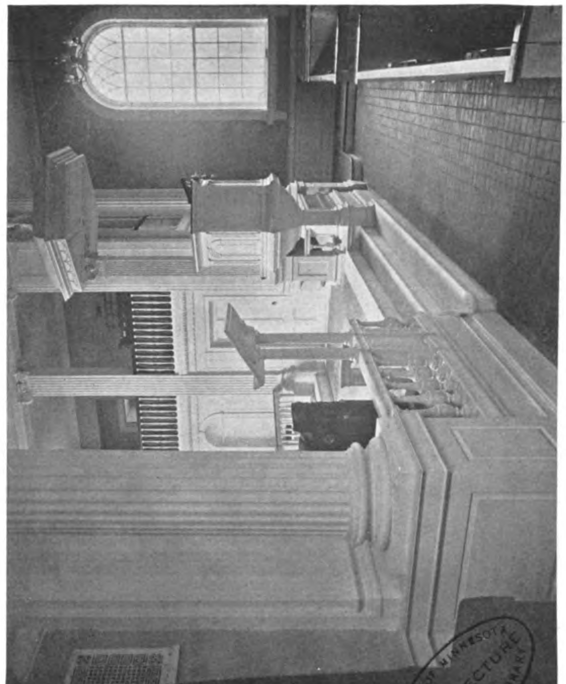


STAIRWAY TO TOWER ALCOVE



VIEW OF CHANCEL AND PULPIT

VIEW OF INTERIOR FROM TOWER ALCOVE

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ST STEPHEN'S EPISCOPAL CHURCH, RIDGEFIELD, CONN

W KERR RAINSFORD, ARCHITECT

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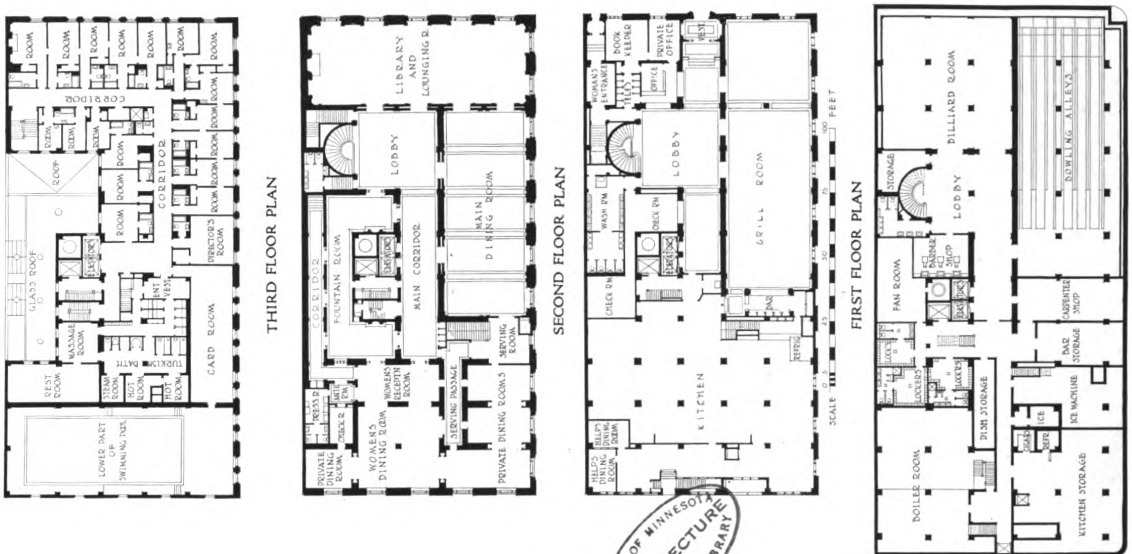
THIRD FLOOR PLAN

SECOND FLOOR PLAN

FIRST FLOOR PLAN

BASEMENT FLOOR PLAN

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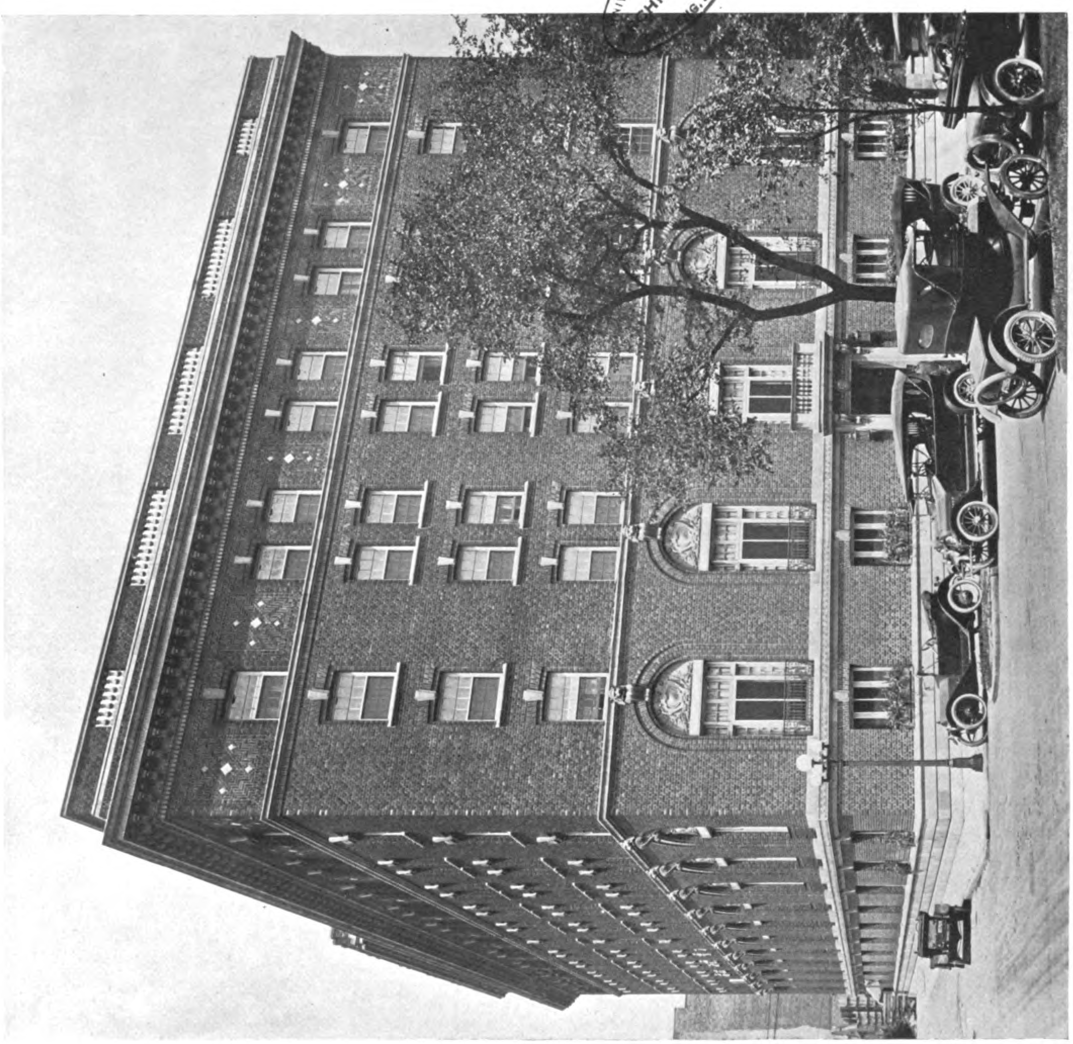
GENERAL VIEW OF EXTERIOR

ATHLETIC CLUB, COLUMBUS, OHIO

RICHARDS, McCARTHY & BULFORD, ARCHITECTS

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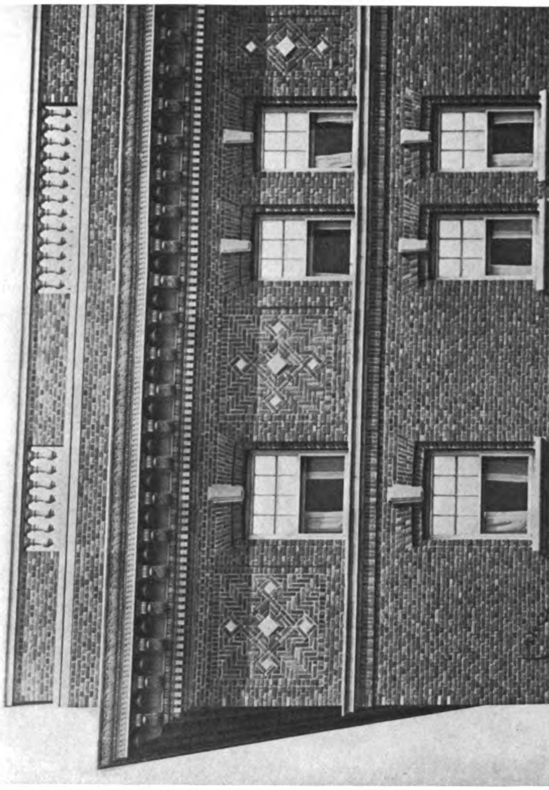
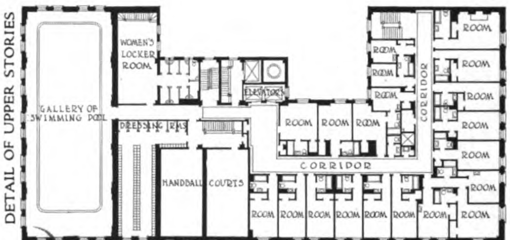
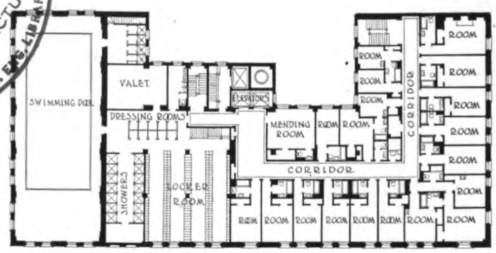


DETAIL OF UPPER STORIES


SIXTH FLOOR PLAN




FIFTH FLOOR PLAN




FOURTH FLOOR PLAN

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RICHARDS, McCARTHY & BULFORD, ARCHITECTS

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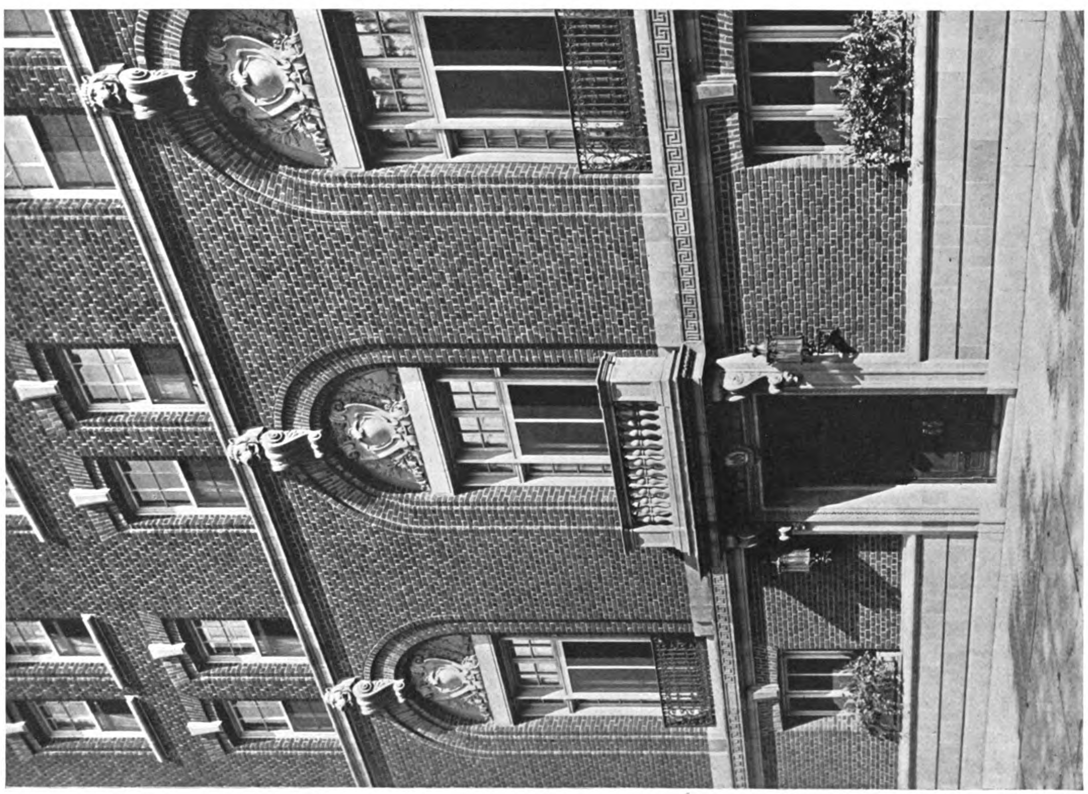

DETAIL OF LOWER STORIES

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GRILL ROOM

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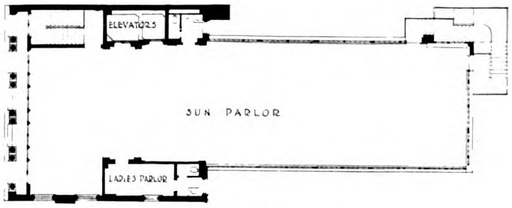


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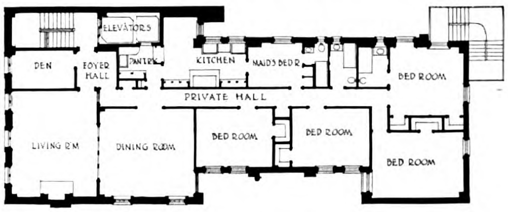


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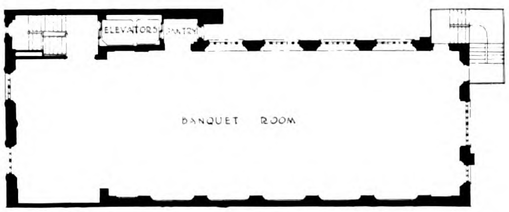
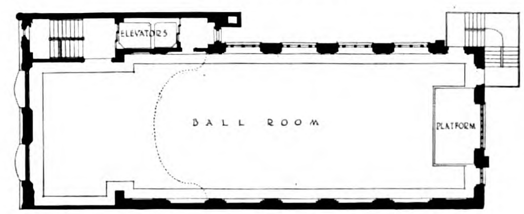



THIRD FLOOR PLAN

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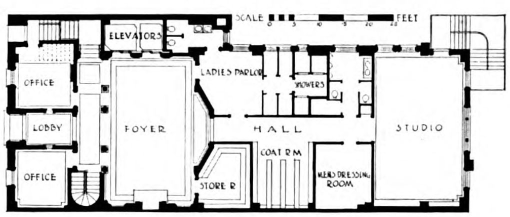


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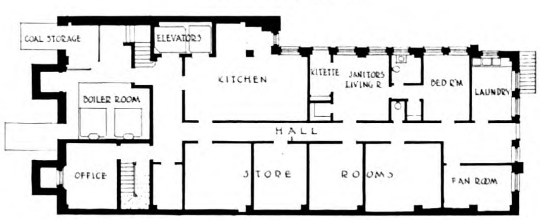
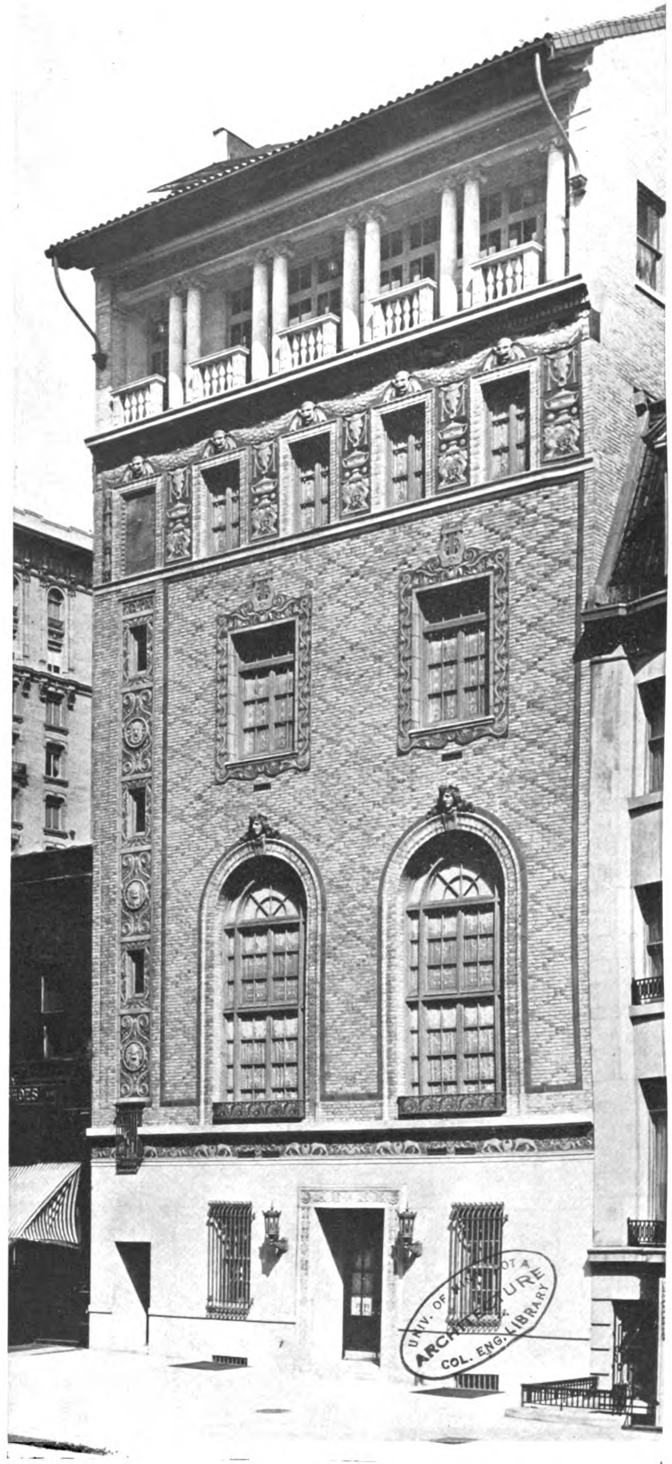



BASEMENT FLOOR PLAN



GENERAL VIEW OF FACADE

CHALIF SCHOOL OF DANCING, WEST 57TH STREET, NEW YORK, N. Y.

G. A. & H. BOEHM, ARCHITECTS

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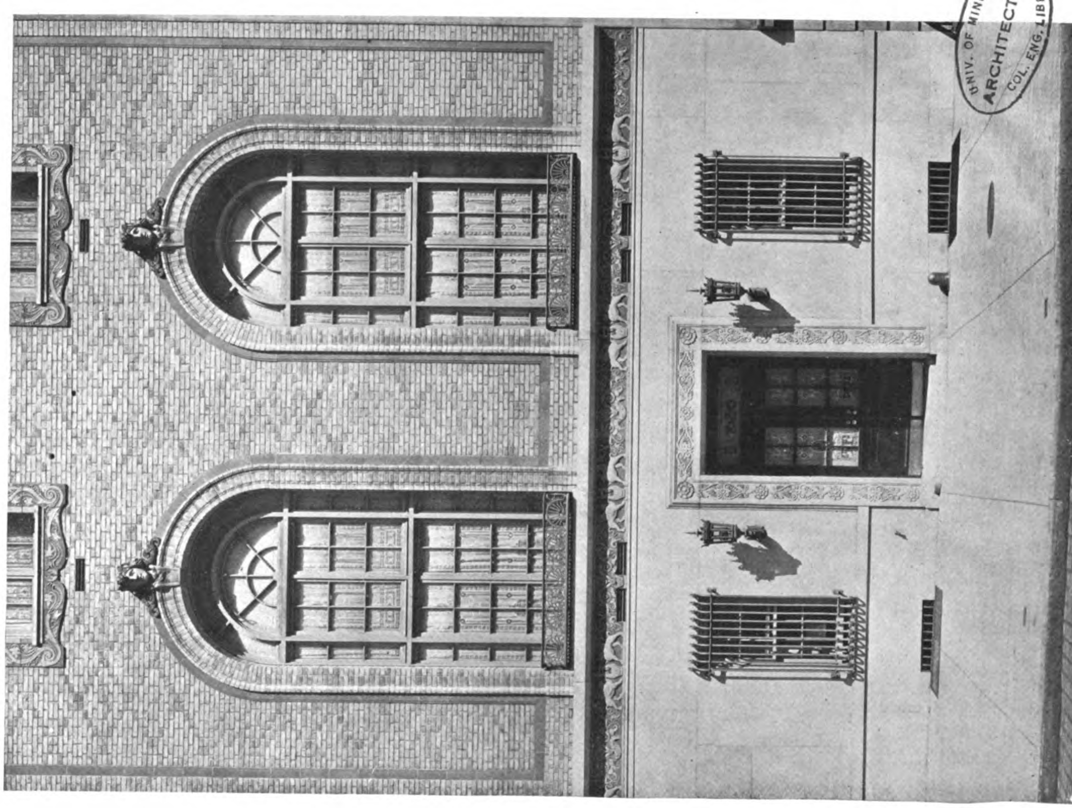
DETAIL OF BALLROOM WALL



DETAIL OF LOWER STORIES

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VIEW OF BALLROOM

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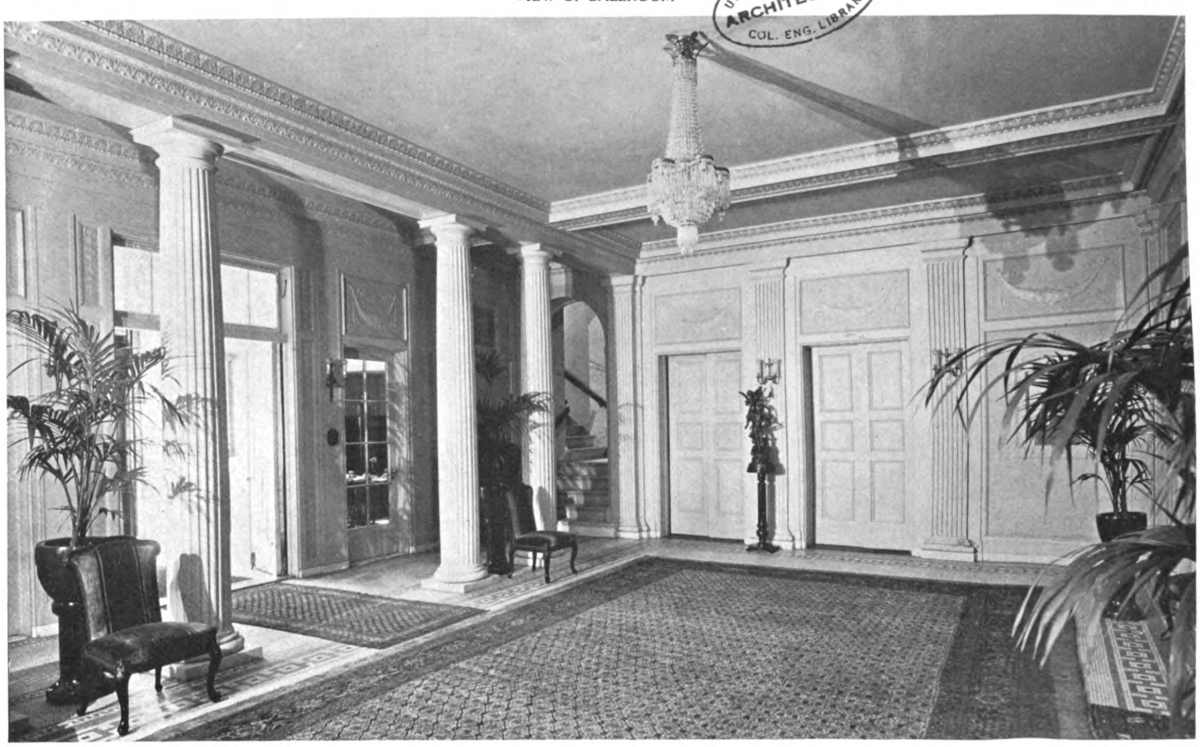

VIEW OF ENTRANCE FOYER

CHALIF SCHOOL OF DANCING, WEST 57TH STREET, NEW YORK, N. Y.

G. A. & H. BOEHM, ARCHITECTS

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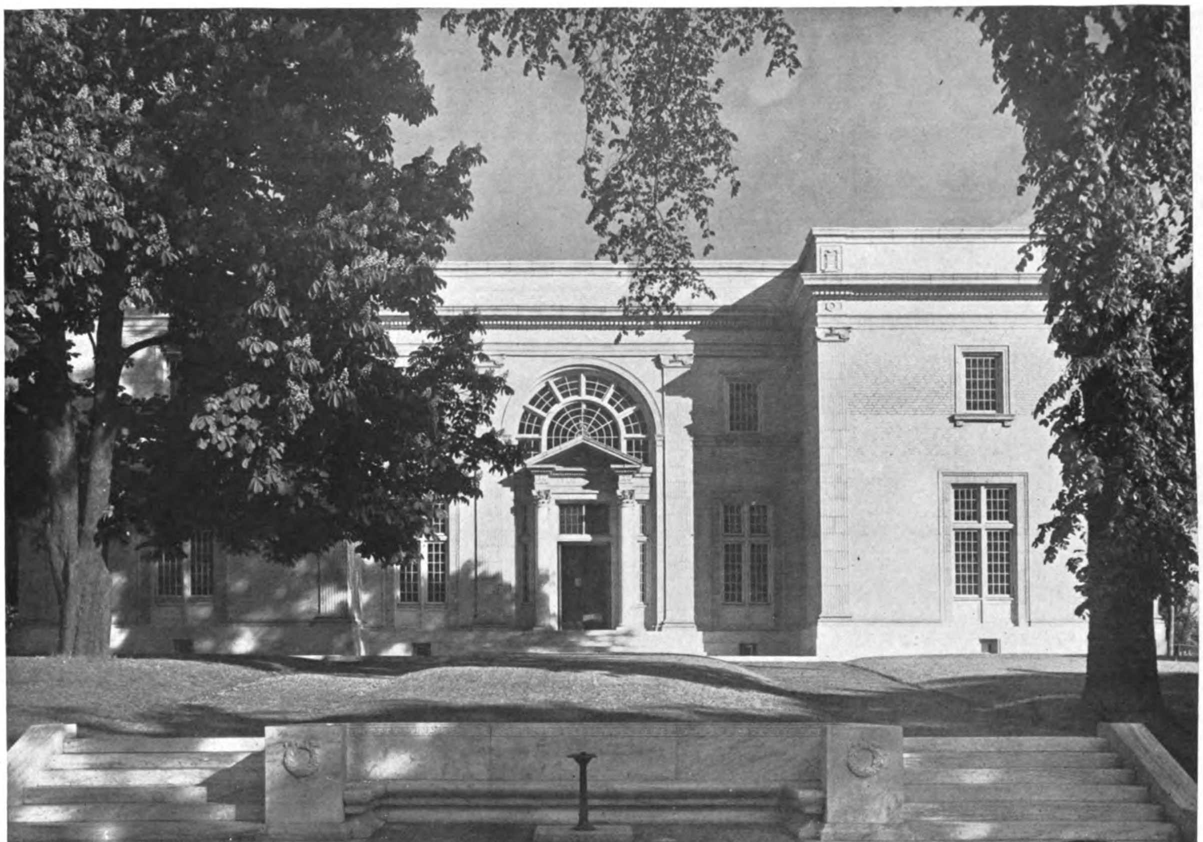
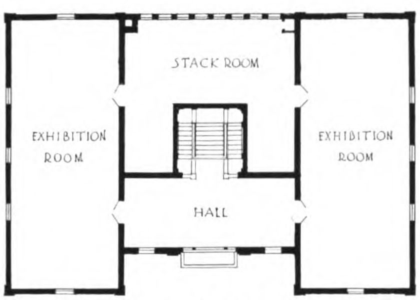
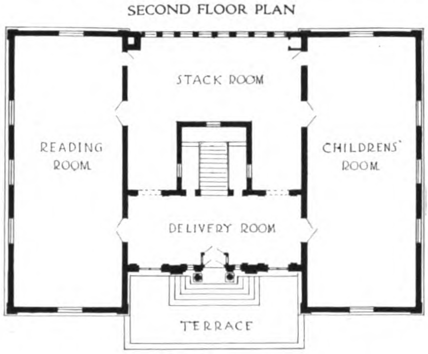


GENERAL VIEW OF MAIN FACADE




SECOND FLOOR PLAN




FIRST FLOOR PLAN

ENTRANCE LOBBY

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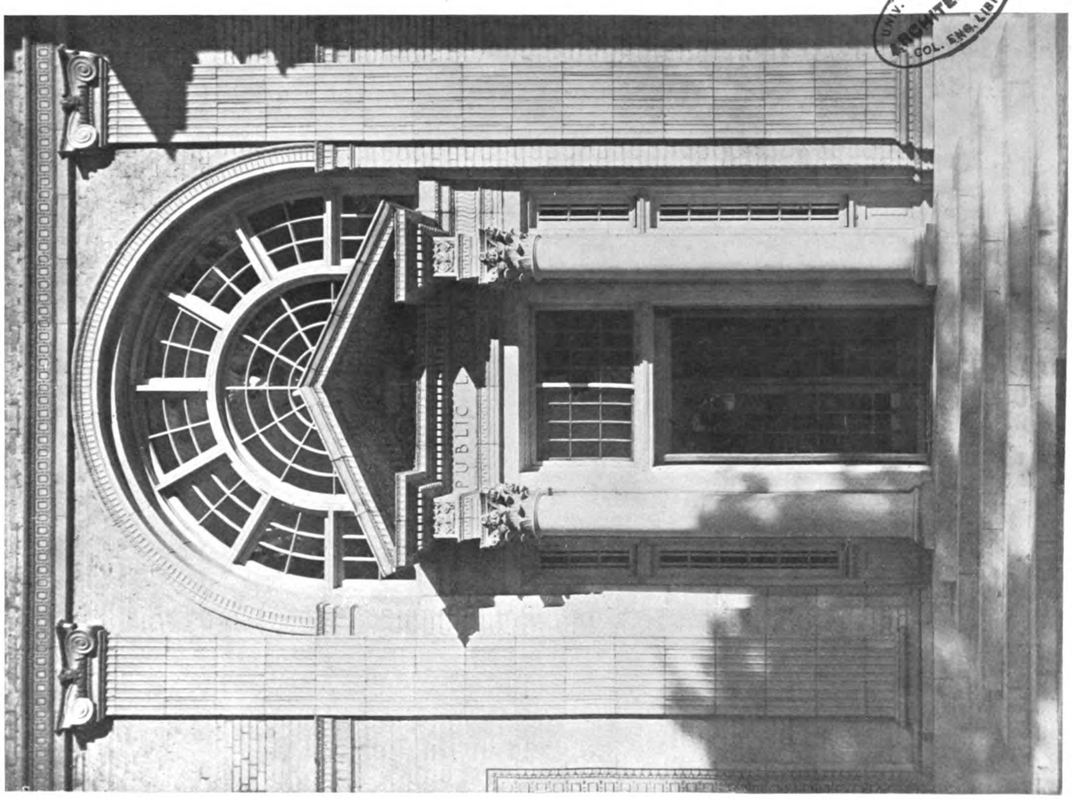
DETAIL OF SIDE DOORWAY




DETAIL OF MAIN ENTRANCE

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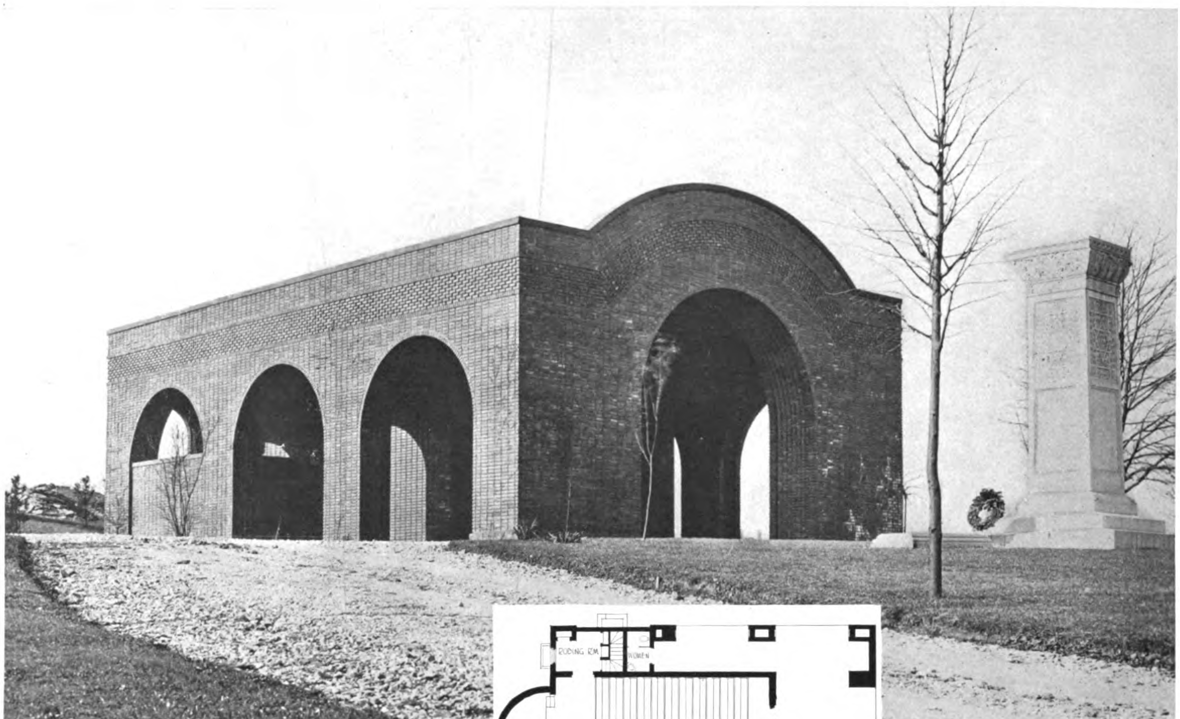

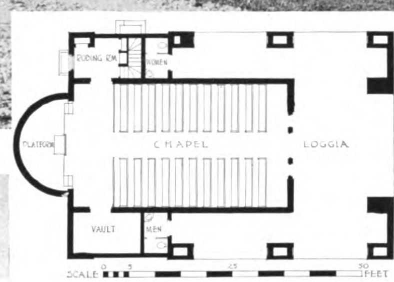


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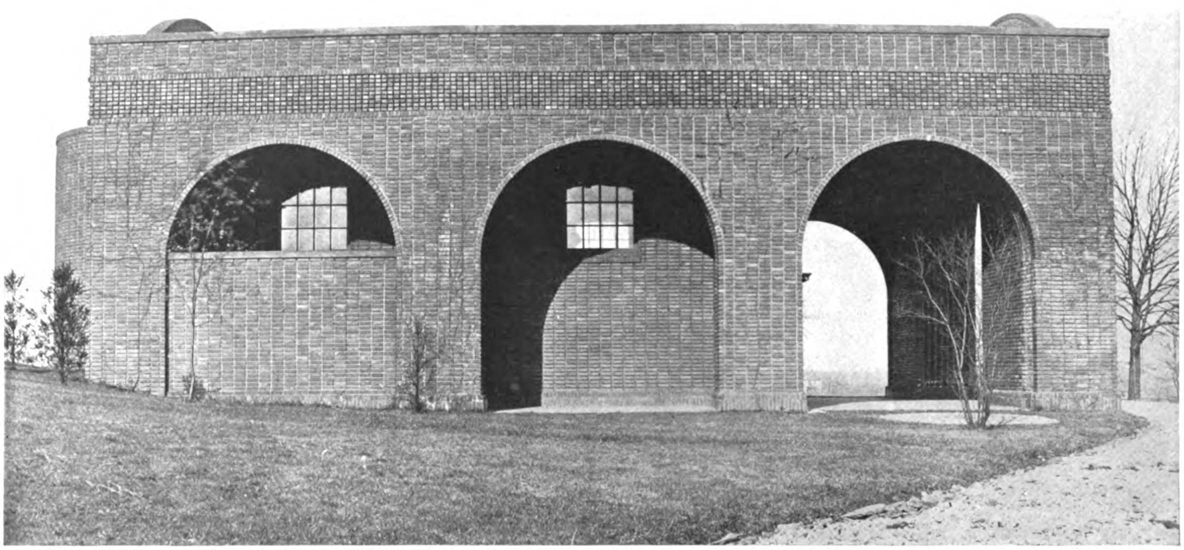

MORTUARY CHAPEL, WEST VIEW CEMETERY, PITTSBURGH, PA.
PALMER, HORNBOSTEL & JONES, ARCHITECTS

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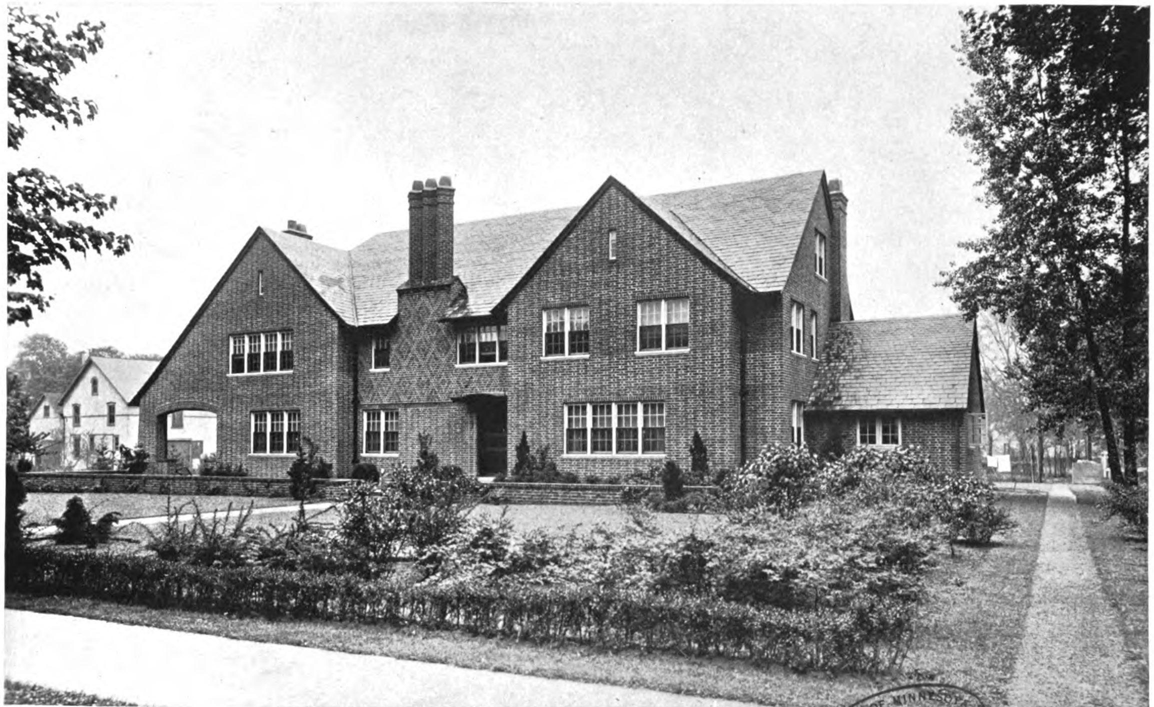

GENERAL VIEW FROM STREET

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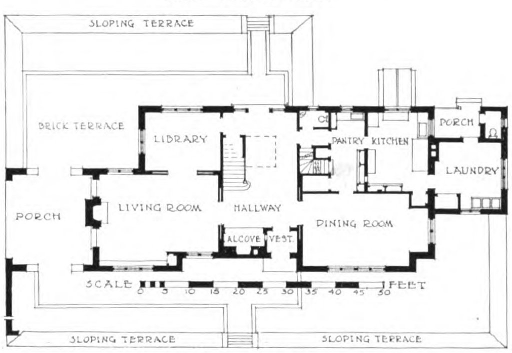
THIRD FLOOR PLAN


SECOND FLOOR PLAN




FIRST FLOOR PLAN

VIEW ALONG TERRACE

HOUSE OF W. A. HENDRICKSON, ESQ., RIVERTON, N. J.

SIMON & BASSETT, ARCHITECTS

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ENTRANCE HALL

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LIVING ROOM

HOUSE OF W. A. HENDRICKSON, ESQ., RIVERTON, N. J.

SIMON & BASSETT, ARCHITECTS

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# Details of Italian Renaissance Architecture

MEASURED DRAWINGS BY MAURICE P. MEADE

THE accompanying plates continue the same general type of details as those illustrated in the two previous series, and represent some additional examples of Italian Renaissance work from buildings in Rome and Siena. The latter city, lying between Rome and Florence, shows an architecture influenced by both centers of culture, but with certain local characteristics as well, notably in the more extensive use of combinations of brick and stone.

Doorway of the Church of S. Lorenzo in Damaso
Cancelleria Palace, Rome

The first plate shows a doorway in the principal front of the Palazzo della Cancelleria, placed somewhat to the right of the main entrance of the palace. This doorway forms the entrance to the Church of San Lorenzo in Damaso, which is incorporated in the palace, though without any indication on the exterior. The reveal of this doorway is greater than is the case in most doorways of the Renaissance in Italy. The simplicity of the mouldings, both of the door and the architrave, is also worthy of notice, the only ornamentation being the leaf motif in the soffit of the cornice and the decoration of the consoles. The architrave mouldings, breaking at the bottom of the consoles and cut off square at the door sill without a return, show a type of doorway unusual in the Renaissance period, and much bolder in execution than the ornamented doorways so common at the time. The section through the frieze of the entablature over the doorway may also be noted, as it differs considerably from most of the work of the period.

The Cancelleria Palace was designed by Bramante and is a characteristic example of his skill in design and in the use of mouldings. Like most of his work, it shows a high degree of refinement, amounting almost at times to monotony, although relieved by a few features of special importance. The base mouldings and the belt course under the windows of the ground floor which are shown on the second plate are worthy of study for their relation to the rusticated surface of the wall. These mouldings return on themselves at the sides of the doorway of the church, while at the main doorway of the palace they are stopped against the pilasters.

In the Palazzo Galitzin the base mouldings are somewhat finer in scale, and the rustication is more delicately executed; thus, for instance, the margins of the rusticated members have a tooled surface, and the width and depth of the channels are less than those of the Cancelleria. The first story belt courses of both buildings present the same form of moulding, though that of the Galitzin is finer in scale.

The third plate of the series is of the front of a house in Siena, and shows the general proportions of the door and window openings, and the relation of the stone belt courses to the brick wall surface in the typical Sienese manner. The doorway is beautifully proportioned, though extremely simple in its details. The architrave mouldings are cut off square at the street line instead of returning on themselves, as is the usual form. The first story window architraves have mouldings that continue around all four sides, so as to form a complete frame for the opening.

On the second and third floors the belt courses form the sills of the windows.

General View of the Cancelleria Palace, Rome

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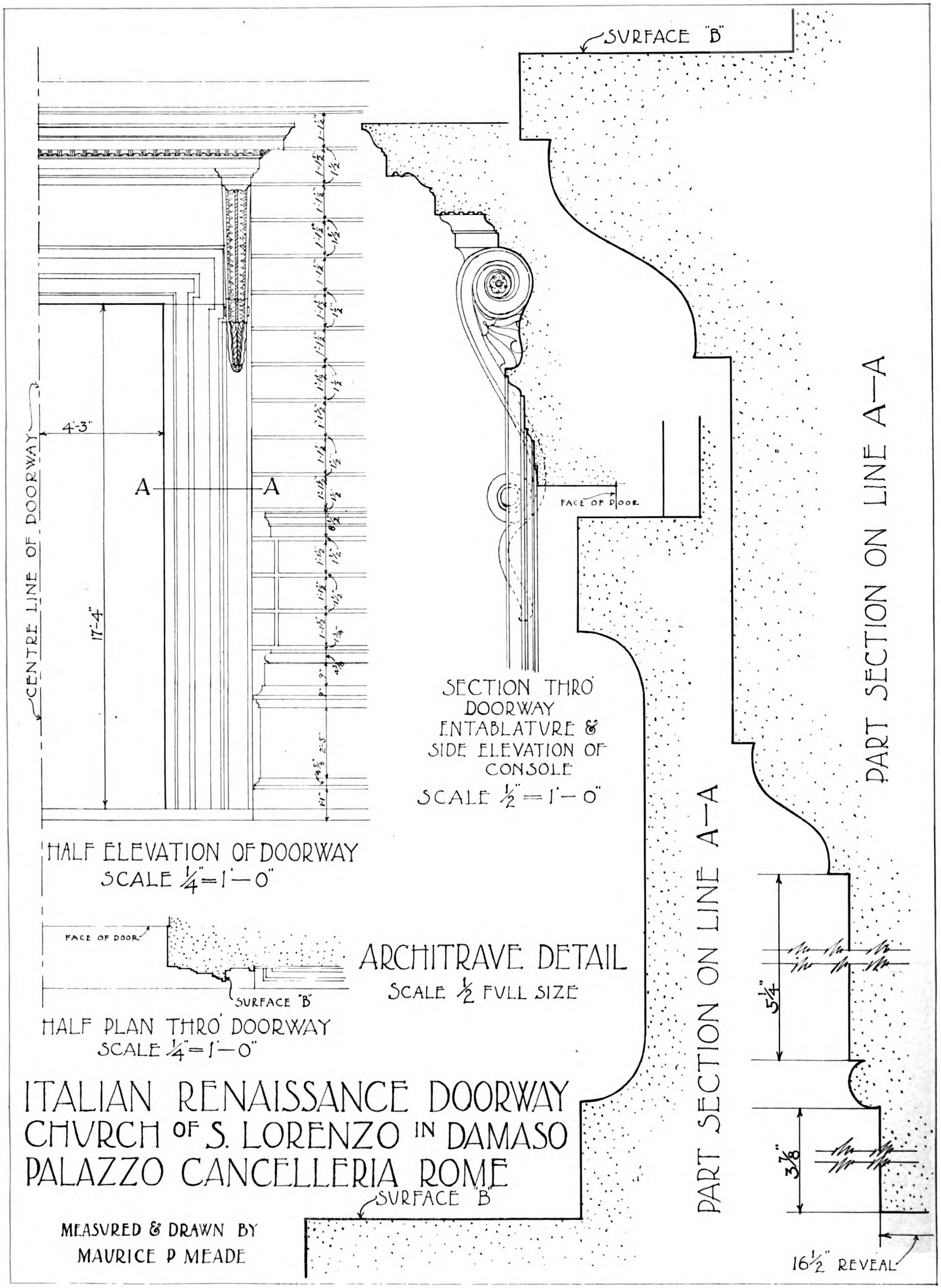




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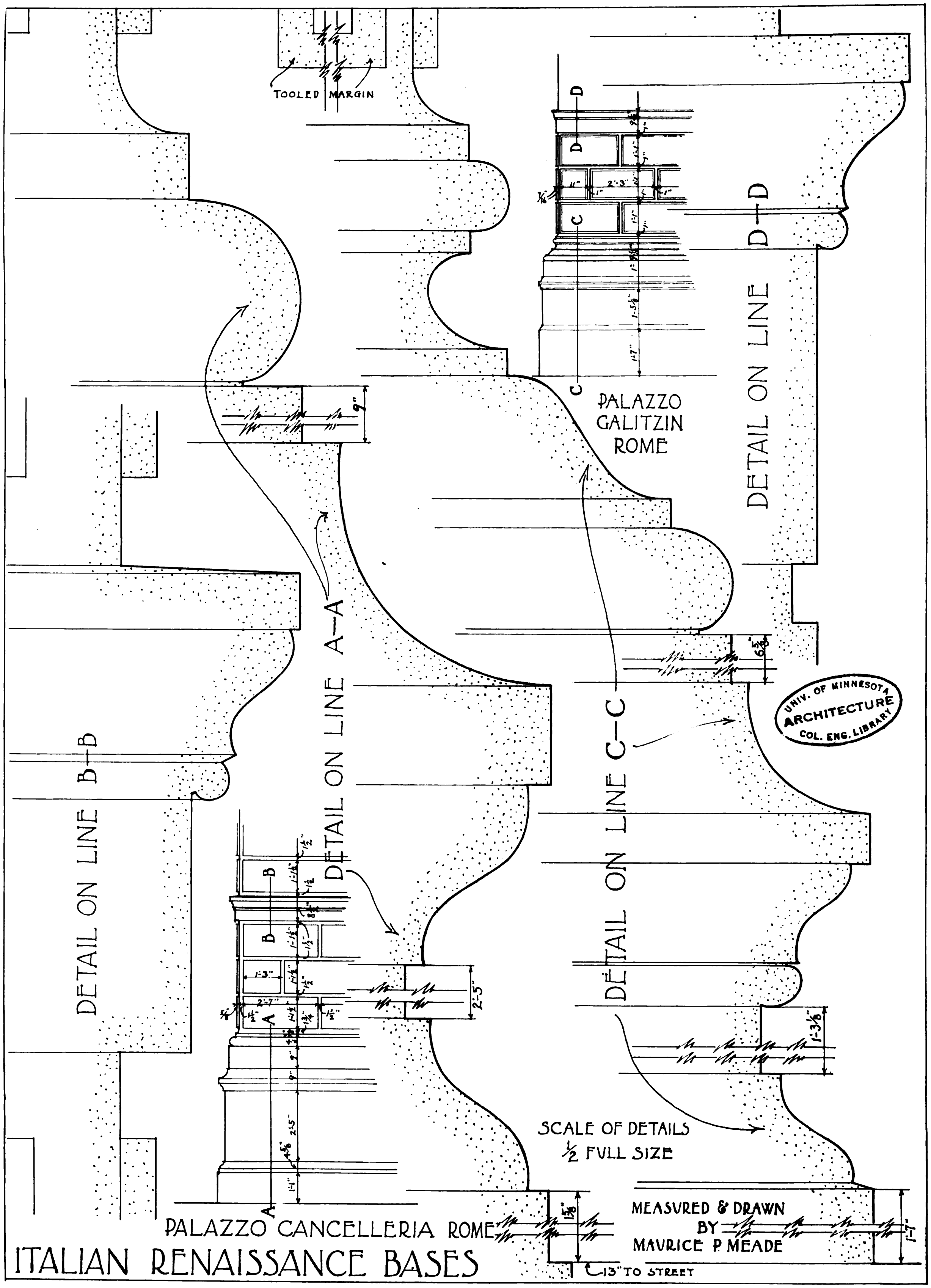




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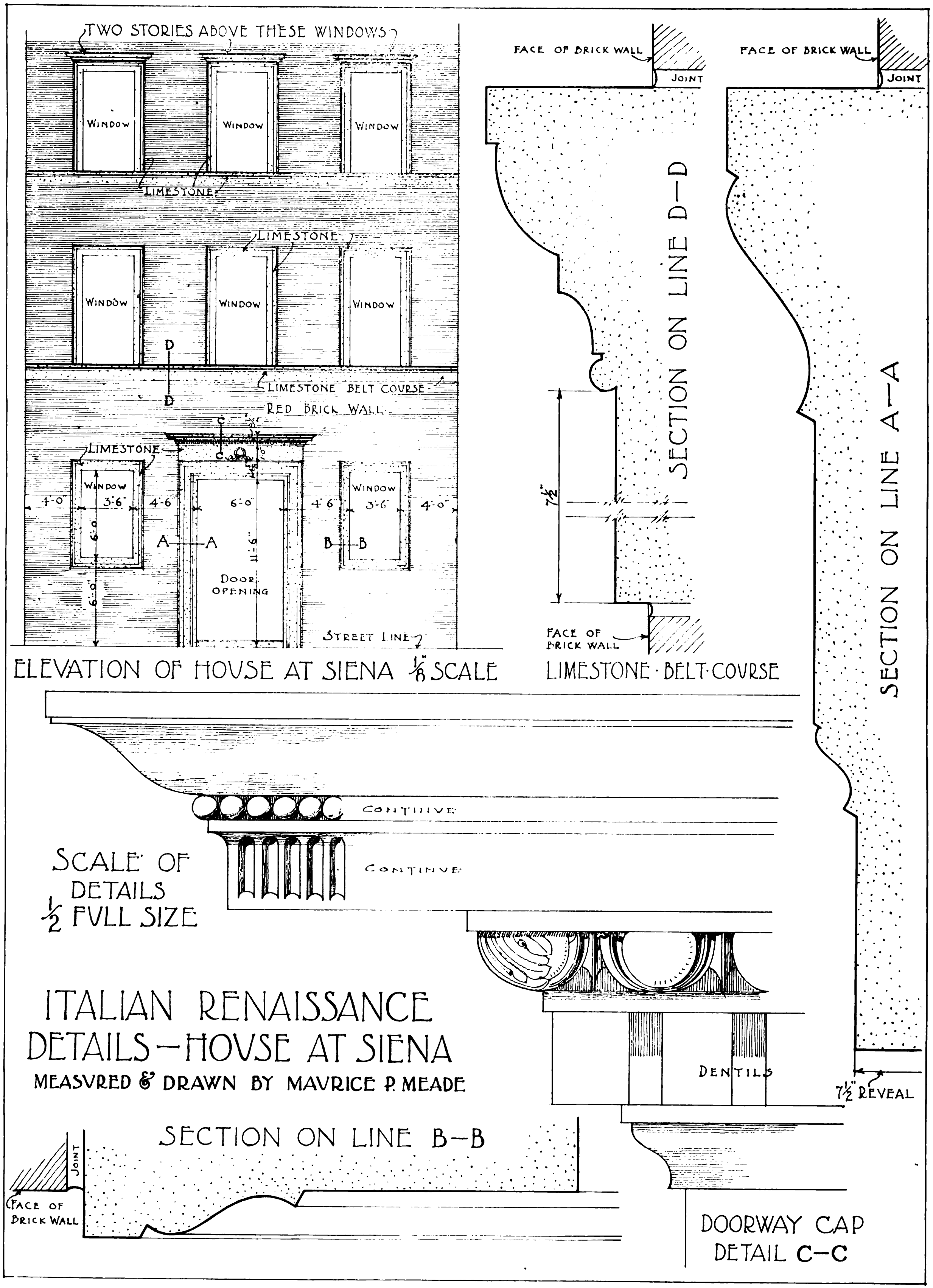




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# The Problem of the General Contractor

*By* WILFRED W. BEACH

THE relation between the architect and the builders of his structures has been so often discussed that it would appear that little that is new can be said on the subject.

Nevertheless there are certain phases of the changing relations between owner, architect, and contractors which have been brought about by the evolution of the business side of present-day construction that are worthy of serious thought.

Buildings—those of any pretense—have ever been the combined product of artist and artisan. Up to comparatively modern times the two functions were frequently unified in a single individual, called the "architect," who worked with the other mechanics the while he directed their endeavors.

Out of the formation of trades guilds in the Middle Ages grew the labor contractor, or "undertaker," who undertook to provide all the labor in his line on a given structure — labor unionism in its early form, but founded on apprenticeship and craftsmanship, not on the activities and avarice of the business agent.

Then, of necessity, followed the contractor for supplies and factory products. The so-called "general contractor" is an outcropping of much later date—a real modernity, in fact.

Architects of present-day practice have become so accustomed to the general contractor and his apparent necessity that they are likely to overlook the fact of his so-recent evolution. Witness that portion of the American Institute definition of an architect which describes one of his functions as "supervising the operations of contractors" instead of "supervising construction."

And some architects, much to their discomfiture, have been made to realize that, in bringing forth this individual for the purpose of shouldering some of the onerous duties incidental to actual construction, they have hatched out a veritable cuckoo-bird which bids fair to oust its foster parents from their perch.

The theoretical relation between architect and contractor is plainly set forth in the printed form of the "Uniform Contract." The contractor is assumed to be rather an undependable depredatory individual with whom another individual, styled the "owner," enters into an agreement, but with small confidence that he is not the victim of a savage wolf intent on fleecing him. To prevent such fleecing he retains the architect, as the best informed personage on the subject matter of the contract, to act as a sleepless detective on the job. And many times he will blame his detective more for having slept a little than he will the contractor for having "put something over." It was to be expected of the contractor, whose interests as stipulated in the contract are diametrically opposed to those of the owner, "but what . . . is the architect paid for?"

Architects may ascribe to themselves all the dignity they can throw into their profession, and then add a modicum, without being able to overcome the opprobrium that attaches to the office of the "gum-shoe" artist, which office, in the mind of the average owner, the architect deliberately assumes when undertaking to superintend a work of construction.

This triangular relation is the direct outcome of the building up of the contracting system which, in turn, was the result of commercial conditions of a bygone generation. Time was, not so *very* long ago, when commercial probity was a joke; when a buyer had no protection but his own acumen, and when great wealth was its own justification, regardless of the means of accumulation. Under such conditions neither reinforced concrete nor heaviest armor plate were barriers too strong behind which to safeguard the interests of the most wary individual when he found it necessary to enter into a building agreement with a rapacious contractor.

Small wonder either that, under such conditions, the detective hireling sometimes went wrong. With the owner trying to beat the contractor full as often as the reverse, the architect must have been a superior personage indeed if, after having been forced down to the lowest possible fee for himself, he did not try to recoup when opportunity offered. Evidence might be adduced to show that he did — too often for his own reputation and that of his confrères.

The writer has in his mail to-day a printed circular from the manufacturer of a building appliance containing the following paragraph:

"The prices shown on page 23 are list — the prices your customer should pay. You are entitled to a trade discount of 10 per cent."

And the circular was prepared for distribution among architects, though worded as if for supply houses.

In what degree these conditions still maintain; to what extent the necessity for the contracting system — more especially the general contracting system — still remains, seems certainly to be a subject for serious reflection.

Architects' methods of practice are largely founded on that system, as it in turn is builded on those methods. All drawings and specifications are so formulated and worded that a legal contract can be executed thereupon. And the average owner, though he may in other matters be educated to the most up-to-date commercial reciprocity, will deliberately brace himself against that contract and direct his architect to assign his work to the lowest bidders, regardless of their reputations for ignorance or dishonesty, then assume that it is up to the architect to earn his detective fee.

And it is to be believed that he earns it.

All this is quite too trite.

The average contractor may be any one of several sorts — he may be, but seldom is, a person of technical education, thoroughly grounded in every branch of building; or he may be a promoted carpenter or mason or concrete worker or paving inspector; or simply a building broker capable of assembling the bids of sub-contractors. He may even be a gigantic corporation — a building entity administered by a skilled financier or a committee; but, in the average, the chances are against the general con-



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tractor being a good business man. Ordinarily, he is not. If he were, the prospect of his getting a fair share of business would not be good.

This was succinctly set forth by Mr. G. Alexander Wright in an address on estimating given before the General Contractors' Association of San Francisco, April 10, 1913.

Said he: "When bidders are asked to submit bids, they are theoretically asked, of course, to submit competitive prices, but in actual practice their bids are based upon competitive quantities, before the competition in prices commences; which, in my opinion, is as unjust to the contractor as it is ridiculous. . . . One or more bidders, through being hurried or being unable to take off the quantities accurately, leaves something out. What happens? Their bids are consequently low, and the owner benefits, at the low bidder's expense, whilst the competent or more careful bidder loses the job, because his quantities are more accurate, or because there may have been room for uncertainty when figuring the plans and specifications.

"Not long ago a general contractor, whom I have known over twenty years, told me that if contractors figured to do competitive work just exactly as plans and specifications called for, a man would not get 'one job in fifty.' Now, if this is true, and personally I believe it is, there is something very poor in our methods. . . ."

From his discussion Mr. Wright draws the conclusion that a better method of estimating quantities is necessary — but is it? Let us grant that it is essential to the well-being of the general contracting system, but is that system necessary to the business of building?

Mr. Wright says that "it must be obvious that no amount of figuring can reduce the real quantity of material which a building will take."

Certainly "figuring" will not do this, yet there may be considerable variation in the amount of material consumed by different constructors for similar work, and there will be still more difference in the amount of labor as directed by different foremen.

The truly obvious fact in estimating is that no one can accurately forecast how much a building will cost, therefore those who attempt to compete for the privilege of undertaking such work at a contract figure indulge in gambling, pure and simple, just as do those foolish architects who enter informal competitions.

Probably a good reason for the lack of business method prevailing in contractors' bidding is that many have learned that they can arrive as closely at the actual cost of a proposed structure by comparing it cube for cube with a similar building of known value as by taking off the actual quantities; and, furthermore, the purpose of contractors' estimating is not so much the ascertaining what a structure will actually cost — that being a known impossibility — as to arrive at a safe figure that will land the job.

Assuming that the purpose of building is less the giving of employment to architect, contractor, and mechanics than to produce a structure for the benefit of the owner, it must then be admitted that the interest of the owner is that most to be conserved. Is he sufficiently interested in knowing the exact cost of his building *to the contractor* as to be justified in paying for a survey of quantities? He is not. He is not even willing to pay a contractor for a guaranteed estimate of cost.

He wants to know the minimum price at which any applicant will undertake to erect his building, and he wishes positive assurance — bonded guarantee — that such figure will also be his maximum expenditure when the returns are all in. But the added expense of having quantities surveyed — which contractors are supposed to do free of charge — *solely for the benefit of competing bidders* does not in the least appeal.

And the interest of the owner is the paramount interest. In countless ways it can be demonstrated that the interests of the building contractor are not those of the owner, nor of his confidential agent and adviser, the architect. Whether quantity surveying be necessary to the proper fortifying of the business of the contractor, or whether it be frankly admitted that contracting under the competitive bidding system is simply gambling to be freely indulged by the shyster or broker as well as by the skilled builder, we can plainly see that there is in the whole general scheme a lack of conservation of the best interests of the owner.

This has been distinctly discernible for some time to many of the leading men in the architectural profession. It was considered sufficiently serious for the American Institute of Architects to appoint a committee to report on the subject, which was done at a session of the Fortieth Annual Convention of the Institute, Jan. 8, 1907. If space permitted, this report would bear reprinting in full, but the gist of the subject is contained in the following excerpts:

"The question — relation of architects to the contracting system — is of such importance that it appears proper to call your attention to the following facts:

"Some fifteen or twenty years ago it was the usual custom to get proposals from the heads of various trades and to award a number of separate contracts for the work of one building. . . . As building construction became more complex there arose a desire to place the work of these various trades under one general contract, and the idea had some advantages to commend it. It was found in practice that at times, with a number of minor contractors at work in one building, there were moments of friction, interference, and delay. Sometimes the minor contracts did not join each other exactly and then an extra bill had to be incurred to complete the structure. Therefore it seemed desirable to put all the work under one general contractor, who would be solely responsible for the whole building and for items which might have been overlooked in minor subdivision. This system appeared to have many advantages, among others, in avoiding the difficulty of telling your client that you were not omniscient and omnipresent. . . . But in this respect the alleged advantage was more apparent than real, for, as you all know, the general contractor was just as keen to take advantage of any defect in your specification as were the minor contractors, and general clauses intended to bridge the gaps proved to be without binding force.

"Then there seemed to be another advantage when the general contractor went to the structural steel concerns and got drawings of trusses or beams that you had not the time or the opportunity or inclination to prepare yourself. At any rate, we were willing to accept what seemed an

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easy way, by attempting to unload the whole responsibility on one firm. But by this the general contractor has become the arbiter of the building trades. . . . This setting up of the general contractor has resulted in the great building corporations of the present time. They have been able to force the sub-contractor to a lower price, consequently they have introduced a lower grade of work, and have succeeded in keeping the architect at arm's length from the man who does the work.

"In public work it is a frequent occurrence that a general contractor is a mere building broker who assembles a lot of sub-bids or guesses at the cost, and takes the contract, beats down the prices of sub-contractors, and attempts to carry on the work without any of the skill and power of direction which makes the fully competent general contractor valuable in works which are to be erected rapidly. Where this evil occurs, the architect is forced to perform in his office a large part of the duty for which the general contractor receives pay. The general contractor receives from 5 to 15 per cent of the cost of the building with practically no expense, with profit guaranteed by sub-contracts, and protected by bonds given by sub-contractors and operating on *their* capital.

"The great promoting and building proposition grows up by introducing the method of competition that relies entirely upon the *price* and seldom upon the *quality*. Strive as you will, you cannot bring about a better state of affairs, so long as you have the general contractor whose interests are, as a rule, monetary and seldom or never æsthetic or even constructional.

"When a building corporation has grown great it assumes to control the situation. In New York and possibly in all our large cities, it may be truthfully said that not one in twenty of the important buildings, that is, such as cost a half million dollars and upward, are handled by private enterprise or are under the control of the architect as they formerly were. The building company employs the architect and assumes to control his design, and very largely does. And the man who opposes that system must find his opportunity in some other direction — certainly not in building important commercial buildings. The building company will be supported by the finance committee of the life insurance company that floats the loan and handles the stock and bonds. Ultimately the building company falls into the hands of a financial man, or, oftener, of a finance committee, none of whom has any practical knowledge of building.

"Such corporations say: 'Come to us; let us design your work; we will employ this architect in our own way and guarantee the results, and we are such large buyers of steel that we get rebates and opportunities of rapid shipment and can do better than the architect can do.'

"This seems to your Committee a most extraordinary situation and one that merits your serious attention. We see no reason for supporting a system which is uneconomic, which is disastrous to our business interests, destructive to our professional relations with our proper clients, and absolutely damning to our art.

"In our present judgment there may be times when we should advocate the employment of a general contractor, but, as a rule, it should be the sentiment of the architects of the country *to deal with the men that do the work.*

"When this body is ready to take its proper place, and courageously discuss these questions of economics relating to the art and business of building in this country, we will be respected accordingly."

In order that those ideas might receive the formal sanction of the Institute, a committee was appointed to draft resolutions which, being offered at a subsequent session, were unanimously adopted as follows:

"Whereas, the existing condition outlined by the Report of the Committee on the Relation of Architects to the Contracting System is one which menaces the entire architectural profession, and if carried to its logical conclusion would make impossible the honorable practice of architecture, therefore be it

"*Resolved:* That this Report be adopted as expressing not alone the ideas of the members of the Committee, but as well the convictions of the American Institute of Architects in convention assembled."

All of which was said and done ten years ago — and mostly forgotten. But the condition which was described and deplored can hardly be forgotten. It is ever too painfully present.

And why?

Of course, the answer is that the general contract system is the simplest one for an architect to handle. With it goes the added employment of the architect as superintendent and the additional fee as well. Without it, the owner is too often convinced that the entire service of the architect can be dispensed with.

And there's just the rub; it can.

Mr. Sturgis, defining "Contract," takes occasion to step aside from the limited path of the lexicographer and to remark, editorially, that "it is probable that there will be no great improvement in the artistic results of architects' practice until the commission system is done away with, and until architects are paid by salary or by lump sum. This improvement can hardly be made, however, under the contract system. The two seem to belong together; the architect, being recognized in the contract as an essential third party to that contract, is naturally paid by a percentage on the amount of money represented in the contract.

"These considerations seem so important to many of those who have strongly at heart a return of architectural practice to older and wiser methods, that it has grown to be a common opinion that the abolition of the contract system is the first step that should be taken."

One cannot so easily see the analogy between the method of contracting and architects' fees as it can be seen that a continuance of the contract system is essential to one-third of an architect's employment and remuneration — unless architects add to their functions the actual execution of work in the field. The march of events seems headed in that direction and the "cost-plus" builder is blazing the way. It may not be long before we awake to a realization that the 10 per cent which the contractor has been exacting, theoretically, is by rights an emolument of the architect.

Now, if the architect chooses to be a lofty professional character, an artistic designer only, rather than a complete "creator of structures," why then should he not be employed either by the builder or the owner, it matters not which, to be just that designer; the actual working out of the design being left to the contractor or building

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entity, their excellent draftsmen, and their field forces for carrying the work through to completion?

This is one solution, and many ethical practitioners, as well as other able draftsmen, have been so employed, sometimes furnishing designs only, sometimes more complete working drawings, the engineering and other details being left to the contractors' own forces. In fact, there probably are to-day more capable structural engineers in the employ of contractors than of architects — a condition largely due to a manifest disposition on the part of many of the best architects to leave their engineering problems to outsiders, specialists in those lines.

Perhaps it is this very assumption of high ethical professionalism on the part of the architect which has greatly assisted in giving the general contractor his ascendency in this age of intensified commercialism.

In almost any American community a man's standing is reckoned, not by his morality or mental attainments, his æsthetic instincts or artistic attributes, but by the number of dollars which he has accumulated or controls. Manifestly, then, even in those cities which do not boast enormous building-financial corporations, such builders as have capital and can give bonds guaranteeing the successful outcome of their undertakings, are of more importance in society than impecunious architects, honest and upright, mayhap, but declining to guarantee anything.

And how much worse is this condition made by many practitioners, some not wholly scrupulous in their undignified scramble for new business and their over-zealous offers of low fees and free preliminaries!

Thus, in so many instances, we behold the inversion of the intended order, the architect taking a back seat in the scheme of things, the contractor predominant.

Nor, in the natural trend of events, is there reason, except in the mind of the architect, that this should not be so. Though we live in the age of the "apotheosis of the dollar," yet we cannot help but observe that the improvement in commercial probity is apparent also in the business of building, even though it be a misfit in contracting methods. The better class of the building public no longer seeks solely for the cheapest building of its structures, but frequently go to those with reputations for upright dealing. Thus we often find such an owner conferring with a builder before consulting an architect, and even asking the opinion of that builder as to which architect to employ.

Now all of this is very reasonable when we consider that what the owner really wants is the best investment to be had — that he is not concerned in the perpetuation of the architect-plus-general-contractor system. Nor does he care a particle that, in first talking to his builder, he is running counter to the tenets of that system. But note the paradoxical effect of his seeking the opinion of the contractor on the subject of architectural merit.

Through wisdom gained of experience the contractor knows that, if he does recommend the architect he believes to be the best, it will be at the probable expense of losing the job. He knows that such an architect, intent on working solely in the interest of his client, will advise that client of several other contractors of about equal standing who would like to bid on the work, and that this will open the door to others, at least one of whom is quite likely to be a lower bidder than the one first consulted. He has seen a good job go a-glimmering that way aforetime, but not again. He knows another architect, not so hide bound by ethics as to prevent his manifesting substantially his appreciation of a favor rendered by returning it in kind. To him he sends his friend — not in the spirit of one betraying that friend, but fully intending to see that he gets good value for his money. For can he not, in the office of this second individual, so control the design, saving unnecessary frills, the idiosyncrasies of the "fancy" designer, as to safeguard the client in his own way, no less than would the high class architect in his?

Which combination is less to be desired — a good architect and poor contractor, or the reverse?

Thus does the second rate architect get the "edge" on his highbrow competitor. And again is it exemplified that the strictly ethical architect cannot work hand in hand with the contractor in the interest of their mutual employer. Is this as it should be? In the evolution of a building should not all concerned labor together for the good of that building and its owner?

But there is another way for the contractor to answer the query of his prospect without running the chance of losing him. This contractor is as clever as he is honest. He has seen good work go too often to the cheap and undependable shyster or the ignorant low bidder, and even from the offices of the best architects. He conceives that it is no longer incumbent upon him to back up such a system, and he revolts. He has for some time maintained a drafting room in which, under the guise of "shop drawings," he has made all the details for those of his jobs presided over by the cheaper architects. He takes but one further step and is then prepared to say to the owner: "Don't pay a fancy fee to an architect. You don't need to. You know Brown. He's been architect Smith's head man for years — been doing all his designing and getting no credit and not enough pay, until he got sick of it. I needed a man to boss my drafting room and I knew he was as good as any architect we have, so I made him an offer. I pay him ten dollars a week more than Smith did, but he's worth it. Let's just give your problem to him and we'll all work it out together and you'll only have to pay what it actually costs, plus such a commission as we can agree upon."

And is it not in this direction that modern contracting is trending?

Look into the drafting room of any large building concern — in cities of moderate size as well as the largest — and see there the evidence of a large consumption of the annual crop of architectural graduates turned out by our well patronized colleges of architecture.

Perhaps fewer of these than we think find their way into the architectural profession proper. There is even a question as to whether or not there has been any actual increase in the number of architectural practitioners in recent years. Some time ago the Minnesota Chapter of the Institute made public complaint that the inroads of the contractors and "mail order" plan factories had served to greatly lessen their clientele. Not only do the general contractors thus supplant the architect, but the sash bar manufacturers offer complete free service in remodeling store fronts, the heating concerns are correspondingly obliging in the matter of plans and specifications for heating and ventilating installations, fixture

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people donate similarly the necessary details for bank and commercial interiors — even the entire structures — and so it goes.

In 1892 Sioux City, with a population of twenty-five thousand, supported seven architectural offices, numbering eight architects, of varying talents. To-day, with that population augmented to sixty-five thousand or more, there are four such concerns of six members. This condition may be considered fairly typical throughout the Middle West. Evidently the emoluments accruing to those who survive are not sufficiently attractive to draw large numbers to the field. On the contrary, investigation would probably prove that, in spite of the enormous increase in the cost of living, these architects are still practising, nearly all of them, at the rates that prevailed before the Institute attempted to increase the minimum fee to 6 per cent.

Now some of these, wiser perhaps than their brethren, and not quite such sticklers as to ethics, have discovered, in the evolution of the drafting rooms of contractors and supply houses, a perfectly simple solution of the problem of "making ends meet." They argue, and who shall say unjustly, that, inasmuch as one of the chief features of the owner's building problem is economy, as is manifest by his refusal to pay a proper fee for architectural service, then why burden him (or the architect) with dual expense for detail drawings? Thus the upbuilding of the contractor's drafting room as aforesaid. If it so be that architectural draftsmen are averse to working for contractors, the idea of special experience thus gained, plus the salve of a few dollars a week extra pay, and the knowledge that it will positively be forthcoming weekly, will do much to eradicate the aversion.

It may not be surprising in the near future, if indeed such is not already the case, to find contractors equipped with drafting forces equal, if not superior, to those of some of the architects under whose direction they have been accustomed to work.

*Note. — The author will continue the discussion of the relations between architect and contractor in the following issue, with special reference to the performance of the cost plus system as it has been developed by contracting and designing firms. — Editors.*

Approach to Manhattan Bridge, New York, N. Y.
Carrere & Hastings, Architects

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# PLATE DESCRIPTION

First Presbyterian Church, Oakland, Cal. Plates 69–71. This church is situated on a lot, 249 feet long (north to south), and, due to the obtuse angle of one boundary, its width increases from 150 feet at the south to 200 feet at the north. Two distinct branches, devotional and social, of the present-day church work are provided for in a two-part and almost equal division of the building, called, for convenience, the auditorium and the parish house. Deciding factors in the study of the plan were: an assurance of sunlight where most needed, convenience of access, the fullest effectiveness of the architectural composition, a minimizing of possible ill effects from future surrounding buildings. After full consideration there was evolved an "L" plan, of which the arm eastward near the north boundary is the auditorium, and the other arm, southward near the west line, is the parish house. In addition to an elaborate Sunday-school system and the usual retiring rooms, the parish house contains a lofty room occupying the greater part of the top floor, serving as a social hall, and equipped with motion picture apparatus. In the basement are the mechanical and electrical installations. For heating there is a battery of boilers, one large and one small unit, that the system in working may be flexible. The parish house is heated by direct steam; the auditorium has a plenum system, by which fresh air is forced through steam-heated warming coils, thence into a large reservoir space or chamber, from which it passes into the room through the five hundred or more small inlets that are uniformly distributed over the entire area of the floor. The power is secured by a large blower or rotary fan, driven by electric motor. The other apparatus installed includes a vacuum cleaner, feed pumps, hot water generator, separate organ blower, and the usual electrical equipment. The type of construction chosen is a logical one, for the section of the country in which the church was built. Precaution against the coming of earthquakes commended the substitution of the more resilient reinforced concrete. Piers, arches, walls, and floors are all of concrete, the exterior being finished with cut and tooled ashlar masonry of concrete stone. All base and belt courses, copings, window tracery, and all enrichments such as niches are made of the same material. A feature of the building, unique in the west, is its roof of rough surfaced slates, graded in size and thickness and variegated in color. The auditorium is planned with a high wide nave and low narrow flanking aisles separated by heavy piers and pointed arches. The width of the nave has been made to exceed that of any Gothic cathedral in England, except York, in order to meet the new need of bringing all worshipers within voice range from the pulpit. For the three divisions nearest the chancel arch the main piers and arches are omitted, and in their stead are great arch spans, approximately 40 feet wide, that open into north and south transepts. There is not, however, the conventional crossing or change in direction of the nave ceiling between the transepts — a plan composition more distinctive of cathedral than of parish churches; in this building the motif of heavy, rich traceried wooden trusses repeats, unvaried, the entire length. The finish of the interior is Caen stone cement, and the stone tracery of the windows, except the small ones of the aisles, is solid through to the inside. All the arches are richly moulded, the clerestory windows have decorated spandrels, and there are clustered colonnettes, separating the clerestory bays below the roof trusses. The high wainscot of the room, the gallery front, the choir screen, and richly carved organ front are all of quartered oak, as is also the furniture, pews, and pulpit. The baptismal font is a replica of an Old English one, executed in Caen stone and marble. For the choice of architectural style, preliminary studies were made not only in Gothic, but also in Spanish Renaissance. The facts were recognized that the latter best suited the climatic and physical conditions imposed, and, further, that it was in a sense indigenous. There seemed, however, a special fitness in Gothic because of its association with Old English Protestantism. Once chosen, the style was faithfully and minutely followed. This church is one of the few adventures into the field of the essential Gothic spirit on the Pacific coast.

St. Stephen's Episcopal Church, Ridgefield, Conn. Plates 72, 73. The material of the main walls and tower is uncut field stone, taken from the stone walls of the district and selected for flatness of surface. Main roofs are of fading brown slate; front porch and belfry are of white pine; exterior cornices of cypress and spire of cypress shingles, all painted white. The interior is finished with red tile aisles, pale buff plaster walls, white columns and cornices, white pews with mahogany tops and red cushions, yellow tile chancel with white marble steps and border. Pale amber glass is used in the windows. The heating is by hot air for the main church, with subsidiary hot water system for the sacristy wing and front portion of building — the latter system to be used constantly during cold weather, the hot air system for Sundays only. There is no system of forced ventilation, the foul air being taken merely by gravity from the ceiling of the auditorium to the belfry. The church accommodates a congregation of 380 people.

Athletic Club, Columbus, Ohio. Plates 74–76. This building houses an organization which is a combination of a business and social club. It has a resident membership of approximately fifteen hundred and a non-resident membership of about four hundred. In plan the problem was to provide such an arrangement as would permit of the use of the building for all of the purposes for which it was intended at the same time, without conflict between any of the parts. The building, therefore, was divided into separate units: business, social, athletic, and living quarters. The front half of the basement is devoted to the billiard room and bowling alley, these rooms being so closed in and protected by double walls and insulation as to prevent all noise reaching the ground floor. The rear half of the basement and the entire sub-basement are occupied by the mechanical equipment. The ground floor is the business floor of the club, and the second the social floor. Above the second story the building is divided vertically near the center by a heavy wall which separates the athletic department, located in the rear, from the living quarters in the front section. The four upper floors in the front section contain twenty bedrooms on each floor, a total of eighty bedrooms, each



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being connected with a private bath. In the four upper floors of the rear half of the building are located the plunge bath, the gymnasium, four handball courts, ample locker rooms, special exercise rooms, the physical director's office, and the Turkish bath department. The building is thoroughly fireproof throughout in its construction. The swimming pool, which is located on the fourth floor, is supplied with fresh water constantly through large filters. Artificial ventilation is provided for all the principal rooms. It was constructed just prior to the upward tendency in building material prices, and cost complete, including furnishings, less than $600,000. The material for the exterior is a red tapestry brick, the trimmings being of dark buff terra cotta.

Chalif School of Dancing, New York, N. Y. Plates 77–79. The building is designed to house the activities of the Chalif Normal School of Dancing, making provisions for classes and periodical exhibitions and for the summer classes to teachers which constitute the normal course. In addition one floor, the fourth, is arranged as a living apartment for Mr. Chalif and his family. The building is planned so that it can be rented for private social functions. The limited land area made it necessary to distribute the elements of the plan through several stories properly interconnected, making the most of the second and third floors for the regular unbroken dancing space required. The ground floor has an ample reception foyer opening on stairs and elevators; the second floor is given up to the grand ballroom, the third to a banquet hall with a nucleus of a pantry connected by a service elevator with a large catering kitchen in the basement. The gymnasium floor at the top satisfies the needs of the summer school, being all light iron and glass, with an open steel trussed roof. The big halls are artificially ventilated by tempered air, screened and washed and forced into them. A fan on the roof draws out the foul air. The building is of regular fireproof construction, heated by indirect-direct and by concealed-direct steam heat. The street front is of marble, brick, and colored terra cotta. The first story is veneered with white Dover marble carrying all around the vestibules. The upper stories are mainly faced with brick, laid in a not too evident diamond pattern. The wall has a rich, cool color, varying delicately through gray green, blue, and cream. The terra cotta is mainly cream and yellow, adding warmth to the color scheme without strong contrast. The color is heightened near the top by an orange background in the fourth floor panels and by a green background in the frieze under the projecting copper cornice. A gray green line of unglazed terra cotta follows the contour of the arched windows and outlines the brick filled space facing the second and third stories. The columns at the top have cement shafts. The sloping roof is of green Spanish tile, the leaders of copper, the grilles and lanterns of cast and wrought iron, painted a gray green. For the decorations of the interior, cast ornamental plaster and paint were freely used. The reception foyer is all of wood except the ceiling, but wood has been sparingly used in the large halls. The hangings and furniture were studied with the color schemes. Crystal chandeliers furnish the artificial light.

New Rochelle Public Library Building, New Rochelle, N. Y. Plates 80, 81. This building comprises two stories and a basement. The first floor, three feet above grade, contains a delivery room directly accessible from the main entrance; a children's room at the right, provided with an independent exterior entrance, and a general reading room with connecting librarian's and cataloguer's rooms. Back of the delivery room is placed the book stack with public entrance and exit. The stack room capacity at eight volumes per foot is 72,440 volumes. The architectural design is based upon a rather free adaptation of the Georgian period. The materials of the exterior are white marble, light colored brick, and mat glazed terra cotta, with a sparing use of color. With the exception of the doors and windows, the building is fireproof. The book stacks are of steel, and the fixed and movable furniture are of oak. The floors of the reading rooms are of cork tile, and of the delivery and reception room above buff quarry tile. The general contract was $56,807; the steel stack, $11,241; and the wood furniture, $7,466.90.

Mortuary Chapel, West View Cemetery, Pittsburgh, Pa. Plate 82. This building is for ordinary mortuary chapel uses where funeral services are held before burial. The building has no cellar, but a small heating room below grade provides space for a steam boiler. The loggia floor is a reinforced concrete slab, the top finish of which is red cement marked off into squares with borders carried out in tile. The brick which are laid in checkerboard pattern for the plain walls are vitrified common brick in variegated shades of red. The header border at the cornice level is the same. These brick are laid with a black joint and the remainder with a white joint about ¾ inch wide and raked ¼ inch with a carriage bolt. The coping is limestone. The outside walls are hollow to secure the deep reveals of the arches. In the reveals the brick is laid dog toothed with the corner to the face. All roofs are built of heavy yellow pine framing with the timbers exposed. All the wood trim is cypress stained dark. For the roof of the auditorium, tongued and grooved sheathing was laid on trusses and purlins in herringbone pattern, and decorated with pure transparent colors somewhat in Byzantine manner. The building cost in 1912, $10,000, exclusive of decorations and furniture.

House of W. A. Hendrickson, Esq., Riverton, N. J. Plates 83, 84. This house was planned for a moderate sized family and designed in a way to avoid the effect of congestion, but at the same time with no extravagant result. The first floor afforded the only opportunity for any architectural effect, and there the thought of the rather informal English home was adapted to produce an atmosphere altogether desirable in an unpretentious home. The exterior walls of the building are of dark red rough brick with darker headers laid with Flemish bond, except that, instead of having the header between each stretcher brick, it occurs between each two stretcher bricks, with the mortar between the stretcher bricks colored to match the brick. This produces the same effect as using the Roman size brick, but without the attendant expense. Graduated green and purple slate was used for the roof covering. All of the joists throughout the building were supported either on brick walls or on structural steel frame, and after several years of use this method has successfully prevented the shrinkage cracks ordinarily encountered in new buildings. The cost, including heating, plumbing, and electric wiring, was approximately $25,000.

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# EDITORIAL COMMENT AND NOTES FOR THE MONTH

A GOOD many architects have a tendency to fall in too readily with the condition we call business depression, and quietly wait for "bad times" to become better, the meanwhile deploring the timidity of actual or prospective clients, yet doing nothing to influence opinion or improve matters. This attitude is in direct contrast to that which they should display. Architecture is a creative force, and architects should assume the rôle to which their profession entitles them. The architect is given the power to visualize, and this great advantage should be used in a constructive capacity. He should not be content to follow conditions as others make them, but by the very nature of his profession he should be a moulder of opinion and himself a maker of conditions.

With the entry of the United States into the world war, it was only inevitable and natural that the architect would encounter timidity on the part of clients occasioned by uncertainty as to future happenings. This should not be a signal that building operations have come to an end or that the profession of architecture should go into retirement till peace has been declared and our daily routine restored to its normal, comfortable pace. It should be the opportunity for the architect to rise to the full height of his power and give constructive evidence of his ability.

This country is not having a period of business depression and from present indications it will not likely experience one. It has, however, taken on a serious, determined air that indicates a hearty intention of seeing the present duty through with the utmost speed and efficiency, and at the same time with the least interference to general business. With the realization that we must feed, clothe, and supply with munitions the greater part of the world, has come a sense of the obligation resting upon us to engage in no work excepting that of a purely productive character. This sentiment is undoubtedly entering into the consideration of building operations, but it need act as no detriment to architects; rather should it prove a decidedly advantageous opportunity. Some types of building are without doubt correctly placed in the class of luxuries, but the great majority of the types that architects are called upon to build are always necessary and of even special need at this time. The energy and money that in other times would be appropriately expended in the erection of public buildings, museums, etc., may now be put to much better use in constructing buildings that will aid in developing the country's production. Private building may also be somewhat curtailed, but for this *possible* curtailment there is a *certain* increase in all types of industrial building.

The abnormal demands which are being placed upon American manufacturers mean that they will need to double and treble their output, at the same time expand their plants and recruit thousands of new workers. These manufacturing centers will require a solution of the housing problem which is presenting itself to every one of them with undoubted force. This constitutes in itself not only a specialized problem for the architect, but a fine architectural opportunity as well. Object lessons from Europe have gradually told their story to large employers of labor in this country, and while it is true that for many years progressive architects have known and preached the advantages resultant from proper housing, their words fell upon deaf ears, as far as the manufacturers were concerned. Conditions, however, have now materially changed, the American manufacturer realizes to-day that to obtain a good quality of labor and to inspire loyalty and efficiency in his operatives he must provide them with comfortable, sanitary, and attractive living conditions. With the great barrier of indifference to the problem removed, it remains only for the architect to devote constructive thought to the economic and æsthetic solution of the need for such improvements to take place as will revolutionize American industry. The problem of housing the industrial worker is the one big consideration to-day before the manufacturer and the architect, and it presents a special opportunity for the architectural profession to align itself with a great economic movement.

Not all of the necessary building, however, will be confined to industrial work. The inevitable expansion which will come through the enlarged sphere of this nation's influence will require much necessary private building, both commercial and residential. The architect may, however, well ask: "What of that all-too-familiar individual, the man who needs to build but feels he will be wiser to 'wait until conditions are more settled' before he goes on with his building project?" "Conditions," after all, are largely what this man and a few hundred thousand like him are timid enough to make them. The very thing which they individually deplore is a creation and figment of their own collective weakness. The application of a little constructive psychology, directed and charged with sound judgment, forceful personality, and strong confidence, will go far to offset this temporary nervousness on the part of clients. "Business as usual" may be (as some English people found it) a damaging fallacy if used merely to inflate unwarranted optimism, but certainly any tendency toward the general suspension of business is a policy not only detrimental, but actually destructive, and hence unpatriotic.

Let the architect exert all his power toward the strengthening of general confidence and against any tendencies which reflect unfounded timidity. Let him also, at this time of intense co-operation among all the citizens of this nation, expect more from himself; let him see the part he may play in meeting present problems. Every American architect to-day should be conscious of his true relation to the industrial world, especially in the realm of the building trades, and should be fired with a convincing patriotic zeal to keep architectural activity alive through every means in his power, be his project large or small.



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