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THE DEVELOPMENT OF THE GOTHIC APSE

By LEWIS W. SIMPSON, F.R.I.B.A.

HOW often one finds that a modern gothic church has been spoilt by an apsidal chancel, yet this may have been the express wish of the client, and in direct opposition to the architect, who has probably condemned it as out-of-date, undignified, etc., in comparison with a rectangular treatment! Of course in the case of a cathedral, conditions are different as the apse has an ambulatory arcade, triforium and clerestory.

In this article I do not advocate the apse for a small church, I merely call attention to the possibility of its better treatment, and mention some interesting examples in England.

Truly it is old-fashioned, and in the present day usually very tamely treated,—a feeble reminder of ancient work. The old apse has a charm which the modern one does not possess. However, having an ancient form, it has at least some claim on our attention.

The apse was used in England in pre-conquest days, and afterwards still more so, under the influence of those

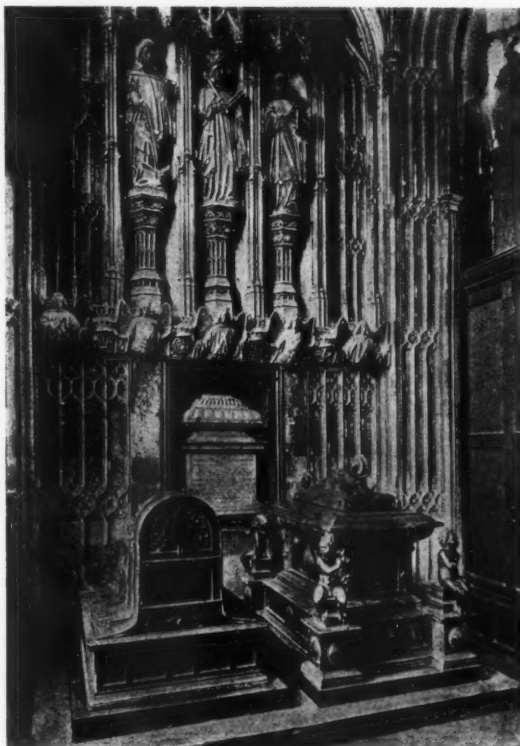
who had known it so well on the continent; while the rectangular chancel was also used at the same early date, but not to so great an extent.

Its more early and Romanesque history we will not now consider, nor the numerous ancient gothic examples which exist in countries other than England.

Those who have seen the little church of Newhaven, Sussex (Fig. 1), with its semicircular apse, small windows, flat buttresses, and short sturdy tower, must

be impressed with its compactness and quiet dignity. In plan (Fig. 2), the apse forms the sanctuary, and the tower the choir. Old Shoreham Church has a rectangular chancel, and this too—in a different way—has its own charm. Both churches are of the early Norman period and in the same county.

Up to the middle of the twelfth century, all the choirs of the greater churches ended in a semicircular apse, with the exception of Dover, Southwell, Sherborne, and Romsey. At Norwich Cathe-



ALTAR SCREEN IN AISLE OF HENRY VII CHAPEL, WESTMINSTER

THE AMERICAN ARCHITECT

dral (Fig. 3) and St. Bartholomew's, Smithfield, London, we find good examples in the Norman period. After this the tendency was to build rectangular east ends to choirs and



FIG. 1. NEWHAVEN CHURCH

chapels, in fact, very soon the apsidal plan fell into disuse, both in cathedral and in church, though we find a few examples of it in each period.

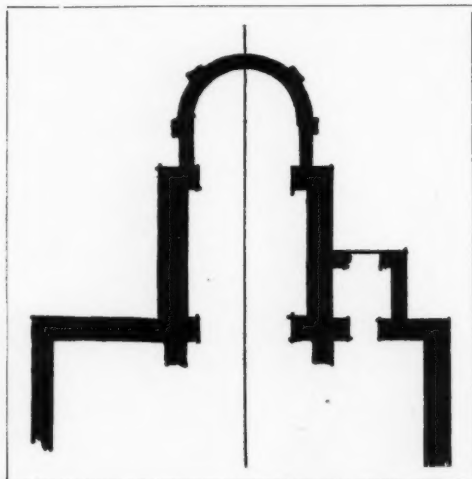


FIG. 2. NEWHAVEN CHURCH

At Canterbury Cathedral the choir and apse are in the Early English style, but it is a poor reminder of the magnificent French apse of that time. At Lincoln

Cathedral in the same period, we find that the four apsidal chapels in the choir transepts are semicircular in plan. Again, at Westminster Abbey, we have the four Early English apsidal chapels surrounding that of Edward the Confessor (Fig. 4); it is interesting to note the strong French influence here.

For an example in the Decorated Period we can take the apse to the Lady Chapel in Wells Cathedral which is peculiar in plan (Fig. 5) but not particularly interesting.

At Gloucester Cathedral a wonderful transformation took place about the middle of the fourteenth century, when the Norman choir and presbytery were cased with Perpendicular work; at the same time the Norman apse was removed sufficiently



VIEW SHOWING DEFECT IN ORDINARY APSE. THE CENTRAL WINDOW LOOKS LOWER THAN THOSE ON EITHER SIDE

to allow a fifteen-light east window to be built, which extended across the entire width of the choir. This window being raised on the walls of the ambulatory naturally followed the polygonal plan though somewhat flattened, and is of more than usual interest and beauty.

We have another example in all the glory of the Perpendicular style at Henry VII's Chapel, Westminster Abbey. Here we no longer find the acutely pointed roof which is a feature in the earlier work, but the prevailing flat one which is not visible above the parapet. The plan is of great interest for in earlier times the chapels radiated from the apse—as in Fig.

4—and were built outside the ambulatory; here however the five radiating chapels are built inside what would otherwise have been the ambulatory. The aisles and chapels are lighted by large bay windows which have two distinct forms in plan, and it may be that the apsidal form generally—and also the plan of these windows—suggested the bay windows so often found at this date in the great country halls and manors,—such as South Petherton Manor House, the Deanery at Wells (Fig. 7), Crosby Hall, London (Fig. 8), and others; whilst the influence of Henry VII's Chapel is even more strongly marked in the bay windows at Hengrave Hall, and Thornby Castle. Figs. 9 and 10 show the plans of windows in this last building which should be compared with the bays at

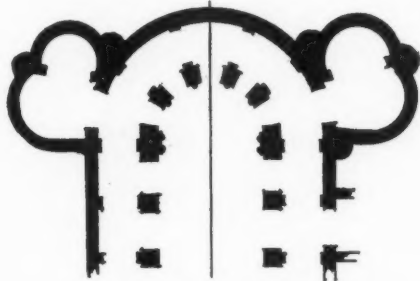


FIG. 3. NORWICH CATHEDRAL

Henry VII's Chapel shown by Figs. 11 and 12.

The treatment of the walls in this famous chapel is very effective, especially the stone altar screens at the ends of the two aisles which are suggestive for modern work.

In St. George's Chapel, Windsor (Fig. 13), the interior of which is a fine example of Perpendicular work, we find apsidal transepts as well as chapels, and this is in itself an uncommon feature.

How is it that the great example at Westminster, the baptistery at Canterbury Cathedral of the same period, and the wonderful bay of the Palais de Justice, Rouen, have not inspired modern architects to design more apses in the Perpendicular style which are really worth looking at?

As to the modern apse, one of the most successful examples I know of is at the

College Chapel of St. Nicholas, Lancing, Sussex, designed by Mr. B. Ingelow, of London, who spent some time studying the French cathedrals beforehand. It is in the late Early English style, with a strong French influence, and the whole structure forms a really fine and imposing piece of work.

The apse (Fig. 14) is flanked on each side

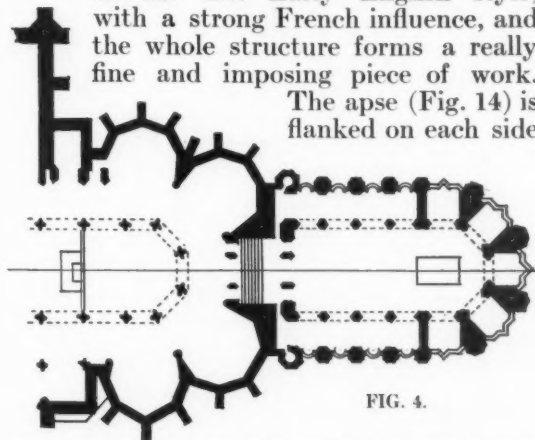


FIG. 4.

CHAPELS OF EDWARD THE CONFESSOR AND HENRY VII, WESTMINSTER

by a tower, and these towers form the chief part of a wonderful whole. They do not rise higher than the parapet and so become part of the apsidal composition, breaking the long continuous sky-line, which is usually so uninteresting. Then again the buttresses

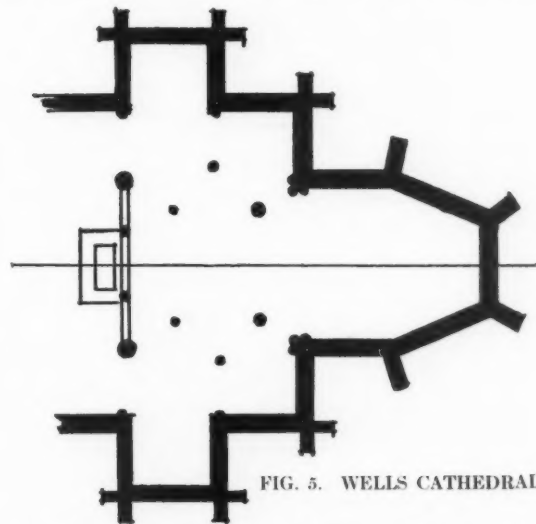


FIG. 5. WELLS CATHEDRAL

have been most carefully designed, the architect evidently realizing how—in this high building—the sky would show up their outline.

Having spoken of the lofty apse, with its triforium and clerestory, let us now

THE AMERICAN ARCHITECT

consider the low apse with only one tier of windows,—the ordinary church apse, semi-octagonal in plan. Its proportions are naturally lacking in the dignity pos-

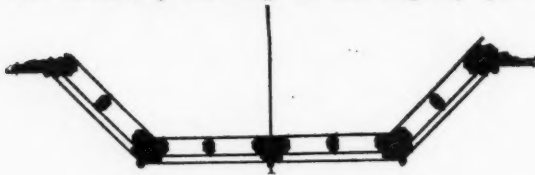


FIG. 7. THE DEANERY, WELLS

sessed by the taller examples. Turning our attention first to the inside effect, we find that—by an optical illusion—the cornice over the central window looks lower than that of the sides. The window

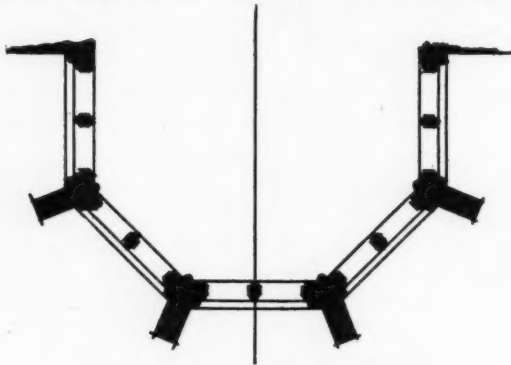


FIG. 8. CROSBY HALL

under it is of course affected in the same way. The central east window being the most important should be the highest. The proportions of the apse are generally

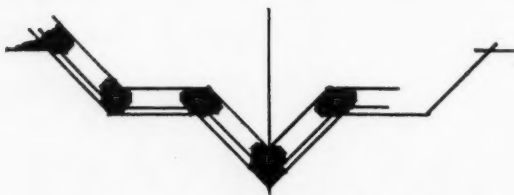


FIG. 9. THORNBY CASTLE

made worse by the roof being stained dark, thus cutting the height into two parts—as it were, instead of utilizing the roof—by keeping the color scheme one with the walls—to give apparent height. Of course this last effect is obtained when the roof is in stone as well as the walls. The arrangement also of the rafters—all

radiating from the axis of the apse—is unpleasant, and reminds one of the inside of a tent. Again, the window sills being low, the reredos must be low also, or it will block out a great deal of the central window, and in these days the tall reredos is in favor. But it is interesting to note an ancient example of the low reredos which is to be found at Exeter Cathedral in the Speke and Oldham Chantries. Here there is not much height, the

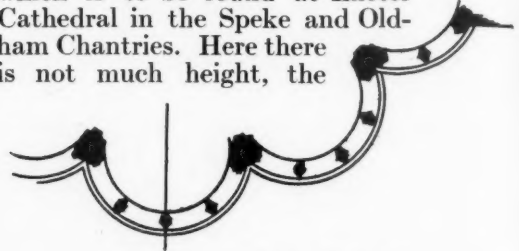


FIG. 10. THORNBY CASTLE

east windows are low down, but underneath them are very fine specimens of ancient stone reredoses, with Perpendicular tracery and sculpture. The walls of these chantries are also richly traceried so that the reredos, walls, and screen form one harmonious design. But this is quite an exceptional piece of work.

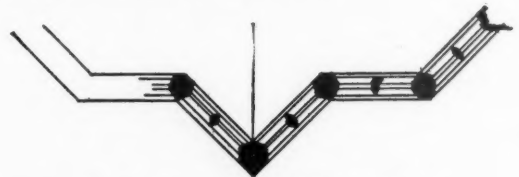
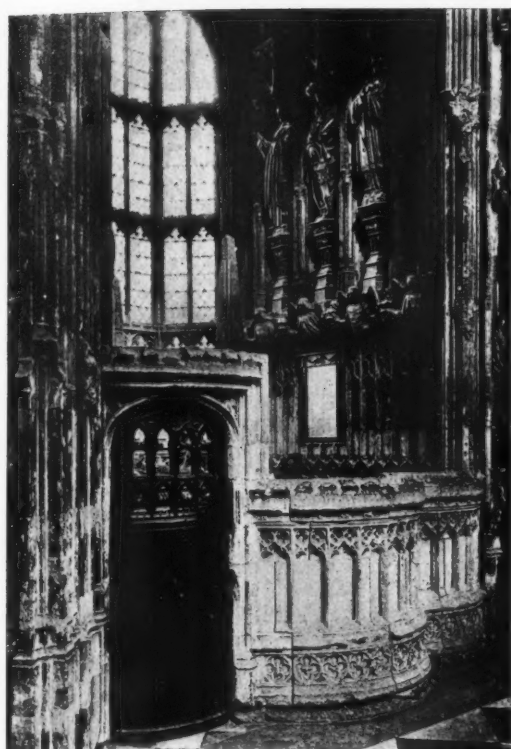


FIG. 11. CHAPEL OF HENRY THE VII

The outside effect of the low apse is as undignified as the interior; at the eaves level there is a want of crispness in the line especially if there be no parapet; one also feels the want of a gable at the east end to give greater height,—though with the Norman apse one is quite content, as this often has no long chancel attached, while the modern apse is spoilt by the necessary and longer chancel.



FIG. 12. CHAPEL OF HENRY THE VII



ALTAR SCREEN AND BAY WINDOW IN AISLE OF
HENRY VII CHAPEL, WESTMINSTER

Now I will show a way in which these defects can be avoided and leave it to others to make such improvements as may occur to them. Some years ago I was asked to arrange the construction of the roof timbers for a little concrete church in one of the Fiji Islands; some

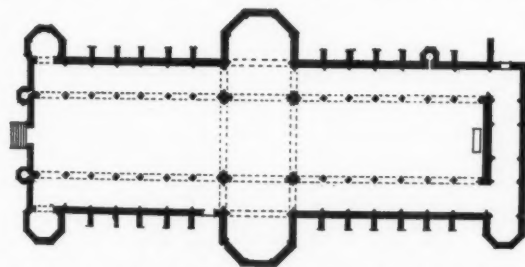


FIG. 13. ST. GEORGE'S CHAPEL, WESTMINSTER

planters had started building it from their own designs, and when about eight feet up began to think how they should roof in the apse. They could not gather the rafters together in the usual way, as the angles of the semi-octagonal apse were

not at forty-five degrees. After due consideration I solved this problem in—what I believe to be—a unique manner, and afterwards enlarged upon it when build-

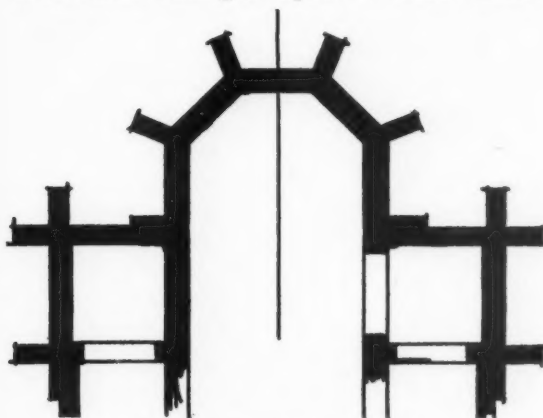
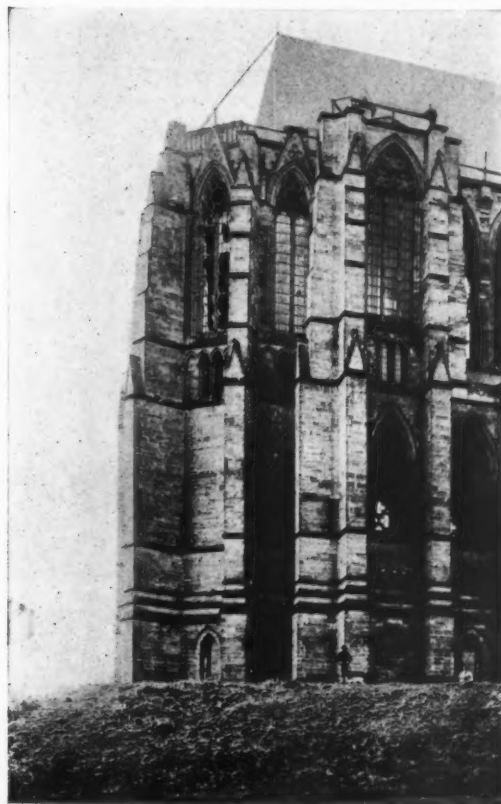


FIG. 14. LANCING CHAPEL

ing a small church in Wiltshire, the photo of which will show how an apsidal plan can form the foundation for an effective



LANCING COLLEGE

THE AMERICAN ARCHITECT

and dignified structure. The ridge of the chancel is run straight through to a gable on the eastern face of the apse; the roof over the northeast and southeast faces is hipped back, and these two faces have windows the same height as those in the sides of the chancel, but the eastern face—having a gable—is able to have three higher windows, without sacrificing the reredos to obtain them. Lofty buttresses run up the gable which is surmounted by



A CHURCH IN WILTSHIRE

a stone cross. This latter is far more effective than the metal one usually found on the ordinary apse. It may be noticed in Fig. 15 that the plan is not part of a

true octagon; the eastern face being the widest, gives more room in the sanctuary. I had to design this church in the Early English style as the funds were extremely

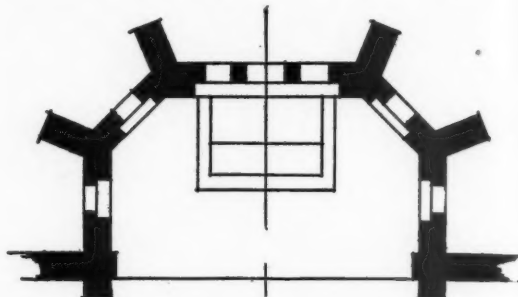


FIG. 15. CHURCH IN WILTSHIRE

limited; it would have been interesting to have built it in the Perpendicular style, with a large east window in place of the three lancets.

RECENT LEGAL DECISIONS

ARCHITECT'S DECISION CONCLUSIVE

Where an architect is, by the terms of a contract, constituted by the parties an arbitrator to determine practical questions of importance arising in the course of the work, his decisions are binding upon the parties so long as he acts honestly and with reasonable efficiency. A contract for the erection of a power and heating plant called for "sectional covering . . . air cell, class A."

The architect, in the belief that the only kind of covering which would conform to the specifications was that manufactured by a particular manufacturer, rejected the covering supplied by the contractor, which was known in the trade as "air cell, sectional covering, class A." It was held that the fact that the covering furnished was not inferior, in quality or otherwise, to that of the particular manufacturer, did not prevent the decision of the architect from being conclusive, he acting in good faith though mistakenly.

Evans v. Middlesex County, Massachusetts Supreme Court, 95 N. E. 897. (J. S.)

FIRST CONGREGATIONAL CHURCH RIVERSIDE, CAL.

MR. MYRON HUNT, ARCHITECT

THE climate, and the architectural traditions of California, especially in the southern section of the state, lend themselves to opportunities for picturesqueness of design and a certain consistency as to environment, that are not present in the East. The studious man who brings to the practice of his profession all the attributes of art that of right belong to it, there finds opportunities for artistic expression that enables him to put an impress on his work and create a result that may well be the envy of those practicing in less favored localities. The church illustrated herewith, originally designed jointly by Mr. Myron Hunt and Mr. Elmer Grey, is a most interesting and satisfactory example of modern ecclesiastical architecture on the Pacific Coast.

The following notes enable a comprehensive idea of this edifice, and supply such further technical information as is not conveyed by the illustrations.

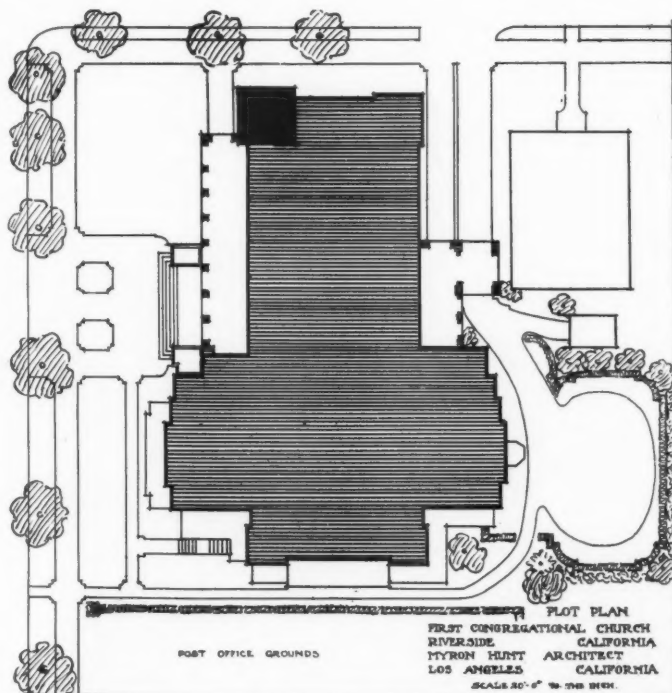
The perspective drawing, reproduced herewith, was submitted with the set of winning drawings in the American Institute of Architects Competition which resulted in the selection of the architects for this church. There were but three competitors,—the firm of Myron Hunt and Elmer Grey (now dissolved) being one.

Between the time when these drawings were submitted in competition and the awarding of the commission, Mr. Hunt and Mr. Grey dissolved partnership, and the committee for the church placed the making of the working drawings and the erection of the building in the hands of Mr. Hunt.

The plan and general scheme of the church, which was Mr. Hunt's conception, have remained substantially unchanged. The exterior, as represented by the competition perspective, was largely worked up by Mr. Grey. As the photographs of the finished work will bear witness, further study has somewhat altered it in detail.

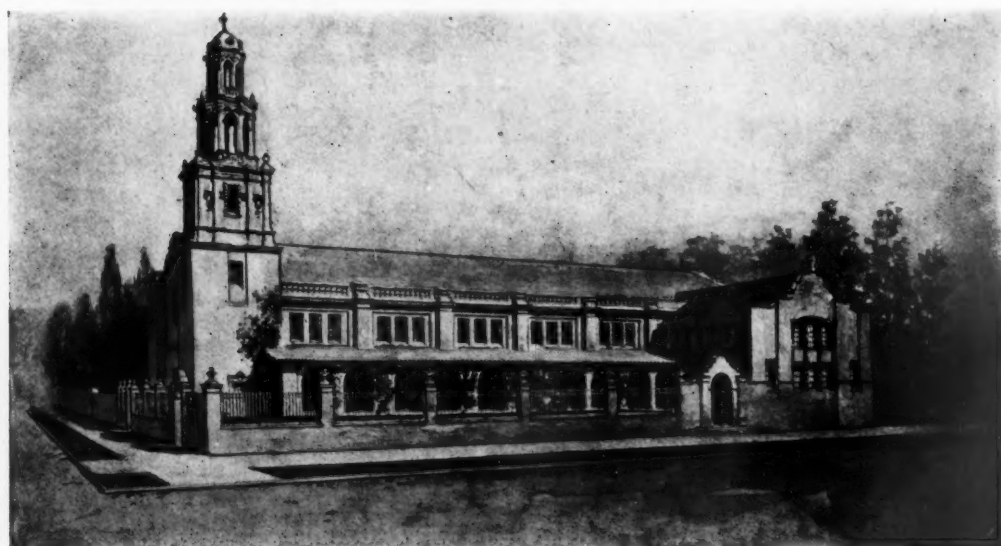
It is the belief of the architects that the winning idea in the competition was the locating of the church on the property so as to minimize the amount of unused space in the rear. The southwest part of the property has been devoted to the outdoor pulpit and a hedged-in audience space.

The church is located on a carline, and an effort has been made to make it proof against outdoor noises. As a result of this construction, on the day of the dedication of the church a house burned down across the street, and the audience did not hear the fire engines. The walls are two feet thick, a double eight-inch wall with an eight-inch air space connected by webs. The piers are of brick. Reinforced concrete continuous bond stones tie the structure together. The lower part of the tower and the skeleton which carries the



PLOT PLAN

THE AMERICAN ARCHITECT



THE COMPETITIVE PERSPECTIVE

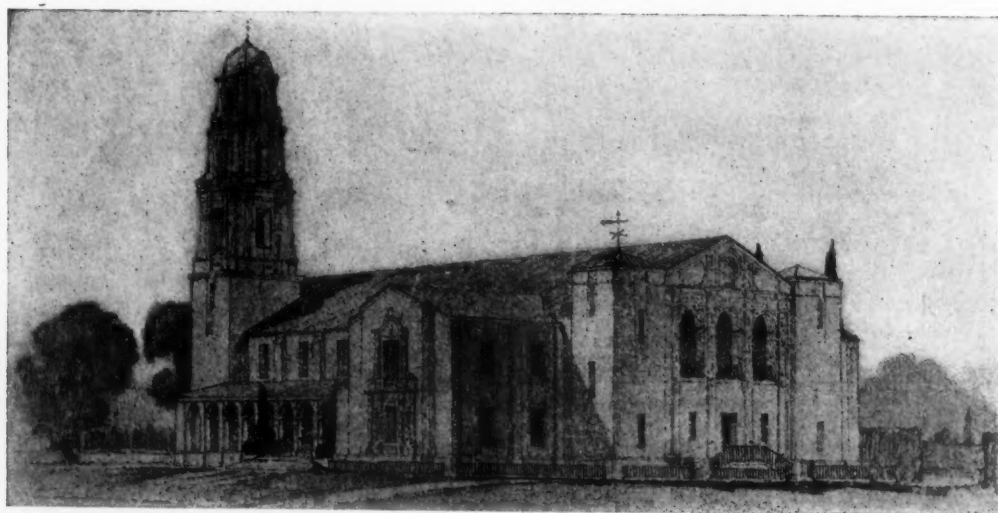
stone is reinforced concrete. This building is situated within forty or fifty miles of the most serious earthquake fault in California, and everything has been done to lend stability to a structure which the congregation wished to make permanent.

The problem, which has resulted in the present plan, was to build a church and Sunday school which might at some future time be enlarged into a church solely. A cruciform church was decided upon, making the nave the present church, and so

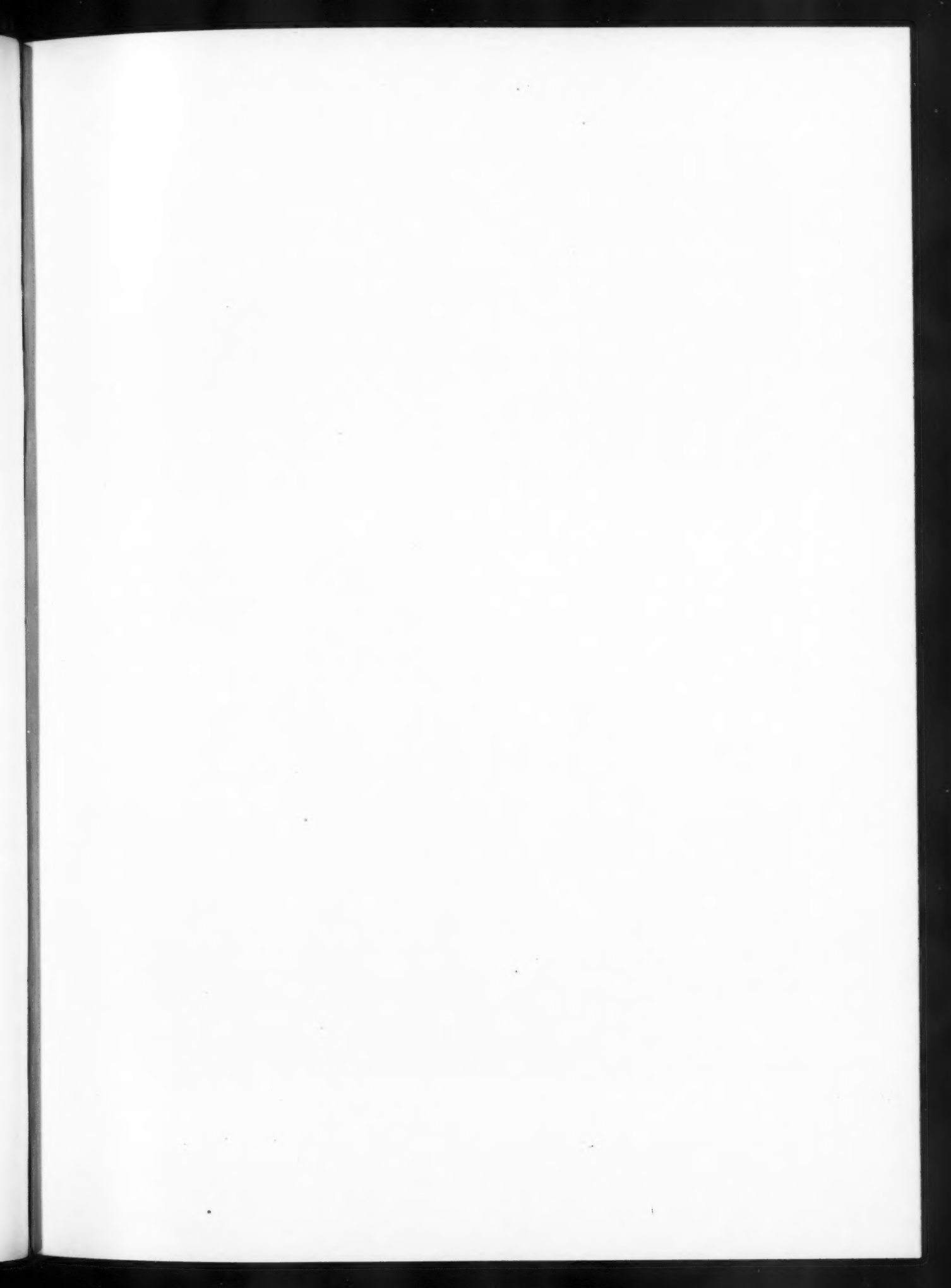
constructing the Sunday school part that the apse and portions of the transepts could in the future be added to the church, at which time it is contemplated the location of the pulpit would be reversed. The trusses of the roof over the apse are so located that the regular roof construction of the nave may be inserted between them.

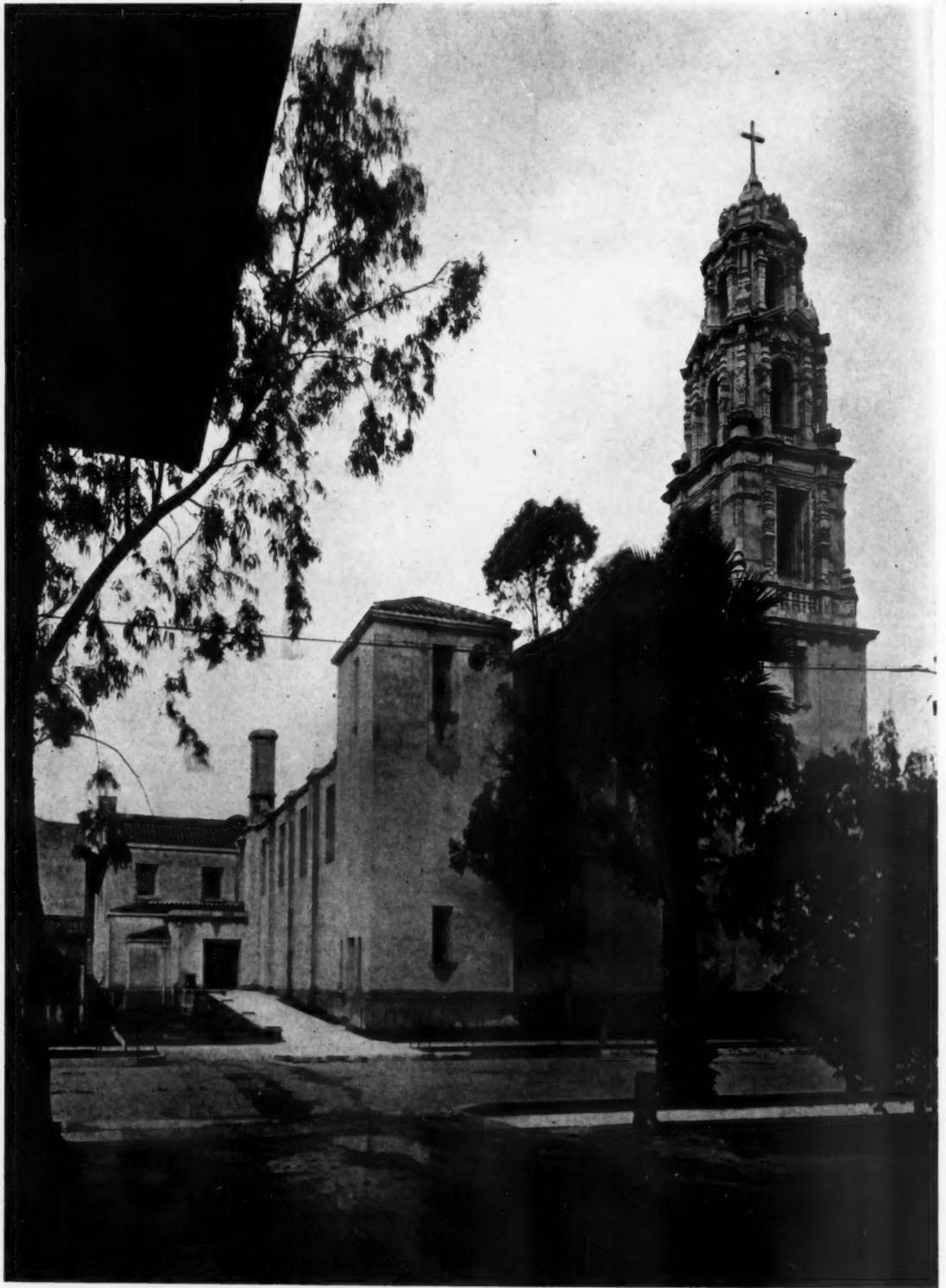
The present Sunday school arrangements are provided by rooms looking into a court

(Continued on page 271)



THE RESTUDIED PERSPECTIVE

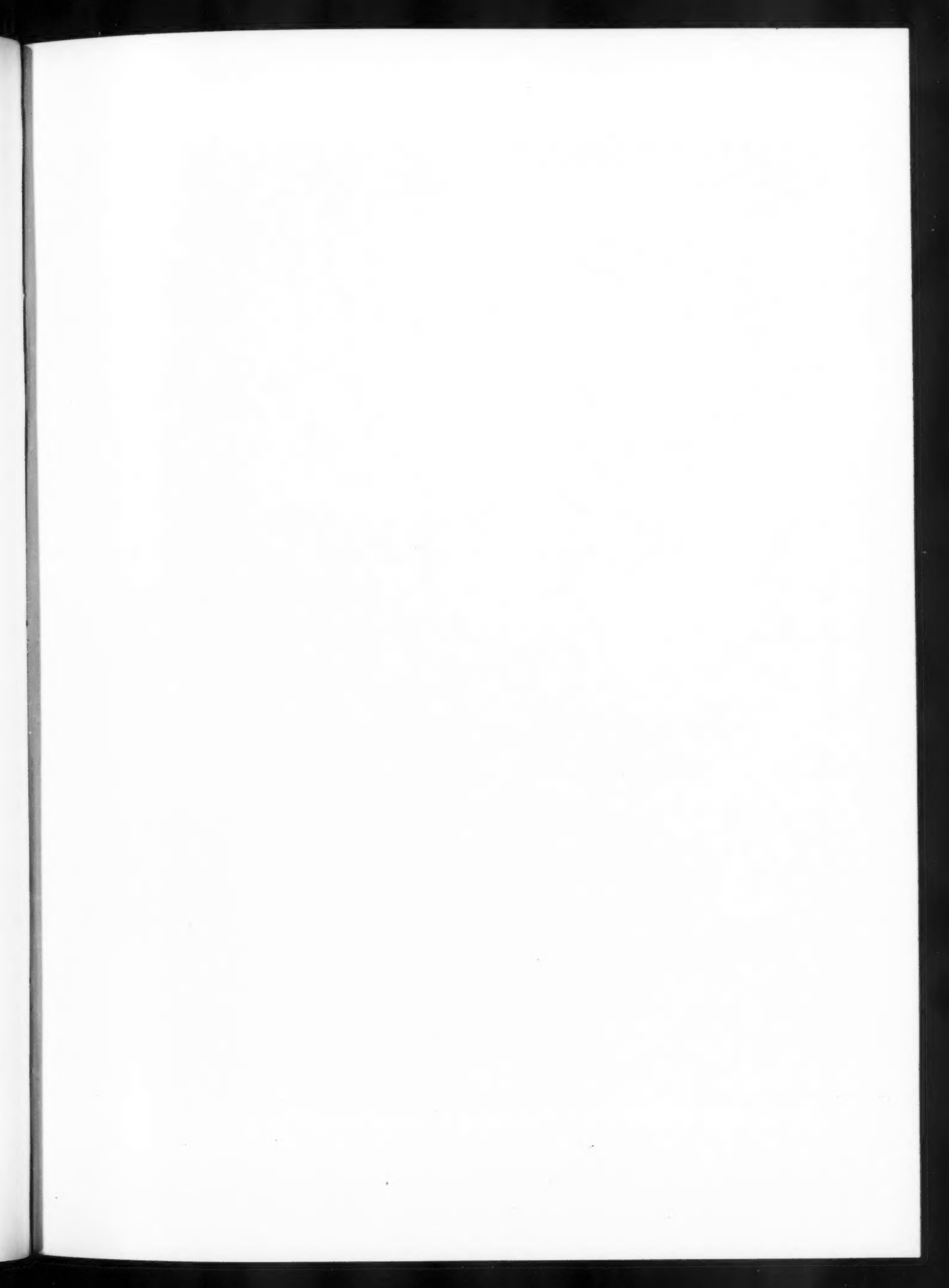


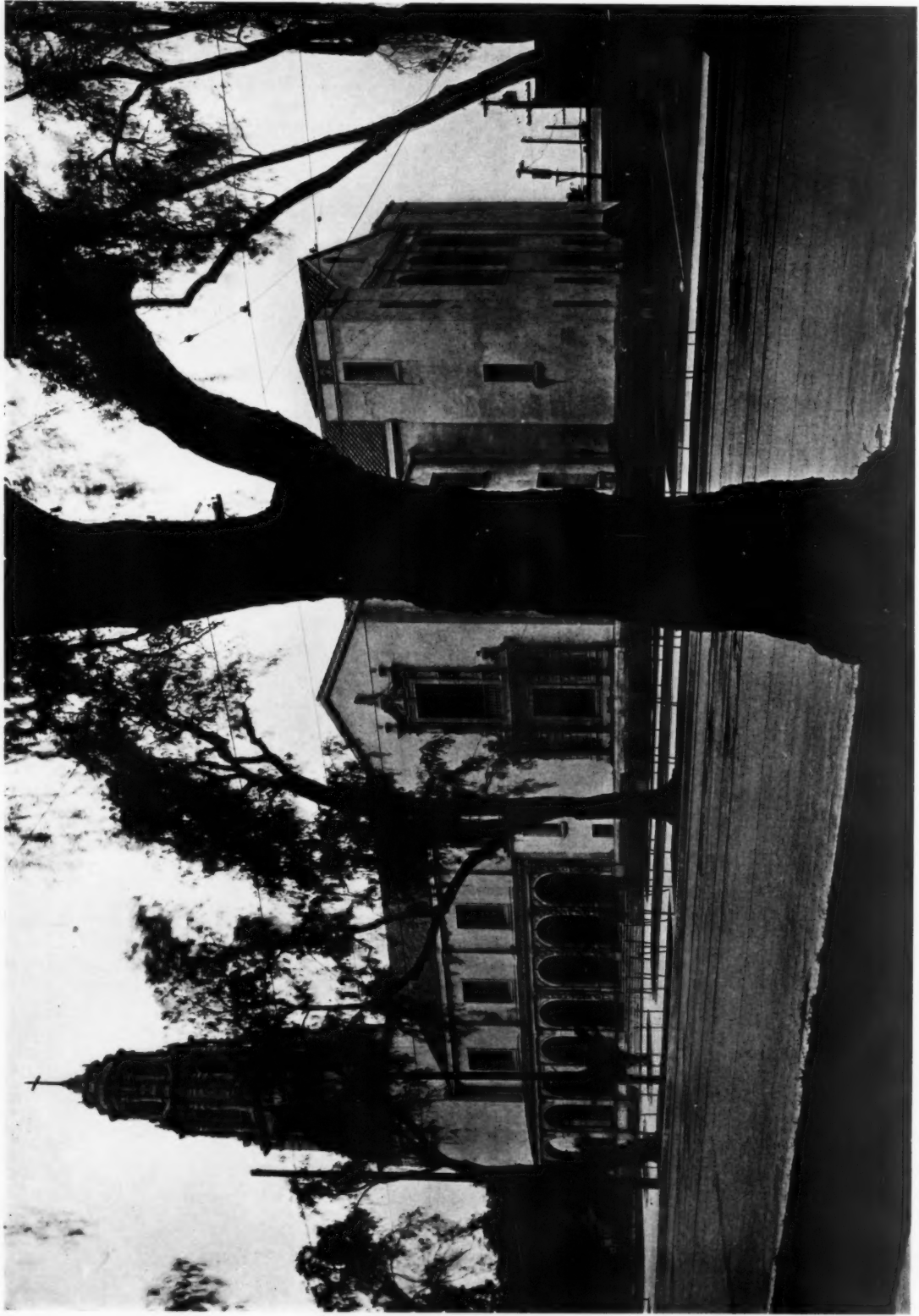


VIEW FROM SOUTHEAST

FIRST CONGREGATIONAL CHURCH, RIVERSIDE, CAL.

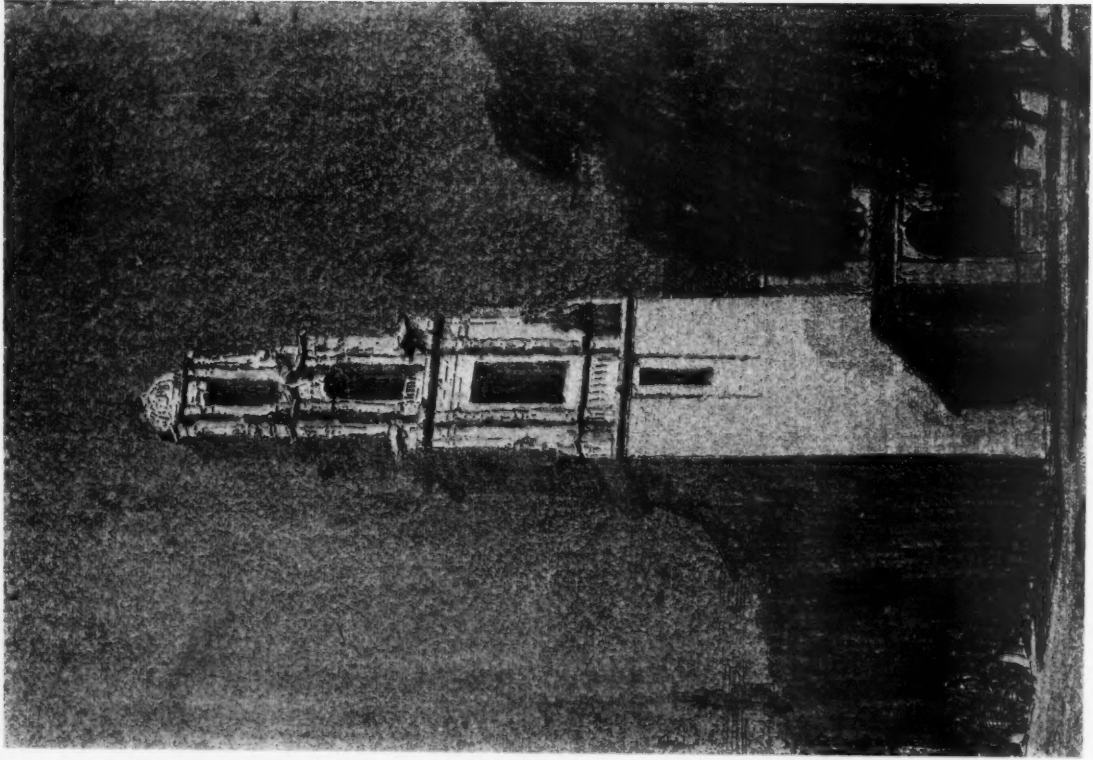
MR. MYRON HUNT, ARCHITECT



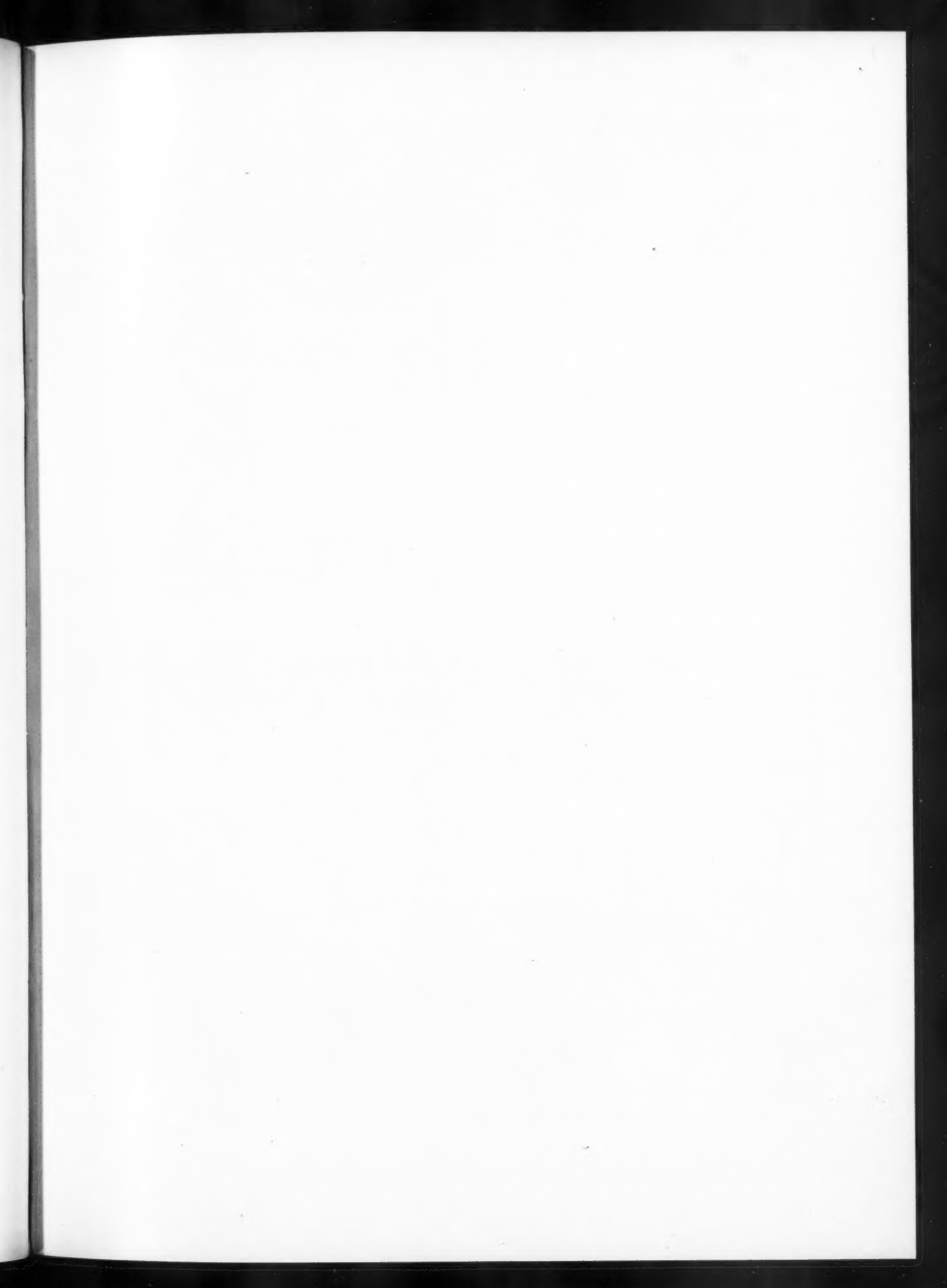


VIEW FROM NORTHWEST
FIRST CONGREGATIONAL CHURCH, RIVERSIDE, CAL.
MR. MYRON HUNT, ARCHITECT





TENTATIVE SKETCH AND PHOTOGRAPHIC VIEW OF SPIRE
FIRST CONGREGATIONAL CHURCH, RIVERSIDE, CAL.
MR. MYRON HUNT, ARCHITECT





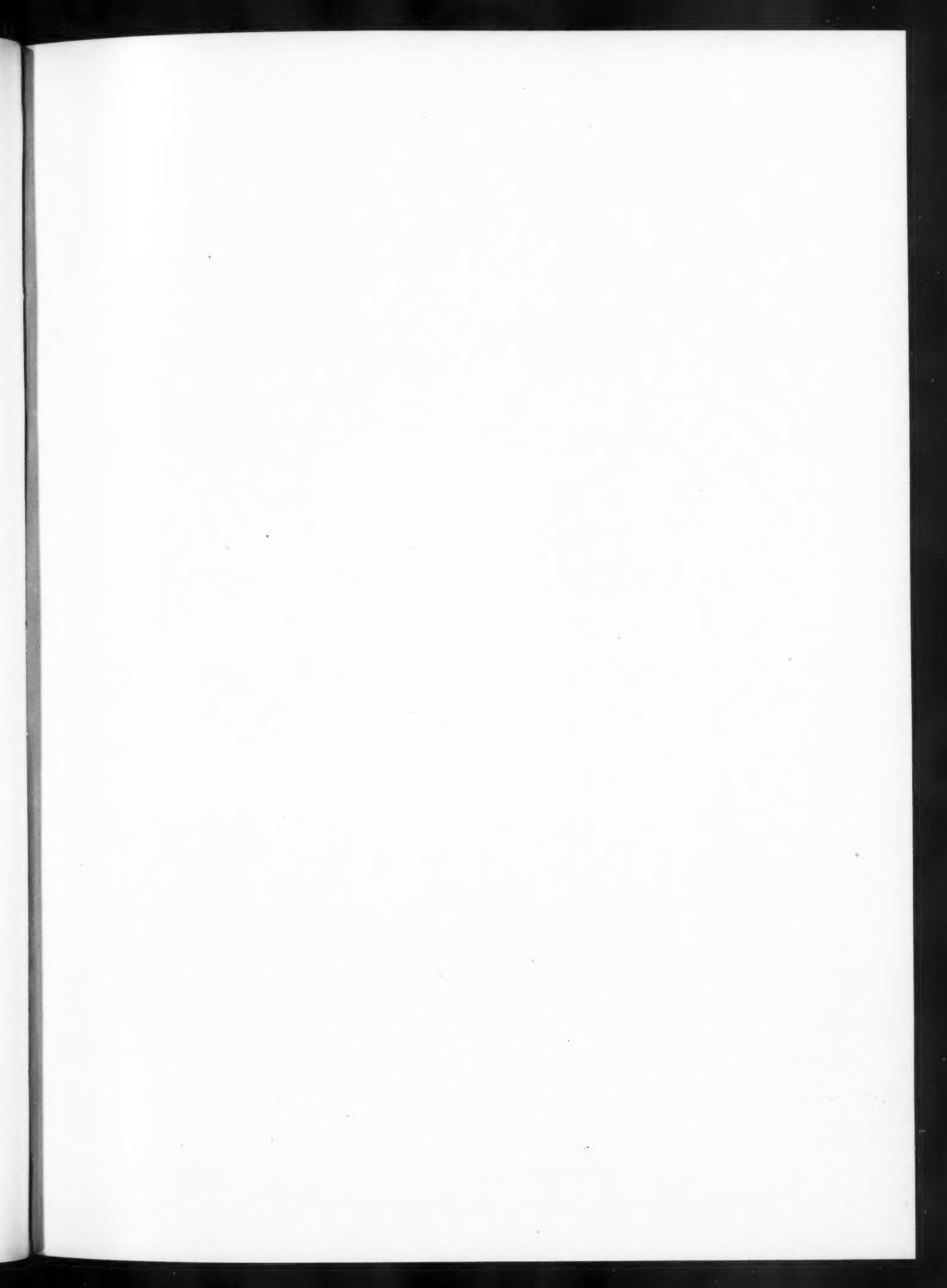
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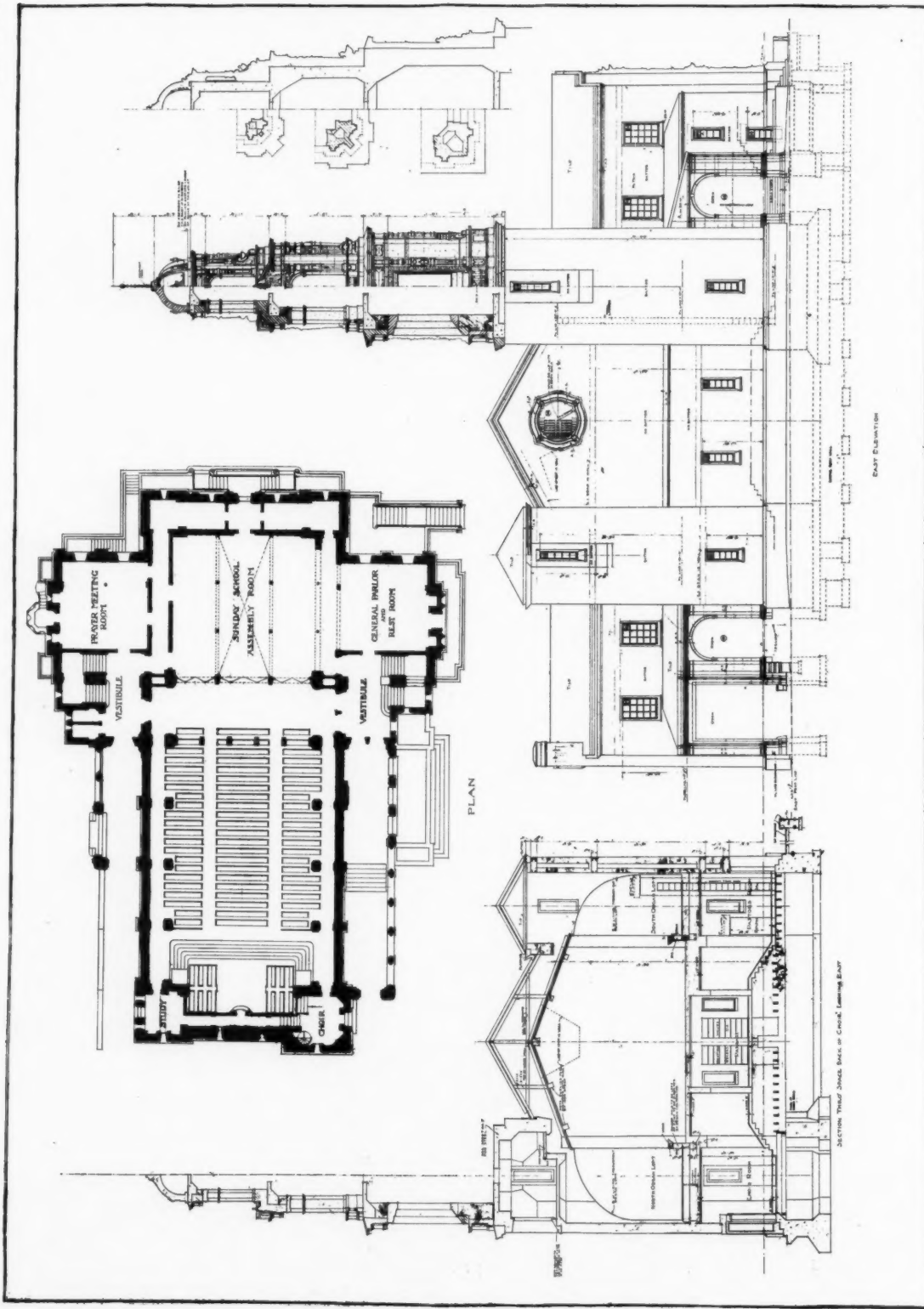


LOOKING TOWARD PULPIT

FIRST CONGREGATIONAL CHURCH, RIVERSIDE, CAL.

MR. MYRON HUNT, ARCHITECT



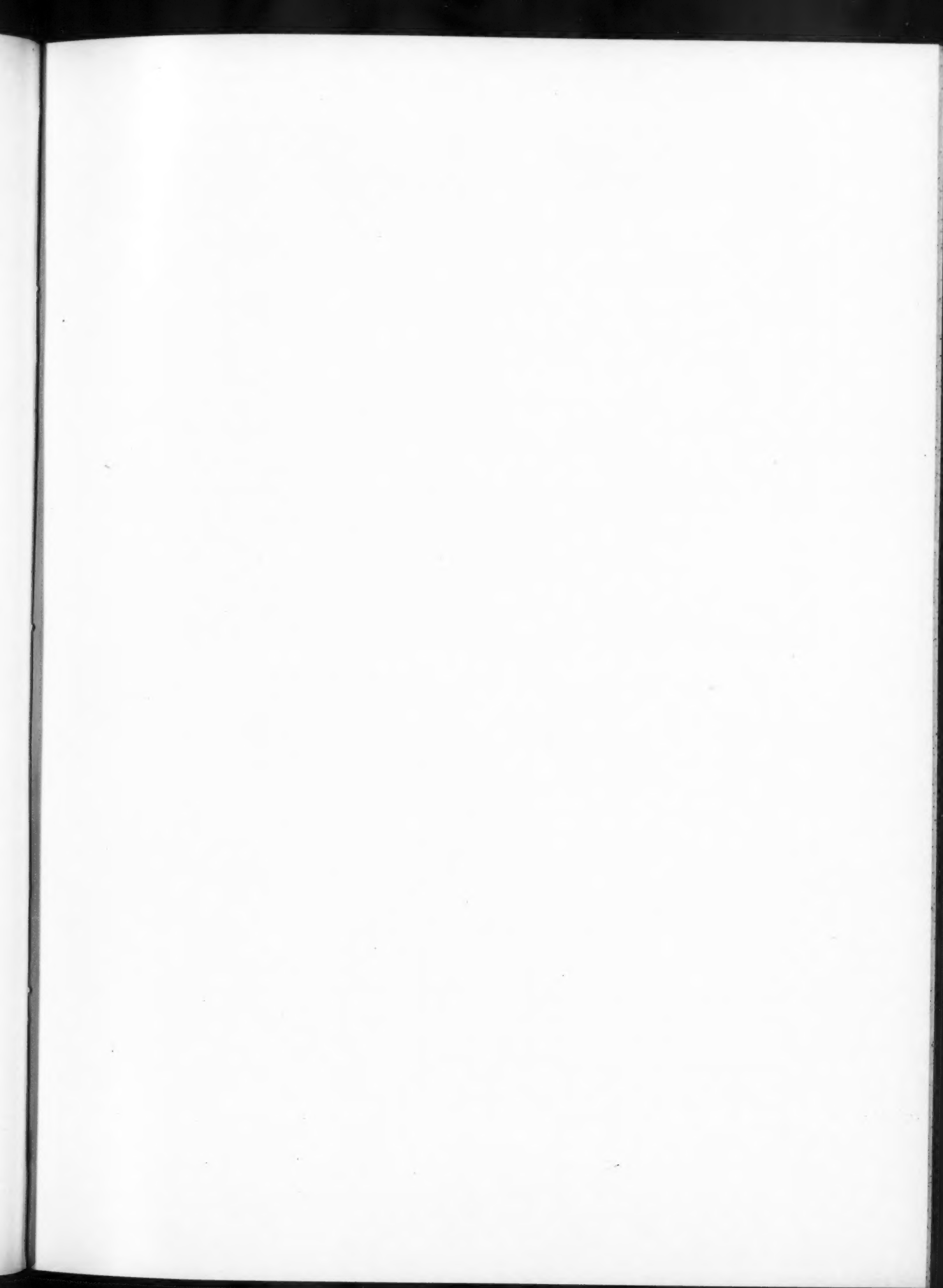


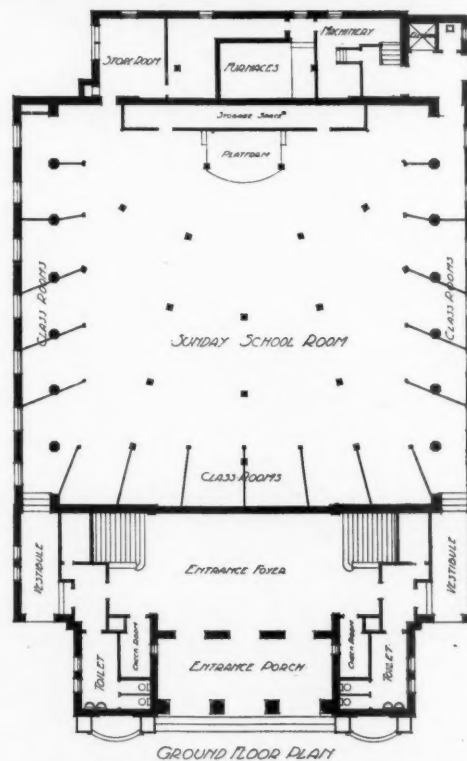
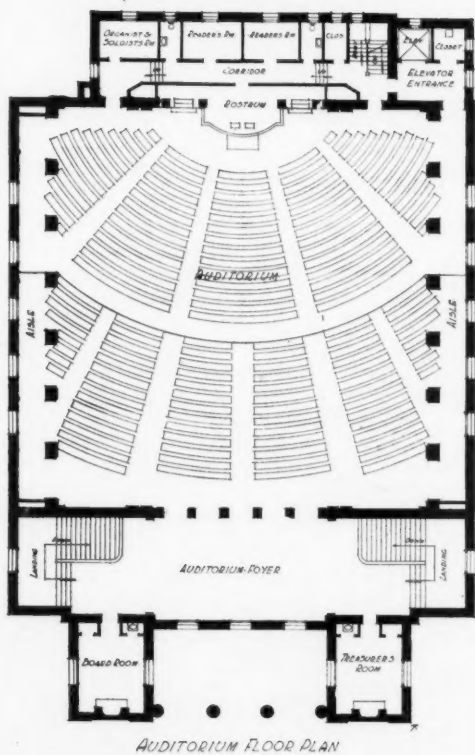
FIRST CONGREGATIONAL CHURCH, RIVERSIDE, CAL.
MR. MYRON HUNT, ARCHITECT





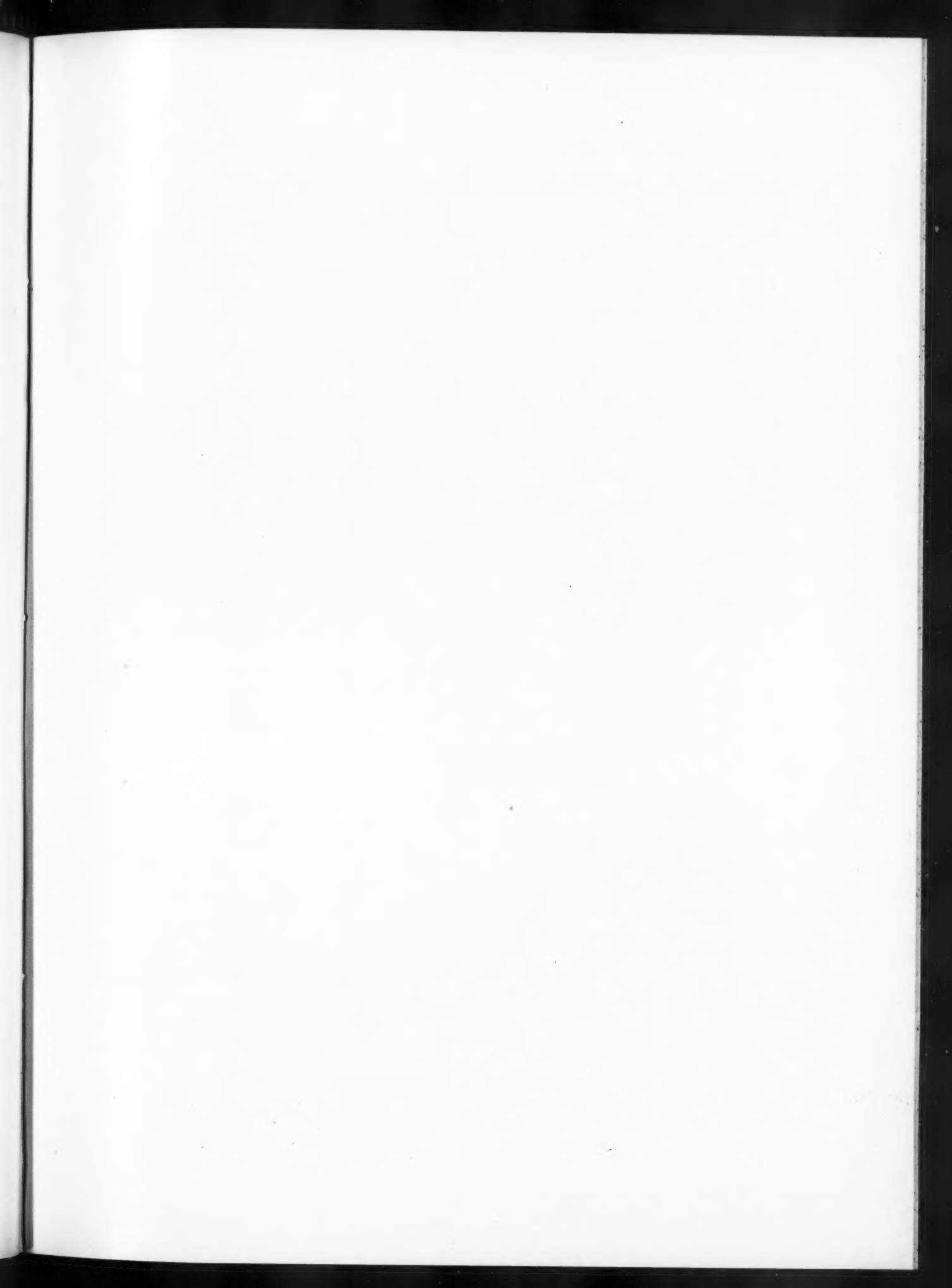
FIRST CHURCH OF CHRIST SCIENTIST, LONG BEACH, CAL.
MR. ELMER GREY, ARCHITECT

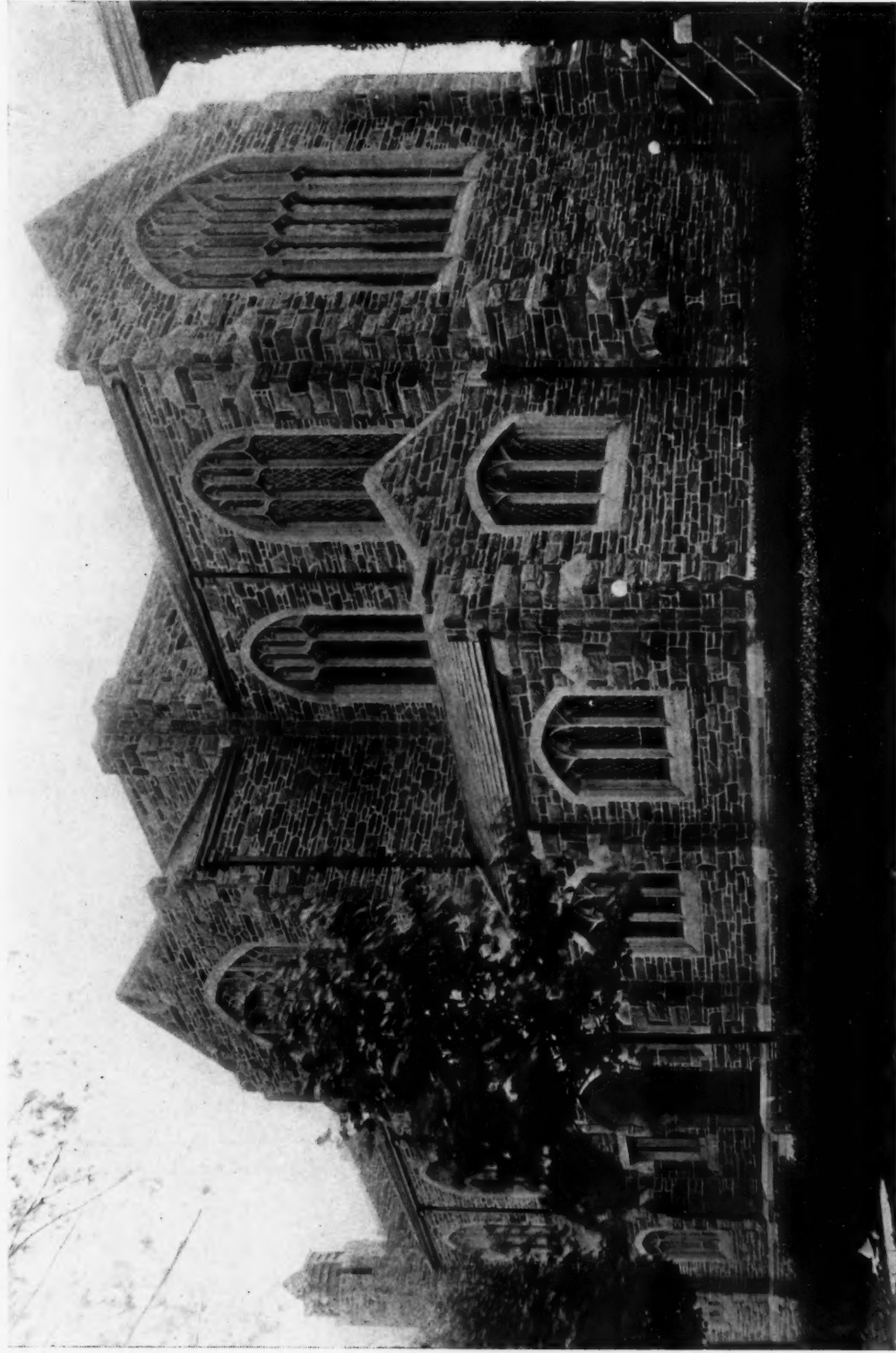




FIRST CHURCH OF CHRIST SCIENTIST, LONG BEACH, CAL.

MR. ELMER GREY, ARCHITECT





REAR VIEW

TRINITY CHURCH, ASBURY PARK, N. J.

MR. CLARENCE W. BRAZER, ARCHITECT

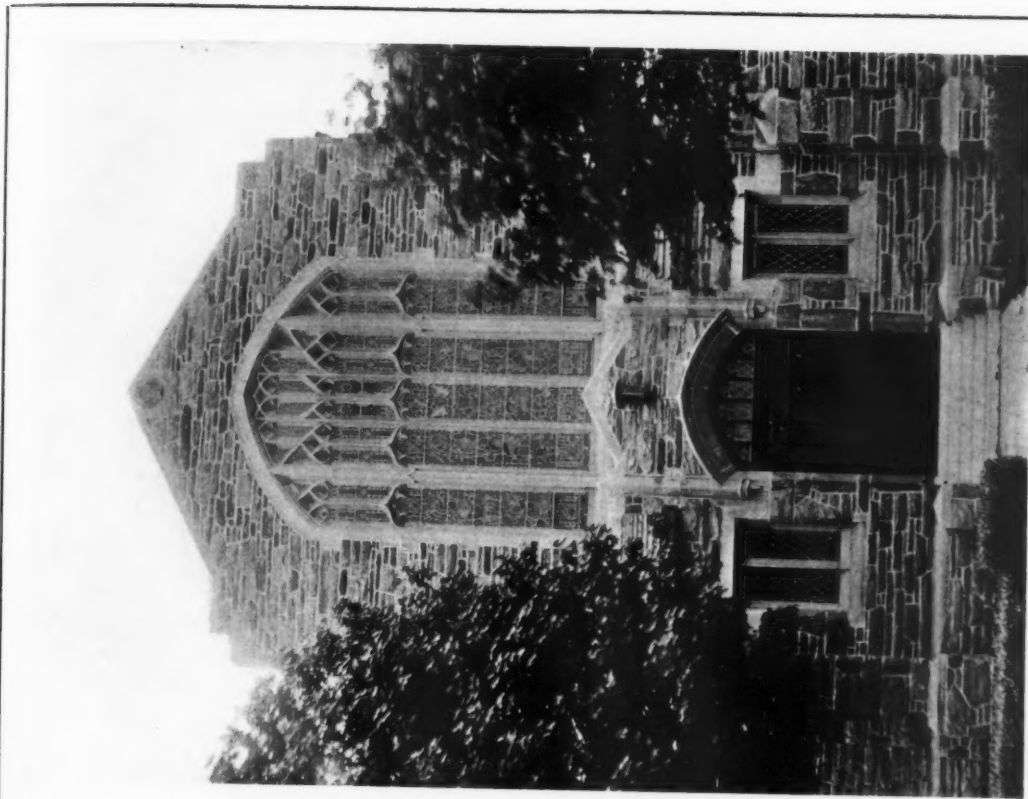
This church is constructed of Ciesnut Hill, Pa., Rubble stone with buffed Indiana limestone tracings. The window tracery and the entire interior is of a manufactured lime stone. The vestibules, main aisle, chancel and chapel have reinforced concrete floors, laid over with tile. Steps and borders are all green purple slate. The furniture is of temporary installation and will be replaced later with specially designed furniture. The central tower is unfinished, and will probably not be built for several years. The pews are of oak and the lighting fixtures of solid brass.



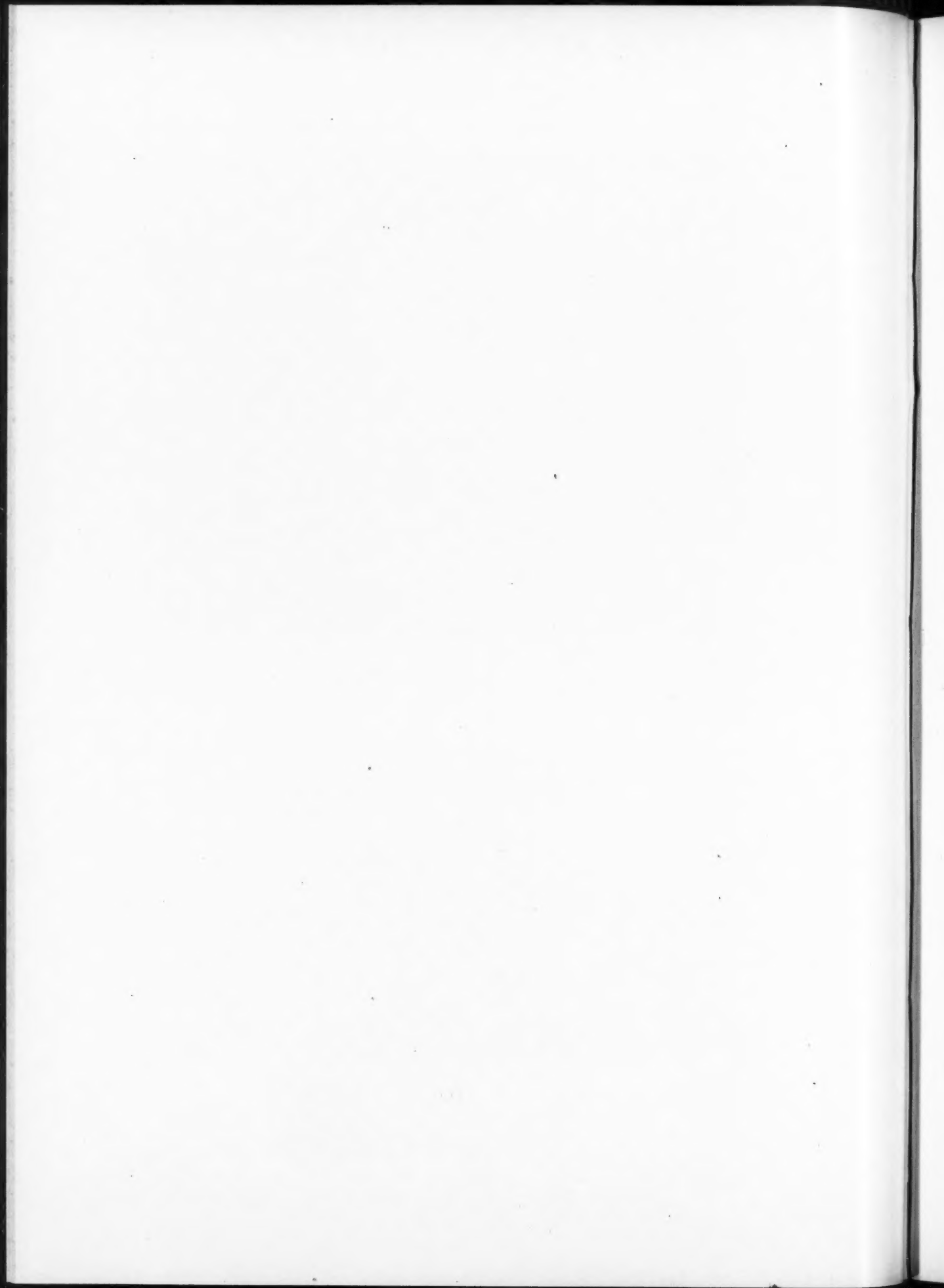
FRONT VIEW

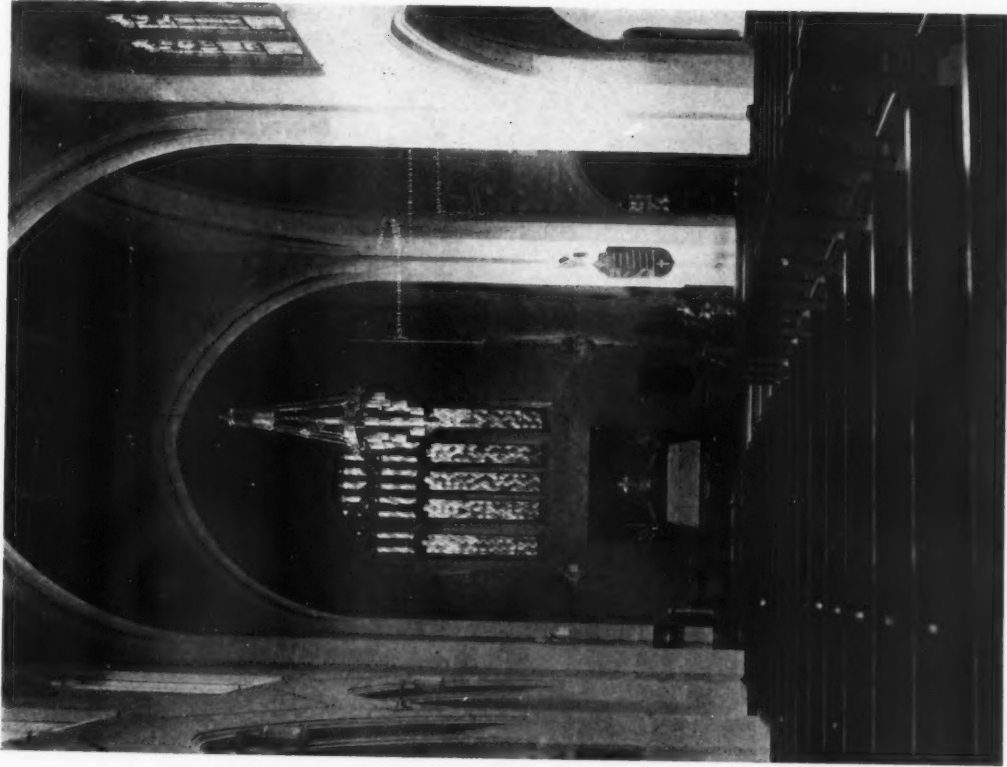
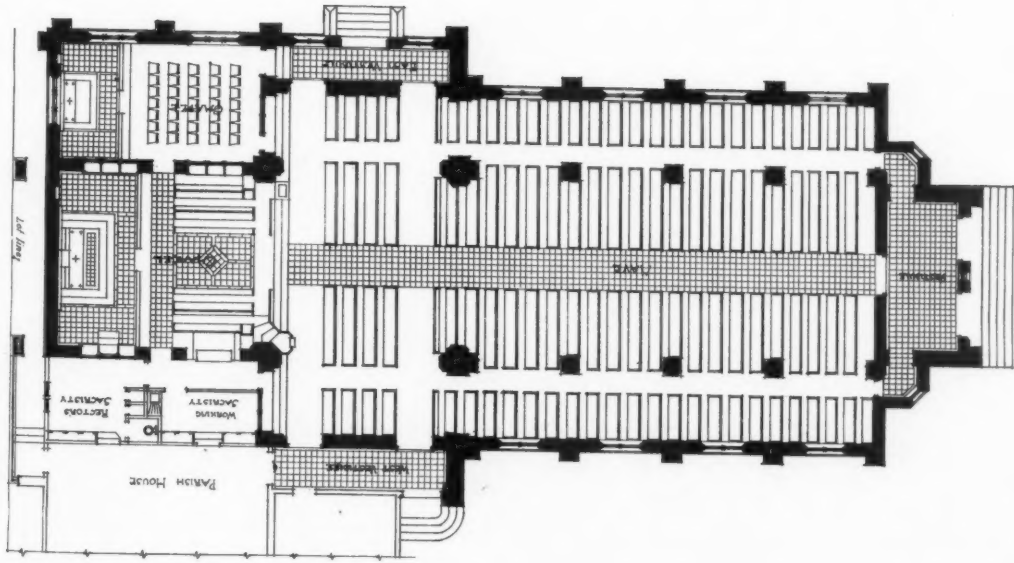
TRINITY CHURCH, ASBURY PARK, N. J.

MR. CLARENCE W. BRAZER, ARCHITECT



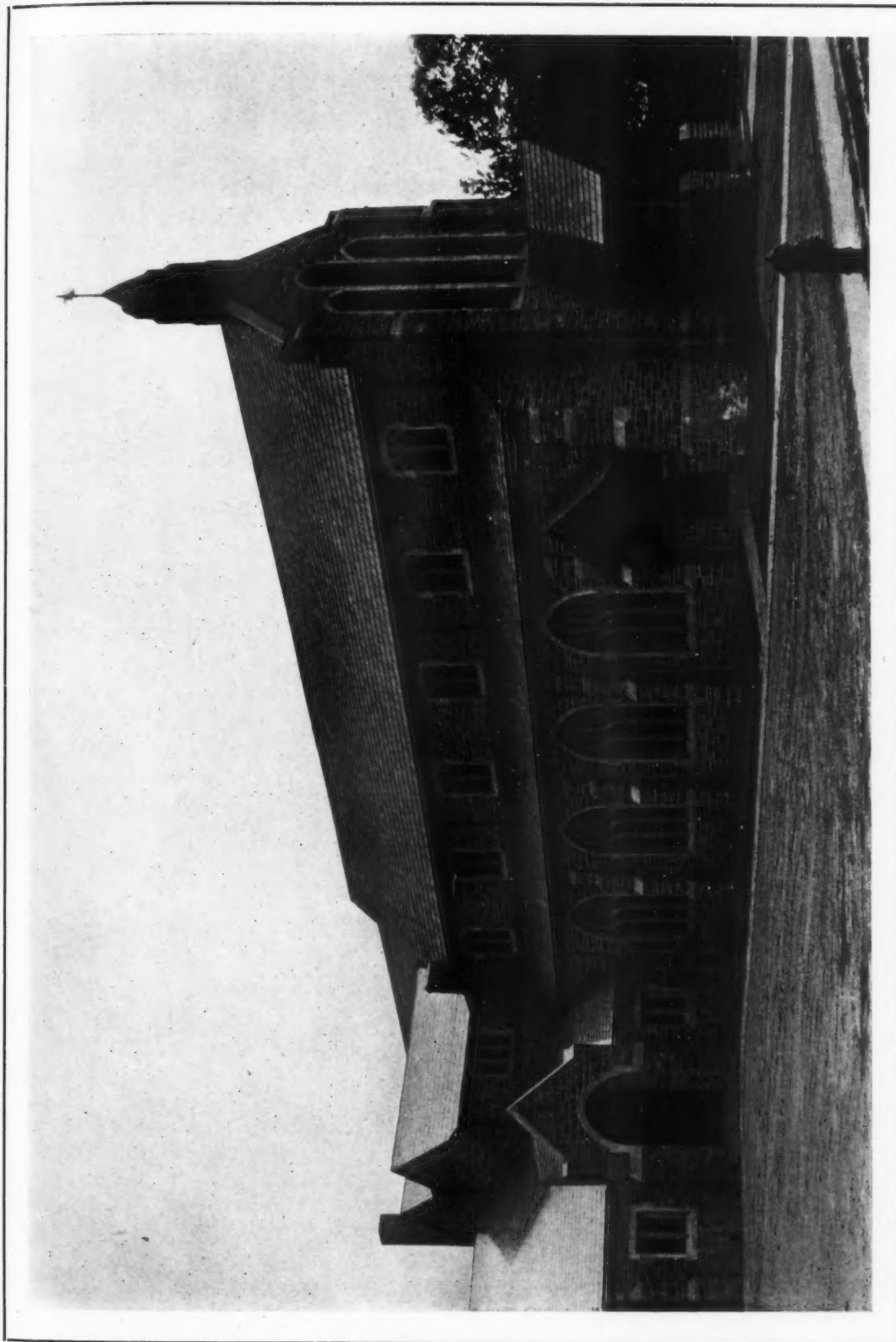
TRANSEPT





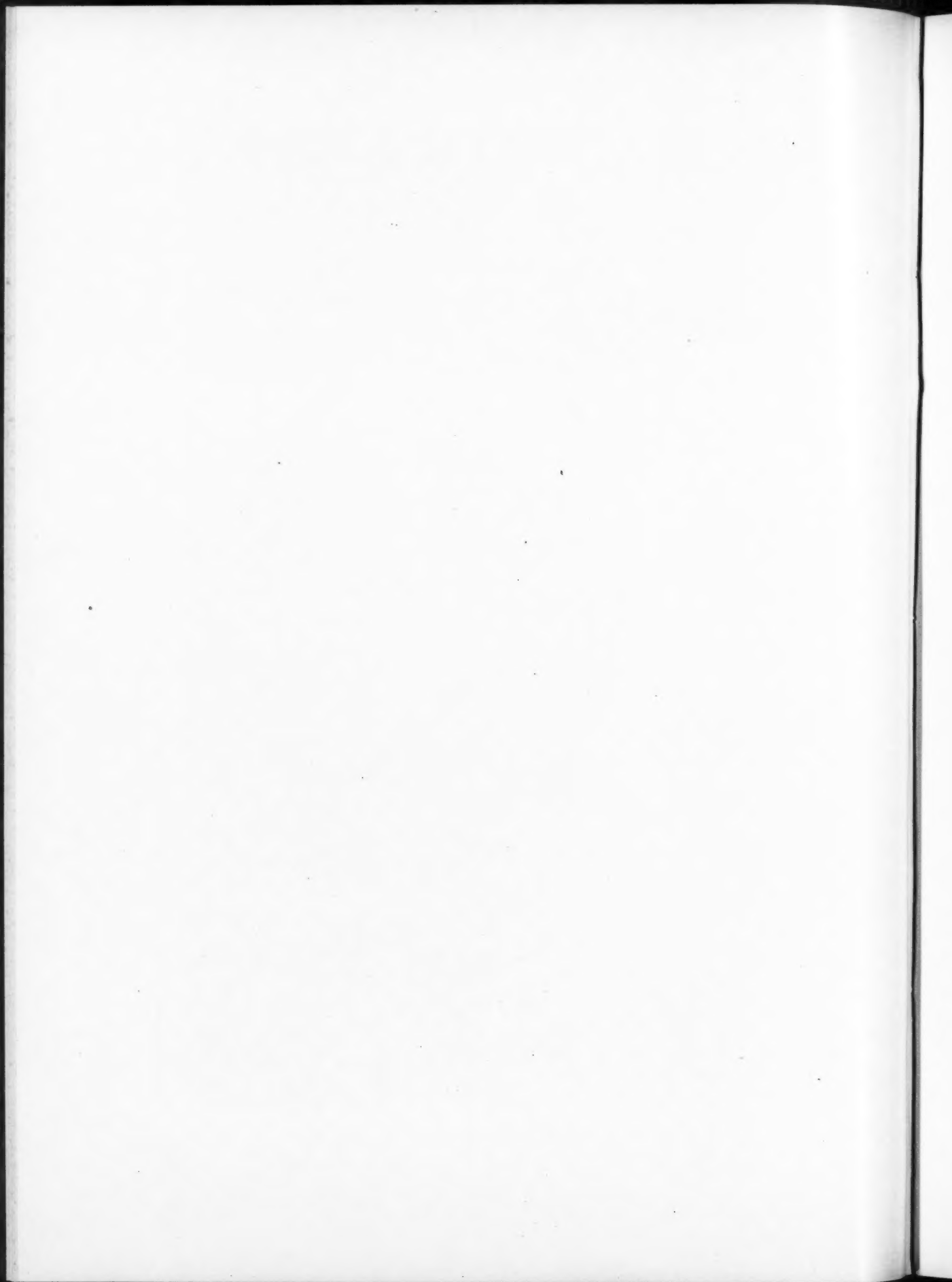
TRINITY CHURCH, ASBURY PARK, N. J.
MR. CLARENCE W. BRAZER, ARCHITECT

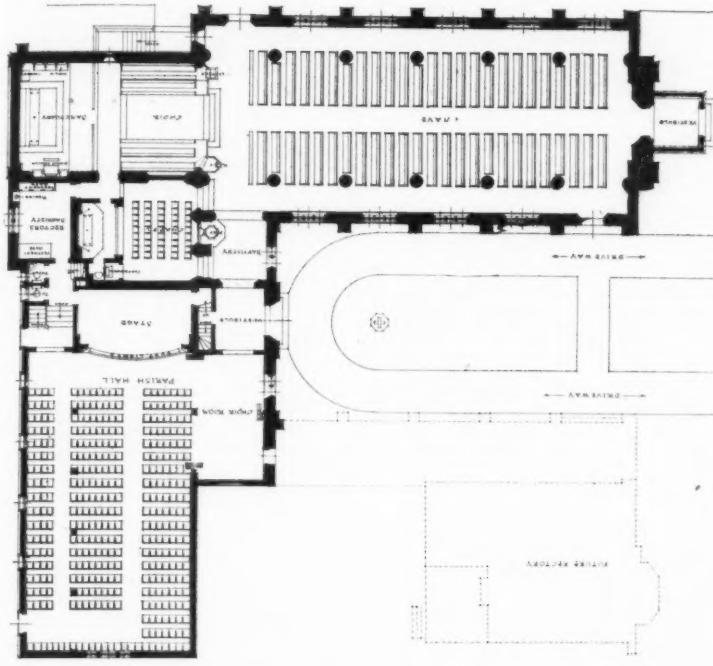
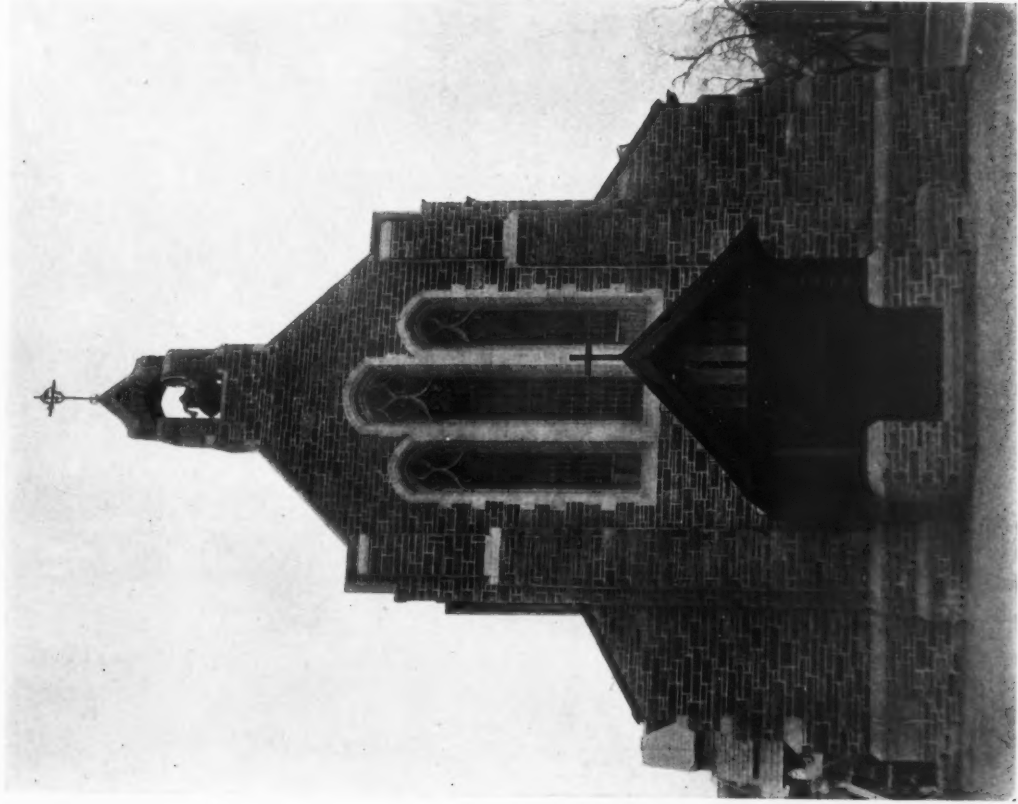




ST. JAMES CHURCH, LONG BRANCH, N. J.
MESSRS. BRAZER & ROBB, ARCHITECTS

This church is constructed of Chestnut Hill, Pa., stone, with concrete trimming tracery columns and arches. The floor is also of concrete and is laid directly on the level of the nave, but has pipe trenches under reinforced concrete floors in the aisles. The ceiling is of North Carolina pine, stained a nut brown, and the chancel ceiling is stenciled and painted in three colors. All the chancel furniture is temporary. The lighting fixtures are of cast brass, silver-plated. The cost to date of this church is \$189 per cubic foot.

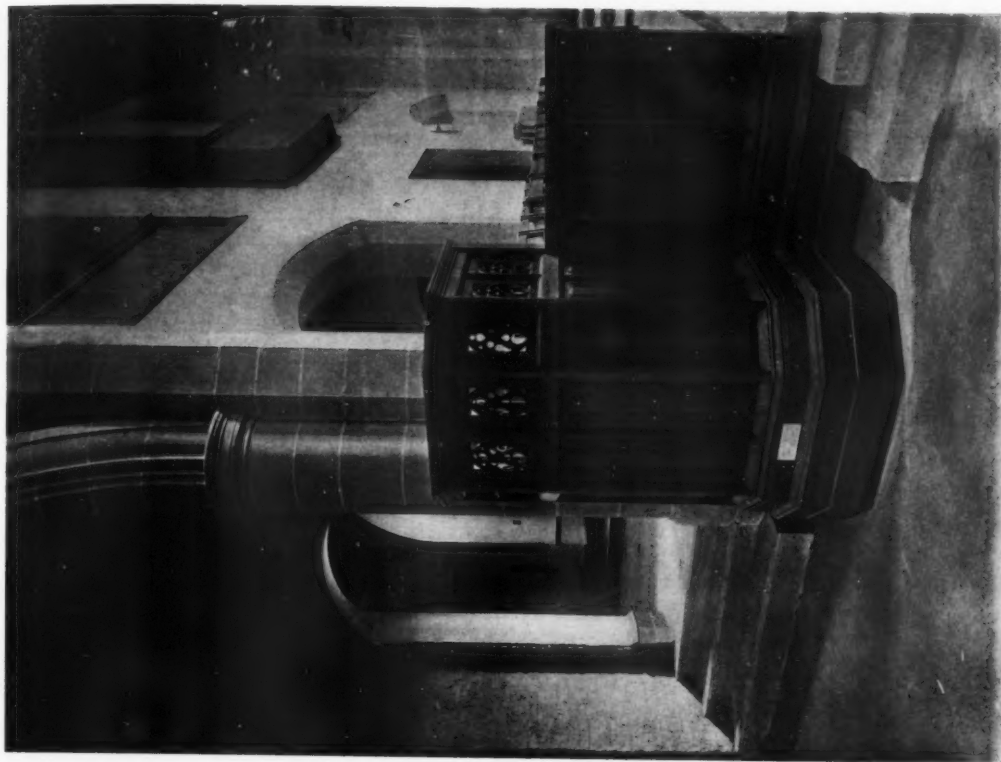
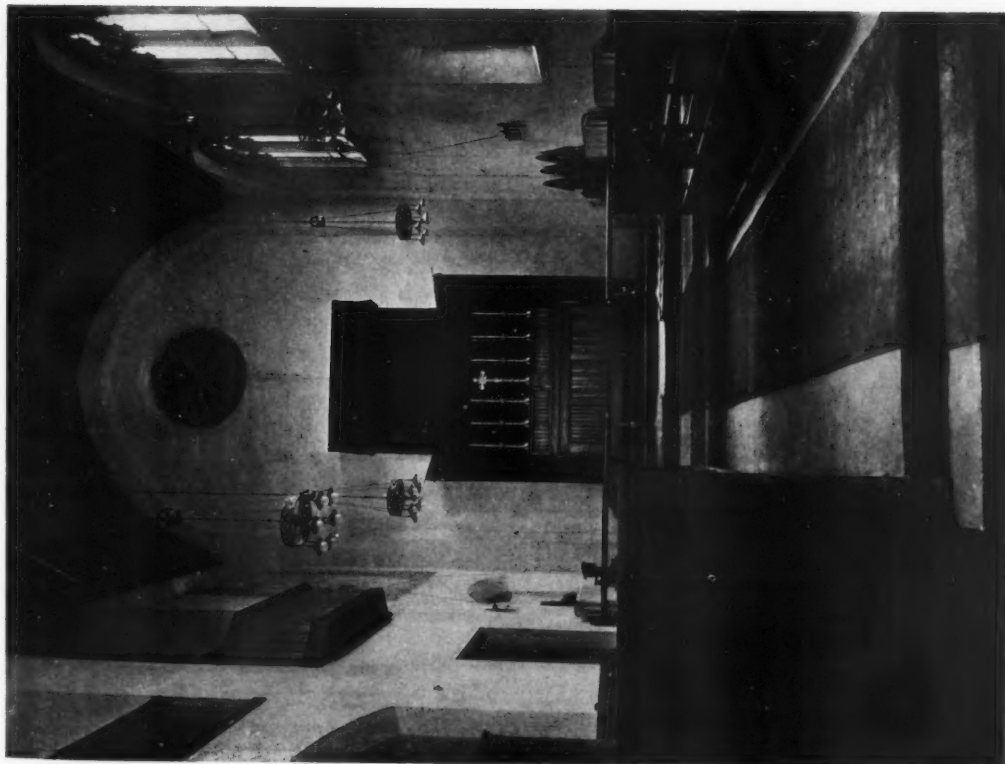




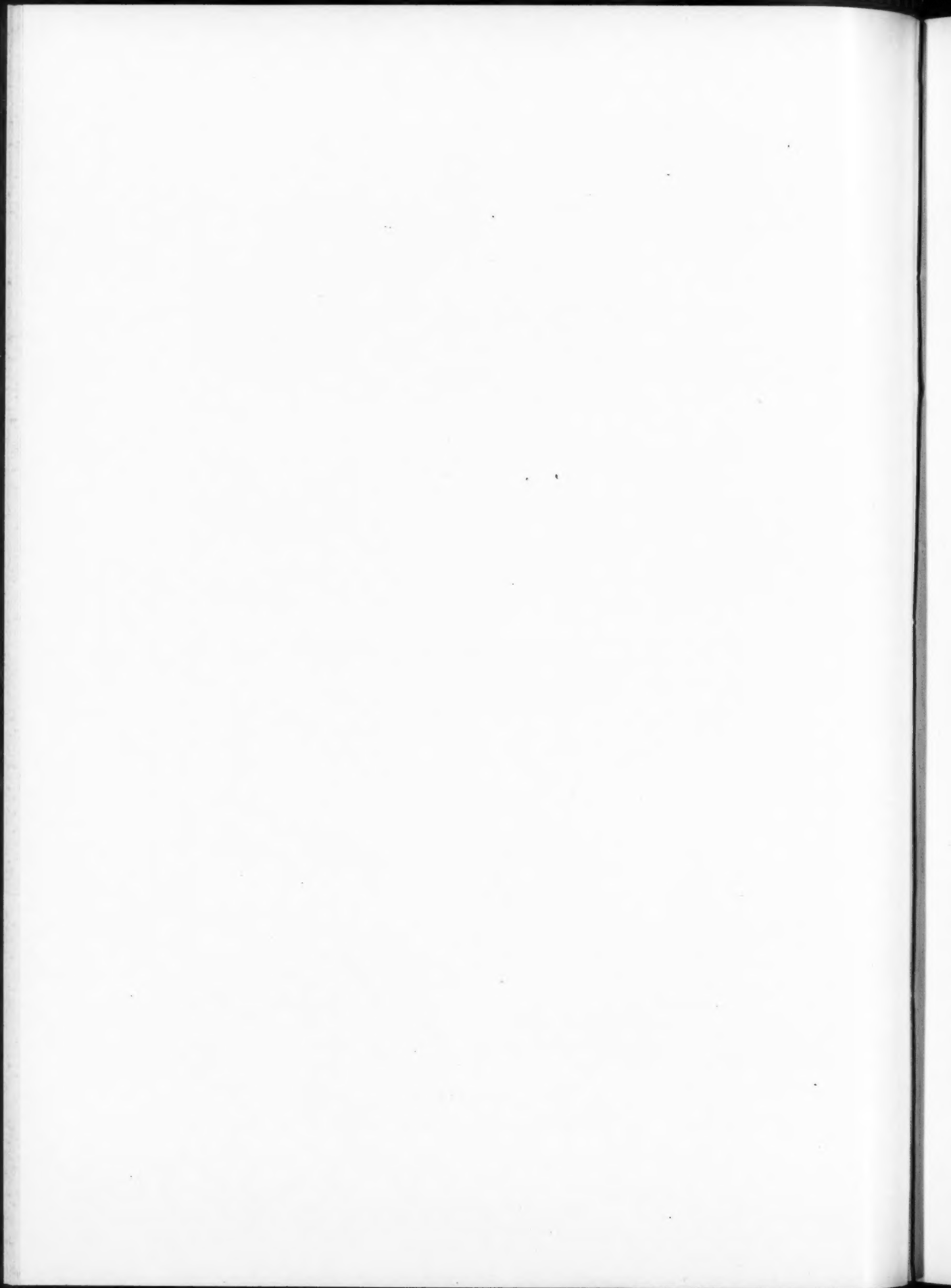
ST. JAMES CHURCH, LONG BRANCH, N. J.

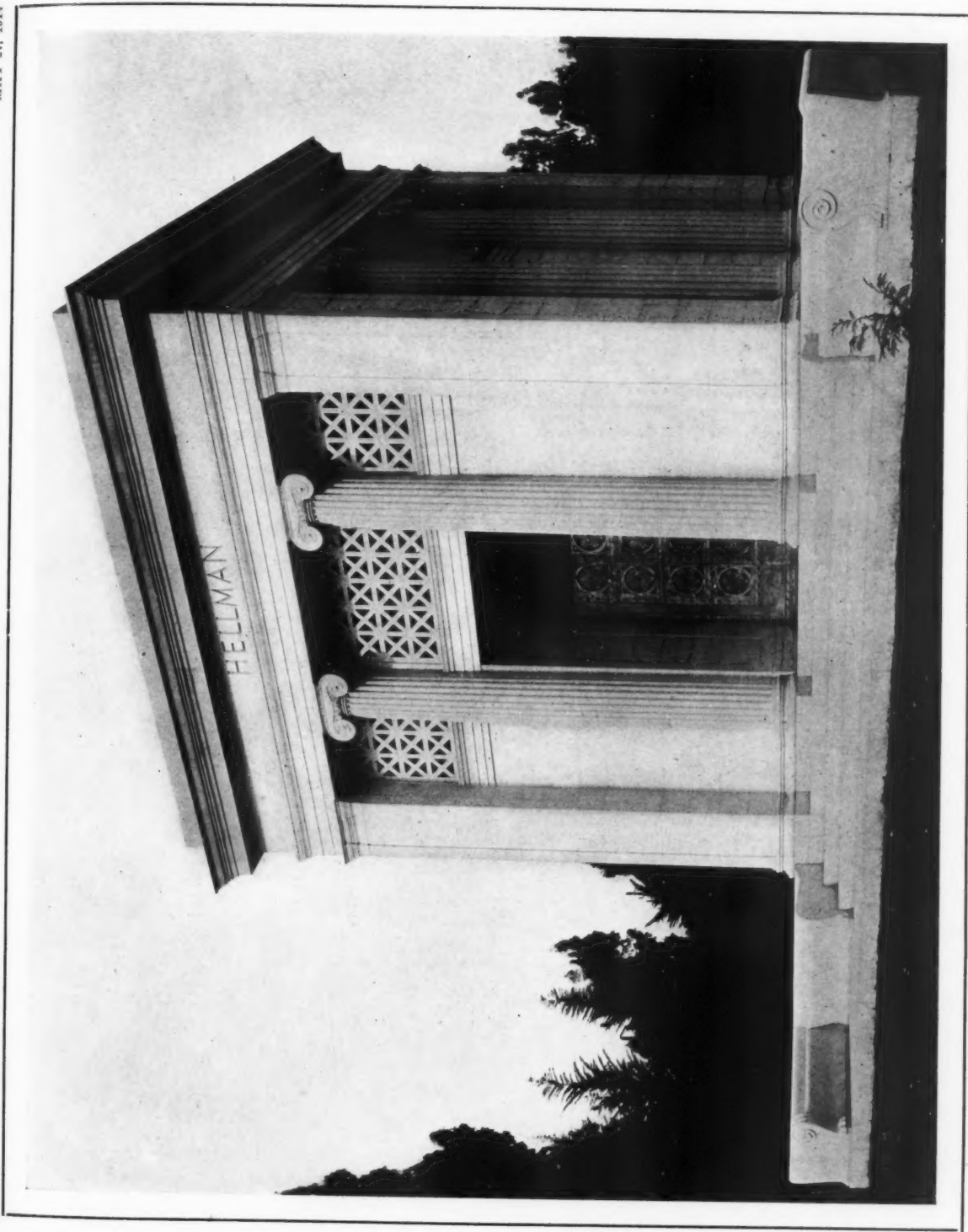
MESSRS. BRAZER & ROBB, ARCHITECTS





ST. JAMES CHURCH, LONG BRANCH, N. J.
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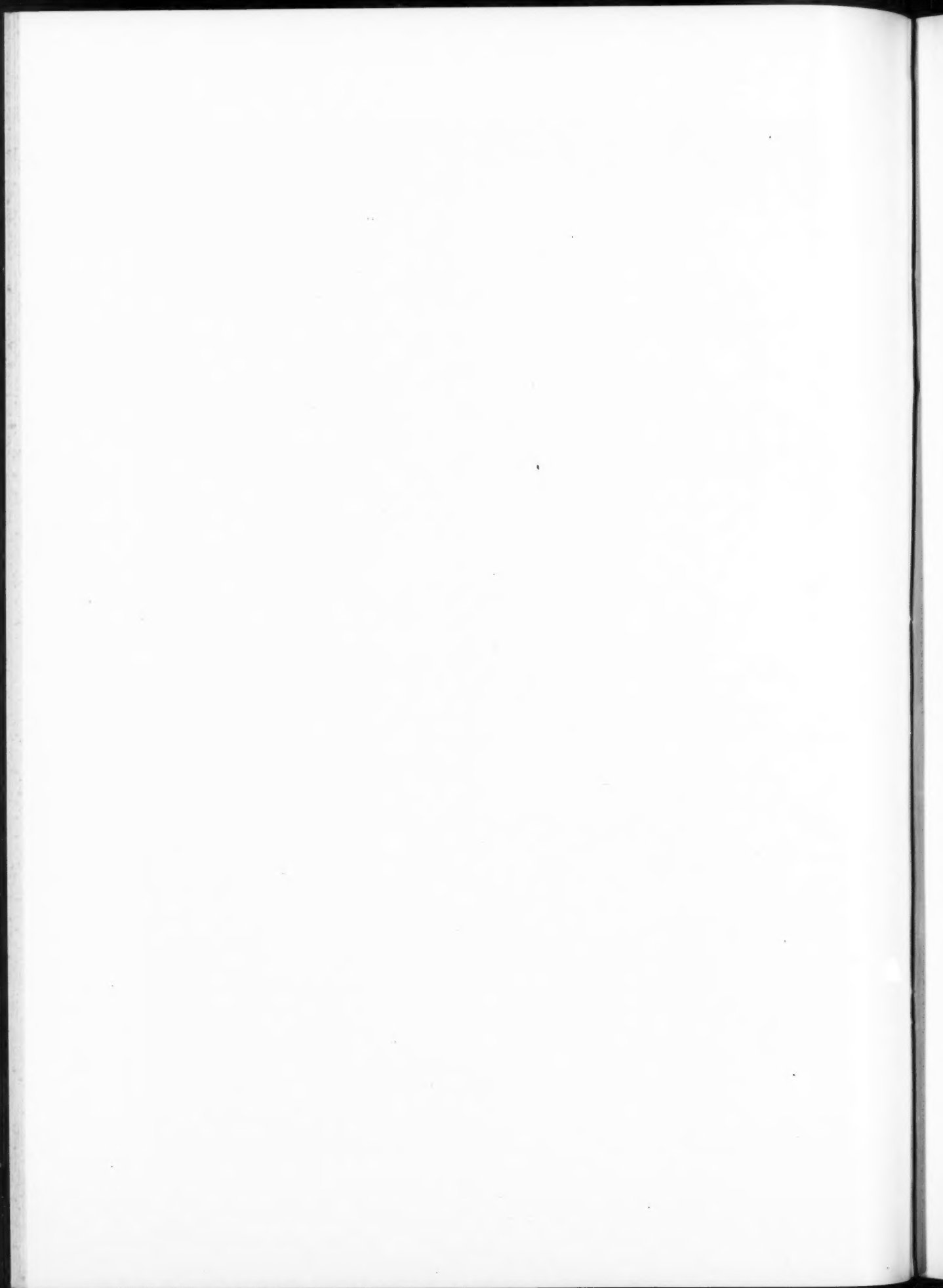
MAUSOLEUM, SAN MATEO COUNTY, CAL.
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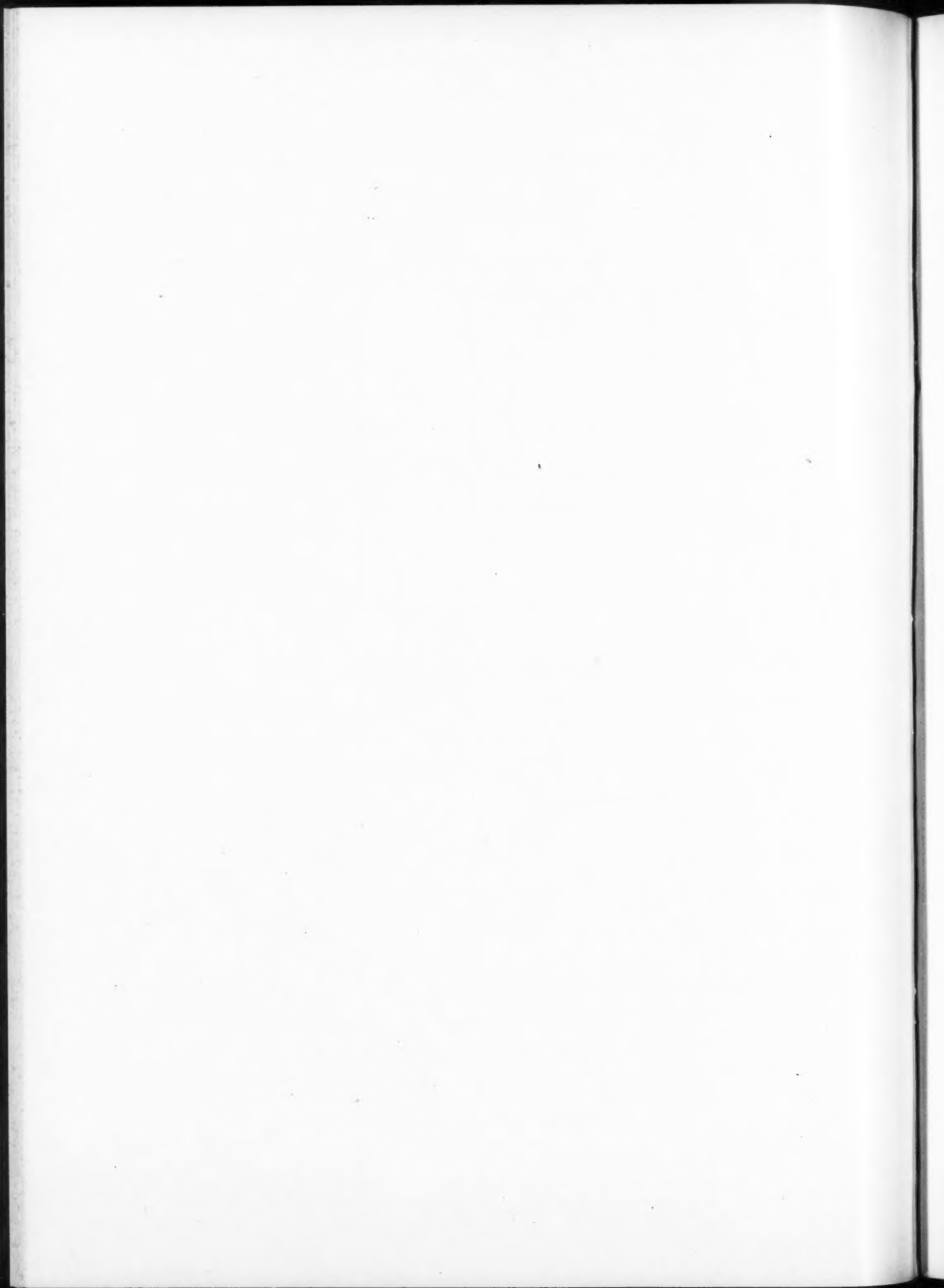




CONSERVATORY OF MUSIC, PORTLAND, ORE.

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PROGRESS TOWARD BUILDING REGULATION BY DISTRICTS

What may properly be characterized as "encouraging progress" is being made toward the legal regulation of the height of buildings in New York and the division of the city into factory, mercantile and residential districts with a view to stabilizing realty values. In February of last year the Board of Estimate and Apportionment appointed a Heights of Buildings Committee to make recommendations based on a study of the present condition and probable future development of New York real estate. This committee, through its advisors, found conclusive evidence of the need for greater control over building development. In the words of the Committee on the City Plan, "the present almost unrestricted power to build to any height, over any portion of the lot, for any desired use, and in any part of the city, had resulted in injury to real estate and business interests and to the health, safety and general welfare of the city." It was realized that in New York, as in the most progressive European cities, a reasonable stability of realty values in all districts

could be assured only by a complete system of building control through the application of different regulations to different parts of the city.

As the city was without authority to enact building restrictions that would apply only to arbitrarily defined districts rather than to the city as a whole, the Legislature was petitioned to grant such authority. In April of the present year the Governor approved a State bill which authorizes the Board of Estimate and Apportionment "to divide the city into districts and to regulate the height of buildings, the area of courts and open spaces, the location of trades and industries and the erection of buildings designed for specified uses."

But in order to assure every opportunity for discussion by interested persons, the Board is authorized to take action only after the appointment, by the Board, of a Commission on Building Districts and Restrictions, which, after full investigation and the holding of public hearings, is to recommend the boundaries of districts and appropriate regulations to be enforced therein.

It would seem that such deliberate procedure, and the public discussion that is invited at every stage assures legislation that can be intended only for the ultimate benefit of the city at large.

Recently a public hearing was held on the subject of appointing a Commission on Building Districts and Restrictions, at which a large number of interested persons were present. Apparently a majority of those who appeared, representing real estate and civic interests, favored the appointment of the Commission as a necessary preliminary toward a better system of building regulation. As usual, however, when the "sacredness of property rights" is involved, a few reactionaries deplored the proposition to divide the city into building districts as "another move in the direction of governmental interference with the property owners' rights that would cause the remaining vestige of profit in realty ownership to vanish." Probably this statement is representative of the position assumed by most of the opponents to the proposed restrictions. Yet it is notable that actual owners of real estate and those interested in it from the standpoint of legitimate in-

THE AMERICAN ARCHITECT

vestment are the very ones who are heartily in favor of a form of regulation which is based upon the experience of other cities and a thorough investigation of local conditions. It appears that on the whole the persons who oppose legislation by districts are not long-term owners but speculators who are willing to disregard the welfare of the city for the sake of easily gotten personal gain. It seems altogether unlikely that these purely selfish considerations will be given much weight by the Board of Estimate, which has so far shown such unflagging zeal in trying to provide New York with better building regulations.

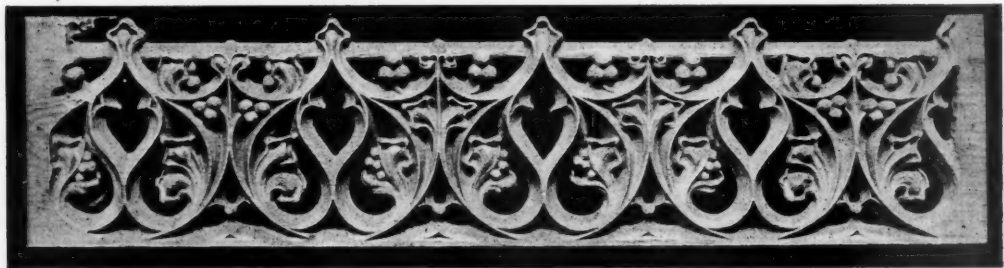
NEED FOR A CIVIC FORUM

As perhaps the most important gateway of the American nation, destined to receive distinguished foreign delegations of every nature, it is highly desirable that the city of New York have a forum of such dignity in design, of such size, and with such environs, as shall make it worthy of use for the country's most important public functions. The need of such a forum was emphasized a few days ago when the nation paid formal tribute to the memory of the seventeen marines who lost their lives in the occupation of Vera Cruz by the United States. The funeral ship bore its flag-draped cargo from the scene of conflict to this port and discharged it at the Battery wall, at the very threshold of the busy marts of commerce. During all the course of the obsequies on Manhattan Island, there was no focal point where the caskets might lie in state or where the administration officials might address the vast throng of mourners.

Fortunately, exactly such incidents are of rare occurrence, but several times each year there are events of national or civic importance which emphasize the need for a monumental forum. It seems probable that in the near future we are to be honored with a visit from the Queen of Holland, and officials here are said to be not a little perplexed as to the nature of the reception she should be accorded. As the city is in the position of a hostess without a reception hall, our distinguished guest must be ushered in through the "service entrance," in the commercial part of the city, but it is to be hoped that in this instance, at least, there will be no ceremonial parade on one of our principal thoroughfares.

About two years ago there seemed to be a good prospect that the city would eventually possess both a monumental harbor and a great public forum in the form of a Robert Fulton Memorial. A design was selected by competent judges for a dignified monument to be erected on Riverside Drive, with its axis on 116th Street, a location which seems in every way appropriate for the ceremonial reception of those who enter our gates by ocean and river. Since then little or no progress appears to have been made toward the prosecution of the work. The result is that New York has yet no worthy harbor for the reception of distinguished visitors, nor any adequate public, open-air forum.

It remains to be seen how long this condition will be allowed to remain unchanged. While we are not a nation given to pomp and display, there are many occasions upon which both the physical and æsthetic requirements seem unquestionably to demand something in the nature of a great public meeting-place.



THE AMERICAN ARCHITECT

FIRST CONGREGATIONAL CHURCH, RIVERSIDE, CAL.

(Continued from page 268)

or well which occupies a part of the apse, and is lighted from above by skylights in the roof of the apse. It is possible to get twenty-four separate Sunday school units within the temporary arrangement, as well as an audience room large enough for the entire Sunday school, while the church and the Sunday school may be partly thrown together. This is done merely by folding wooden doors which form a part of the wainscot beneath the gallery at the back of the present church.

As will be noted by plan, the scheme is a broad nave with rudimentary aisles, which is elementary enough. There are, however, webs from each column of the outer wall, and the space normally occupied by flying buttresses in a clear story type of construction is kept within the room. The columns themselves are thicker than the web which connects from them to the outer wall.

A series of reflectors were placed vertically in the angle between this thin web and the thicker column. The light is thrown from the reflector upon the outer wall, and thence is reflected back into the room. The construction is such that neither the congregation nor the minister can see the source of light. It is particularly satisfactory to have been able to light the church adequately without having any glare in the eyes of the congregation, but to have kept all glare from the choir and the minister is a further advantage.

This using reflected light on the walls, instead of on the ceiling, as is usual with modern indirect lighting, has made it possible to retain a timber construction in the roof, and to keep the woodwork of the pews and wainscot dark without loss in actual effect of light in the room, all as will be seen in the view of the interior.

The top of the cross on the tower is about 125 feet above the ground. This cross does not show on the detail as it was an after thought on the part of the committee of the church.

An effort has been made to include some of the spirit of the New England towers and their prototypes, and with this spirit

to work in the traditions of California and the inspiration to be made from the prototypes of the old California work.

The tower was not modelled, but fifteen



NORTH TRANSEPT WINDOWS

or twenty different sketches from different points of view were made at different times, the tower being tried out at all the way from eighty-five to 125 feet high.

The church and furnishings cost \$100,000.

ENGINEERING AND MECHANICAL DEPARTMENT

THE HEATING AND VENTILATION OF TECHNICAL AND TRADE SCHOOLS

By CHARLES L. HUBBARD

SO far as general class room ventilation is concerned, the methods employed in buildings of this kind do not differ from those in the ordinary city high school. In addition, however, technical schools contain rooms which require special treatment, such as machine and wood-working shops, laboratories, foundries, etc., thus making the problem somewhat more complicated in detail.

Ventilation: Buildings of this kind require ample ventilation. While drafts or air currents do not appear to be harmful, but rather the reverse when at the room temperature, it is not advisable to allow cool air to strike directly upon the occupants of a room unless they are especially protected against it by suitable clothing. This may be carried out to a certain extent in buildings like hospitals, but except in mild weather, window ventilation in school buildings is usually confined to a thorough flushing out of the rooms during recess and the noon hour.

Here as in other large buildings, it is necessary to keep the heating and ventilating systems separate in order to control the temperature in the different rooms. While supplementary heaters at the bases of the supply flues are still used to a considerable extent, direct radiation seems to be growing in favor for this class of work and has been used in many of the larger buildings recently erected. This makes it

possible to introduce the fresh air at the normal temperature of the room, which seems to be a matter of some importance in maintaining its out-door quality.

Air Volume: The air supply to buildings of this type should, in general, be based upon fifty cubic feet per minute per occupant for classrooms, recitation rooms, laboratories, etc. Corridors and recitation

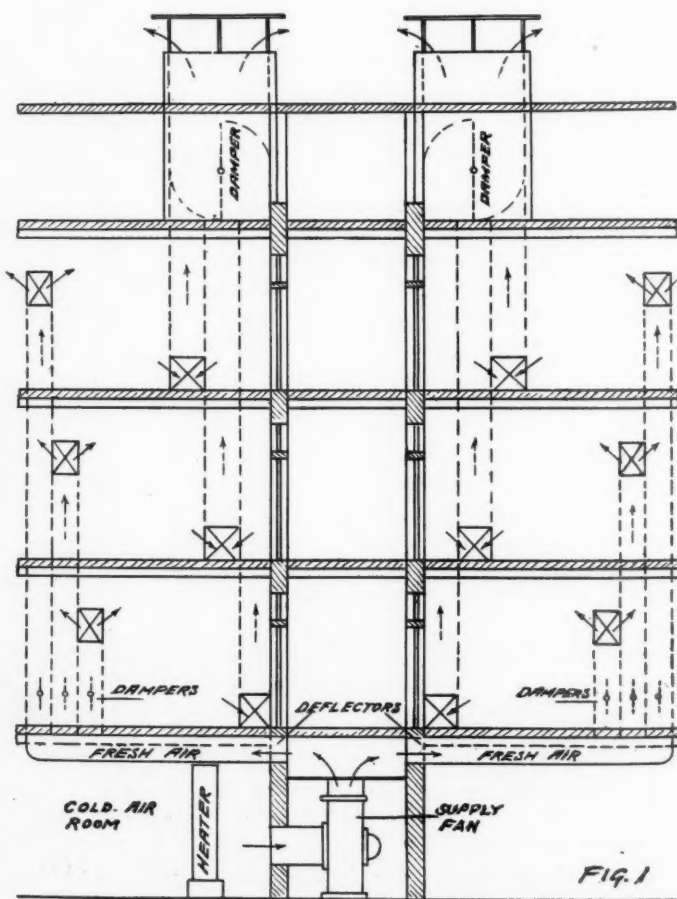


FIG. 1

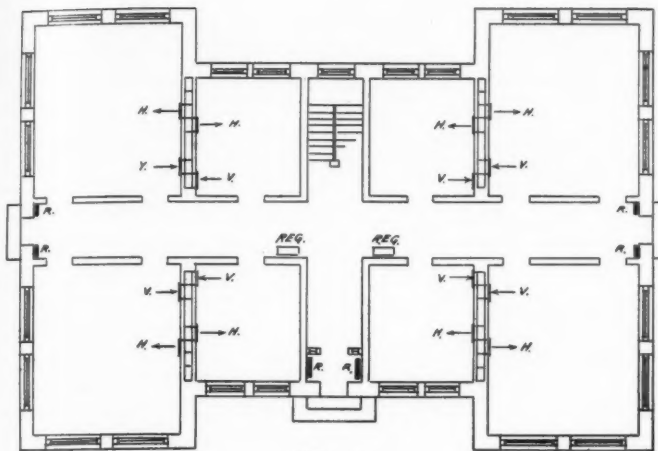


FIG. 2

rooms should have at least four changes per hour. In the case of forge shops and foundries, which are often of considerable height, sufficient air should be supplied to make five or six changes per hour over a zone twelve feet in height.

Toilet rooms and lavatories should have six or eight changes per hour, and be provided with exhaust ventilation only.

Air Supply and Removal: There are two general systems of air distribution employed in buildings of this kind, one of which is shown in diagram in Fig. 1. In this arrangement, which is especially adapted to buildings not over three stories in height, the fresh air distributing ducts are run either underground or at the basement ceiling and the vertical flues carried up in banks to the different floors as shown.

The main supply duct is commonly made to follow the line of the corridors with branches leading to the various uptakes. An even distribution to the different rooms is secured by means of adjustable deflectors at the junctions of the branches with the main duct, supplemented by dampers in the vertical flues.

Discharge ventilation is due to the slight pressure within the rooms produced by the action of the fan and no exhausters or aspirating coils are usually required. The vent flues are carried up separately to the attic, where they are joined into main shafts extending through the roof as indicated. The outboard vents should be provided with hoods, having dampers placed beneath them, for shutting off the flow of air

when school is not in session.

The first floor plan of a small building employing this method of ventilation is shown in Fig. 2 and illustrates the general arrangement of the flues. Either direct radiation or supplementary heaters may be used with this system, as desired.

In the example shown, the class and recitation rooms employ the latter method of heating, with direct radiators at the entrances. Foot-warmers are placed in the main corridor near the center as indicated.

The other general method of

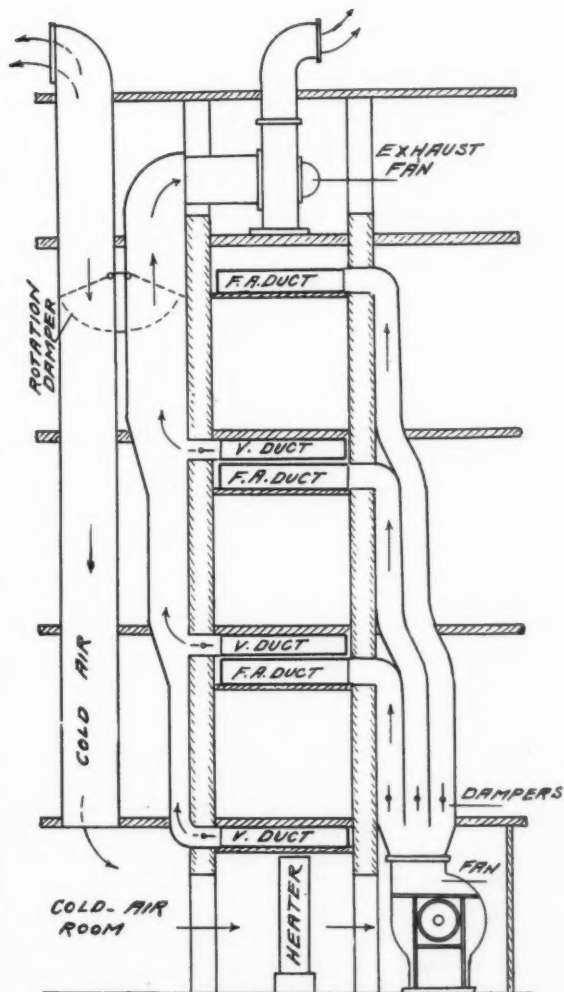


FIG. 3

air distribution referred to is illustrated diagrammatically in Fig. 3. This arrangement is especially adapted to comparatively high buildings and where it is desired to eliminate the large distributing ducts from the basement. It is similar to the scheme often used in connection with office buildings and consists of a main distributing duct on the corridor ceiling of each story, supplied by an independent flue from the basement fan.

Corresponding vent ducts are run parallel with the supplies and are connected with an exhaust fan usually located at the top of the building. An even air distribution is secured by means of regulating dampers which are permanently adjusted when the plant is installed.

Connections between the corridor ducts and the rooms are illustrated in Fig. 4. A first floor plan of a building employing this arrangement is shown in Fig. 5.

This scheme of ventilation can only be used to advantage with a system of direct heating as it offers no practical opportunity for the installation of supplementary heaters. The diagrams shown in Figs. 2 and 5 are for illustrating principles rather than details of construction and are applied to small buildings on account of simplicity.

The same general arrangements may be enlarged to meet almost any condition, and are often combined to advantage in buildings of large size. Although omitted from the diagrams, filters and air washers form an important detail in the equipment of large city schools.

Heating: When supplemen-

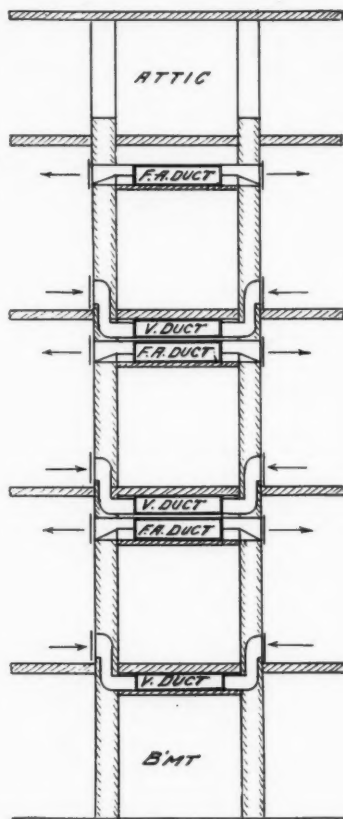


FIG. 4

tary heaters are used at the bases of the flues, provision should be made for admitting inside air to the main duct for gravity warming when the fan is not running. Temperature regulation is secured either by attaching pneumatic valves to the supplementary heaters, actuated by thermostats in the rooms, or by the use of mixing dampers which by-pass a sufficient amount of tempered air around the heaters to give the desired temperature. With the first method the amount of heat stored in the stack is often sufficient to raise the temperature of the room somewhat after steam is shut off, and for this reason the best results are usually obtained by the use of mixing dampers operated by graduated thermostats which proportion the heat supply to the actual requirements at all times.

The advantages claimed for direct-indirect heating are the elimination of direct surface from the rooms, compactness of the piping system, and the avoidance of over-heating in the case of those sitting near the coils and radiators.

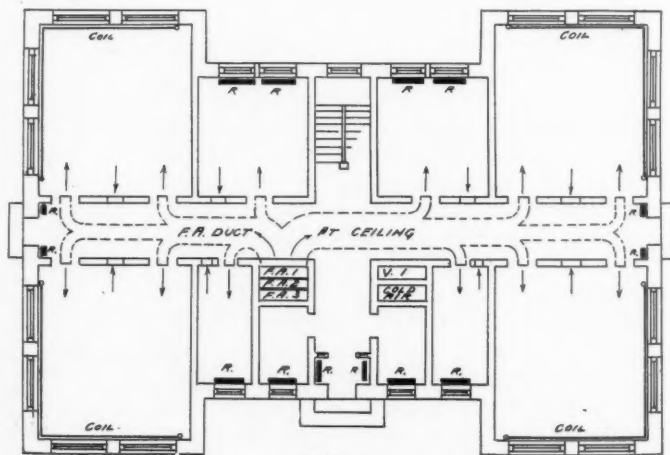


FIG. 5

THE AMERICAN ARCHITECT

Direct heating, in buildings of this kind, has the advantage of distributing the heat where most needed, along outer walls and beneath the windows, and requires no shifting of dampers or opening of doors for keeping the building warm when the fans are shut down.

Temperature regulation is best secured in this case by placing pneumatic valves upon the direct radiators and coils. In both systems the fresh air supply is maintained at a constant temperature by means of a duct thermostat, attached to one or more sections of the main heater, or to a by-pass damper leading around it.

Air rotation, for quick warming, should always be provided when possible. With the arrangement shown in Fig. 1, a door opening into the cold-air room back of the heater, and connecting with the main corridors, will answer the purpose if the class room doors are left open to complete the circuit.

In Fig. 3, rotation is secured by means of a double damper connecting the cold-air downtake and the vent uptake at the third floor level. When these are thrown, as indicated by the dotted lines, air passes from the rooms through the vent registers in the usual manner, and then, instead of passing to the exhaust fan, is returned to the cold air chamber.

In general, class rooms, drawing rooms, laboratories, etc., should be maintained at a temperature of sixty-eight to seventy degrees, while sixty-two to sixty-four degrees is sufficient for corridors, manual training rooms, shops, assembly halls and toilets.

Lecture Rooms: These are usually provided with raised seats having a space beneath. In cases of this kind the best results are obtained by discharging the air supply into this space by means of a diffusing outlet and admitting it to the room through mushroom ventilators beneath the chairs the same as in theatres.

Exhaust ventilation may be the same as for class rooms, that is, through wall registers near the floor at the sides of the speakers' platform on the other side of the room. A good arrangement for heating a room of this kind is to place a double coil at the rear, beneath the raised floor, with a line of narrow register faces above.

In the case of interior rooms, lighted from above, sufficient heat may usually be furnished by the use of steam coils carried around the chamber between the upper and lower sashes. A typical layout for the heating and ventilating of a lecture room is shown in Fig. 6.

Gymnasium: Many large city high schools contain a gymnasium which should receive careful attention when laying out the general system of heating and ventilation for the building. Rooms of this kind should be furnished with an abundant air supply while in use, which is best admitted at a height of about eight feet and exhausted from a point near the floor. When there is an elevated running track,

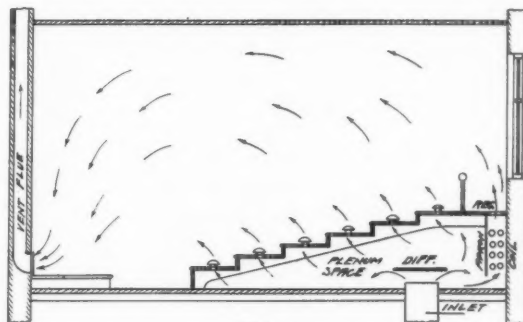


FIG. 6

a portion of the air may be admitted seven or eight feet above it in order to assist in the distribution as much as possible. Investigations show that a temperature of about sixty degrees, and a relative humidity of forty-five to fifty per cent. are the most satisfactory for rooms of this kind.

As a gymnasium is in use for only a portion of the time, it should be arranged for independent operation by means of separate air ducts and lines of piping. Sometimes in large and important buildings it is provided with special fans and heaters.

Laboratories and Kitchens: Chemical laboratories should be supplied with fresh air in the same manner as a standard class room but a considerable portion of the discharge ventilation should be through the hoods, or other exhaust openings under a strong suction.

Chemical hoods are most efficiently ventilated when constructed on the general principle shown in Fig. 7. In certain processes a down-draft through the top of

the desk or table is preferable to a hood, this being especially true in case of the instructor's table where a hood would obstruct the view from the seats. All hoods and draft outlets containing chemical fumes should be connected by means of tile pipe with a special exhauster so constructed as to resist corrosion. In laying out the vent ducts the amount of air required to be drawn through the hoods to produce the required velocity should first be computed and the remainder of the discharge air turned into the regular system, as general or room ventilation, through a register near the floor. In physical and electrical laboratories, the heating pipes should be of brass to avoid the magnetic effect of iron.

Kitchen ventilation, in connection with lunch rooms and cooking departments, requires special treatment, including hoods over range, steam tables, and coffee urns, the same being connected with an exhaust fan.

Toilet and Locker Rooms: The toilets are an important item in schoolhouse ventilation and should receive careful attention. In the case of trade schools where the boilers are in constant use for power purposes, even during the non-heating season, the toilets may sometimes be vented into a brick shaft surrounding the iron chimney stack, thus doing away with a special exhaust fan. If the stack is of brick or the power plant located in a separate building, this arrangement cannot be carried out.

A typical method of locker ventilation is shown in Fig. 8, in which

case each individual closet is connected with a duct leading to an exhaust fan. Sometimes a line of steam piping is run through the base of the lockers in order to facilitate the drying of wet clothing.

Shops and Foundries: Woodworking and machine shops are usually treated in the same general manner as ordinary class rooms, except for local exhaust ventilation in connection with special machines, such as grinders, polishers, wood planers, etc. In the case of forge shops and foundries the air is best admitted and discharged near the floor, a good arrangement being to place the supplies along the outer walls and the vents near the center of the room. Roof ventilation in foundries is not effective because the gases to be removed are heavier than air, and also on account of the amount of steam present which is rapidly condensed by the entrance of cold air through a monitor.

In forge shops a considerable proportion of the exhaust ventilation is through the forges, but general room ventilation is also advisable as noted above. Monitor openings should be

provided for summer use and for such other times as it may be desired to ventilate by open windows.

Steam and Hot Water Heating: Both steam and hot water are suitable for warming buildings of this kind. Sometimes a combination of the

two is employed, steam being used in the main heater at the fan and hot water, under forced circulation, in the direct radiation.

Such an arrangement is specially adapted where automatic control is not installed.

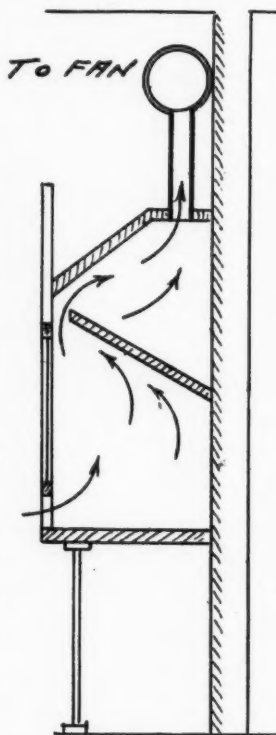


FIG. 7

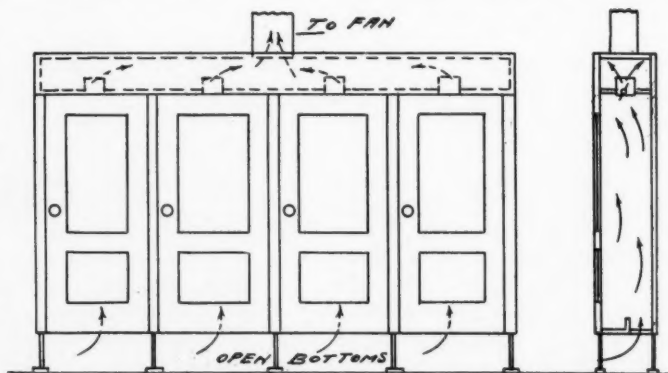


FIG. 8

CURRENT NEWS AND COMMENT

SOUTHERN PENNSYLVANIA CHAPTER, A. I. A.

The fourth annual meeting of the Southern Pennsylvania Chapter, A. I. A., was held at York, Pa., on May 1st. President B. F. Willis, of York, presided at the meeting, and in his address dwelt on the importance of the architect's work, not so much to himself, as to the community to which he belonged.

At the banquet held in the evening, there were present as guests of the Chapter many members of the profession from neighboring states. Addresses were made by Ex-President J. A. Dempwolf, Hon. A. B. Farquhar, Mr. John Hall Rankin, Mr. Albert Kelsey, and Mr. George S. Schmidt.

The following officers were re-elected for the ensuing year: President, B. F. Willis, York; Secretary, I. M. Kast, Harrisburg; Treasurer, Reinhardt Dempwolf, York.

Although definite action on the question of a meeting place for 1915 has not yet been taken, it seems probable that Harrisburg will be selected.

SAN FRANCISCO CHAPTER, A.I.A.

The regular monthly meeting of the San Francisco Chapter of the American Institute of Architects was held on April 16th, 1914. The meeting was called to order at 8:45 o'clock by Mr. Geo B. McDougall.

Mr. St. John McCormick was a guest of the Chapter.

Mr. McCormick read a paper on "Manufacturing of Ornamental Bronze and Iron Work," and at the conclusion of the reading was tendered the thanks of the Chapter.

Communications were read and ordered placed on file.

The following resolution offered by the Board of Directors was read by the Secretary:

"Resolved, That in the interest of the Institute, all minutes and proceedings in the matter of the charges and trial of three of its members are hereby expunged from the records."

Mr. Geo. B. McDougall, Edgar A. Mathews and Henry A. Schulze spoke in support of the resolution. On motion duly made and seconded the resolution was carried unanimously.

The Board of Directors were authorized to arrange for a dinner of appropriate dignity in honor of the Honorable James D. Phelan, and Messrs. Cass Gilbert and Paul Cret, on the evening of May 5th, 1914.

It was also moved, seconded and carried that suitable entertainment be arranged upon the arrival of President MacLaren of the Massachusetts Institute of Technology.

The form-letter of the R.I.B.A., a copy of which was sent to the Chapter by Mr. G. Alexander Wright, was reread upon request, and the Secretary directed to include a copy of the same with the next minutes.

The following is a copy of a form letter suggested by the R.I.B.A. and presented to the Chapter by Mr. G. Alexander Wright:

DEAR SIR:

With reference to this (Insert here name of work) which you have been so good as to entrust to me I enclose the Conditions of Engagement and Scale of Charges sanctioned by the Royal Institute of British Architects, of which I am a (Insert here fellow, associate, or licentiate). As my work as Architect will in all probability extend from first to last over twelve months, a written memorandum with regard to my remuneration is desirable in the interests of both of us.

Will you kindly peruse the enclosure and if it is satisfactory to you will you kindly send me a letter signifying your assent to its terms? If you find anything which requires further explanation please let me know and I shall be happy to discuss it with you.

FIRST NATIONAL ARCHITECTURAL FRATERNITY ORGANIZED

Two architectural societies, one at the University of Michigan and the other at the University of Illinois, have affiliated and incorporated under the laws of the State of Illinois to form the first national professional architectural fraternity—Alpha Rho Chi. Their charter sets forth the distinguished purpose of professional advancement in the art and science of archi-

THE AMERICAN ARCHITECT

ecture. Each chapter of the new organization has a large membership. The chapter at Illinois has among its honorary members Professor L. H. Provine, Acting Head of the Department of Architecture; Dr. N. C. Ricker, Professor of Architectural History, and Mr. A. H. Kimball of the Department of Design.

With the high ideals which the fraternity has established there can be no doubt but that it will be a strong factor in developing among the younger men of the profession a strong *esprit de corps* and fill a necessary place in architectural advancement.

A COMMUNICATION

To the Editor:

In your issue of April 15th, a statement appears "that the first arrest has been made by the California State Board of Architecture, for illegal practice." The Board is desirous of informing you that the arrest mentioned is not the first, as there have been many arrests in the period of the thirteen years that the law has been in force; however, it is the first arrest this year, and we are pleased to say in the meantime, that the offender was found guilty by a jury.

SYLVAIN SCHNAITACHER, *Secretary California State Board of Architecture.*

ARCHITECTURAL CLUBS' MEMBERSHIP TRANSFER SYSTEM

Headquarters: San Francisco Architectural Club, 126 Post Street, San Francisco, Cal.

The Membership Transfer System wishes to report that favorable answers have been received from clubs throughout the country, following which a letter was sent to each club outlining our plan and asking for approval of same.

To date six clubs (Portland, Ore., St. Louis, Mo., Washington, D. C., Chicago, Ill., Cleveland, O., and San Francisco, Cal.) have accepted our plan, to wit:

"Former members of clubs registered in the Architectural Club Transfer System, upon presenting their applications, accompanied by their first quarterly (or as required by various club laws) dues and a certificate from the Secretary of said Club,

stating their initiation fee is paid and that applicant is in good standing, may be admitted to this Club without payment of the initiation fee; provided, that should the initiation fee of said club be less than that of this Club, he shall pay the difference," thus becoming recognized members of the System.

The organizers of the System are gratified at the interest shown by the various clubs, which indicates the immediate success of the plan. It is hoped that the other clubs will eventually realize its advantages and become members.

It is interesting to note that the San Francisco Architectural Club has already received Mr. Wm. K. Dunnivant, a member from the St. Louis Architectural Club. Aside from the transfer of members, it is our idea that hospitality be extended to any member of the System traveling about the country.

A list of the clubs registered will be published quarterly, and other matters of interest as well, will be noted.

The Membership Transfer System will be pleased to hear from, or give information to, any clubs desiring to affiliate with the System.

AN INTERESTING LEGAL DECISION

Judge Ambrose B. Reid, in Common Pleas Court, Pittsburgh, Pa., May 11, 1914, held that a duplex house is but a single dwelling in the eyes of the law, and building restrictions preventing the erection of more than one dwelling on a forty-foot lot does not apply to the building of duplex houses. The decision was given in an equity suit brought by James H. Hamnett and others against John E. Born. The complainants held that the erection of duplex houses on lots owned by the defendant in Woodwell Street, Fourteenth Ward, would be a violation of building restrictions on the plan of lots and asked the court to enjoin Born from proceeding with such buildings.

Judge Reid holds that under a Supreme Court decision a four-story flat is decided to be a "dwelling house" and that since a duplex house presents the appearance of a single residence it will in fact be but one building on each lot. (*Pittsburgh News Letter.*)

THE AMERICAN ARCHITECT

BOOK NOTES

A PRACTICAL TREATISE ON SUB-AQUEOUS FOUNDATIONS. Including the Cofferdam Process for Piers and Dredges and Dredging, with Numerous Practical Examples from Actual Work. By Charles Evan Fowler. Third edition, revised and enlarged. New York: John Wiley & Sons, Inc. Price, \$7.50.

This book contains thirty-three chapters which treat very thoroughly of sub-aqueous construction. Former and present methods of practice are ably discussed with observations that lead to very definite opinions as to those to be preferred. Photographs of completed work and work under construction, together with tables and other data, are published in abundance. While the work is of first importance to the engineer, it commends itself to the architect as a reference book in which may be found the solution of many foundation problems encountered in modern building work.

THE PRACTICAL BOOK OF GARDEN ARCHITECTURE. By Phebe Westcott Humphreys. Full cloth, 323 pages, size six and one-half by eight and one-half inches, 125 illustrations. Price \$5.00. Philadelphia and London: J. B. Lippincott Co.

While a number of the chapters in this book have formed parts of contributed articles to magazines devoted to gardens and the artistic development of the country house, it is stated that more than twenty have been especially prepared for this work. Throughout the book the author shows a keen appreciation of the good in the art of landscape gardening.

Fortunately we are becoming more and more an out-of-doors people. We are developing a strong love for the beauties of nature, a keen appreciation of the value of pure air and take increasing interest in those sports that are the safeguards to health and happiness. It is the desire to surround our life out-of-doors with those same evidences of refinement that we consider essential within the house that prompts the beautifying of its surroundings.

This healthy tendency has been an incentive to many men well fitted for the

work to closely study the principles of garden architecture. The result is shown and the value proven in the many well selected illustrations that appear in this book of recent work by American landscape architects.

The thirty-three chapters of the book are each one devoted to the discussion of special features of garden architecture. Watertowers, bridges, walls, swimming pools, windmills, fountains and other purely architectural features of gardens are all carefully discussed, and some good examples illustrated and described. These essentials together with their details, novel decorative features and the usual utilities, are treated in a manner that imparts to the book considerable suggestive value.

LANDSCAPE GARDENING AS APPLIED TO HOME DECORATION. By Samuel T. Maynard, formerly professor of botany and horticulture at the Massachusetts Agricultural College. First edition, 1914. Cloth, 338 pages, five by seven and one-half inches, illustrated with 167 text and full page cuts. New York: John Wiley & Sons, Inc. London: Chapman & Hall, Ltd. Price, \$1.50.

The variety of trees most suitable for given conditions, their description and character of growth and suggestions for their care, are the principal themes of this volume, although the theory of landscape design is not entirely ignored.

An introductory chapter on the location of the house is followed by discussions on preparation of the land, the planting and care of trees, shrubs and hedges. In subsequent chapters, many of the most valuable and beautiful trees, shrubs and plants are briefly described and the effort is made to point out any peculiarities they possess or special treatment they may require for their most successful growth.

One of the greatest difficulties in the care of ornamental trees and shrubs is the injury caused by insects and fungous pests, and a chapter is therefore devoted to a brief outline of the most destructive plant enemies with comments upon some of the most efficacious and most easily applied remedies.

THE AMERICAN ARCHITECT

BUILDING, BY A BUILDER. Practical and Economical Considerations for the Man About to Build a House. By Benjamin Howes. Full Cloth, Illustrated, 220 pages, size four and one-half by seven inches. Price, \$1.20. Garden City, N. Y.: Doubleday, Page & Co.

Wherever in this volume the author approaches the subject of the architect, or wherever he counsels his reader as to the selection of an architect, or discusses his relations with an architect, a tone of polite toleration seems to be assumed. The architect, "unfortunately," appears to be a necessity, but the real essence of a successful house is only to be secured, if we are to credit this author, in giving due heed to the experienced and practical point of view of the builder.

The author indicates that he is by profession an engineer, and his text throughout, therefore naturally, accents as of greatest importance these features that are more nearly allied to his profession.

A very readable style and an interesting narrative of fact and incident imparts to the work a novelty that is not often to be found in semi-technical books. But as it is conceded that an architect of competence is a prime essential in the building of a house, it would seem to render publications of this nature, to a large extent, unnecessary, since with a skilled adviser to study all the problems present in a particular building and make proper recommendations, he will be able to guide his client to a successful outcome.

INDUSTRIAL INFORMATION

SMOKELESS FIRE BOX BOILERS

A booklet entitled "Cutting Coal Cost in New York City," has been issued by the Kewanee Boiler Company, Kewanee, Ill. It states that this desirable end is being accomplished by Kewanee Smokeless Fire-box Boilers in buildings where these boilers and water-heating garbage burners are installed.

The pamphlet presents interesting and instructive details in connection with eco-

nomical administration of buildings, and illustrates a number of important apartment houses, residences, hotels and restaurants in New York City.

It may be had upon request.

THE QUANTITY SURVEY COMPANY, INC.

On account of the widespread interest in the subject of quantity surveying, many architects will doubtless be interested to know that The Quantity Survey Company, Inc., with offices at 30 East 42d Street, New York City, has recently been formed to carry on the work of quantity surveying.

This company, according to a recent statement, is prepared to make lists of quantities which it guarantees to be correct, within a small percentage, backing up the guarantee with an acceptable surety bond.

Further details may be had by addressing the company direct.

ELECTRICAL ACCESSORIES

A line of electrical accessories manufactured by H. Krantz Mfg. Co., 160 Seventh Street, Brooklyn, N. Y., is illustrated in a series of pamphlets to be had upon request.

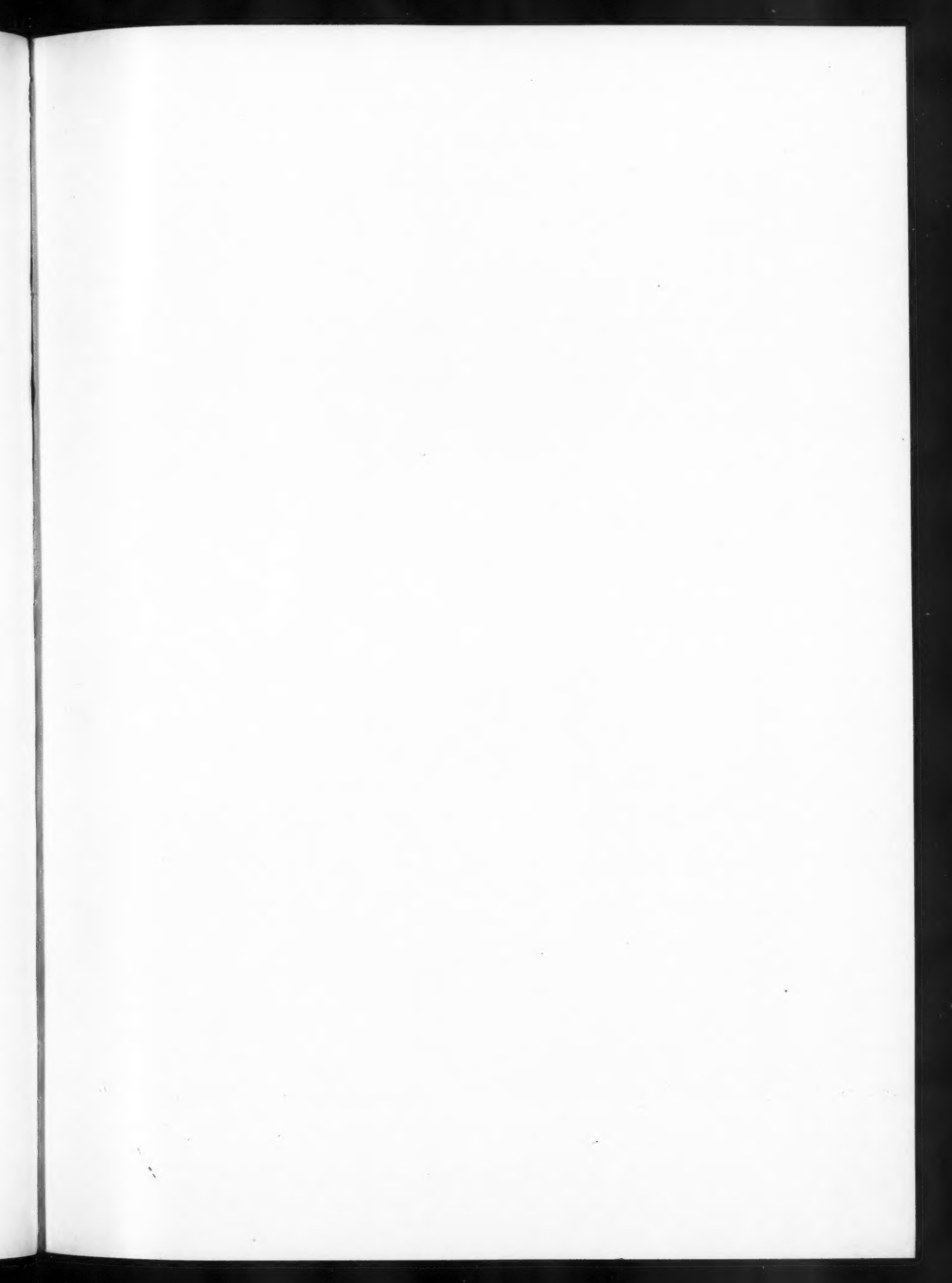
A safety panel board is shown and its merits explained. A "straight-line" panel, recommended for the fewness of its parts and high efficiency is also illustrated.

FURNACE DRAFT WITHOUT A CHIMNEY

The Coppus Engineering & Equipment Co., whose main office and works are at Worcester, Mass., illustrate and describe in a recently issued pamphlet an undergrate draft blower consisting of a propeller fan driven by a steam turbine of the impulse type, both on the same shaft. These fans are located on the side wall of the ashpit, and project from five to eight inches from the wall, according to the size of fan.

The makers state that these fans provide abundant draft for any boiler plant or fuel, and insure unusual draft control and boiler economy.

Pamphlet will be mailed upon application.



THE AMERICAN ARCHITECT



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