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NEXT CONVENTION AT WASHINGTON, D. C., April 22, 1907.

Chicago Wants the Next Convention.

On the return of the delegates and members of the Illinois Chapter from Washington, steps were taken to secure the influence of the Western chapters for Chicago as the next meeting place for the Institute. A letter rehearsing the claims and advantages of this city was sent to these chapters with the request that they petition the Board of Directors of the Institute to select Chicago for the next convention. It is regarded as certain that this city will be selected. It has been many years since the convention was held here, and it is well that so important a city should not be too long neglected. The Chicago idea for the next convention is to depart radically from the rather luxurious program that has prevailed at the recent meetings at Washington, however enjoyable and advisable these may have been. Chicago has an established record as a generous host, and is in the position to advocate a return to simplicity when this seems most desirable, as at present. It is felt that the days set apart for the meeting should be strictly devoted to the business of the convention as expressed in the reports, to the discussion of papers read and the consideration of new business. Many important reports and questions were continued from the last convention that should have final action at the next meeting. Should such a program receive the sanction of the Board of Directors of the Institute, much of enduring benefit to the profession will doubtless result from the Chicago convention.

Remember the Contractor.

An architect's function is to enable an owner to get the best possible building for his purpose in the most economical way and with the least trouble and delay. To this end he makes plans and specifications, invites bids and draws up contracts. Quite too often, in his zeal to protect the owner under all contingencies, he forgets that contractors also have rights which are no less important, and draws up specifications and contracts so one-sided that responsible bidders either refuse to figure at all, or add such a margin, to protect themselves, as brings the cost far above the owner's expectation or the architect's estimate. The result may be that the architect loses his job entirely—the owner selects some other investment. In the city of — a business block was to be erected. The plans showed foundations to a certain depth, but the specifications required all foundations to descend to the solid rock, at whatever depth it might be found, *without extra charge*. This clause protected the owner in one way, but it harmed him in another. As any intelligent architect should have foreseen, the bids were all so high that the whole project was abandoned, and the owner's lot remained as unproductive as before. In this case it would have been an easy matter to put down a few borings, ascertain the depth of the rock below the surface, and made the plans and specifications accordingly. The disposition to over-reach the contractor was so manifest as to create a feeling of mistrust not only as to the plans themselves, but the architect who made them.

Influence of Lighting on Design.

The question as to how much should be conceded to the architect in his provision for architectural effects, and those of light and shade, is one that is being discussed by the electric lighting experts. The diffused illumination obtained by concealed lamps and fixtures has so much to commend it that there is quite a unanimity among illuminating engineers that this is the ideal method, lighting alone considered; at least for theaters, auditoriums, etc. While the architect may coincide with this view as regards auditoriums of the usual character, he makes an exception of churches of the historical types. He feels that in buildings of this class the play of light and shade and the dominant lines of the vista may be greatly enhanced by the use of long perpendicular fixtures in the nave. Such fixtures also have an important place in the decorative treatment that could not be supplied by hidden fixtures. In the usual construction with exposed recurring roof trusses much is gained to the perspective by the long pendant fixtures of wrought metals in harmonious design. In the chancel, however, where the effect of mystery is desired the hidden light has its advantages. The best solution, therefore, of the problem of the illumination of churches of the usual type would appear to be a combination plan of concealed and visible fixtures.

A Novel Plan for Lighting.

An interesting example of lighting in which the source is hidden is found in the new building for the engineering societies in New York City, Hale & Rogers, architects. Here there are several auditoriums or meeting rooms, large and small, and in all of them the ceilings are curved back of the side walls, which are appreciably lower for the purpose, to allow the placing of rows of electric lights. In this way, fully adequate yet pleasantly diffused illumination is secured. There is much complaint by illuminating engineers that the architects too often fail to provide in the initial plans for all possible requirements in lighting. In such cases instead of the desirable several units of low power, the owner is forced to use comparatively few units of high power, and endure the unpleasant accompanying glare of light; or to increase his wiring at much inconvenience and extra expense. Not only should ample allowance be made for candle-power per square foot for illumination, but for such decorative uses as the owner is likely to desire. Wall brackets used to supplement ceiling lights should be so placed as to avoid shadows. Economy is greatly conserved in residence lighting by planning in advance an ample allowance of outlets for an adequate number of units of low candle-power, fully controlled by switches that will allow the use of few or many lights as required.

The Resourcefulness of Youth.

In architectural competitions young architects often meet a reluctance to intrust them with important work, because of their youth and inexperience. Without disputing the reasonableness of this reluctance on the part of trustees and building committees, it is well to know that some of the finest things on record have been done by young talent with ingenuity and energy enough to more than supplement the lack of years and experience. A young engineer was sent to a distant port, to unload a warship. One item was a 75-ton cannon, which must be lifted over the ship's side and put ashore. The cannon was all in one piece and could not be unscrewed or taken apart, yet he had only a

50-ton crane to lift with. His job looked like trying to put a bushel and a half of grain into a bushel measure. But this young man was not of the kind to halt at impossibilities. He could not lift the whole cannon a hair's breadth, but he got his chain under the muzzle, lifted that a few inches and blocked it up, then lifted the breech in the same way and blocked that up. So, by energy and resourcefulness, he finally got the cannon over the ship's side and rolled it ashore. "Where there's a will, there's a way." In perfect fairness we should add that this engineer was not a Yankee. He was a Russian.

Adverse Art Criticism.

The public criticism that has been rampant throughout the land for the past few years has been of undeniable benefit in curbing and correcting abuses in the financial and commercial world. It has fostered, however, a cynicism concerning the fine arts that does not tend to ideal conditions for the production of better architecture, painting or sculpture. The apt comments by Architect Cass Gilbert in a recent lecture, are worthy of serious consideration:

"Art," he said, "thrives on appreciation, not on adverse criticism. The artist is a man of 'temperament,' if he is continually beset by bounding critics, he becomes introspective, and all that is best and most spontaneous in his art is lost. The greatest periods in art have always been periods of enthusiasm and appreciation; such a time was the height of the renaissance. The age of decadence came when the people became critical and morbid. If we want to see the great art in America, we must look for and expect the highest and best; we must see what is good in the work that sincere workers do, not what is bad."

Architects in Small Fields.

The architects in the great centers of wealth and population are under such tremendous responsibilities and work at such high pressure that it would not be strange if at times they should incline to fields of less extended operations. On the other hand, the practitioner in the small town with the quiet and peace that are supposed to be the accompaniment of small places, has a struggle with conditions that cause many a sigh for the large cities with their big opportunities for fame and fortune. He feels that his training and ability fit him for the larger field, but for valid reasons his lot has been cast with the smaller. He devotes his utmost skill and energy to the work in his charge, small though it be, and hopes for the opportunity to handle more important commissions, such as a church, public building or library. This chance seems near when he learns that some such building is in contemplation. He naturally feels that he has labored for the improvement and beautifying of his city with meager acknowledgement and returns, and should be given first consideration when a structure worth while is to be built. Imagine his disappointment when he learns that the commission is to go to an architect from a great city to whom it will be of small consequence; or that a competition is to be held in which the local man is always at a decided disadvantage. The character of the work he does in his home city testifies permanently to his worth or discredit. If the building over-runs in cost or is faulty in design or construction he is there to be held to strict accountability. It is not strange, therefore, that he should hesitate to enter the competition and should prefer to allow the opportunity for which he has long hoped slip away.

REINFORCED CONCRETE WORK

BY F. D. WARREN

IN order to treat this subject with proper regard to its importance, undue influences tending either to reduce first cost or to increased profit, should be ignored. On the one hand, there are the owners clamoring for curtailment of expenses during construction, thus tending toward a minimum cost of plant; on the other hand, there is the contractor whose aim is to accomplish things with the least labor, expense, and often times to the sacrifice of the strength and stability of the finished structure. Between these opposing factions, each tending toward economy, the one because of unfamiliarity and often because of ignorance of the results, the other by device, the architect, who is morally responsible for a satisfactory design and a successful structure, should fit. Whenever the latter is unable to give his personal attention to the inspection, not only of the material, but also of the incorporation of the same, he should employ one or more inspectors or superintendents thoroughly experienced with every material and operation used, whose only duty and obligation should be thorough and practical inspection. These inspectors should have unrestricted access to all parts and processes, and should have authority to stop any uncertain or doubtful method, on suspicion or fact, subject to the subsequent acceptance or rejection by the architect. Finally, a representative of the architect should be on the grounds at all times whether it be night or day, whenever any operation in connection with the structure is under way.

While the causes of past failures have been numerous, they, in general, may be classified under faulty design, inferior materials, poor workmanship, lack of foresight and judgment in carrying on the operation, in coping with atmospheric conditions or in removing forms. Other than in cases where faulty design has caused disaster, it must be granted that all other cases named above could have been lessened or prevented had there been proper inspection by one thoroughly familiar with such causes of weakness. A careful study of former disasters as well as the loose and careless methods employed by some contractors can lead to but one solution, namely, that inspection, in that it safeguards life and property, is necessary and just as important as is boiler and elevator inspection.

COMPETENCY OF ORDINARY CONTRACTORS.

The next question worthy of consideration is whether the ordinary contractor, especially in small places, is properly equipped and is thoroughly competent to handle reinforced concrete construction without municipal or independent inspection. In most cases we find the small contractor has acquired his knowledge by experience in service rendered to those gone before; hence his methods have been more or less copied from his predecessors and in general he is hampered by out of date ideas. His equipment and plant comprise merely the rudiments and, while sufficient for general construction in past times, is wholly inadequate to cope with the new construction both as regards successful workmanship and economy of labor, each so necessary for the future of reinforced concrete. On the other hand, the full success of the construction can be realized only through the ability to accomplish much in a continuous process and to combat the elements of weather during and after this process. To attain this, a complete labor saving plant, equipped with modern machinery, is

the first consideration; the second requirement is a large and efficiently trained corps of mechanics and workmen; in the third place, there should be perfect and complete organization under skillful and conscientious superintendents and foremen.

Unlike the older constructions, where each brick, stone or piece of lumber is an individual part of an integral whole, and, when properly placed, will do its infinitesimal part required of the whole structure, reinforced concrete is a unit, the size of which varies with the capacity of the plant in one continuous process, of considerable and variable size. The fewer the number of units the more efficient and durable is the whole; hence equipment, organization and speed are vital requisites. While such requisites lie beyond the jurisdiction and command of an inspector, he can see to it that such units are selected that can be completed in a continuous operation; he can require proper materials and oblige them to be installed in a proper manner; can command that no part shall set up before a contiguous part is applied; can enforce proper consistency of materials, insuring such qualities as cohesion, adhesion and bond. In a word, he can turn out a high class job, although it be of a greater number of units, and hence not so efficient as one of a lesser number.

EXPERIENCE OF CONTRACTORS.

While this quality in a contractor, when backed up by conscience and conservatism, is an admirable one and adds much to the efficiency of the structure, it is not absolutely necessary. Ignorance, when supplemented by willingness to learn and to profit by good advice, is much to be preferred over a little experience, curbed by mercenary traits and a "know-it-all" obstinacy; thus an inexperienced contractor, who will profit by the advice of a trustworthy and experienced inspector, is capable of turning out a first-class job.

CONTRACT VERSUS PERCENTAGE BASIS OR OTHER SYSTEMS OF COMPENSATION.

While much may be said pro and con in regard to this important matter, it is far from the intention to enter beyond such traits as seriously affect the future of the completed structure. Mankind in general, being subject to the weaknesses of coining dollars, is ever loath to give every attention to the minor and expensive details connected with reinforced concrete construction which are so extremely important for its ultimate success. Contractors, in order to obtain contracts, have to vie with one another to a point below healthy profits and good workmanship. Rather than sacrifice the first, it is but natural to abuse the latter; thus with such a system, there is ever danger of poor workmanship and inferior materials unless the owners' interests are guarded by independent and rigid inspection, and even then results are generally below par.

On the other hand, while the percentage basis system, unless restrained by disinterested superintendence and careful check methods, usually bring the cost of buildings much in excess of the contract basis, few will hesitate to adopt it, being thereby secured of a first-class structure in preference to a system where efficiency can not be guaranteed.

A modified percentage system, which requires the contractor to keep his costs for every portion of the work

within certain predetermined bounds by pressure brought to bear upon his individual departments, assures the contractor of his just profit and no more; at the same time, it removes all tendencies for deceit and tends to good workmanship.

Should the owners require a lump sum contract, a particular duty devolves upon themselves and especially upon the architect or engineer in awarding a contract. Unless the contractor has already established a reputation that will guarantee the contract to be fulfilled in good faith as prescribed by the specifications, he should furnish a bond of an amount that will secure the owners of a just fulfillment of the same. Without such security, the awarding of contracts to the lowest tenders should be a point of careful consideration. Poor workmanship in the past has resulted from this source more often than from any other and it has attained such alarming proportions that, under the moral obligation of both owners and architects, it should not be overlooked in their strife for economy. In a word, a lump sum contract not under the supervision and control of an inspector tends not only to the discredit of the construction, but very often to disastrous results.

SPECIFICATIONS.

The first step in guaranteeing good results is a complete and rigid specification covering the class of materials to be used. For the sake of uniformity the standard specifications, adopted by the American Society for Testing Materials, should be used wherever possible, making such modifications where necessary to meet local conditions. It remains for the inspector or supervisor to see that the standards specified are realized. Since much of the poor work and failures in the past may be traced to inferior materials, composing the concrete, this is one of the vital questions to settle before commencing operations.

CEMENT.

It is needless to modify the standard specifications in regard to this factor unless the conditions to be met are very peculiar and special. Since nearly all the brands of cement have passed or may be made to pass these requirements, it is very unwise to accept any brand, however good a record it may have had in the past, without carrying on a systematic series of tests to guarantee each carload lot. How often in the past has poor work resulted from overlooking this necessity and from accepting a brand that has given satisfactory results on its face value. It should be thoroughly impressed upon all users that a cement bearing the highest brand on its label may be so very freshly ground and not tempered by age that it will be too flashy for use; this fact will appear in the boiling test of samples taken from the lot and hence an unsatisfactory and unsightly job may be prevented by such a test when thoroughly made; on the other hand, it may have been stored in a damp place for so long a time and have absorbed so much moisture that its life is impaired, and instead of giving a ringing sound when set up in concrete form, will appear to be dull and lifeless; this fault will also appear in a rigid test. In addition such faults as coarseness, excess of free lime, etc., will be discovered in due season to prevent impaired work. No cement for all time can be free from all these defects, however satisfactory its past may have been; for this reason no brand should be given a black eye because of some

unfortunate event in its past history. In all due fairness to both maker and user, systematic testing of carload lots by the owners seems to be the only justifiable solution.

To save time and reduce the storage space on works in erection, the following solution has given satisfactory results. A quantity of cement of a sufficient amount to carry on complete tests for 24 hours, 7 days, 28 days, and if need be, 3 months set, is sampled from at least ten bags or barrels in a carload lot, taken from different parts of the car to insure an average sample, by a representative of the makers. He then takes oath before a notary that this sample has been taken as specified and is a representative one. This affidavit is then made out in legal form and mailed to the engineers and the sample is shipped to the tester by express. The results from the seven day tests, along with the tests for fineness, specific gravity and soundness, will determine whether the carload of cement is satisfactory for immediate use or should be held for the twenty-eight day test. In this way it often happens that the results from a test are known shortly after the arrival of the lot, to the end that little delay results.

The next step is to keep each carload lot separate from all others, giving it and all the test samples the car number in which it was shipped so that they may be easily allied or traced at any time. Each carload lot should be deposited into the building in a contiguous mass and its limits noted. A log should then be kept of each lot by the inspector. This should contain a copy of the test as submitted by the tester, the tester's remarks, a sketch or notation carefully defining the limits where used, the conditions under which it was installed, along with the temperature readings during the placing and at intervals afterward, up to the time of hard set and longer if need be.

SAND.

The sand used should conform to the standard specifications, where practicable. The results of the sand-cement test of briquettes, when made from the particular sand, in conjunction with the heat tests, will usually tell whether the sand or the cement is at fault. When there is any confusion, special tests should be made from the same sample of cement with the sand in question and with standard Ottawa sand, to bring out the trouble. Any marked drop from the result of the standard sand should be a warning of suspicion, and if continued, should be just cause for condemnation. In localities where proper sand can not be found, and it is impracticable to substitute standard or some equivalent sand, it may be well to remark that some of the best results known to the writer have been brought about by using crusher screenings passing a $\frac{3}{8}$ -inch screen and including all particles except dust, instead of sand. Therefore, there is always a practical solution to the difficulty and it is an affair of too serious proportions to allow inferior sand to go in unheeded, or for reasons that may appear impractical to obviate. Of two evils, namely poor cement and poor sand, it is hardly out of place to remark that the latter is more conducive to poor results than the former, and it is but fair to the cement makers to impress this point upon the public. It is needless to remark concerning the sphere of action of the inspector in obviating this difficulty and his value to the owners in guaranteeing that the proper sand or substitute is being used at all times.

(To be continued.)

ARCHITECTURAL AND STRUCTURAL ENGINEERING

BY MAURICE M. SLOAN

WITH the advent of modern construction it is imperative that the successful architect be informed regarding the engineering principles and formulas requisite for the economic design of the steel work or the reinforced concrete construction forming the structural frame of the building. While the smaller steel frame buildings usually embody only simple engineering problems, it is quite frequent that the larger structures, owing to their great height, the necessity of using every available square foot of site surface by building on the party lines, and from the presence of indifferent foundation soil, offer problems in construction which require, for their successful solution, the best engineering skill and judgment.

Frequently the exterior design is influenced to marked extent by aesthetic considerations and small regard is paid to the economic structural conditions. It is an unusual instance when the engineer, whether he be embodied in the person of the architect or is a specialist in his profession, is not required to subjugate his structural design to the requirements of the architectural treatment; and it is only proper that such should be the case, for if economic construction was alone considered many buildings would be entirely robbed of their attractive appearance, and the city streets would present a barren waste of unattractive facade, consisting of mass and voids, lacking the gradation of shadow and depth only secured by ornamental forms and decorative applique.

Not only has the practicing architect of today to deal with problems of construction, but he must as well be informed regarding the mechanical equipment of the building. His information, in neither structural nor mechanical engineering need be so specific as to enable him to turn out structural shop drawings or to design mechanical apparatus, but he must be able to determine the size of structural sections, the spacing of rivets and the design of connections as well as be competent to select and locate the steam boilers, engines, and generators and to determine upon the best system of electric light wiring, steam heating, and elevator installation. While undoubtedly the bridge or structural specialist would design the skeleton frame work of the building to as good advantage as the architect, yet he is not as keen with regard to the disposal of the parts of the structure to comply with the utilitarian requirements and architectural treatment.

The influences tending to produce the modern type of steel constructed building were several: First, and most important, it was manifestly impossible to construct with masonry piers the many-storied building required to pay a reasonable investment on valuable real estate; for these piers would necessarily be of such extraordinary thickness and width as to preclude the proper lighting of the building. Second, the extensive manufacture of structural steel, and at reasonable cost, was contemporary with the demand for the high buildings, so that it was natural to use this material in the reinforcement of the exterior wall piers as well as interior columns and floor framing, for which it had previously been used. By the use of this material it became possible to furnish the requisite strength in exterior wall piers of small dimensions, even when the structural steel was adequately fireproofed.

At first the skeleton steel construction in the exterior wall piers was surrounded with considerable masses of masonry or brick work, but, as the steel frame developed, the casings for these columns became mere shells of fireproofing, and where the lighting of the building was of primary importance, the sash frame type of design was common for the exterior facade.

As the buildings increased from fifteen to twenty or more stories in height, and where their width was comparatively small compared with this height, the problem of wind bracing became one of the principal ones in the design of these structures. This wind bracing was usually accomplished by one of the several following ways: First, by rigid connections between the floor systems and columns, with well riveted junctions and, sometimes, gusset plates at the corners of the connections; second, by lateral or sway bracing; and third, by the expensive systems of portal bracing.

With the development of the structural frame type of construction one salient advantage was gained, namely, the concentration of all loads upon independent footings. By this isolating of the footings for each supporting member of the building it could be accurately proportioned for the load which it carried, and in this way the tendency for unequal settlement was obviated.

It has long been discussed among engineers and architects as to what limits the height of the steel frame building. The usual building law does not offer restrictions with regard to the height of office and similar buildings, and it would hardly seem justifiable to compel the owner to curtail this investment because of aesthetic considerations; and while undoubtedly the business streets of American cities offer erratic and homely skylines, it is hardly within the power of a community to regulate the height of buildings merely to secure pleasing vistas. It is probable that the only regulation that will exist with regard to high buildings is that compelled by the practicability of the construction and the economic operation of the building after completion.

Reviewing this last consideration, it is evident that the superimposed weight of each story must be transmitted to the foundation soil, and it is therefore evident that the necessary structural sections must be carried through all stories below for the support of the upper ones. At some point, therefore, the addition of another story becomes costly, and curtails the percentage of interest received on the investment rather than increases it. When this point is reached the economic height of the building has been determined.

When the area of the building is restricted and the structure is many stories in height, the elevator service must be proportional to the people occupying these floors, so that the percentage of area taken up by the elevator shafts materially reduces the available floor area; therefore in order to get proper elevator service in buildings of comparatively small area and many stories in height the space occupied by the elevator service is out of proportion with the space reserved for rental, and consequently this consideration exercises a no mean influence upon the economic question.

With reference to the restrictions of height by the municipality, there are but two conditions under which the community or commonwealth would have the right to regulate the building, and they are—the consideration of sanitation or hygienics, and public safety. Where the street is narrow and the sides compact with tall buildings, the volume of business transacted compels the overcrowding of the thoroughfare, while the height of the buildings precludes the entrance of sunlight, and produces dampness and unhealthy atmosphere. To arrive at data sufficiently accurate to regulate the height of the building according to the former condition, namely, congested traffic, would be difficult, but the second problem is of ready solution. If the declination of the sun were considered in the particular locality, at midwinter, then the height of the building with reference to the width of the street could readily be adjusted in such a manner as to provide the entrance of sunlight for a portion of the day, at least, to the lower stories of the building on the opposite side of the street.

In designing the steel frame there is no portion of the work that requires the display of as much judgment as the assumptions regarding the amount of the live loads. Frequently the client has in mind much heavier weights than will actually exist upon the floors of the proposed building, this especially being the fact with regard to warehouses and other commercial and industrial buildings, and it is not unusual for him to base his ideas regarding the weights to be carried, upon local loads, which to his untrained mind appear to be exceedingly heavy, whereas they are comparatively light when distributed over the area supported by the primary or secondary members of the floor construction. In the design of tall buildings in large cities the architect is ordinarily unable to follow his own judgment, being compelled to meet the requirements of the building department, which usually requires loads considerably above those ever realized in such buildings as hotels, apartment houses, office buildings and places of public assembly. It is in the determination of the live loads for the buildings in which this load is likely to exceed the requirements of the building department that the designer's judgment is of account. Generally much money can be saved in construction if the architect will investigate buildings used for similar purposes and thus determine from actual precedent the maximum live load that will ever be encountered.

It is usually found in warehouses and exchanges for vehicles, machinery, and apparatus, that can not of necessity, be placed one piece over the other, and whose base covers a considerable floor area, that a great live load is not realized on beams and girders, though heavy concentrated loads may exist on floor planking or slab. It is in buildings, however, where the material is of considerable weight and is in packages that can be piled, such as plumber supplies, plate glass, and heavy merchandise, that the live load becomes very high and is most important in influencing the design of the structure. In printing houses where a lithographic business is transacted the local weight becomes great because of the piling of the lithographic stones closely together, and from the heavy presses required in this class of work. The lightest live loads encountered in the design of large buildings are those that obtain in office buildings, apartment houses and hotels. It is probable in these buildings that in no instance does the average live load exceed fifteen pounds to the square

foot except in the large rooms used for exchange or for public assembly. In these rooms, before deciding on the probable live load, attention must always be paid to the method of seating, whether this consists of seats fixed to the floor or separate and movable chairs; for if the seats are fixed to the floor it is practically impossible to load these floors to more than about forty pounds to the square foot.

It is hardly possible to give any rules or data with reference to the reduction that should be made in the live load from the top floor to the basement in proportioning the columns and determining upon the area of the column footings. It is seldom that the full live load is ever realized in even the main girder, but it is possible that the slab and beam may in many instances be loaded to their full capacity. It is therefore reasonable to allow only about 80 per cent of the live load on each floor girder, and to make further reductions on the columns.

In buildings many stories in height it is hardly admissible to assume that all the floors are loaded with their full live load, and it is entirely safe with any usual construction, or conditions, to reduce the live loads on each floor from the top to the basement. It is here again that the problem demands the best experience and judgment of the designer. Usually a deduction of 10 per cent in the live loads on each successive floor for a fifteen-story building or under, and of 5 per cent for buildings over this height gives results that are economically satisfactory.

The practical architect as a rule, has no time to enter into accurate calculations; he is principally concerned with the securing of the right premises upon which to start the preliminary sketches, and his engineering calculations must necessarily be generalized. It is only proper that this should be the case, because the dead load can not be accurately determined until the construction drawings are developed to an advanced stage of progress, and it is therefore necessary to check the first assumption by careful and final calculations. It is surprising, however, to note how little the general calculations differ from the final, and they frequently act as a positive check on the final calculations, for in making the detail calculations there is more opportunity for making a vital mistake than there is in the generalized preliminaries and many times the preliminary calculations have shown a radical error due to some important omission in the final calculations.

In the designing of the columns and the footings under them the ratio between the live and the dead loads must be considered. The interior columns of the building support the greater percentage of the live loads, while with the exterior columns the reverse is true. From this it is evident that it is good practice to increase the unit pressure upon the soil underneath the interior columns in order that their settlement will be somewhat in proportion to the exterior columns, which carry the great weight of the curtain walls and heavy facings as well as the dead loads of the floors.

(To be continued.)

The whole subject of elevator designing and installation is one that demands the services of special engineers. This field of electrical engineering is a promising one, and it pays for the best study of the best minds. The expert elevator engineer should be a designer as well as a constructional engineer, and then his services are of equal value in both departments.

HOW TO PLAN TO EXCLUDE GROUND AIR

BY J. L. SMITHMEYER, ARCHITECT.

IN the autumn, winter and spring months, and during the nights, even in summer, says Dr. Pettenkofer, the air in our houses is warmer than that contained in the soil beneath. The house acts like a suction pump in such cases, sucking up the air within the soil, and with it, the poisonous gases and germs with which it is infested. An explanation of the great prevalence in cities of epidemic diseases such as diphtheria, typhoid and scarlet fever, during the winter months, when the purity of the air is supposed to be greatest, is furnished by this simple induction. By ingenious inquiries conducted during a number of years, the doctor has shown that the soil beneath our feet is saturated with air, carbonic acid and microscopic life to a considerable depth. He has also discovered that the "ground air" and its organisms are constantly sucked up and that germs of diseases ripened in the earth, may be brought into our abodes, or exhumed and wafted for miles by the wind.

Basements should, therefore, never be used as sleeping rooms, because, aside from the detrimental effects of the ground air exerted most effectively in that portion of the house, the gases and moisture, which, during the day, under the influence of the sun, ascend to a considerable height, descend to the surface during the night, so that the atmosphere near the soil, in great cities in the night time, may be said to be saturated with carbonic acid and such other gases of decay as sulphuretted and carburetted hydrogen, and sulpho-hydrates of ammonia, and other impurities, together with minutely divided particles of living matter, capable of germinating and producing disease. These products, taken together, constitute what is now known and dreaded under the name of "malaria."

Dr. Wales, ex-Surgeon General of the U. S. Navy, appointed, in 1884, a Board of Doctors and Scientists to examine the site for the new Naval Observatory in Washington, D. C., with regard to its sanitary aspects. The report of these gentlemen is very exhaustive and in it, they use this language, viz.: "Extended observations have been made by the Board upon the composition of the ground air, a department of sanitary surveys which has not received a great deal of attention hitherto. Wherever water does not stand, as ground water, the interstices of the soil are occupied by air, and as the ground water rises, this air is forced up into cellars and basements and becomes, by aspiration into the warmer parts above, the air of our houses. Should the soil contain tracts impregnated with decomposed organic matter covered over by innocuous earth, as is the case often in made lands, air charged with offensive gases or deleterious organisms, is likely to be forced up in this way from considerable depths, and may account for the occasional occurrence of epidemics which cannot otherwise be explained."

We know now that the soil, to a considerable depth, is a perfect nursery of microscopic forms of life, and is constantly charged with carbonic acid, and that by the suction exerted by the currents of air in contact with the surface, this ground air, with its myriads of organisms and its deleterious gases, is being constantly exhumed and brought into our houses.

A striking illustration of the results of the incursion of ground air into our dwellings was published in New York City, viz.:

"In one of the most elegant quarters of the city of Brooklyn, an instance occurred which attracted the atten-

tion of the medical profession to a wider extent than generally happens in such cases. A gentleman by the name of Rockwell, having amassed a fortune in business in this city (New York), decided to erect a residence for his family on Brooklyn Heights, which should be perfect in every detail of convenience and sanitary arrangement. No expense was spared; no modern appliance of plumbing or trapping neglected; no device of sanitary engineering, as concerns ventilation or sewerage, forgotten to render the 'Rockwell mansion' a model to be copied by future residents on the heights. The ground was naturally supposed to be dry and apparently well drained, and so no measures were taken either to abate the normal moisture of the soil or to cut off and prevent the rising and percolation of the ground air. The house was finished and the family, consisting of Mr. and Mrs. Rockwell and two little girls, aged respectively ten and twelve and a boy seven years old, moved into it, anticipating many years of pleasure, ease and happiness. Within one year every member of the family had been conveyed to the 'Rockwell plot' in Greenwood, dying one after the other in the rapid succession of disease, easily recognizable as directly produced by malarial poisoning. A medical inquiry followed, and disclosed the fact that, owing to the neglect of the fundamental precautions (against the ground air) the very perfection of the appliances for ventilation, by exerting a stronger suction on the ground air and its gases, than a less carefully constructed and plumbed arrangement would have done, had precipitated a catastrophe it was intended to avert."

That air, soil and water greatly influence the development of various diseases, especially "typhoid fever, diphtheria, grip and cholera," is now universally accepted, and that the propagation of these diseases must be ascribed to the pollution of air, soil and water. The part which water takes in this important hygienic process is too vast to give it here more than a passing notice, and an illustration.

Dr. Fodor's extensive experiments in the city of Budapest, Hungary, show the immediate detrimental effects which the overflows of the River Danube have upon the people who live in inundated districts. He also shows the striking correspondence between the varying heights of the river and the ground water in the adjacent soil, and the respective sanitary condition of the people during these periods, and he concludes from all this that the rise of the river checks the drainage of the ground water, sewers, etc., and forces it back to fill and pollute the wells and springs; and to permeate the entire inundated district with these organic substances, and to saturate this polluted soil to the extent of repletion. The ground water, when driven back, forces the organic and effete matter, unwholesome gases and disease germs to the surface, and forces the ground air out of the ground into the atmosphere or into our abodes, carrying with it a great deal of noxious moisture, gases, organic substances and disease germs.

Dr. Fodor has devoted many years to the study and investigation of the sanitary condition of Budapest, the capital of Hungary. He made many and very valuable discoveries whereby he was enabled to solve some of the sanitary problems incidental to the appearance of certain diseases in certain localities, under certain conditions of the soil, and at certain periods of time.

Judging from the doctor's description of that city,

we detect enough of similarity between it and numerous cities in this country including Washington (the capital of the nation) to admit of our deriving high benefits from his investigations.

If the soil of a city or town is largely porous like that of Budapesth and a good portion of it lies low and close to rising and falling water, that portion is subject, at times, to partial, and at times to total inundation and naturally brings about the same conditions which exist in Budapesth on the River Danube.

Every high rise of the adjacent water or excessive rains drive this decomposed organic matter (in the soil) to the surface, and expels the "ground air," which thus escapes from this mass of deleterious substance into the atmosphere, and into the dwellings of the inundated districts.

Enough has been said to prove the existence and harmful nature of the ground air. The question which presents itself to the architectural mind is: "How can the harm done by this air be reduced to its minimum?" The ready answer is: "By averting all contact with it as much as possible, especially in our abodes."

True, the laws of nature can not be changed, but by the exercise of intelligent observations they may be made subservient to our purposes. Thus, by means of a simple and comparatively inexpensive device the "ground air" can be averted from entering our abodes, hospitals, school houses, etc., and its harm reduced to a minimum, if not

wholly abated. Nor does this device require special skill, cost or attention; on the contrary, it is very simple; works continuously and automatically and lasts as long as the building will last.

As the ground air (beneath our inhabited structures) follows the warmer air in the houses above it, there should be a suitable sized "air space"—an "air chamber"—interjected between the ground (from which this air emanates) and the basement floor. This air chamber should be provided with suitable air-tight ventilating flues "built" in the walls, starting at the bottom of these air chambers and extending as high above the top of the house as the chimneys, so as to carry this bad air (by aspiration) beyond the reach of harm. The effectiveness of this device will be greatly enhanced by building these ventilating flues adjacent to the smoke flues, or between. These ventilating flues will not only carry off the ground air but also the poisonous gases and odors from the leakage of "waste" and "sewer" pipes buried in the soil beneath our abodes, and will also greatly add in keeping the house dry. Acting automatically (as they will) they will not require any attention to keep them in working order.

It is the duty of the architects and builders to bend their energies toward the erection of buildings (especially dwellings and hospitals) which would secure safety and comfort to their occupants as well as health and it seems incumbent on the municipal authorities to make suitable regulations for the protection of its citizens from that source of harm.

ENGLISH SANATORIUM PLANS

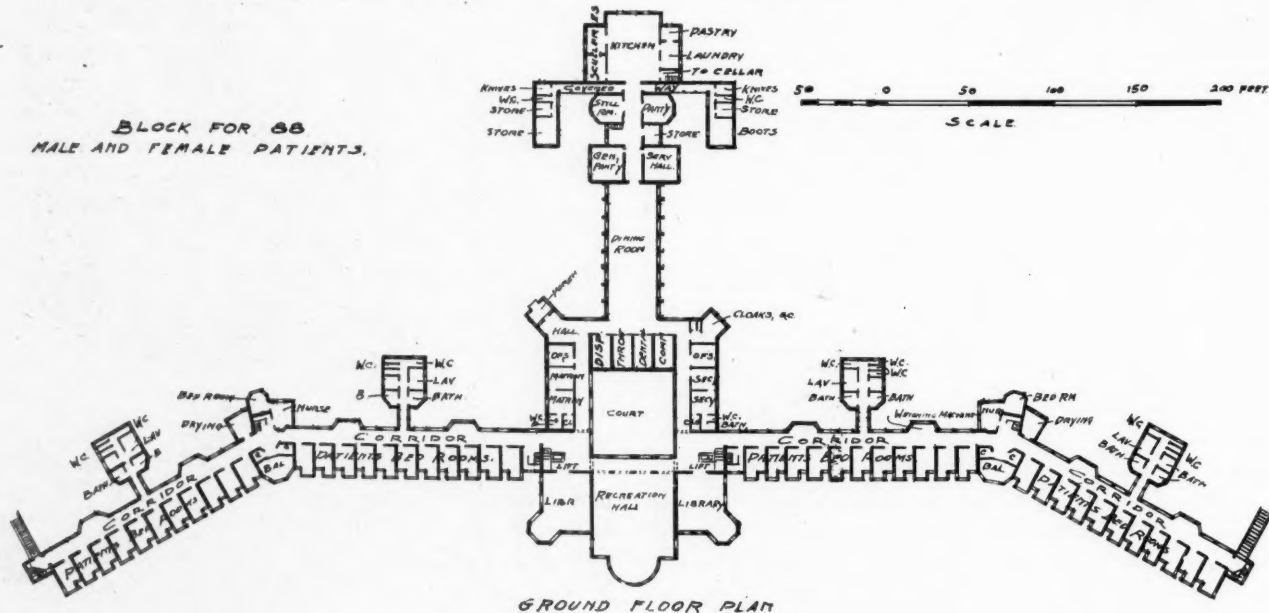
FIRST PRIZE DESIGN, KING EDWARD'S COMPETITION

CRITICISM BY T. M. CLARK, ARCHITECT.

THE King of England, some three years ago, offered prizes for the best essays, with accompanying drawings, on the planning and arrangement of sanatorium buildings for tuberculous patients. The first prize was awarded to the plan here reproduced from the *London Lancet*, accompanying an essay by Dr. Arthur Latham. The architect associated with Dr. Latham was Mr. A. William West, deputy treasurer of St. George's Hospital.

This plan intentionally rejects the usual system of providing extensive open balconies for the use of the pa-

tients. Dr. Latham thinks that consumptives, especially of the poorer classes, should, as a rule, exercise gently when in the open air, in order to prevent them from forming indolent habits, which, as experience shows, they can not shake off, even after their disease has been cured. He therefore prefers to allow only two small balconies on each floor of his wards; but, as a compensation, to give the patients' bedrooms a particularly ample provision of windows. The arrangement of these windows is, however, open to criticism.



Forming, as they do, square bays, with recesses between, they do not admit any more light than would be admitted by a plain window of considerably smaller glass surface, and they admit less sunshine, for each bay shades the recessed portion beside it from all rays except those nearly normal to the wall. Moreover, the bays not only look directly into each other, at a distance of three or four feet, but each commands the greater part of the next room, so that there could be no privacy in the bedrooms without closing the windows and pulling down the shades, thus shutting out the air and sun, which it is particularly desirable to admit at all times. On a breezy day, also, the recesses between the bays would catch much dust, and on calm days in summer the air in them would be hot and stantant.

Apart from this, the arrangement, although it follows the conventional type of plan for general hospitals, is, to American ideas, less suited to the air-cure of consumptives than a simpler one would be. The angles in the front, often used in arranging hospital wards, with the idea of gaining a little eastern or western sun at the back of buildings with a general southerly exposure, are here worse than useless, as the south sunshine is, in great part, cut off from the bedroom windows in the side wings; and, even if morning and evening sunshine were needed in the corridors, it is effectually obstructed by the blocks of rooms

which project at intervals from them; while the bedrooms in the middle portion of the building, which face directly south, are more or less shaded, during half of each day, by the projection of the administration block.

None of these projections are, apparently, necessary, and all are objectionable, shutting off light, air and sun, the three remedial agencies of which it is, perhaps, impossible to have too much in an establishment for the cure of tuberculosis. Except for the administration rooms, which could, without difficulty, be pushed back, so as not to break the front line of the group, there need be no angles or projections of any kind, either on the north or the south side of the building, and the circulation of air would be freer, and there would be more light and sunshine in the rooms, and less dust without them.

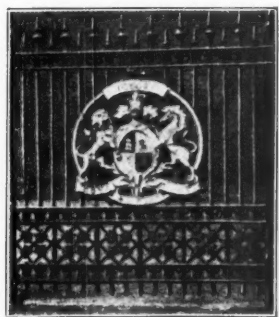
Even the lavatory rooms could be placed among the bedrooms, or at the ends of the corridors, at a fraction of the expense involved in building them in projecting blocks, with an isolating corridor, and without inconvenience; for, although it may, possibly, still be necessary to arrange lavatories in this way in general hospitals, there is no need, in sanatoria, with modern appliances and modern ventilation, of any further disconnection of such rooms than may be desirable to prevent the noise of running water from annoying patients in adjoining bedrooms.

ARCHITECTURAL HERALDRY

BY E. WILSON DOBBS

(CONCLUDED)

"THE GILDED THRONE," used at the King's Coronation, differs, of course, from those which are situated in other places, such as at the House of Lords and elsewhere. It, however, was very finely designed, and had the King's monogram in the center of the back, surrounded by the Royal and Imperial emblems, the Rose, Shamrock, Thistle, Lotus and Fleur-de-lis, while the Royal Arms appeared on the curved and carved top of the back part of the Throne. The rare Persian carpet beneath the King's Throne was also of very beautiful design. It was woven as long ago as 1540 A. D.

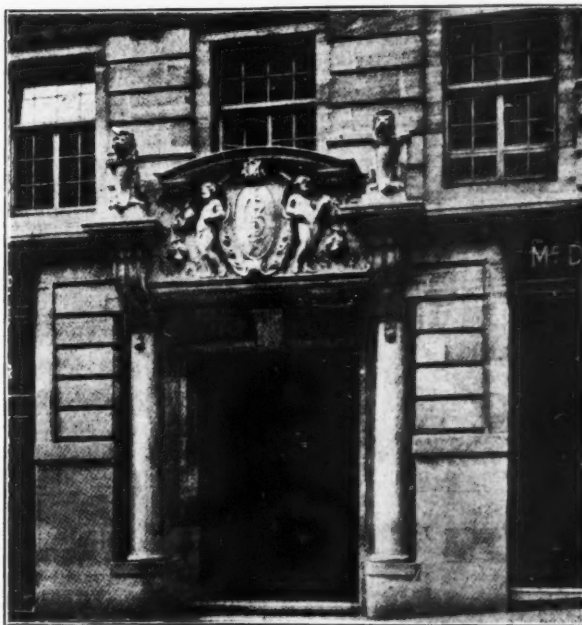


The new Processional carpet was of dark blue—having been specially manufactured by Webb, of Worcester—of deep and elastic pile, bearing a design in somewhat darker hue than the ground. This design included the Star of the Garter frequently repeated and an intertwining of the Tudor Rose, the Thistle and Shamrock with the Egyptian Lotus, the various spaces being outlined in wreaths of laurel leaves.

IN CONCLUSION.

Ruskin, in his "Seven Lamps of Architecture" (Chap. IV, Section 8), thus deals with Heraldic Decoration: "We may condemn all Heraldic decoration so far as beauty is its object. Its pride and significance have their proper place fitly occurring in prominent parts of the building, as over its gates and allowable in places where its legendry may be plainly read, as in painted windows, bosses of ceiling, etc. And sometimes, of course, the forms which it presents

may be beautiful, as of animals, or simple symbols like the fleur-de-lis, but for the most part Heraldic similitudes and arrangements are so professedly and pointedly unnatural that it would be difficult to invent anything uglier; and the use of them as a repeated decoration will utterly



A SCOTTISH EXAMPLE.

destroy both the power and beauty of any building. Common sense and courtesy also forbid their repetition. It is right to tell those who enter your doors that you are such a one, and of such a rank; but to tell it to them again and again wherever they turn becomes soon imperti-

nence, and at last folly. Let, therefore, the entire bearings occur in few places, and these not considered as an ornament, but as an inscription, and for frequent appliance let any single and fair symbol be chosen out of them. Thus we may multiply as much as we choose the French Fleur-de-lis or the Florentine giglio bianco or the English rose; but we must not multiply a King's arms." This, after all, is but tantamount to saying that Heraldry must be treated with the same consideration for the ordinary principles of good design that would be applied to any other species of composition. It has perhaps too frequently been the custom to regard Heraldry as something of so profoundly mysterious a nature that—to paraphrase what was well said by Hamerton about etching: "It was thought to excuse incoherent composition, poverty of in-



A POPULAR APPLICATION

tention and ignorant drawing." But every form of Art has natural peculiarities which more or less control its technique, and Heraldry no less than others—still that is all. Artistic weakness is no less weak then because it is Heraldic. The degree of finish, too, with which a work is carried out should be quietly subordinated to a clear conception of the true effect desired, together with a due regard to harmony of line, just proportion and correct balance. When tinctures are used they should receive careful treatment, and it is well to recollect that even the crude reds and staring blues which are sometimes ignorantly classed as Heraldic may be much modified in tone or broken up by adopting diaper work with charming effect.

It, of course, may yet be urged—What actual artistic service to Architecture can the obsolete jargon and grotesque monstrosities of the old Heralds possibly render in this eminently practical age? Well! much in every way. If the study and practice of Heraldry served but to gratify the vanity of a few to excite the envy of many, then indeed would its teachings be useless—nay, worse than useless—absolutely pernicious. But happily this delightful science has higher and nobler purposes to serve; its scope

and influence are far more extended. For—as has been already instanced—there are many incidents only faintly written in the pages of history which would have always remained dark and illegible but for the light flashed on them by the Torch of Heraldry. A Shield of Arms, a Badge or a Rebus depicted on a stained glass window, painted on a wall, carved on a gateway, a corbel or a monument will frequently indicate with unerring precision the date to which such relics are to be ascribed, and whose memory they are intended to perpetuate when all verbal descriptions are wanting. And the identity of many an old portrait rests on no other authority than that of a coat-of-arms painted at the side. As James says regarding Scotland in the Middle Ages: "For the pursuit of family history, of topographical and territorial learning, of ecclesiology, of Architecture, Heraldry is altogether indispensable." It is not to the Antiquarian, Architect, Artist or Art-worker alone, but to the literateur, the artist in literature, that its teachings are likewise valuable. To one who is totally unacquainted with Heraldic usages and phraseology, the writings of many of our best and most entertaining authors lose half their interest. Shakespeare, Scott and Tennyson and a host of other poets, prose writers, dramatists and novelists may be cited in this regard. Does not that dear, delightful Die Vernon say with surprise to Frank Osbaldistone in Scott's "Rob Roy": "What! is it possible? . . . not know the figures of Heraldry? Of what could your father be thinking?"

So long, then, as the Sovereign has the power to create a new Order of Knighthood and attach thereto Heraldic insignia, so long as the Crown has the power to create a new coronet or to order a new ceremonial, so long as new coats-of-arms are being called into being, for so long is it idle to treat Armory and Heraldry as an Art and Science incapable of further development or as an Art and a Science which in recent periods has not altered and amended its laws.

Modern Heraldry is therefore the result of thoughtful study of the best Mediæval Heraldry and investigation of its principles. The development therefrom comes through working with a thorough appreciation of its Science and a fresh application of its Art, so that Heraldry becomes consistently as well as truthfully historical of ourselves. For the purpose of Architectural decoration and adornment, Heraldry is no less applicable now—with our present-day needs under King Edward VII—than when Edward I or Edward III reigned. We may apply to our own times, our own uses, our own delight, what the old Heralds have taught us without dreaming of again wearing armor or re-establishing the feudal system. True Heraldry is a Science, and it is also an Art for all time—for our times, and for future times as well as for times past. Let it be but understood and appreciated, then it will not fail to be used and applied aright as an admirable adjunct to Architectural adornment.

Friction brakes are not sufficient for the modern elevator. To secure absolute safety, the motor should be turned at the proper moment into an electro-dynamic brake. This reinforces the friction brakes and removes any great strain from them. It also insures a smooth and steady running of the car under all conditions. A properly designed and installed electric elevator can be operated at great speed and under heavy load so smoothly that no jar is communicated to the occupants.

EAST LAKE PARK, LOS ANGELES

(CONCLUDED)

BY W. L. B. JENNEY, ARCHITECT

DOCTOR, says Jack, let us go to the north end of the park. I judge from what I saw from the electric car that it is a children's play ground. We were soon there and found it much as we expected, numerous seats and tables, for picnics. There were a number of pretty little ponds all connected by water ways. In the ponds there were in bloom the yellow *Lymphia*, and big bunches of the *Lotus*, out of bloom, and of *papyrus* grass.



ONE OF THE WALKS.

There is an interesting plant, a white *Lantana*, with daisy-like flowers, like little white bells, about the size

of a large nutmeg. The flowers have not the shape of a *Lantana*, which are flat on top and larger, usually of varied colors, white and yellow to red and deep orange in concentric circles. The assistant gardener gave me a flower from that white *Lantana*, to demonstrate that it really was a *Lantana*. The flower has the characteristic odor and the buds the true shape. Look at the bed of bright yellow *Cannas*; how beautiful they are; broad, flat and rich yellow flowers; they are very effective and there on the opposite side are some large bunches of yellow *Callas*, fine but not equal to the *Cannas*. Cut the *Cannas*, with their stalks and broad green leaves, and half a dozen fill a large vase with beautiful effect.

Wherever the water way was narrow it was spanned by pretty little bridges. There was a zoo, small but containing many interesting animals, and a few birds, such as peacocks, vultures, eagle, doves, quails, etc., and quite a variety of animals, many not common. There was the *Gila monster*, very poisonous, and one of the only two species of lizard that are poisonous, both American—the *Gila monster* found in Arizona, the other found in southern Mexico, and very rare. I have never seen but one. It is attractive, not at all repulsive. I was hunting on the Isthmus of Tehauntepec. One of my men killed it with an ax. I tried to have it skinned, but, no, they insisted that it kills folks though dead, and so it would, should one be pricked by the fangs, some half an inch long, on the end of a long stiff tongue, not in the jawbone.

ELECTRIC ELEVATORS

(CONCLUDED)

BY A. S. ATKINSON.

IT is difficult to determine in advance the amount of current elevators will require for economical operation. They stop and start so frequently in different buildings that the total amount of energy consumed in a day in starting may be from 50 to 200 per cent greater than the actual energy consumed in running. It is this variation in the load at starting which makes good elevator designing difficult, and which calls for the best expert advice. Any device or equipment which will lessen the amount of energy required for starting will prove very economical. It is essential that a motor with a wide field variation should be provided for drum elevators. The motors should be connected through a controller to constant potential mains and run at fixed speeds determined by the shunt winding. The strength of the shunt windings should be made so that it can be changed to give several speeds ranging from one-half to the maximum. In a machine which consumes a certain amount of current and then returns more or less in operation in the opposite direction, the regulation can be made safe and satisfactory by a smaller motor and on a constant potential circuit.

In ordinary passenger or freight elevators it is not desirable to keep the field of the motor excited, for the waste of current is thus considerable. On the other hand if the starting excites the field of the motor through a shunt winding, the armature must absorb excessive current at starting. This causes more or less loss of time and cur-

rent, and tends to produce disturbances of a local nature. To overcome this a strong series field is usually employed for starting, and when under full speed this is cut out. This must be cut out automatically and not left to the operator, or some time failure to do it may cause the car to run away with a heavy load in descending.

As mentioned at the beginning, protection from accident is the first prime essential in elevator designing, and this can be obtained best by the employment of automatic devices of control and regulation which must operate so long as the elevator is in running condition. When the operation of these safety devices is left to the elevator man the danger becomes threatening. Owing to the automatic simplicity of electrical devices elevators run by this power have secured a great advantage over nearly every other type.

The current generated by the motor when turned into a generator goes to strengthen the shunt field. This should in all cases be sufficient to keep a surplus of power ready for any emergency. In fact, in some designs of electric elevators, the car is made to run and stop with the friction brakes off. That is, the self-exciting electro-dynamic brakes are sufficient to stop the car under all conditions if anything should happen to the friction brakes. These latter are used in reality only to lessen the consumption of current in stopping the cars.

OUR ILLUSTRATIONS.

School building, National City, Cal., F. S. Allen, architect.

Residence of Mr. Holder, Pasadena, Cal., J. J. Blick, architect.

First Church of Christ, Scientist, Pittsburg, Pa., S. S. Bemman, architect, Chicago. Exterior and interior views and plans are shown.

Interior views the Annex to the Chicago Athletic Club, Richard Ernest Schmidt, architect. The billiard room, men's reception room and banquet room are shown.

Interior views, New Amsterdam Theater, New York City, Herts & Tallant, architects. The following views are given: Smoking room, Ladies' room, looking toward the stage.

The Washington apartment building, Baltimore, Md., Edward Hughes Glidden, architect. The following views are given: Exterior, entrance detail, view in lobby, one of the mantels.



ONE-HALF OF TYPICAL FLOOR PLAN, THE WASHINGTON APARTMENT BUILDING, BALTIMORE

CORRECTION: In the January number sole credit as architects of the Baltimore & Ohio office building, Baltimore, was given to Parker & Thomas. The name of Herbert D. Hale should have been included.

House and stable of H. H. Ellison, Rosemont, Pa., Lindley Johnson, architect, Philadelphia. The property is situated at Rosemont, Pa., a half mile east of the Pennsylvania Railroad station upon the crest of a hill commanding a beautiful and extended view to the south and southwest, with the picturesque Bryn Mawr college buildings in the distance. The house is protected on the north by heavy woods and open to the south and southwest to the prevailing summer breezes. The house itself is at an elevation of about fifty feet above the public road and distant about 1,500 feet, approached by a most picturesque winding driveway skirting a creek until it approaches a hill, when it winds up among a mass of rhododendrons and old forest trees. Local materials were used generally in the construction. The first story walls of a gray sandstone laid up in rough rubble work. The walls above the stone line are all treated in half timber work with a rough trowel surface to the plaster work. All roofs are shingled with white cedar stained. All exterior mill work is stained a dark brown, sash white. The interior is finished largely in Canadian chestnut stained very dark. The chambers are finished in enamel paint. The building, including heating and plumbing complete, cost less than 21 cents per cubic foot.

The Church street terminal buildings of the Hudson & Manhattan Railroad Company, New York City, Clinton & Russell, architects. There will be two buildings situated on Church street from Cortlandt to Dey street and from Dey to Fulton. The northerly building will be known as the Fulton building. The southerly building will be known as the Cortlandt building. The buildings will be twenty-two stories high above the surface and will extend seventy-five feet below the surface to bed rock. Beneath these buildings will be the terminal station of the Hud-

son & Manhattan Railroad Company which will operate the tunnels now being built under the Hudson River. In the tunnel system four tunnels are now being built under the Hudson. The two southern tunnels will extend from Cortlandt street and from Fulton street Manhattan to Montgomery street Jersey City. There will be a transverse tunnel in Jersey City extending 1/4 miles along shore beneath the tracks of the Pennsylvania, Erie and Lackawanna railroads, with entrance to each station. The northerly tunnels will extend under the Hudson from Fifteenth street, Jersey City, to Morton street, New York. The tubes will continue under Morton street, Greenwich and Christopher streets to Sixth avenue. The main line will continue northward under Sixth avenue as far as Thirty-third street. At Ninth street and Sixth avenue a branch will be continued eastward under Ninth street to Astor place, where it will connect with the Manhattan subway. A large station will be built at Thirty-third street and Sixth avenue on the site of the present Manhattan theater. The northerly tunnels are completed under the river and the tubes have been carried as far as Sixth avenue, under which thoroughfare the borers are now at work. The terminal on Church street will constitute, when completed, the largest office structure in the world. There will be space on the twenty-two floors for 4,000 offices. The buildings will have as permanent occupants at least 10,000 persons. The great population will be handled by thirty-nine elevators. Twenty-two of the elevators will be express cars, rising without a stop to the eleventh floor; the remaining seventeen will be local cars, stopping at every floor up to the eleventh. These elevators are expected to handle at least 20,000 persons a day. The two buildings together will occupy 70,000 square feet of ground. The cubic area will be 14,500,000 cubic feet above ground, 3,650,000 cubic feet below ground, or a total of 18,150,000 cubic feet. The structure will be an example of Italian Renaissance. Up to the fourth story it will be built of polished granite and Indiana limestone. Above that it will be built of brick and terra cotta. The public halls will be of marble, handsomely decorated, and the building will be finished in hardwood throughout. An idea of the size of the building may be obtained by comparing it with the Broad Exchange building, the largest at present in Manhattan, or with the U. S. Express building. The Broad Exchange contains 7,000,000 cubic feet. The U. S. Express building contains 2,500,000 cubic feet. Nearly three Broad Exchanges, or nearly eight Express buildings could be inserted in the space to be occupied by the Hudson Terminal buildings. There will be a very complete conduit system within the building to provide for the telegraph, telephone and stock ticker systems, compressed air and vacuum cleaning apparatus. As already stated, the terminal station for the tunnels under the Hudson River will be located under these buildings. Passengers will enter upon the street floor and pass down into the station by means of easy stairways, inclining planes, and elevators. The first floor below the sidewalk will be known as the Concourse floor. Here will be the waiting rooms. Below the Concourse floor will be the train platform. Passengers will pass down from the Concourse floor by means of stairways and elevators to the platforms. Another feature of the building will be the Arcade. This will be a great glass enclosed passage way, lined with shops and booths. It will be much larger than any of the famous European arcades. The engineering features are being worked out by Mr. Charles M. Jacobs, chief engineer, and Mr. J. Vipond Davies, deputy chief engineer.

ASSOCIATION NOTES.

ARCHITECTURAL LEAGUE OF MEMPHIS.

Constitution and by-laws were adopted January 15. The officers of the League are as follows: J. B. Cook, president; C. O. Pfeil, first vice-president; B. C. Alsop, second vice-president; M. H. Furbringer, secretary and treasurer.

CHICAGO ARCHITECTS' BUSINESS ASSOCIATION.

The first meeting of the association in its new quarters at the Art Institute was held January 22. It was announced that the Information Bureau regarding draftsmen was in working order. The meeting adjourned at 8:30 to Fullerton Hall to listen to the lecture by Peter B. Wight on the "Use of Clay Products in the Fireproofing of Buildings."



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ASSOCIATION NOTES—Continued.

ILLUMINATING ENGINEERING SOCIETY—CHICAGO SECTION.

A meeting was held February 14 to discuss the subject, "Fixture Design and Location for Residence Lighting." An exhibition of photographs and lantern slides of examples for discussion was shown. R. C. Spencer, of the architectural firm of Spencer & Powers, who has given this matter considerable attention led the discussion on this subject from the architect's standpoint. The fixture-makers and designers were also represented in the discussion.

PROVINCE OF QUEBEC ARCHITECTS' ASSOCIATION.

The annual convention and banquet of the association were held at Montreal on January 24. A speaker dwelt at length upon the competition of architects of the United States for Canadian work. The feeling strongly exists that tariff laws should protect the architects of Canada from this competition. The following officers were elected: President, R. P. Lemay, Quebec; first vice-president, D. R. Brown, Montreal; second vice-president, Mr. L. A. Amos, Montreal; secretary, J. E. Vanier; treasurer, J. R. Gardiner. The council for the coming year was elected as follows: Alcide Chausse, W. S. Maxwell, J. O. Marchand, L. Lemieux and A. Piche, of Montreal, and H. Staveley, of Quebec.

SOUTHERN CALIFORNIA CHAPTER, A. I. A.

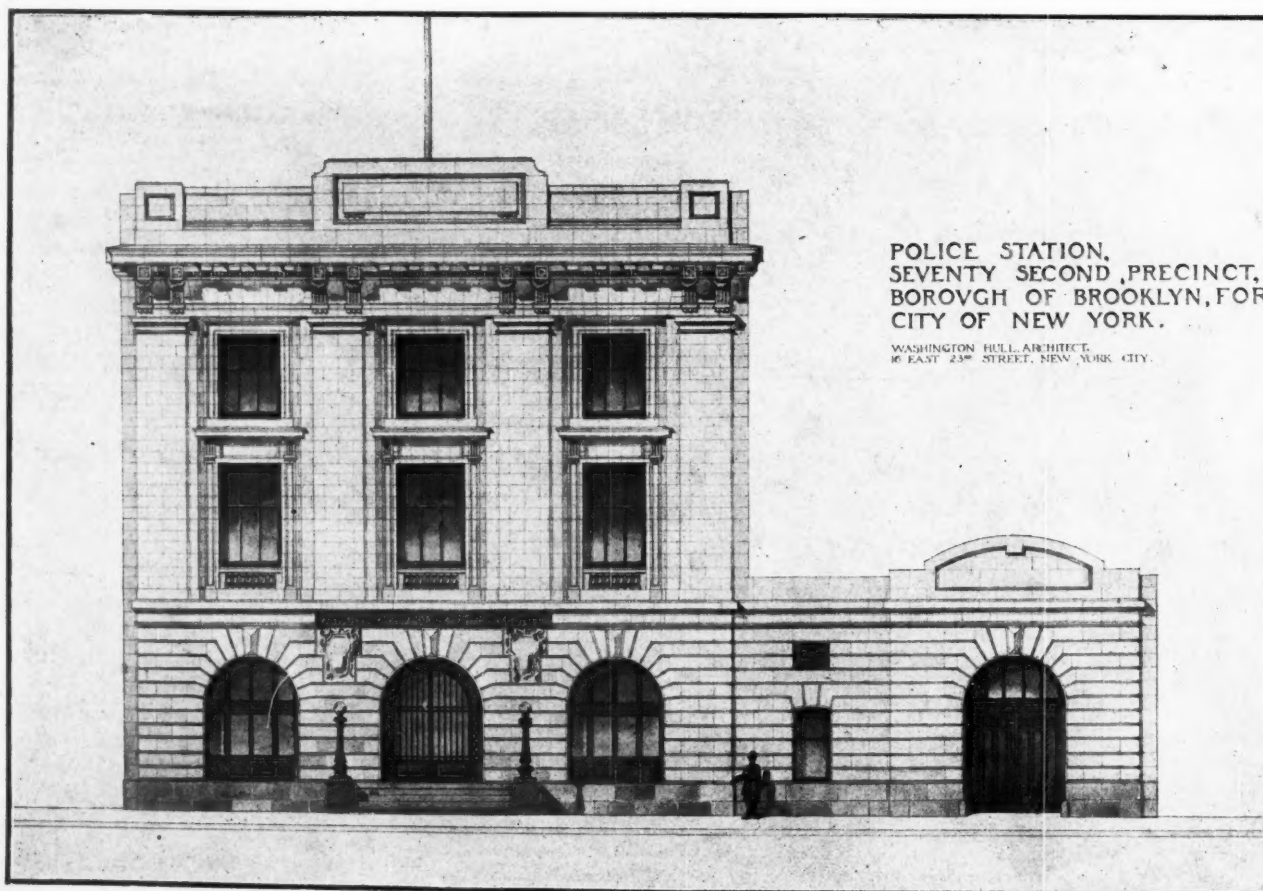
After the usual monthly dinner at Levy's, the chapter indorsed the work being done in large cities of the United States by the National Industrial Peace Association. The request for endorsement came from P. H. Scullin, general secretary of the organization, who told the architects of the endeavor being made to establish state boards of arbitration for the prevention of antagonism between employers and employes in the form of lock-outs and strikes. The association's work was commended in a letter from Secretary Glenn Brown, of the American Institute, which President Myron Hunt of the chapter read. The remainder of the meeting was devoted to consideration of voluminous committee reports submitted by Architects Hudson and Rosenheim.

ILLINOIS CHAPTER A. I. A.

The regular monthly dinner and meeting were held at the Art Institute February 11, at 6 p. m., President Woltersdorf presiding. The principal business was to consider amendments to the constitution and by-laws changing the names of the classes of members to conform to the changes voted by the Institute. A reduction was voted by the chapter in the dues of members whose offices are outside of the thirty-mile limit from Chicago. Letters were read from the St. Louis and the Kansas City chapters indorsing Chicago for the place of meeting for the next convention of the American Institute of Architects. A contingent indorsement was received, also, from the Cincinnati chapter. It is regarded as certain that the next convention will be held at Chicago. The chapter's recommendations for projections over the lot line for ornamental features have been sent to the city council on the request of Alderman Snow. Provision is made for submitting to the chapter any doubtful questions as to what constitute reasonable projections. S. A. Treat cited a recent suit in which he was a witness as to the value of an architect's services. Decision was given in favor of the architect for \$100, the amount of his bill as rendered, which was about one-half of the Institute schedule rate for services performed. Having rendered his bill for a definite sum, the architect was estopped from collecting more.

AMERICAN CERAMIC SOCIETY.

A several day session of the society was held in St. Louis this month. Among the papers read and discussed by men of scientific training and taste were some bearing upon the treatment and betterment of terra cotta, tile and face brick. Chemical technology and experience along the physical and mechanical lines occupied much attention. Great strides have been made in reducing cost and using shapes and colors once thought impossible. Better taste and material and sounder architectural ideas will mark the erection of all buildings in the future. The sessions of the National Association of Brick Makers followed the American Ceramic Society meeting and both interested nearly 500 delegates. An exhibit of clay products and clay working machines was also held at the Planters' Hotel.



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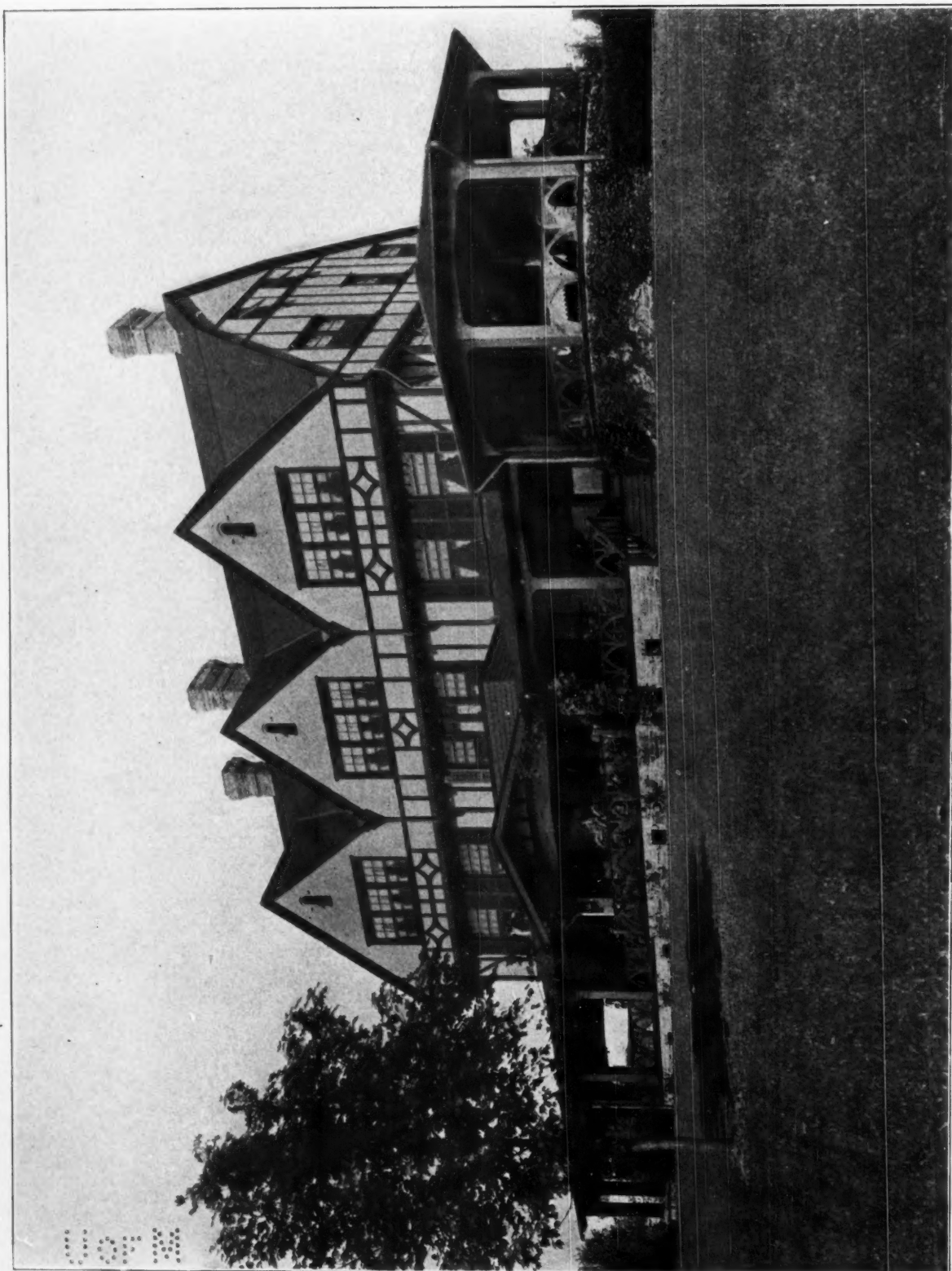
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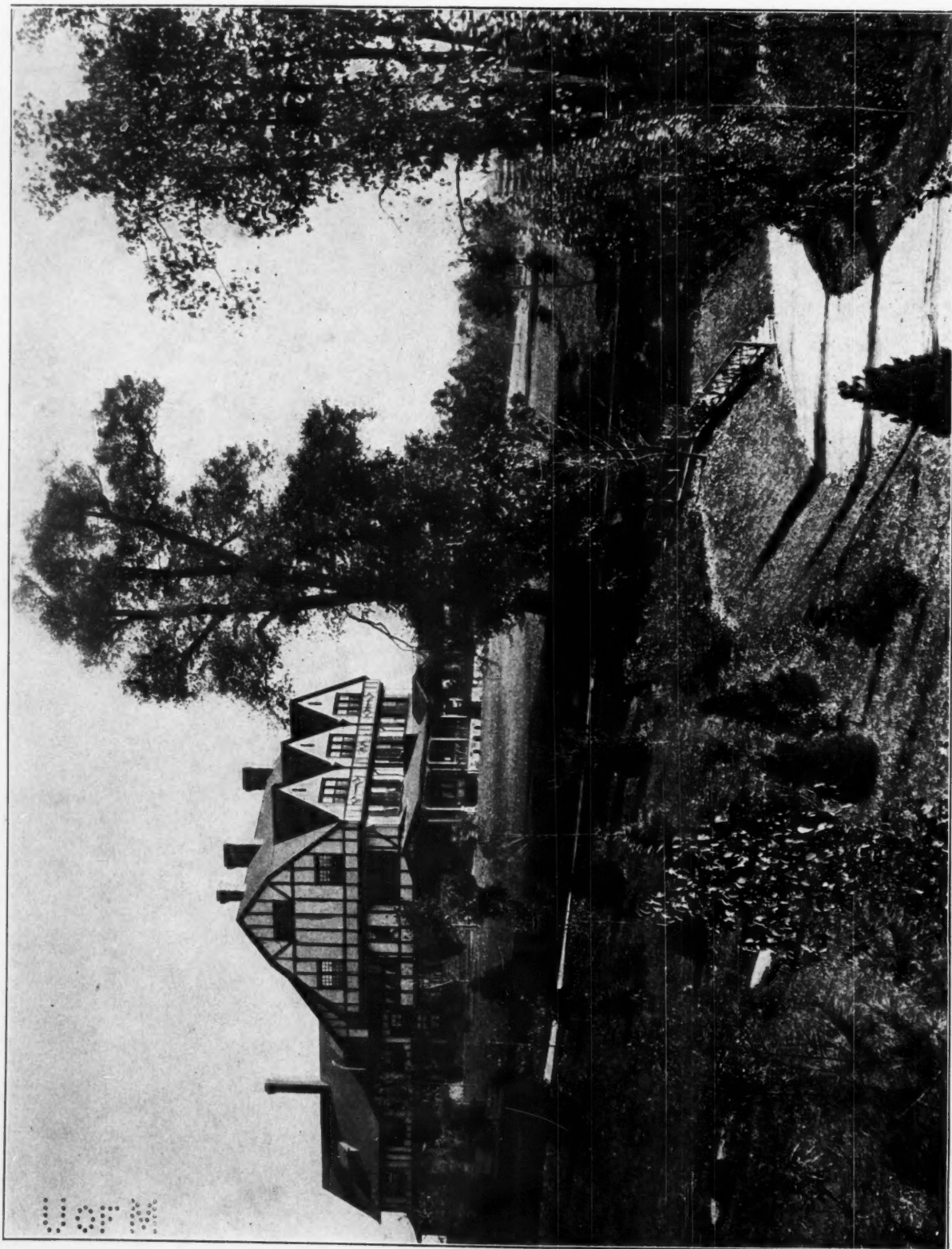
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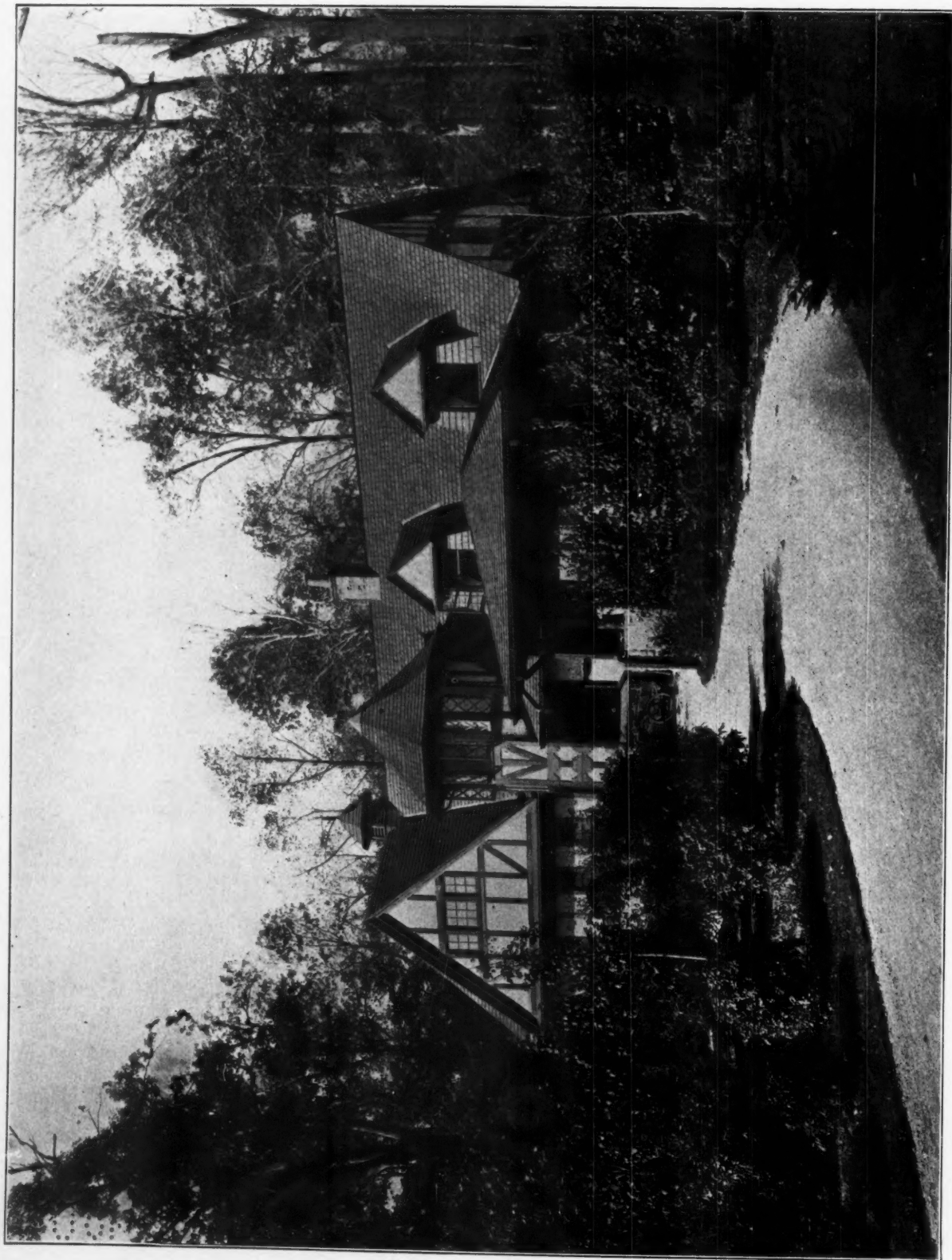
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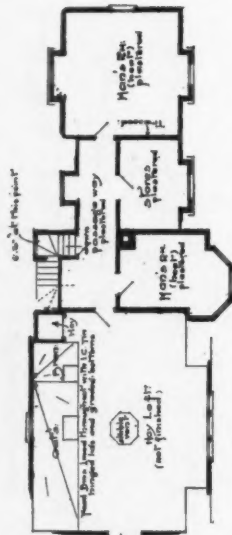
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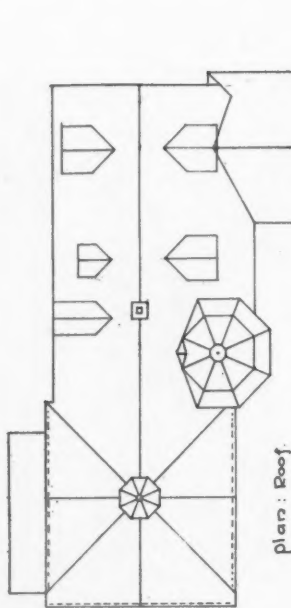
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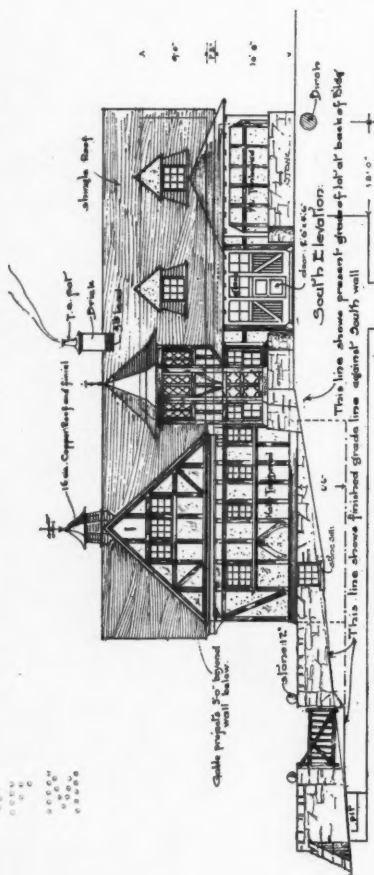
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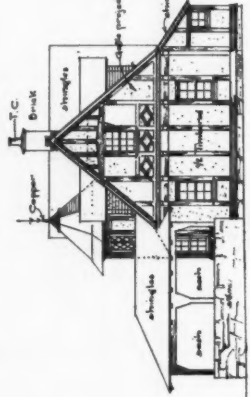
Plan: 2nd floor:



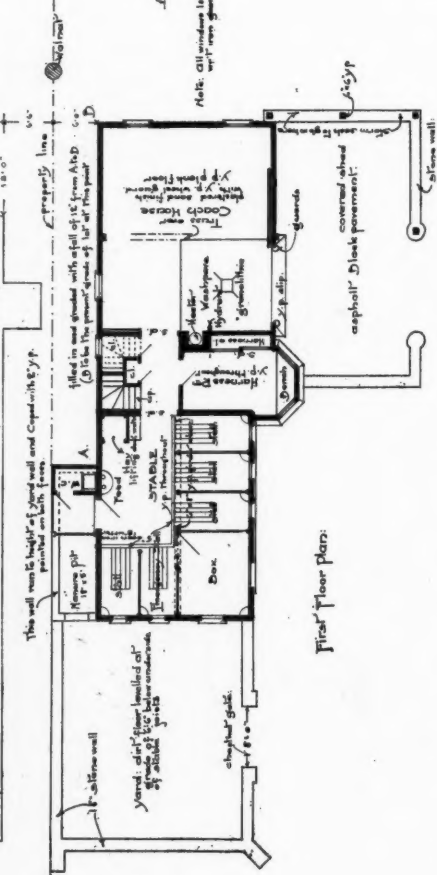
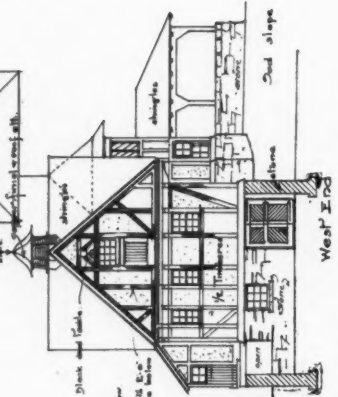
Plan: Roof:



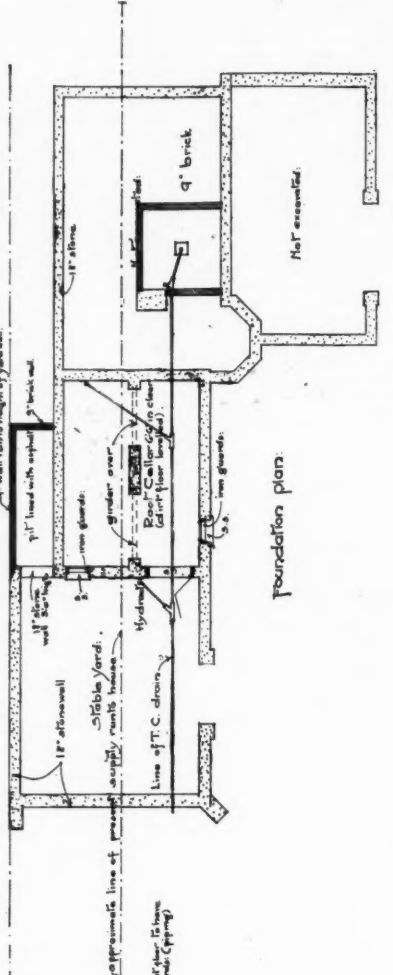
South Elevation:



EAST END



First Floor plan:

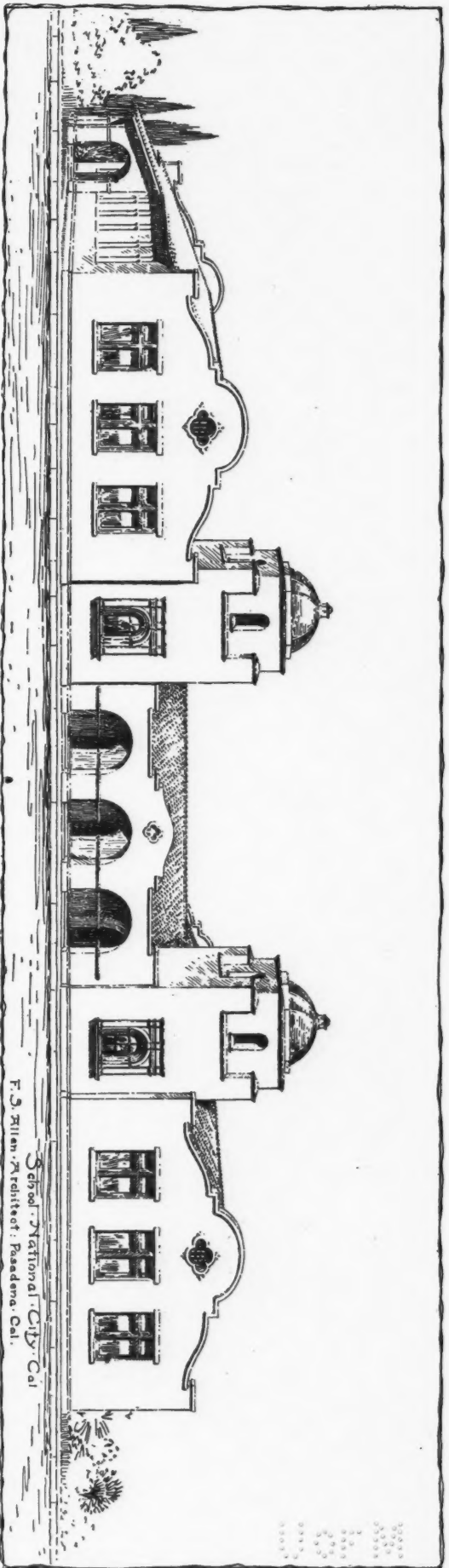


Foundation plan

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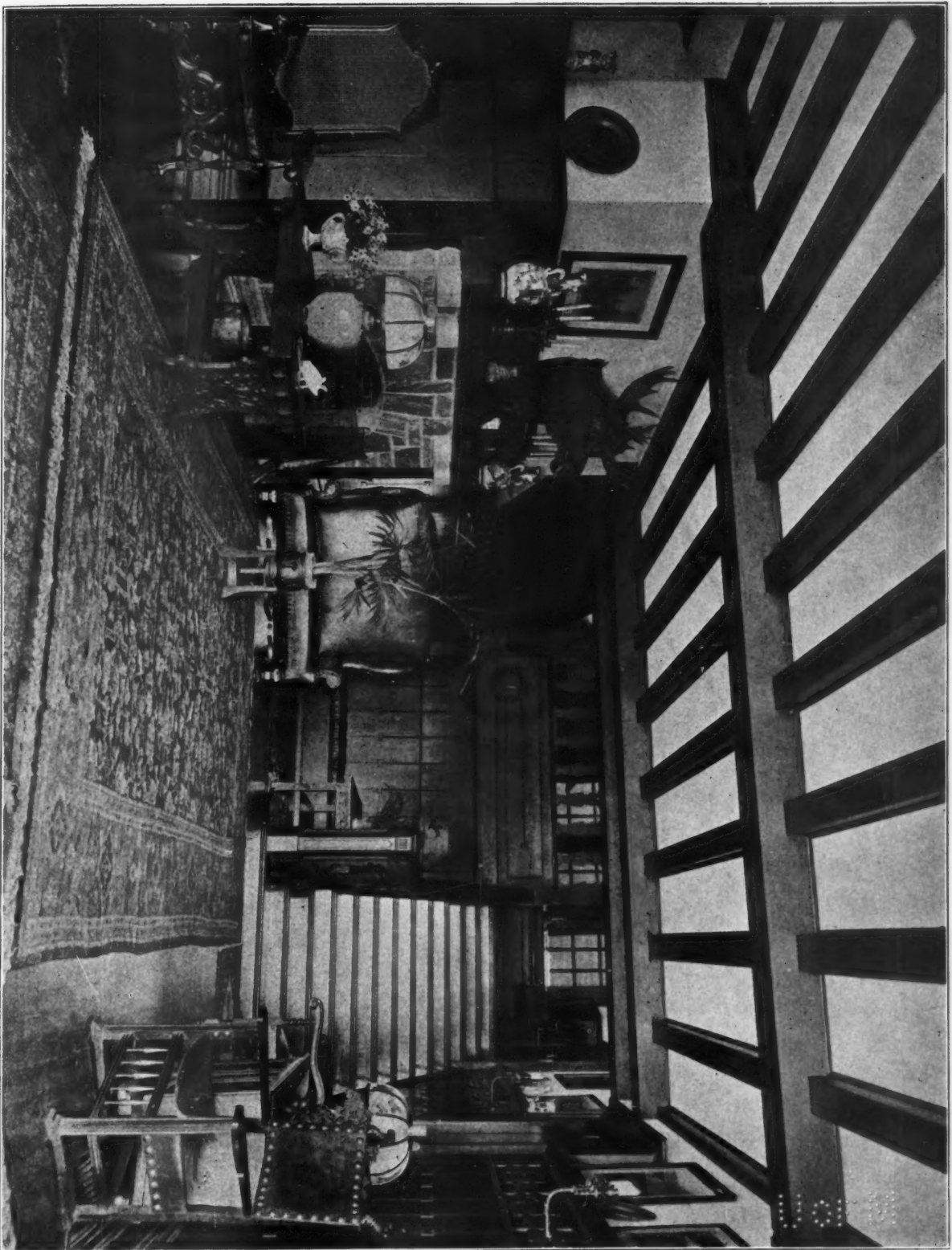
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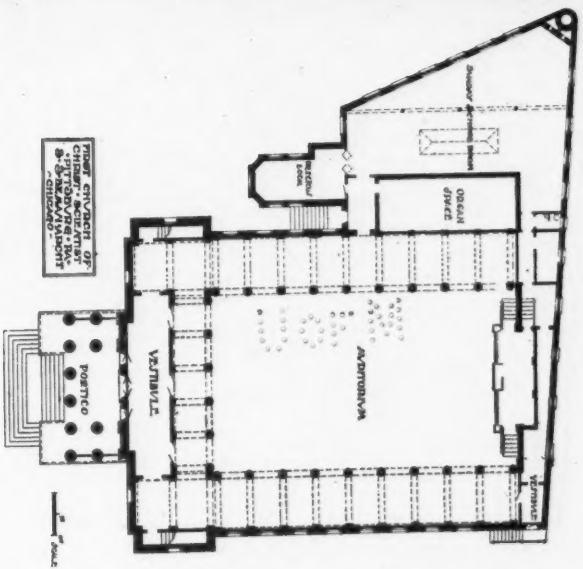
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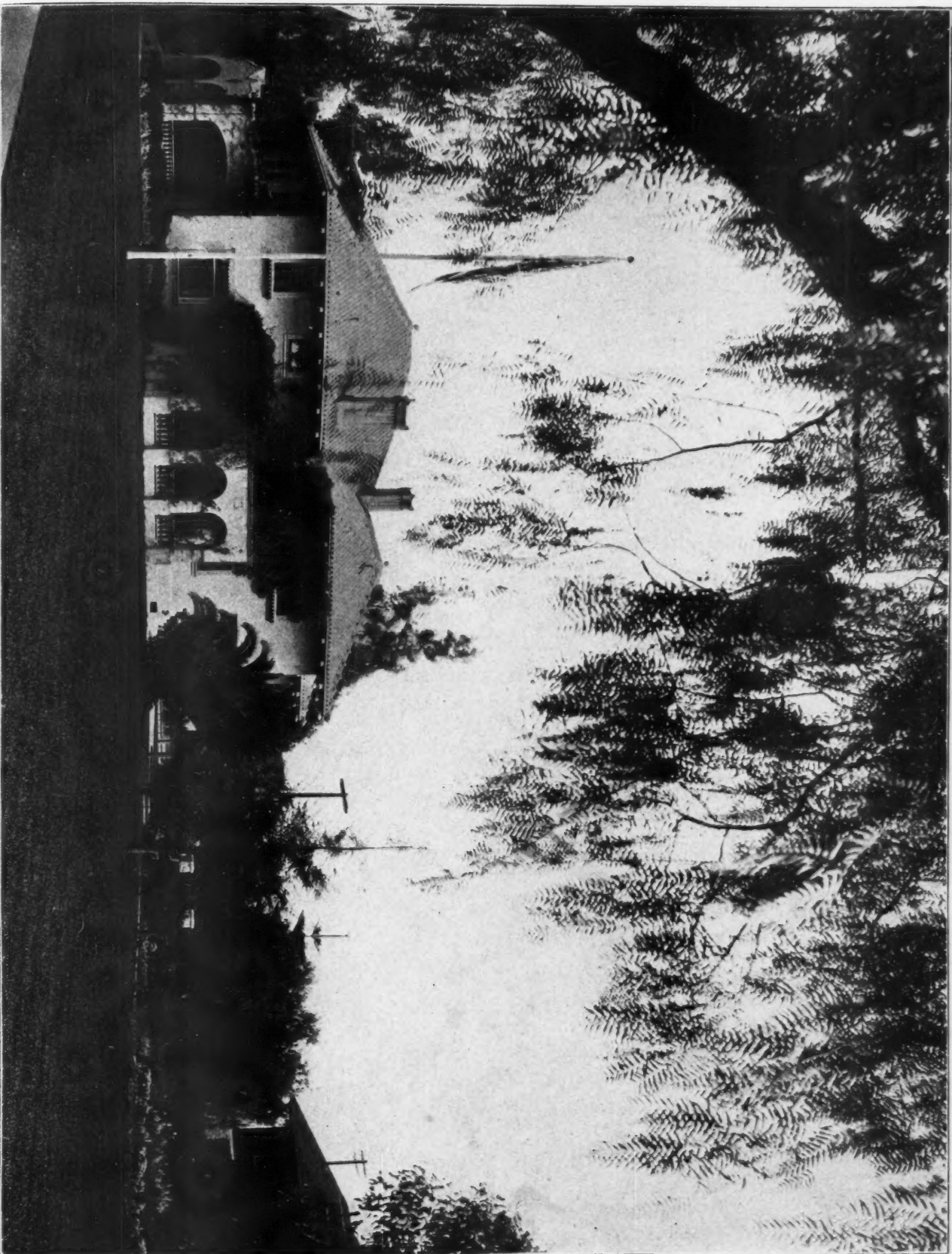


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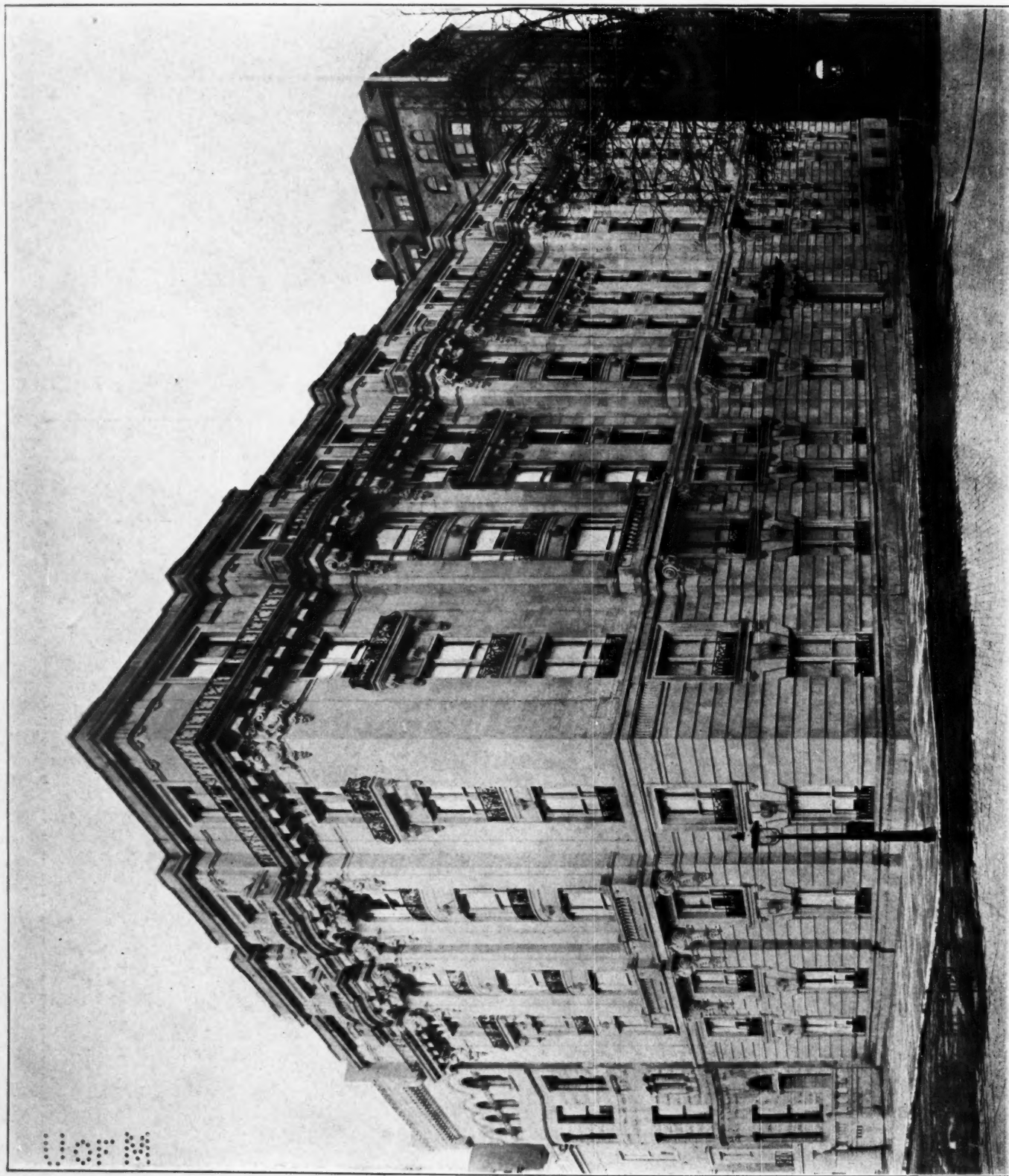
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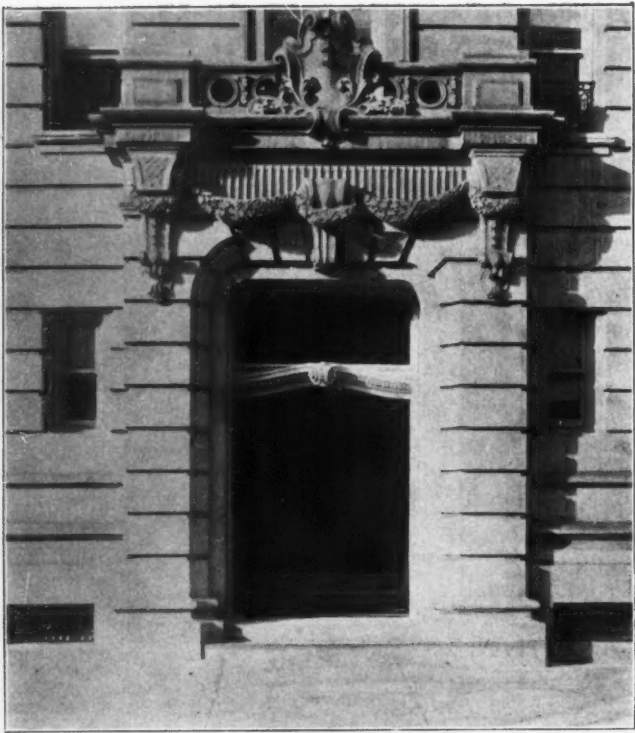
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THE WASHINGTON APARTMENT BUILDING, BALTIMORE, MD.
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1907



Entrance Detail



One of the Mantels



View in Lobby

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LADIES' ROOM, NEW AMSTERDAM THEATER, NEW YORK
Herts & Tallant, Architects



VIEW IN SMOKING ROOM, NEW AMSTERDAM THEATER, NEW YORK
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INTERIOR VIEWS. ANNEX TO THE CHICAGO ATHLETIC CLUB

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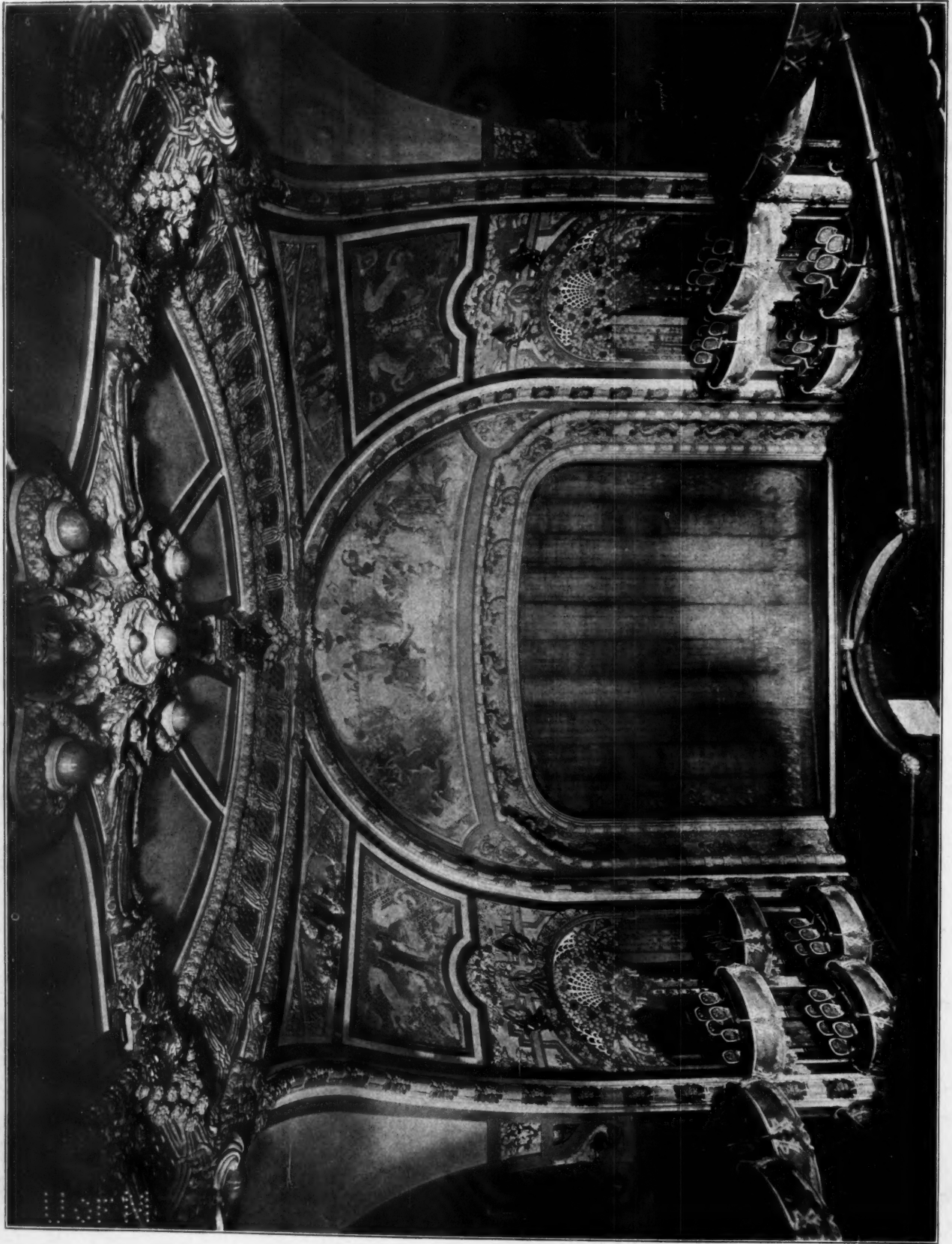
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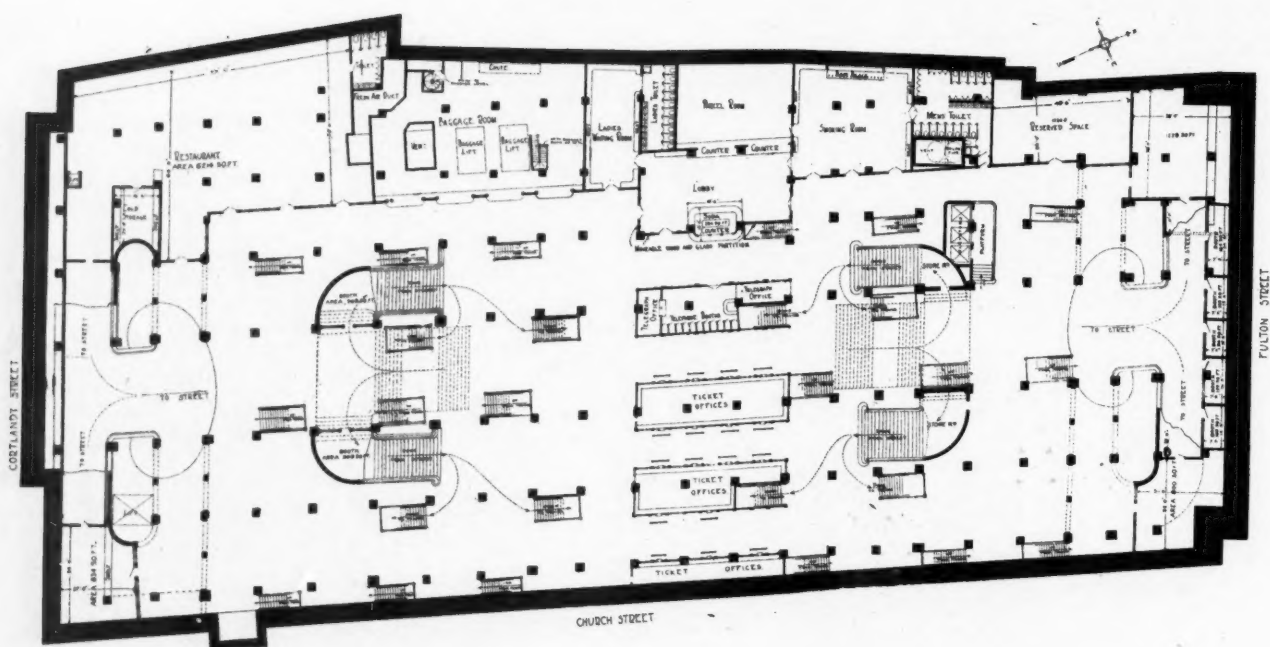
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Richard Ernest Schmidt, Architect

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VIEW TOWARD STAGE, NEW AMSTERDAM THEATER, NEW YORK
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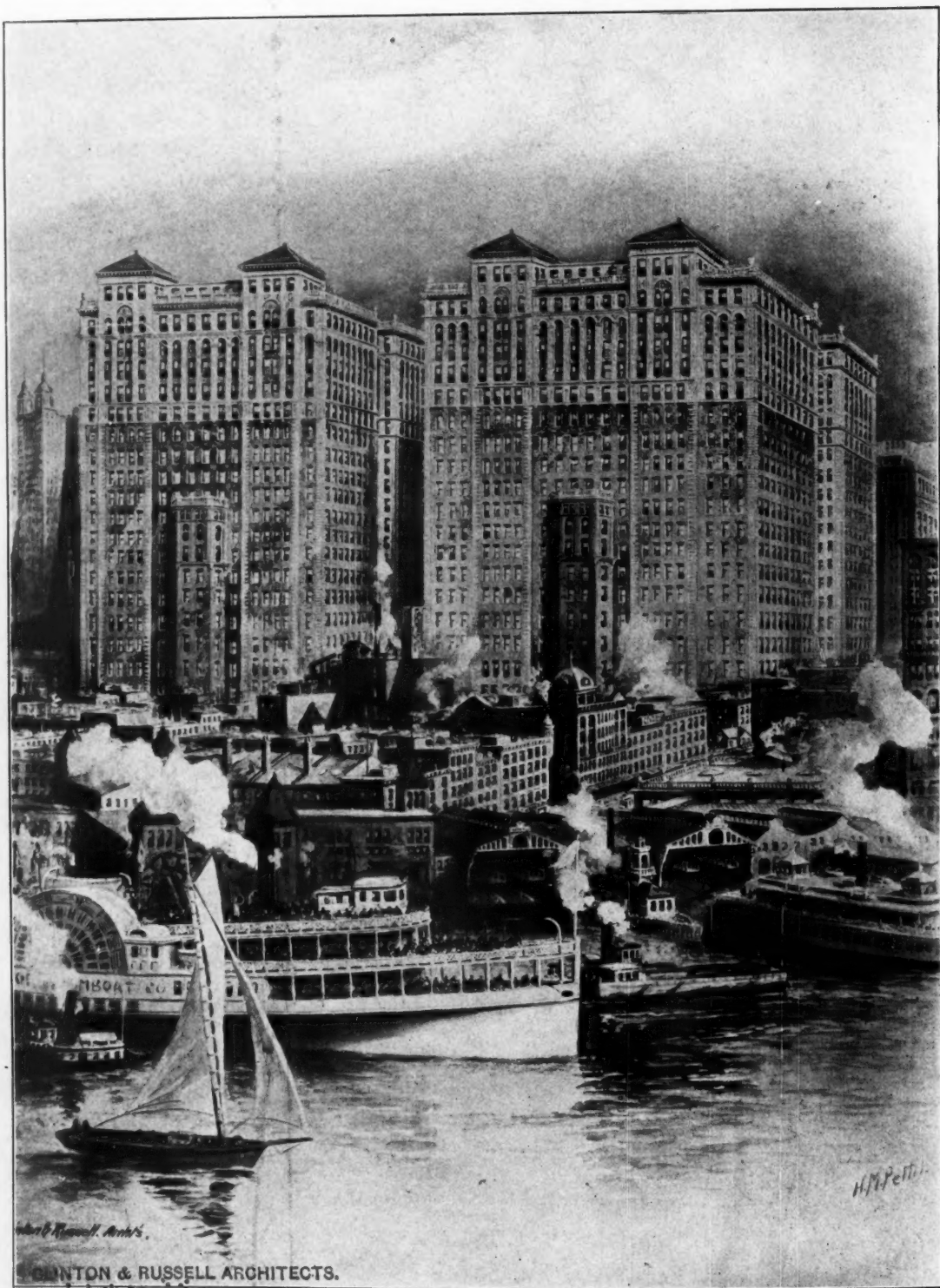
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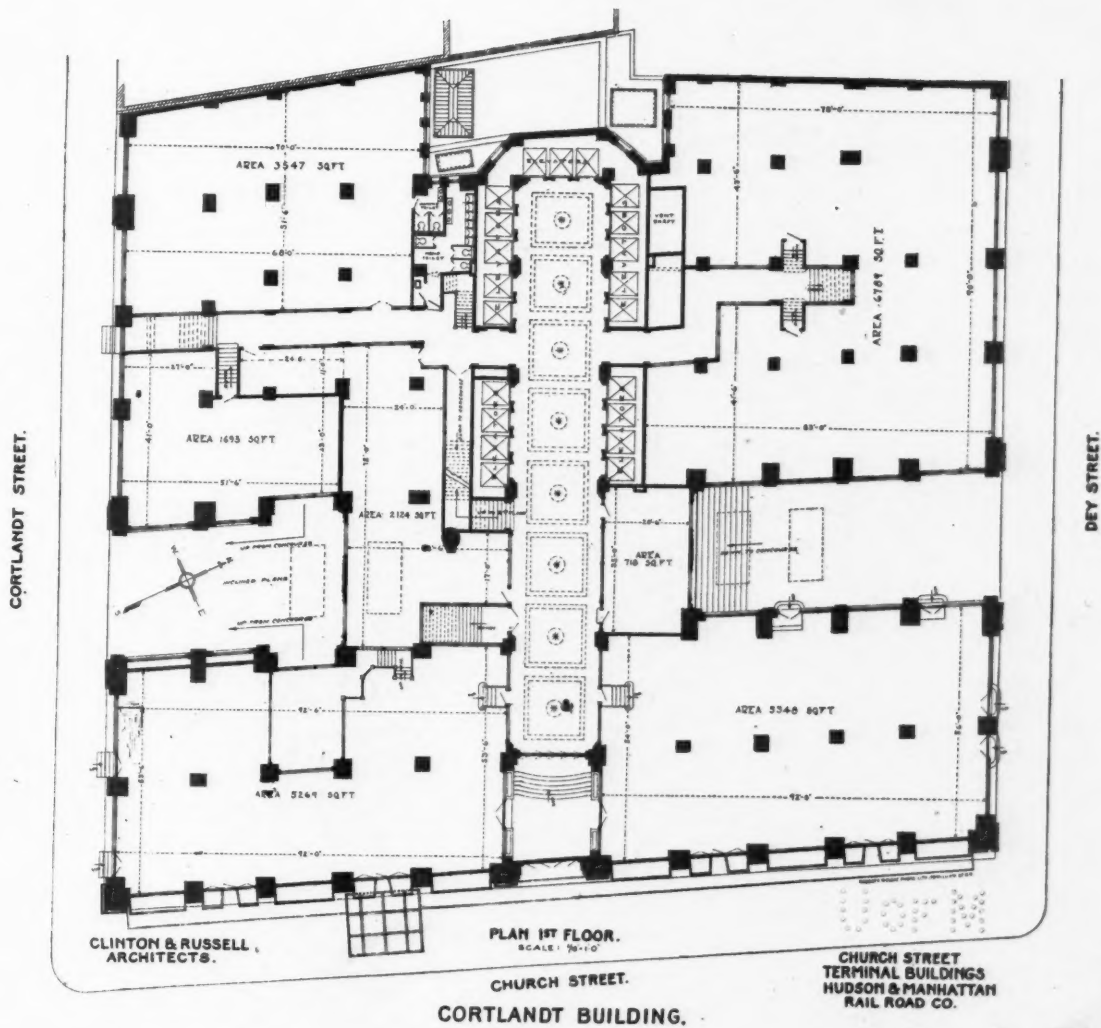
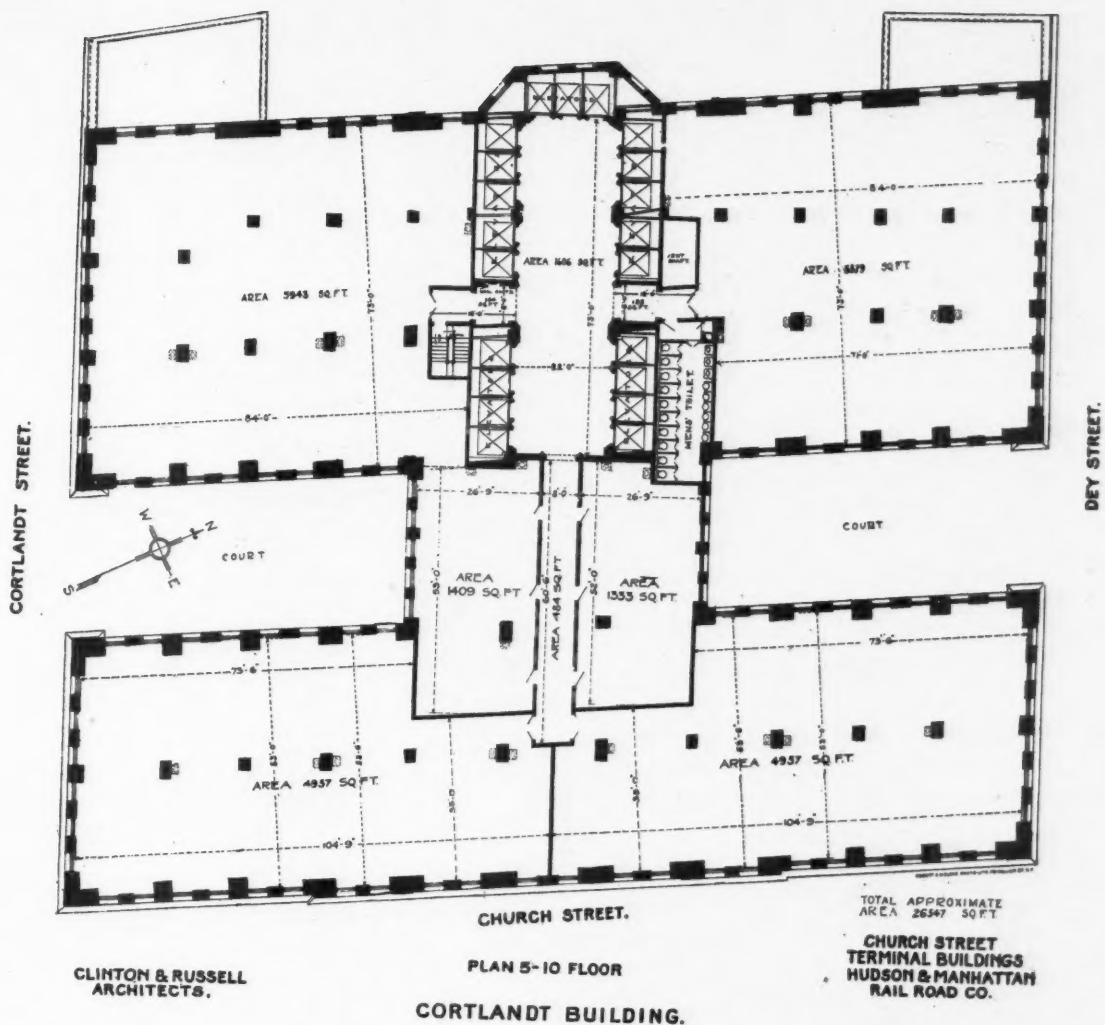
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CHURCH STREET TERMINAL BUILDINGS.
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PLANS OF ONE DIVISION OF THE TERMINAL BUILDINGS, NEW YORK
Clinton & Russell, Architects

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FIRST CHURCH OF CHRIST, SCIENTIST, PITTSBURG, PA.
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