Irving K. Pond, Des. Lorado Taft, Sculpt.

THE INLAND ARCHITECT AND NEWS RECORD

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THE INLAND ARCHITECT AND NEWS RECORD

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IN THE WEST.

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L. MULLER, Jr., Manager. ROBERT CRAIK McLEAN, Editor.

SPECIAL CONTRIBUTORS:

C. Howard Walker.	D. H. Burnham,	W. L. B. Jenney,
Henry Van Brunt,	P. B. Wight,	Irving K. Pond,
Louis H. Sullivan,	Allen B. Pond,	J. R. Willett,
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Two Important National Conventions. The two important national conventions of the year will be held at Washington this fall. That of the National Association of Builders will convene October 28 and 29. That of the American Institute of Architects on December 11, 12 and 13. Each convention will devote special attention to one theme, that of the Builders being "Labor issues in relation to the building trades," while the Architects will discuss "The artistic treatment of municipal improvement." That these two associations range side by side in their strong influence for the betterment of profession and trade, no one can doubt who has watched with any degree of earnestness their progress and history. They represent the leading thoughts in the profession, and while in numbers they are not as comprehensive as they should be, the future field in which they move is influenced and largely governed by their action, and upon them rests the credit for the standing of their respective callings in the country to-day. To them the public looks for direction and advice, and in their hands lie the ethical problems that continually confront our advancing civilization.

The Third Party to Labor Disputes. The condition of the country through the disputes between the coal operators and their employes in Pennsylvania brings more clearly before the American people a condition that has existed, though in a lesser degree, perhaps, for many years, in that it has demonstrated that in almost every instance there is a third factor — the public, that is as directly affected as the parties to the controversy. From selfishness and greed on the part of the employer, and the usually unskilled and illogical attempt to obtain a greater proportion of the profits of his labor, which is entirely different from an attempt to better his condition, on the part of the workman, a degree of suffering is entailed upon the public which does not cease when the controversy is ended, and is sometimes an almost unbearable hardship while it lasts. It, therefore, seems perfectly logical, when this occurs, that it is not only the right but the duty of the federal Government to step in and regulate the matter for the good of the whole people, which it represents. It is not enough to hold up one as a big, overbearing bully, for though that is largely true, the other, though he acts on one's sympathies because of his apparent weakness, his rickety body and weak limbs are matched by a spirit that takes every advantage that presents itself, no matter how unfair or disastrous it may be. Not even one of his own class escapes his bites and scratches if, in his desire to work, he interferes in the controversy. The logical outcome of the situation is the eventual control of all industries that affect the people in general by the State, which latter condition would be worse than the first. But it can be prevented by a rigid inspection by the national authorities of all industrial conditions, and an impartial government, whether it be of prices or wages, for the general convenience of the public. Then wages would be adequate, prices reasonable and the greatest good to the greatest number fully conserved.

THE CARRIAGE DRIVE.

BY THOMAS HAWES, LANDSCAPE ARCHITECT.

THE choice of a route for the carriage drive is a factor that has great bearing on the selection of the site for the building. The contour of the ground, convenience and directness must decide its course. To obtain the best result, this line of driveway should be staked out to the tentative site of the building, having regard to the before-mentioned requisites. It is necessary that the driveway must be properly adjusted to the position of the building, or vice versa.

Leaving the highway, over its entire length, it should afford varied and interesting views to those who traverse it. As the visitor receives his first impressions of the beauty, mediocrity or puerility of the improvements of the estate from this driveway, and as this is the ever-varying point from which the dignity, importance and beauty of the building is revealed, too much care can not be exercised in the selection of the route. The treatment of the driveway must, therefore, naturally vary with the dignity, simplicity and use of the building.

The following remarks apply generally to country houses, with extensive grounds. It being desirable to make them appear still more extensive, the entrance should not be at or very near the corner of the estate. The boundary wall or fence should be concealed by irregular planting. The imperceptibility of the termination of the estate, and the suggestion that the extent of ground is indefinite, will produce this effect.

The actual requirement of a carriage drive is to provide a smooth, hard surface for the passage of carriages from the entrance lodge direct to the house, and any method which causes an abnormal divergence from a direct route is a violation of first principles.

Nothing more desirable can be obtained for the purpose, than a driveway that sweeps easily and naturally with graceful curvatures, along its entire route, giving glimpses of fine scenery and of the building which it approaches. These curvatures must have some definite reason for their being. They should be impressive of a suggestion of necessity to avoid obstacles, such as plantings, water, or irregularities of ground. Advantage can nearly always be taken of the contour of the ground, in order to obtain the required curvatures and grades. Obstructions can be created to supply reasons for a curvilinear route, but a curved road without any apparent object for its sinuosity, is execrable. A road with false curves degenerates into absurd crookedness.

On those estates where approaches are necessary from more than one point of the highway, the drives should unite before reaching the building. In doing so their "natural" appearance should be merged into that formality and symmetry which should prevail around a building that evidences the skill and taste of man "the builder."

On large estates it is often desirable to make a back road as a separate drive for the tradesmen to the servants' offices, stables, gardens and out-buildings, but it is usually necessary to utilize some considerable portion of the carriage drive for this purpose. Animation is thus given to the scenery; the sight of vehicles approaching the house is not objectionable, but they should be hidden from view as they approach closely, and this is effected by a branch road diverging from the carriage drive at some distance from the house.

Houses of sufficient importance having extensive grounds, require a porter's lodge at the entrance from the highway. This lodge should be made attractive, interesting and appropriate. It reflects the station of the owner of the estate and shows his consideration for its occupant. It should never be extensive, ornate or fanciful in design, but simple in outline; it should be of the same style of architecture as the house.

So much depends on the character and uses of a country estate, that it is impossible to advise whether or not the driveway should be fenced its whole length and connected with the fence dividing the lawn from the park. Fencing is unnecessary, unless it be to prevent stock from intruding on the driveway, and to protect planting disposed along its length. The effect of this continuous fencing is displeasing and should be avoided.

Landscape effects are heightened, and proportion is gained, by the presence of cattle, sheep or deer in the park. They give animation to the scenery. They are inexpensive grass mowers and fertilizers, and should likewise be a source of profit. The method of excluding them from the lawns and pleasure grounds will be treated on later. In small parks, diminutive grades of cattle should be pastured; and an illusion will be formed as to the extent of the ground. The eye is accustomed to judge extent and distance by comparison of the appearance of familiar objects.

It is easy to obtain a naturally formed appearance to a carriage drive, when the ground is level in cross section, or where the grade follows the contour of the ground: but when it has to be formed on a hillside, the slopes on both sectional sides must never show as a cutting or an embankment, but in their contour have the appearance of natural slopes.

Where an embankment is necessary, the slopes must not be abrupt, but should meet the natural surface with long undulations. Where high ground intervenes in the course of the proposed route and a cutting is necessary for the purpose of obtaining grade, the banks should be treated as if nature had formed the depression, and no evidence should be given of the excavation having been made. This result can be happily achieved in various ways.

Though the best road is the one with the easiest grades, varying inclinations are not objectionable, but are interesting. In cases where from necessity the drive must be on high ground, it should be conducted to a lower level before arriving at the final approach to the house, in order to obtain an up grade and give the building the necessary appearance of elevation.

The width of a carriage drive depends greatly on its length and the character of the building it is to approach. Eight feet is all that is necessary for carriages going in one direction, but that looks too narrow, and has a mean appearance, and there is not sufficient room for vehicles to pass without turning out on the grass. Twelve feet is sufficient for two carriages to pass, but it often results that the grass verges are driven over in so doing. Fourteen feet is a better width, and is generally sufficiently wide for use in private grounds. On important places this width can be appropriately increased.

The carriage drive should be made substantially and must be maintained in neat and good condition. Material for its formation can nearly always be obtained on or near the estate. Ofttimes the necessary rock or gravel will be found in the excavation for the building, or in the formation of the drive itself. If there is a clay subsoil, the clay can be burnt and used as a foundation for the drive. Newly made roads require a good deal of attention. An ill-kept drive evidences lack of means or slovenly neglect, and the requirement that the route should be sylvan does not apply to the carriage drive itself.

THE PHYSICAL LIMITS OF ELECTRIC-POWER TRANSMISSION.*

BY ALTON D. ADAMS.

ELECTRICAL energy may be transmitted around the world if the line voltage is unlimited. This follows from the law that a given power may be transmitted to any distance with constant efficiency and a fixed weight of conductors, provided the voltage is increased directly with the distance.

The physical limits of electric-power transmission are thus fixed by the practicable voltage that may be employed. The effects of the voltage of transmission must be met in the apparatus at generating and receiving stations, on the one hand, and along the line on the other. In both situations experience is the main guide, and theory has little that is reliable to offer as to the limit beyond which the voltage will prove unworkable.

Electric generators are the points in a transmission system where the limit of practical voltage is first reached. In almost all high-voltage transmissions at the present day alternating generators are employed. Very few continuous-current dynamos with capacities in the hundreds of kilowatts and voltages above 4,000 have been built in Europe, and probably none in the United States. This is due to the troubles encountered at commutators when the effort is made to deliver energy at a greater rate and voltage than that just named. Where a transmission at high voltage is to be accomplished with continuous current, two or more dynamos are usually joined in series at the generating station, and a similar arrangement with motors is made at the receiving station, so that the desired voltage is available at the line though not present at any one machine.

Quite a number of such transmissions have been carried out in Europe with satisfactory results, and in one case a line pressure as high as 14,400 volts is in regular use, this being the voltage employed between Combe-Garat and la Chaux-de-Fonds, in Switzerland. Eight dynamos are connected in series to obtain the voltage named. For a transmission from the falls of Saint Maurice to Lausanne, Switzerland, ten dynamos in series are used,

* From the October number of the *Engineering News*.

giving a maximum of 22,000 volts. Plants of this sort require very thorough insulation at each dynamo, but this is fairly easy to obtain and there is no indication that the limit of practicable voltage has been reached, since higher voltage can be had by simply connecting more dynamos in series. In a system of this sort the frame of each dynamo is insulated from the earth in a very substantial manner, so as to limit the electric stress on the insulation between the windings and frame of any one dynamo to the voltage developed by it alone. Alternating dynamos that deliver current at about 6,000 volts have been in regular use for several years, in capacities of some hundreds of kilowatts each, and may readily be had of several thousand kilowatts capacity. But even 6,000 volts is not an economical presssure for transmissions over fifteen to fifty miles, such as are now quite common; consequently in such transmissions it has been the rule to employ alternators that operate at less than 3,000 volts, and to raise this voltage to the desired line pressure by step-up transformers at the generating station. More recently, however, the voltage of alternating generators has been pushed as high as 13,000 in the revolving-magnet type where all the armature windings are stationary. This voltage makes it practicable to dispense with the use of step-up transformers for transmissions up to or even beyond thirty miles in some cases. This voltage of 13,000 in the armature coils is attained only by constructions involving some difficulty because of the relatively large amount of room necessary for the insulating materials on coils that develop this pressure. The tendency of this construction is to give alternators unusually large dimensions per given capacity. It is quite clear, moreover, that the pressures developed in the armature coils of alternating generators must reach their higher limits at a point much below the 50,000 and 60,000 volts in actual use on present transmission lines. In the longest transmissions with alternating current there is, therefore, no prospect that step-up transformers at the generating stations and step-down transformers at receiving stations can be dispensed with. The highest voltage that may be received or delivered at these stations is simply the highest that it is practicable to develop by transformers.

A very high degree of insulation is much more easy to attain in transformers than in generator armatures, because the space that can be readily made available for insulating materials is far greater in the transformers, and further because their construction permits the complete immersion of their coils in petroleum. This oil is not only an excellent insulator but offers a much greater resistance than air to the passage of electric sparks, which tend to set up arcs between coils at very high voltages and thus destroy the insulation. Danger to insulation from the effect known as creeping between coils at widely different pressures is largely avoided by immersion of the coils in oil. For several years groups of transformers have been worked regularly at 40,000 volts, notably those concerned in the transmission of power from Provo to the Mercur mills, Utah, over a distance of 35 miles. More recently transformers operating most of the time at 40,000 volts, but on one or two occasions at 60,000 volts for which they are ultimately intended, have been used in the transmission from the Colgate power-house in Yuba county, California, to San Francisco, a distance by the line of 218 miles. Since the early months of the present year, transformers have been operating at 50,000 volts at Cañon Ferry and Butte, Montana, for the purpose of an electrical transmission between these points, a distance of 70 miles. In none of these instances where transformers are working at 40,000 to 60,000 volts is there any indication that the upper limit of practicable voltage has been reached. On the contrary, transformers have repeatedly been worked experimentally up to and above 100,000 volts.

From all these facts, and others of similar import, it is fair to conclude that the physical limit to the voltages that it is practicable to obtain with transformers is much above the 50,000 or 60,000 volts now in practical use on transmission systems. So far as present practice is concerned, the limit to the use of high voltages must be sought beyond the transformers and outside of generating and receiving stations. As now constructed, the line is that part of the transmission system where a physical limit to the use of higher voltages will first be reached. The factors that tend most directly to this limit are two — temporary arcing between the several wires on a pole, and the less imposing but constant passage of energy from one wire to another. On lines of very high voltage arcing is occasionally set up by one of several causes. At a point where one or more of the insulators on which the wires are mounted become broken or defective, the current is apt to flow from one wire to another along a wet cross-arm, until the wood grows carbonized and an arc is formed that ends by burning up the cross-arm or even the pole. Where lines are exposed to heavy sea fog, the salt is in some cases deposited on the insulators and cross-arms to an extent that starts an arc between the wires, and ends often in the destruction of the cross-arm. One part of the 40,000-volt line between Provo and Mercur mills, Utah, runs near a former basin of Great Salt Lake, where the soil has much salt mixed with it. This salt is deposited with dust on the insulators and cross-arms supporting the wires, and gives rise to arcs from wire to wire that consume energy at a rapid rate while they last, which is usually not more than a few seconds for a single arc. Occasionally a series of arcs from the cause just named follow each other rapidly and become a very serious matter. The three wires of this line are arranged at the corners of a triangle about six feet apart, and the arcs started by deposits of salt often involve all three wires and flame up above them. Lines not subject to the action of salt fog or dust are much less liable to develop arcs, other conditions being the same. In some instances the glass and porcelain insulators supporting wires used with high voltages are punctured by sparks that pass right through the material of the insulator to the pin on which it is mounted, thus burning the pin and ultimately the cross-arm. This trouble is easily met, however, by the adoption of a better grade of porcelain or of an insulator with a greater thickness of glass or porcelain between the wire and the supporting pin. Arcs between lines at high voltages usually start by sparks that jump from the lower edges of insulators, when they are wet or covered with salt deposit, to the cross-arm. As the lower edges of insulators are only a few inches from their cross-arms, the sparks find a path of comparatively low resistance by passing from insulator to cross-arm and thence to the other insulator and wire. The wood of a wet cross-arm is a far better conductor than the air. Where wires are several feet or more apart, sparks probably never jump directly through the air from one to the other. Large birds flying close to such wires, however, have in many instances started momentary arcs between them. The treatment of cross-arms with oil or paraffin reduces the number of arcs that occur on a line of high voltage, but does not entirely do away with them.

As the voltages of long transmissions have gone up, the distance through the air between wires and the distances between the lower wet edges of insulators and the cross-arms have been much increased. Most of the earlier transmission lines for high voltages were erected on insulators spaced from one to two feet apart. In contrast with this practice, the three wires of the transmission line put into operation at 50,000 volts between Cañon Ferry and Butte, a few months since, are arranged at the corners of a triangle 78 inches apart, one wire at the top of each pole and the other two at opposite ends of the cross-arm. A voltage that would just start an arc along a wet cross-arm between wires 18 inches apart would be quite powerless to do so over 78 inches of cross-arm, the lower wet edges of insulators being equidistant from cross-arms in the two cases. To reach the cross-arm, the electric current passes down over the wet or dirty outside surface of the insulator to its lower edge. In the older types of insulators the lower wet edge often came within two inches of the cross-arm. For the 50,000-volt line just mentioned the insulators are mounted with their lower wet edges about eight inches above the cross-arms. At its lower edge each insulator has a diameter of nine inches, and a small glass sleeve extends several inches below this edge and close to the wooden pin, to prevent sparking from the lower wet edge of the insulator to the pin. These increased distances between wires in a direct line through the air, and also the greater distances between the lower wet edges of insulators and their pins and cross-arms, are proving fairly effective to prevent serious arcing under good climatic conditions, for the maximum pressures of 50,000 to 60,000 volts now in use. If these voltages are to be greatly exceeded it is practically certain that the distance between wires, and from the lower wet edges of insulators to the wood of poles or cross-arms, must be still further increased to avoid destructive arcing.

The nearest approach to an absolute physical limit of voltage with present line construction is met in the constant passage of energy through the air from wire to wire of a circuit. A paper given by Mr. Scott, Vol. XV, T. A. I. E. E., gives the tests made at Telluride, Colorado, to determine the rates at which energy is lost by passing through the air from one wire to another of the same circuit. The tests at Telluride were made with two-wire circuits strung on a pole line 11,720 feet in length. Measurements were made of the energy escaping from wire to wire at different voltages on the line, and also with the two wires at various distances apart. It was found that the loss of energy over the surfaces of insulators was very slight, and that the loss incident to the passage of energy directly through the air is the main one to be considered. This leakage through the air varies with the length of the line, as might be expected. Tests were made with pairs of wires running the entire length of the pole line and at distances of 15, 22, 35, and 52 inches apart respectively. Losses with wires 22 or 35 inches apart were intermediate to the losses when wires were 15 and 52 inches apart respectively. Results given in the original paper for the pair of wires that were 15 inches apart and for the pair that were 52 inches apart, are here reduced to approximate watts per mile of two-wire line. At 40,000 volts the loss between the two wires that were 15 inches apart was about 150 watts per mile, and between the two wires that were 52 inches apart the loss was 84 watts per mile. The two wires 15 inches apart showed a leakage of approximately 413 watts per mile when the voltage was up to 44,000 volts, but the wires 52 inches apart were subject to a leakage of only 94 watts per mile at the same voltage. At 47,300 volts, the highest pressure recorded for the two wires 15 inches apart, the leakage between them was about 1,215 watts per mile, while an equal voltage on the two wires 52 inches apart caused a leakage of only 122 watts per mile or one-tenth of that between the wires that were 15 inches apart. When about 50,000 volts was reached on the two wires 52 inches apart, the leakage between them amounted to 140 watts per mile, but beyond this voltage the loss went up rapidly, and was 225 watts per mile at about 54,600 volts. For higher pressures the loss between these two wires was still more rapidly increased, and amounted to 1,368 watts per mile with about 59,300 volts, the highest number recorded. With a loss of about 1,215 watts per mile between the two wires 52 inches apart, the voltage on them was 58,800, in contrast with the 47,300 volts producing the same leakage on the two wires 15 inches apart.

Evidently, however, at even 52 inches between line wires the limit of high voltage is not far away. When the voltage on the 52-inch line was raised from 54,600 to 59,300, the leakage loss between the two wires increased about 1,143 watts per mile. If the leakage increases at least in like proportion, as seems probable, for still higher pressures, the loss between the two wires would amount to 6,321 watts per mile with 80,000 volts on the line. On a line 200 miles long this loss by leakage between the two wires would amount to 1,264,200 watts. Any such leakage as this obviously sets an absolute, physical limit to the voltage, and consequently the length, of transmission.

Fortunately for the future delivery of energy to great distances from its source, the means to avoid the limit just discussed, though novel, are not difficult. The electrical resistance of air, like that of any other substance, increases with the length of the circuit through it. The leakage described is a flow of electrical energy through the air from one wire to another of the same circuit. To reduce this leakage it is simply necessary to give the path from wire to wire through the air greater electrical resistance by increasing its length, that is, by placing the wires at greater distances apart. The fact demonstrated at Telluride, that with 47,300 volts on each line the leakage per mile between the two wires 15 inches apart was ten times as great as the leakage between the two wires 52 inches apart, is full of meaning. Evidently, leakage through the air may be reduced to any desired extent by suitable increase of distance between the wires of the same circuit. But to carry this increase of distance between wires very far involves radical changes in line construction. Thus far it has been the uniform practice to carry the two or three wires of a transmission circuit on a single line of poles, and in many cases several such circuits are mounted on the same pole line. For the 70-mile transmission into Butte, Montana, only the three wires of a single circuit are mounted on one pole line, and this represents the best present practice. The cross-arms on this line are each 8 feet long, and one is attached to each pole. The poles are not less than 35 feet long and have 8-inch tops. One wire is mounted at the top of each pole, and the other two wires near the ends of the cross-arm, so that the three wires are equidistant and 78 inches apart. By the use of still heavier poles the length of cross-arms may be increased to 12 or 14 feet, for which their section should be not less than 4 by 6 inches. Placing one wire at the pole top, the 12-foot cross-arm would permit the three wires of a circuit to be spaced about 10.5 feet apart. The cost of extra large poles goes up rapidly and there are alternative constructions that seem better suited to the case. Moreover, a few tens of thousands of volts above present practice would bring us again to a point where even 10.5 feet between wires would not prevent a prohibitive leakage. Two poles might be set 20 feet apart, with a cross-piece between them, extending out 5 feet beyond each pole and having a total length of 30 feet. This would permit three wires to be mounted along the cross-piece at points about 14 feet apart. Such a cross-piece would approach a pole of moderate size in cost, and the distance between wires would soon reach its limit. Moreover, the support of wires carrying extremely high voltages above any horizontal arm is objectionable, because the lower wet edge of each insulator can not be very far from such an arm, no matter how great the diameter of the insulator.

If the present transmission pressures of 50,000 to 60,000 volts are to be greatly exceeded, the best line structure seems to involve the use of a separate pole for each wire of a circuit, each wire to be mounted at the top of its pole. This construction calls for three lines of poles to carry the three wires of a three-phase transmission. Each of these poles may be of only moderate dimensions, say 30 feet long with 6- or 7-inch top. The cost of three of these poles will exceed by only a moderate percentage that of a 35- or 40-foot pole with an 8- or 10-inch top, such as would be necessary with 12-foot cross-arms. The distance between these poles at right angles to the line may be anything desired, so that leakage from wire to wire through the air will be reduced to a trifling matter at any voltage. Extra long pins and insulators of the umbrella type at the pole tops will easily give a distance of two feet or more between the lower wet edge of each insulator and the wood of pin or pole. Such line construction would probably safely carry two or three times the maximum voltage of present practice, and would force the physical limit of electrical transmission back to the highest pressure at which transformers could be operated.

SOUND-PROOF PARTITIONS.*

REPORT OF EDWARD ATKINSON.

THE subject of "fire-resistant partitions" and of "heat-resistant coverings for wooden surfaces" has long since been investigated on behalf of the Factory Mutual Fire Insurance Companies. There are many places in factories where it is desirable to put up partitions sufficiently light to be supported on the timbers without the necessity of building from the foundation. There are also many stairways, elevator-wells and belt-chambers in mills, where it is dsirable to put up a fire-resistant partition without going to the heavy expense of encasing them in brick.

The materials and method of constructing such partitions vary with the conditions in each case. Thin metal, plastering on wire laths, expanded metal and other methods have been applied in different cases.

Among the heat-resistants, the Sackett's Plaster Board proved to be one of the most effective for covering wooden surfaces or partitions made of plank. This material is made ¼ inch in thickness and may be made thicker. It consists of four layers of felt and three layers of magnesium plaster. It is made in large sheets and may be fastened up in various ways at a moderate cost. It is then covered with "brown plastering" so-called, and finished with a skim coat of hard plaster. The partition occupies very small space; some which were put up in the office occupied by the undersigned, about two years since, without interfering with the daily work in any considerable measure, have proved to be free of cracks or any discoloration, taking up very little space. In this instance, the plaster board was nailed to seasoned wood-studding.

So far as we could judge, this material also retarded the passage of sound.

When the subject was submitted to Professor Norton by the architect in charge of the construction of a dormitory or dwelling-place for students in the New England Conservatory of Music, arrangements were made for including this material with others. The report of Professor Norton is herewith submitted.

Cabot's Quilt, recommended in connection with this material, is made of dry seaweed, padded between two thicknesses of paper, which, in buildings of fireproof construction, should be asbestos paper.

The architect in charge of the construction of the building of the New England Conservatory of Music, in which instruction is to be given, has adopted a partition of the Keystone Fireproofing Co.'s blocks with the Cabot's Quilt between the two sections.

These buildings are both approaching completion, so that ere long a practical test will be possible by which the relative sound-proof quality of each partition may be determined.

REPORT OF CHARLES L. NORTON.

The subject of partitions for fireproof buildings is one which has led to much investigation, especially by the New York City Building Department.

When it is desired to make a partition which shall be reasonably sound-proof, it is apparently necessary to diminish somewhat the absolute incombustibility of the partition, though to a less extent than was supposed.

The following account of tests made for Mr. Edward T. Barker, architect of the dormitories of the New England Conservatory of Music, will show the relative values of some of the typical partitions of sound-proof separations between rooms:

There were built upon the concrete floor of the B. & A. warehouse, East Boston, five rooms, 7 feet square, whose side walls were made of the several partitions. The rooms were built upon a floor of the same kind as that which is to be used in the buildings for the students of the Conservatory, for which the results of these tests were especially desired.

The rooms were built near one another on the fifth floor of the warehouse in a large loft or room about 50 by 70 feet long and 9 feet high. The ceiling of each room was the undersurface of the concrete ceiling of the large room. Each room had a floor of two thicknesses of ⅞-inch floor-boards with *two* thicknesses of Cabot's Sheathing Quilt between the floor-boards and the concrete slab of the main floor. On one side of each room was a door with a glass panel, the door-jambs being faced with soft felt, and the bottom of the door was fitted with a stop, or "weather-strip," operated when the door closed, making a tight joint at the bottom.

The side with the door will be referred to as the front in the following description:

Room A: This room was submitted by the National Fireproofing Company, and its four sides were made of terra-cotta blocks. The front and back walls were made of blocks 4 inches thick; the sides of 2-inch and 3-inch blocks. After the blocks were in position the room was given two coats of plaster inside and out.

Room B was submitted by the Keystone Block Company, and its four walls were made of the blocks of the Keystone material of the nature of plaster-of-paris with a fibrous bond. The front wall was of blocks 4 inches thick, and the left side was of blocks 2 inches thick, the back of blocks 3 inches thick, and the right side of two 2-inch blocks with a 2-inch air-space between them. The entire room was given two coats of plaster inside and out, except the front, which had no plaster on the outside of the blocks.

Room C was submitted by the Sackett Wall Board Company, and was built of Sackett Plaster Board ¼ inch thick, wired upon both sides of 3-inch steel channels. The channel truss or studs of the back and right side were wrapped with felt about ⅛ inch in thickness before applying the plaster-board. The Sackett Plaster Board is a composite board of alternate layers of paper and plaster, the whole being about ¼ inch thick. This room, like the other, was plastered inside and out, but to a slightly less thickness.

Room D was submitted by J. Russell & Co., and was of a more complex construction. The left side was a solid partition of metallic lath and plaster. The ⅞-inch steel ties were spaced 16

* From the August number of *Insurance Engineering*.

inches on centers, metal lath was applied to one side only of the ties, and then plastered to a thickness of 2 inches. The rear wall was built upon two rows of ⅞-inch studs staggered. Between them were placed one thickness of waterproof paper about 1-32 inch thick and metal lath was wired to both sides of the row of studs and given two coats of plaster. The right side was of the same construction with a layer of ⅛-inch felt between the two thicknesses of waterproof paper. The front wall was of metal lath on two rows of staggered studs, with Cabot's Seaweed Quilt between the rows of studs.

Room E was submitted by Mr. Samuel Cabot, and was wholly of metal lath and plaster double partitions, with the space between the lath filled with Cabot's Sheathing Quilt. The front and left sides contained three thicknesses of quilt, and the right side and rear two thicknesses. The quilt was placed between the studs and the metal lath, and where three thicknesses were used, one was between the row of studs as well.

The rooms had been vigorously dried for several days, none longer than a week, but the whole building was so damp and the time so short that no considerable part of the plaster and none of the interior portions of the partition were dry. The Sackett Board room was the driest and Cabot's was the least dry.

The preliminary trials showed so great a range of efficiency of the several constructions that the microphonic apparatus, which was designed to make rapid comparisons of sound intensity possible, could not be used. Reliance had to be placed wholly on listening with and without a felt-mouthed stethoscope at the outside of the partitions to sounds of various quality and intensity from within. The notes of the piano, violin, cornet and the human voice were carefully tried throughout wide ranges of pitch and intensity. The performers and the instruments were interchanged, every possible chance of unfairness, due to the variations of intensity in the sounds used, was eliminated. Of course, no interchange of the positions of the room was possible. No electrically-driven tuning-fork could be used for producing sounds of constant loudness. The insulating property of some of the partitions was so good that even the blare of a cornet or the overpowering tones of an Italian tenor, drawn from the ranks of the laborers on the building, could be heard through the partition, except by careful listening within a few inches of the wall.

After much consideration, the writer has given the following ratings to the different partitions. The order of their standing upon the list indicates their efficiency as compared with those above and below them:

NO.	ROOM.	SIDE.	SCALE.	COMPOSITION.
1	E	Left	100	Cabot's Quilt, 3 thick + metal lath.
2	E	Right	95	Cabot's Quilt, 2 thick + metal lath.
3	E	Rear	95	Cabot's Quilt, 2 thick + metal lath.
4	C	Rear	85	Sackett Board, 2 felt on ⊏ s.
5	C	Left	85	Sackett Board, 2 felt on ⊏.
6	C	Right	80	Sackett Board, 2 felt.
7	D	Rear	75	Metal lath + paper.
8	D	Right	75	Metal lath + paper + felt.
9	B	Right	60	Two 2" Keystone Blocks with 2" air-space.
10	A	Rear	50	4" National Terra-cotta Blocks.
11	B	Rear	50	3" Keystone Blocks.
12	A	Right	45	3" National Terra-cotta Blocks.
13	B	Left	40	2" Keystone Blocks.
14	A	Left	40	2" National Terra-cotta Blocks.
15	D	Left	30	2" Metal lath, solid plaster.

Nothing more is to be inferred from the numerical efficiencies than that the first partition is about three times as good as the last, and that the numerical interval between any two partitions on the list merely indicates the order of magnitude of the difference between the partitions.

The partitions making up the rooms submitted by Samuel Cabot and the Sacket Wall Board Company were the most efficient; but it is distinctly to be borne in mind that no other room had so easy a test as did these, in that each of the others had one thin and ineffective side which transmitted sound to the sides adjacent to it. The thin side of the Keystone room was noticeably resonant and plainly rendered it impossible to make a fully satisfactory test of the air-space partition. The solid metal-lath plaster partition of the room submitted by J. Russell & Co. acted in the same way in that room.

I do not believe, however, that this defect in the structures has caused any changes in the position on the efficiency list of the Cabot and Sackett rooms.

The efficiency of the Cabot Quilt as a material for rendering the partition "sound-proof" is so clearly demonstrated in these tests that I recommend it for use in the partitions for which these tests were made. The nature of the material in which the Quilt is encased should be carefully considered. I do not think it within the province of this report to discuss the partition from other than acoustic considerations, and as an encasing medium the most effective material is Sackett Board and Adamant Plaster.

I would, therefore, give as my opinion that the best acoustic results would be attained by using a partition of Sackett Board and plaster with two thicknesses of Cabot's Quilt between the plaster-board.

I should recommend a wooden stud rather than steel channels, if the fire-risk is not materially increased thereby.

As later tests showed, some sort of a suspended ceiling will be needed, as the concrete slab transmits the sound across the top of the partition readily. No trouble will be given by the sound passing through the concrete to the rooms above or below; but, unless a layer of Cabot's Quilt, with under-lath and plaster, or of Sackett Board and plaster be put on the under side of the concrete ceiling, the efficiency of the partitions will be diminished somewhat.

The front walls could not be tested because of the leaks around the door and through the door-frames, even where covered with a large shutter padded with Cabot's Quilt. It is evident that a double glass door will be needed. The floor construction is acoustically good.

THE ART INSTITUTE OF CHICAGO ARCHITECTURAL SCHOOL.

THE recent addition of a hall of sculpture, as well as a library and auditorium to the Art Institute of Chicago, directs more than passing attention to the remarkable growth of this, one of the largest art schools in the world. Although the present building, designed by Shepley, Rutan & Coolidge in 1892, and each addition, present and future, has been planned and designed by them, has existed but ten years, its needs have always been far ahead of the ability to meet them. With no large deposit of funds, but many endowments from its friends, the Art Institute has grown until the last addition, that of the hall of sculpture, has been completed. At the close of the Columbian Exposition it acquired not only a large amount of the statuary casts that decorated the buildings, or more valuable works exhibited in the art section, but secured the unparalleled collection of casts of French historic architecture, sent by France to the exposition. For ten years these invaluable sculptures have been unavailable to the student, but now ample room for their exhibition has been provided in this magnificent hall. To the architectural student the Art Institute therefore offers peculiar advantages. Its architectural department was organized by Louis J. Millet, as a work of love for his profession, and is still under his advisory guidance, though with the exception of an occasional lecture, he is not an active teacher. A decorator by profession, Mr. Millet was educated as an architect in the Ecole des Beaux-Arts in Paris, and has always been an enthusiastic advocate of thorough architectural training, and with not only his professional knowledge, but the talent of concentration and a pedagogic insight into the best course to pursue in the training for a practical architect he has established by his advice and direction a solid basis upon which others can work and make of the students that take the architectural course, valuable additions to the profession.

The architectural school is under the direct charge of Walter F. Shattuck and William K. Fallows, and a committee of practicing architects, as a board of visitors, has been formed to aid the students with council and criticism. The student has, through an alliance with the Armour Institute, special privileges in the line of mathematical and scientific subjects, while at the Art Institute examples of the best sculpture, decorative and applied design in the world are found in the galleries and open to his daily use and inspection; and also, located as the school is in the most progressive city in the country, architecturally, he has constantly before him the practical working out of the problems of his profession in the greatest possible variety.

MOVING A HIGH WALL.

THE relocating of a long, thin, high wall in the New York subway is described by F. W. Skinner in the *Century*, detailing how such work can be accomplished.

Generally, when such a wall is to be relocated, it is taken down and rebuilt; but such was not the case on the subway above One Hundred and Thirty-fifth street, where, at the entrance to a tunnel section, walls nearly two hundred feet long retain the bank on each side of the cut. After the structure was completed it was decided to widen it eleven feet to receive a third track, and although it was at first intended to tear down the masonry and build new, it was finally decided to move it bodily, and this was successfully accomplished at a saving of several thousand dollars.

The walls are of concrete and brick, thirteen feet high at one end, three feet thick on top, and weigh about four hundred thousand pounds each. The earth was dug away behind them for a width of six feet, and to a depth a little below their foundations. In the bottom of each trench a concrete floor was laid just below the level of the foot of the wall. Small holes were tunneled under the wall a few feet apart, and in them were laid transverse timbers reaching to the floor of the trench and having both ends supported on cross-sills. Narrow, thin, greased steel track-plates were inserted under the walls, on top of the timbers, and extended across the trench floors. Small steel bearing-plates were set on the track-plates under the front and rear edges of the walls, and pairs of oak wedges, driven between the cross-timbers and their sills, lifted the whole wall on the steel plates.

Horizontal five-ton jack-screws were set close together against the face of the wall at the base for its whole length, and being simultaneously operated, the wall in a few hours was moved back five and a half feet on the floor in the trench. The projecting ends of the track-plates were cut off, and the spaces between the plates under the wall were filled with liquid cement. The work on each wall was done by twenty men in ten days, and the walls were not distorted the sixteenth of an inch.

THE CONTRACTOR'S DEER STORY.

THE Buffalo architect was showing his visitor from the West a set of blue-prints when a step was heard in the drafting-room entrance — (in Buffalo they do not, as a rule, keep a boy in the outer office to announce visitors — or keep them out, as he may judge proper) — and, to quote Holmes, "A man of forty entered exclaiming 'How 'd do'." The quotation could be continued, for he answered Holmes' description. "He was not a ghost — my visitor, but solid flesh and bone. He wore a Palo Alto hat, his weight was twenty stone," — or thereabouts, I should judge, though I've forgotten exactly how many pounds a stone represents. Some of those they use to ballast their boats up in the Georgian Bay would be like the Irishman's potatoes, "Ten of 'em wud make a meal."

Speaking of the Georgian Bay country — well, that was exactly what this contractor-looking party did the moment he came in, and commenced his remarks by throwing down a photograph. Instantly the blue-print faded and in its place was a placid sheet of water with the glimmer of morning light, the cold, clear light of a crisp November morning, flashing from its surface. Beyond, the serrated tops of pine forest, with the red and yellow blotches of sumac and maple, the decorators of the fall landscape, spreading an ever-varying and artistic scheme of color along the water's margin. Close to the rock upon which a camp kit was spread and near which a fire with a suspended coffee-pot gave promise of breakfast, a Peterborough canoe was being paddled by a man that would have looked like an Indian did he not so closely resemble the holder of the photograph. And then the blue-print, the contractor-looking man and his friend, the architect, came back and blotted out the vision of a November morning in the Muskoka district. Singularly enough that was just the country he commenced talking about. "We had taken possession," he said, "of Sawbones camp up in Sturgeon Bay, where a jolly lot of Pittsburg doctors spend their 'holidays,' as they call a vacation over there in Canada, every summer. The water for miles around is dotted with pine-covered rocks and islands, but over across the bay is the mainland. Westward is the Georgian Bay, southward Lake Ontario, Toronto and Buffalo, if you please, while right east and north the dense forests, intersected by thousands of lakes and streams, stretch to the Atlantic ocean or Hudson Bay. It is the game storehouse of the world. The Grand Trunk Railway long ago built local lines running into and intersecting this country everywhere and connecting with the main lines, but lately it has placed upon them the same first-class service as is found on its through trains and the phenomenal sight of parlor cars and schedule time to the jumping-off places in the wilderness, where the deer are thick and the lakes and streams are full of trout and bass, is experienced. Tell you about the photograph? It is worth telling. It was through a desire to show our Ojibway Indian guide, Pain-in-the-face, that I could get a deer without his help that I got the picture. Pain-in-the-face's real name, I believe, is David Ma-je-sic, but he had something the matter with his jaw years ago and he still keeps it tied up. Here is a verse we found on a piece of paper in the camp that shows that those doctors evidently had a poet among them who not only seems to read but can imitate Kipling, for it paraphrases a verse in his 'Feet of the young men:'

"Do you know the graceful Una, do you know the sawbones camp,
With the silent jaw-tied Indian cook and guide?
Do you know the joy of plunging in the water when its damp,
And the bottle labeled "Segram" on the side?
It is there that we are going, with Robeson, Day and Morris,
And Mabon, just to tend the camp and row,
He will cook and pass the bottle, and do any old thing for us,
He always works so hard we'll let him go.
We must go, go, go, away up there;
At Hang-dog point we're over due;
And the Una's waiting for us
When the old spring fret comes o'er us,
And Hang-dog calls for us.

"Well, it's tough on Kipling, for there is a hunting fever in every line of his poem, and even when it is amputated and dissected by a Pittsburg doctor, it don't seem to be injured any.

"But the story of how I got the deer. Just woke up before daylight, got my 30, 30, and slid in my moccasins down to the canoe and started out across the bay to Sucker creek. You ought to see Sucker creek. Not much of a creek, but it is at the end of a long bay with towering granite walls on either hand, dense woods cover the hills around and the series of granite ridges and deep ravines make the best kind of cover for deer and the worst for any but an Indian or a rabbit to crawl through. The shadows were still black upon the water and the mist hanging heavy in the gray air when I reached a point near the entrance to the creek, and where I knew there was a favorite run-way or crossing-place for the deer.

"Just here the bay spreads out into a beaver meadow and I knew I would not have long to wait before a deer would come down from the hills to feed. As my canoe touched the sandy shore in a little hollow between two rocks, I noticed the sand covered with tracks as though a flock of sheep had made it their watering-place. I lifted the canoe from the water and began to follow the freshest of the tracks. I noticed that the leaves were wet a little farther on and almost immediately realized that a deer had landed within a few minutes of my arrival and was even then but a short distance up the well-defined trail that penetrated the gully. Did you ever feel the thrill that goes through you from your collar to your feet and makes your knees shake when you suddenly find yourself in the presence of big game? If it were a bear you might mistake it for fear, so utterly overpowering and unnerving it seems for a second. Then every nerve becomes tense and you find yourself holding your breath. I felt it when I hooked my first 'lunge. Watching every stray leaf, avoiding every projecting branch and with both eyes and ears wide open I started to stalk that deer. It was putting man's cunning against the trained senses of the forest-born. I had gone perhaps a hundred yards, though it seemed miles, and the strain was beginning to tell on my still

COMING INTO CAMP.

shaking knees, when, in the dim, half light of the woods, ahead I saw what appeared to be the side of a gray rock. Crouching behind a log and not daring to move I watched it. Then all at once something happened. There was a sudden streak of white at which I shot as one shoots at a jack-snipe and then the woods were still and nothing but the smoke of my rifle curling among the leaves to tell that I had either killed a deer or that I should go back to camp and endure the slow smile of Pain-in-the-face and the guying of the camp. My heart sank into my boots and I was about to return to my canoe anathematizing the stick that had snapped under my knee and my luck and everything in general when I thought I would go up the trail and see where it led to. I had not gone fifty yards when, right in my path, lay the deer, stone dead. My snap-shot had, by pure accident, struck it in the back of the head and gone right through the brain. When I got back to camp one of the boys snapped me with his camera and this is the second shot at that deer's head. Then I landed, and Pain-in-the-face laid the deer out on the rock and said 'nichischin,' and then poured me a cup of coffee."

The architect had been an intent listener. He drew a long breath, looked at the picture and then, as he turned to the blue-prints,' said: "You've got six weeks, John, to get that building enclosed, and I'll have these plans in shape so that the boys can go ahead for a few days, and I'll see. By the way, I wish you'd get a Grand Trunk time-table and some of their printed matter, and maps about that country up there. I'd like to look them over. And say, John, we might ask some other fellows, and make it an architects' camp. We are as professional as any Pittsburg doctors, and — well, coming to think of it, I have a client who wants to build a cottage up in that country, and I think I'll have to go up to look the ground over about the first of November, though I can't spare time to go hunting. Did you say, John, that the open season was the first two weeks in November?" The visitor from the West said nothing, but he will not expect to find that architect in his office on November first.

PAINTS IN ARCHITECTURE.

IMPERVIOUSNESS TO MOISTURE.

WE want paint to be impervious to moisture, because it is this quality upon which we must depend for its protective value; but it is too often forgotten that a paint which will keep water away from a surface will also imprison that which is already there. The obvious lesson from this reflection is that to insure the best results we must paint only on dry surfaces in dry weather.

Undoubtedly a very large proportion of the objections which old-time painters have to zinc white arises from neglect of this very important requisite. They apply paint when it suits their convenience, not when hygroscopic conditions are favorable, and the result, if dampness be prevalent at the time, and if the paint be truly impervious, therefore effectively protective, is blistering, scaling or cracking. But a paint that will not blister, scale or crack under such conditions fails to do so because it permits the imprisoned moisture to transpire through its substance; and the necessary corollary is that if moisture can escape it can also enter.

It appears, therefore, that what we should guard against is not a paint which, under the circumstances indicated, will crack or blister, but against the use of paint under improper conditions.

Interiors are usually dry and none of the above-mentioned defects are commonly seen in interior painting. They would be quite as rare in exterior work were the requisite conditions insisted upon by architects and observed by painters.

CHARLES JOURDAIN.

CHURCH ARCHITECTURE.

DESIGNERS of church architecture will be interested in a paper recently read by the Rev. A. E. Waffle, of Rochester, as it is well sometimes to obtain the well-thought-out deductions of the layman.

The different styles of architecture, said the speaker, were expressive of the life of the people by whom they were evolved. The architecture of a people gave an idea of the progress they had made in civilization, showed to a degree their mental and moral status, but especially did it serve to express their religious life. Not only this, but the architecture of different ages and people had an effect in modifying their religious life and character. Architecture might be of such a nature, he said, that it would stimulate religious emotions. There were styles, however, that merely soothed and gratified the æsthetic tastes, arousing emotions that were very often confounded with those of a religious character. The speaker then considered three requisites of church architecture — fitness, utility and beauty.

"Fitness is a prime element in church architecture," he said. "Is the building suitable? Is it the kind of building that will express Christian life and Baptist Christian life? are questions that should be asked. There are some characteristics about our church, though it is in the main in harmony with all Christian churches, which serve to distinguish it from other churches. While our church should be more Christian than Baptist, there are some features of Baptist life and principles that may be expressed in the architecture of our buildings.

"In the first place, our church structures should be characterized by simplicity, because of the simplicity of our doctrines. In this respect our denomination is separated to some extent from all churches, and widely from many churches. Our churches should not be excessively ornamented.

"Then, our churches should be massive in appearance and in reality. We hold to the solid truth and build our faith on the word of God. We believe as a Christian denomination we are going to outlive all other denominations and, indeed, absorb all other denominations. The walls should be made thick, the moldings heavy and the appearance of massiveness secured in other ways that may suggest themselves.

"We found our faith and doctrines on the Bible alone, not on the philosophies of any of the great men of the past. In this we have the quality of unity, and this unity we should strive to express in our churches. We should not put up composite churches. The different parts of the typical church should be in right proportion to one another. The windows should be of suitable size to harmonize with the rest of the building and the molding should not be too light nor too heavy for the other parts. We believe that some churches are out of proportion in the stress they lay on certain parts of their institutions. We may not have reached the highest conception in this yet, but we should try to arrive at it.

"Then, we should express in our church buildings proper respect for the ordinances of our church. I maintain that we are the only church that gives proper emphasis to the ordinances. We Baptists gather about these ordinances, and never should we allow them to be subordinated. Never have as a baptistry a hole under the pulpit. The baptistry should be a distinctive feature of the church interior, and it should always be open. It may be built behind the pulpit, or better, at one side of it. It should not be gaudily ornamented, but it should be as carefully and beautifully finished as any other part of the building. The same is true of the communion table. The communion table should be like a great altar, built in a conspicuous place. It should have seats about it. It should be where no one could come into the church without seeing it. I do not think it is possible for us to make too much of these ordinances in our church architecture.

"Ought we to aim to have our churches churchly in appearance, or should we adopt the style followed in the construction of halls and theaters? In this connection, let me ask you to consider whether the function of the church is always evangelical or whether it has not some other equally important functions. If it were always to be used as a means of reaching those who are not Christians, I should say build them after the fashion of the hall. But is it not that the churches are designed to perfect the Christian character and stimulate religious feeling? I maintain that, if you are going to do the whole work of the church, the church should be churchly. I would not say that, in case a church is to built for evangelical purposes purely, it should not conform to the theater type of architecture, but, where it is to be devoted to the ordinary work of the church and all of its work, it should be as little as possible like the public hall or theater."

Under the head of utility, Dr. Waffle emphasized the need of good ventilation, good heating facilities and the securing of proper acoustic properties. Ceilings disproportionately high were one of the reasons given why it was so hard to hear the speaker in many churches.

Dr. Waffle spoke at length upon the proper relation of the different rooms of the church. As far as possible, he said, the prayer-meeting room, the Sunday-school room and the social rooms of the church should be so arranged that the people in leaving the main audience-room would be going toward them. When after-meetings were being held in the prayer-meeting room, he said, the people would be more apt to remain to them if, in passing out of the church, they went by the door of this room. A prayer-meeting room situated back of the pulpit was in the worst possible place, said he. Some in the aisles would be going in one direction and some in another, and many who might otherwise remain, would be influenced to leave by the example of others. A roomy vestibule was very desirable, the speaker said, since it was in the vestibule that much of the social life of the church found encouragement.

The Norman style of architecture was best for churches, said the speaker. It was simple, massive and strong. A church should also be as beautiful as possible, since, if the beauty were of a high order, it would serve in a measure to awaken religious feeling and maintain it. The aim should be to adorn the interior rather than the exterior. The general color scheme should be in subdued tints, such as terra-cotta, the grays and certain shades of brown, while the brighter colors might be employed suitably in window ornamentation. The color scheme should be under the supervision of one person, if possible, so that harmony might be secured.

AN ARCHITECTURAL CONTEST AT PATRAS.

THE city of Patras, Greece, has decided upon the erection of a church, to cost 2,000,000 drachmas ($250,000), which will take the place of the present edifice, dedicated to St. Andrew, erected early in the second quarter of the last century. With a view to securing something specially apt in design, the committee having the matter in charge (composed of the metropolitan bishop, the Governor of Achia, mayor of Patras and other prominent officials) has decided to secure plans through an architectural contest, and I have been assured that contributions from American architects will be welcomed. The general order of architecture will be Byzantine, after the spirit of the East. Some of the governing conditions are given, probably sufficient to enable artists and architects to decide whether they can profitably enter the contest.

1. The dimensions are left to the discretion of the architect, but must come within a ground space of 2,400 square meters (25,834 square feet).

2. In planning the structure, consideration must be given to possible effects of earthquakes, to which the region is subject.

3. The edifice must accommodate at least five thousand worshipers, not including standing room in the women's apartments or other annexes.

Possible models of architecture might be found in the Russian Church of St. Nicodemus, in Athens, or in the Church of St. Sophia, in Constantinople.

The contest will be divided into two parts: all who pass the first degree will be entitled to enter the second degree, and no others. The general requirements for the first degree are as follows:

1. To submit a general view of the temple and courts on a scale of 1 to 500.
2. View of front of temple; scale, 1 to 200.
3. Two views, front and lateral; scale, 1 to 200.
4. View, cross section, setting forth the general plan, according to the judgment of the artist.
5. Estimate of the cost.
6. An abridged technical memorandum.

The plans submitted will be passed upon by the committee, and the successful architects will be required to meet some additional conditions, among which are the following:

1. View of temple; scale, 1 to 100.
2. Three views — front, lateral and rear; scale, 1 to 100.
3. Diagram showing the principal architectural features; scale, 1 to 10.
4. Two cross sections, with internal views; scale 1 to 100.
5. Cross section, showing manner of heating, ventilating, etc.

The contest of the first degree closes at 12 o'clock noon of February 13, 1903. All who have successfully passed into the second degree will be given one hundred and fifty days additional from the time the decision is rendered. The final plans will be submitted to some academy of the fine arts in Europe, and in accordance with its decisions the committee will award a first prize of 10,000 francs ($2,000), a second of 4,000 francs ($800) and a third of 2,000 francs ($400). I need scarcely add that much interest is manifested in the attitude of American artists. It is to be hoped that from among the men who have planned and constructed some of the most remarkable buildings in the world will be found one equal to planning a Byzantine temple to the satisfaction of the Greeks.

HENRY W. SCHLUETER.

BETTER evidence could not be given that thorough preparation for an accurate scientific knowledge of the business of building is necessary for the highest success therein than the career of Henry W. Schlueter, general contractor and builder in the Marquette building, Chicago. Graduating in 1880 as a civil engineer and architect at the Government Building college, at Nienberg, Hanover, Germany, he came from his studies to this country during the same year. His first important work was building the barracks at Fort Riley, Kansas, during the years 1888-89. In 1891 he came to Chicago to pursue his profession at the center of the great western world. In 1894 he commenced his building operations in connection with a company of which he was secretary and manager. He sold out his interest in this company and in 1898 began business for himself. Among Mr. Schlueter's remarkable successes as a pushing, forceful contractor, is the addition to Sears, Roebuck & Co.'s building. This occupies a whole block nine stories high, with a double basement, and was built and turned over in sixty working days, costing $300,000. To satisfactorily complete such a building within such a time limit was indeed a remarkable achievement. Another remarkable piece of work he accomplished was building the foundation beds for the two enormous engines, one of 5,000 and the other of 8,000 horse-power, for the Chicago Edison Company at their Harrison street station. The foundations cost $25,000, and are said to be the most difficult work in the shape of foundation-building ever done in this city. Mr. Schlueter has now in course of construction for the University of Chicago a gymnasium, 80 by 200 feet, costing $250,000. He has also under way a large commercial building for J. H. Lesher, 100 by 110 feet, eight stories, mill construction; cost, $200,000, being built on the New England construction method, whereby no joists are being used, the girders supporting a 6 by 8 floor grooved for splines. A cast-iron scupper is built in the outside walls, on the floor line, under each set of windows, which in case of fire will drain the water out of each story and prevent the building from being water-soaked when a small fire should occur. Also a store and warehouse building for Thos. Chalmers, of Allis & Chalmers Company, at 307 and 309 Wabash avenue, six stories and basement; costing $100,000. Also constructing a store and warehouse building for the Henry Bosch Company at 338-344 Wabash avenue; seven stories and basement, 80 by 160; cost, $150,000. Also under construction a large plant for the Ward-Corby Company, of Pittsburg, Pennsylvania. This plant is located at Rockwell and Lexington streets, Chicago; 125 by 185 feet; cost, about $100,000; to be used as a biscuit factory. Outside of the city he has contracts for $1,500,000 worth of work. Among outside work is the engineering hall of the Iowa State college at Ames, Iowa, just completed. He has under construction for the Wooster University, Wooster, Ohio, three buildings, viz., Academy of Science, the Biological building and Kaulke hall. Contracts were let for four buildings in this group, of which number he obtained three. He is also building the Polk county courthouse at Des Moines, Iowa, a million-dollar building. Besides these he is building at Beloit, Wisconsin, large machine shops of steel construction, having a saw-tooth skylight admitting all the light through the roof. Chicago is accustomed to men of action and is quick to recognize a master of his business and equally quick to reward him. Mr. Schlueter's success is but the natural result of his earlier years' training in preparing for this work, which, from all indications, is but the beginning of a career of wider scope and even greater importance to the building trade of the future.

ASSOCIATION NOTES.

NEW JERSEY CHAPTER A. I. A.

A meeting of New Jersey Chapter of the American Institute of Architects was held October 3. The following officers were elected: President, Herman Kreitler, of Newark; first vice-president, F. W. Wentworth, of Paterson; second vice-president, Robert C. Dixon, of Union Hill; secretary, Hugh Roberts, of Jersey City; treasurer, Thomas Cressey, of Newark; trustees for two years, J. F. Capen and C. G. Poggi, and trustee for one year, Charles C. Baldwin.

KANSAS CITY CHAPTER A. I. A.

The Kansas City Chapter of the American Institute of Architects on September 19 held its annual election and elected the following officers: President, Rudolph Markgraf; secretary, Albert Turney; treasurer, George Seamens. Board of directors, B. von Unwerth, T. B. Hamilton and T. B. Howe.

BUFFALO CHAPTER A. I. A.

A regular meeting of the Buffalo Chapter of the American Institute of Architects was held at the Buffalo Club, September 29. Reports showed the public-spirited work done by the Chapter this year. Among other things accomplished was the revision of the building laws undertaken in conjunction with the members of the Builders' Exchange and the Society for Beautifying Buffalo.

The revisions have been contemplated and filed with the city authorities for action by the council. E. B. Greene was elected president of the Chapter, to succeed Edward Kent, who received the gratitude of his fellow members for indefatigable work done in behalf of the purposes of the association. Other officers elected were: H. O. Holland, first vice-president; R. A. Wallace, second vice-president; F. A. Whalan, secretary, and M. C. Beirl, treasurer.

RHODE ISLAND CHAPTER A. I. A.

The annual meeting of the Rhode Island Chapter of the American Institute of Architects was held September 25 at the University Club, at Providence. After the dinner Mr. Isham gave an address on "Architectural Tradition."

The following officers were elected for the ensuing year: President, Edward I. Nickerson; vice-president, Charles E. Carpenter; treasurer, Fred E. Field; secretary, Prescott O. Clarke. Executive Committee — The president, secretary, treasurer and Messrs. Hoppin, Stone, Ely and Howe. Committee on Admissions — The president, secretary, and Messrs. Isham, Humes, Sawtelle and Hilton. Committee on Entertainments — The president, secretary, and Messrs. Isham, Willson and Robertson.

CLEVELAND ARCHITECTURAL CLUB.

The Cleveland Architectural Club held its first meeting of the season September 12. It was a most successful opening session. It was announced that a scholarship in some Eastern technical institution would be awarded this year in competition.

During the fall and winter several contests will be held, open to members of the club. The man making the best showing in these will have his choice of schools. His expenses will be paid there for one year. It is believed that there are many young men of talent in the city who need only the course in the East to fit them for active architectural work.

The meeting was held in the rooms of the Association Technical Clubs in the Arcade. F. W. Striebinger presided. There was a full attendance, and several applications were received for new membership.

MOSAICS.

MR. GEORGE H. DANIELS, of the New York Central Railway, is responsible for the publication of a bright, live and instructive brochure, magazine in form, called the "Four Track Series," devoted to travel and education. The last number of the series elaborates Bronx Park and is an exceptionally complete addition to the municipal improvement libraries of the day.

OFFICIAL announcement has been made by the Southern Railway of the removal of its General Freight Department from Washington, D. C., to Atlanta, Georgia, on October 1, 1902. The general freight agent, Mr. E. A. Niel, and assistant general freight agent, Mr. L. Green, and their forces, left Washington on September 27, and these officials announce that communications intended for them should hereafter be addressed care Equitable Building, Atlanta, Georgia.

OUR ILLUSTRATIONS.

Residence, Pasadena, California.

Residence, Denver, Colorado. F. J. Sterner, Architect.

Apartment Building, Chicago. S. N. Crowen, Architect.

Lincoln Trust Building, St. Louis. Eames & Young, Architects.

Residence, W. W. Candy, St. Louis. Weber & Groves, Architects.

Houses, Grand Boulevard, Chicago. Peabody & Beauley, Architects.

Interior Views, Art Institute, Chicago. Shepley, Rutan & Coolidge, Architects.

Stable for Winthrop Sargent, Haverford, Pennsylvania. Lindley Johnson, Architect.

Building for Southern California Savings Bank, Los Angeles, California. John Parkinson, Architect.

Second Lutheran Church, Louisville, Kentucky. Kenneth McDonald and J. F. Sheblessy, Architects.

King Edward Hotel, Toronto, Ontario. Henry Ives Cobb, Architect; E. J. Lennox, Architect. Fireproof construction.

Photogravure Plate: Residence of Winthrop Sargent, Haverford, Pennsylvania. Lindley Johnson, Architect.

PHOTOGRAVURE PLATES.

Issued only with the Photogravure Edition.

Apartment Building, New York city. Hugh Lamb, Architect.

Residences for George C. Edgar, New York city. Turner & Killian.

Parochial School, Oak Lane, Pennsylvania. Howard Hager, Architect.

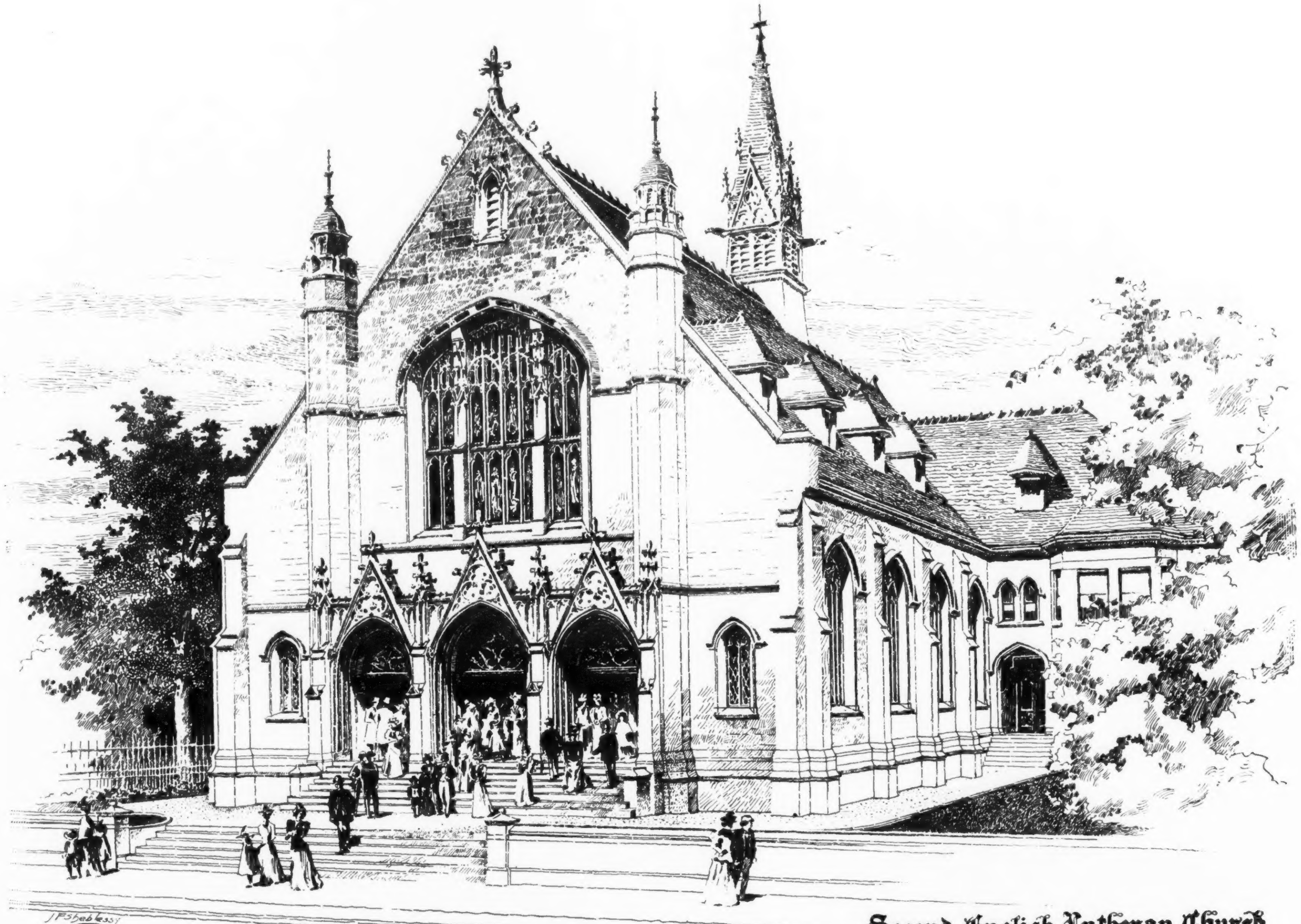
Residence for Mr. Wood, Wayne, Pennsylvania. Hazelhurst & Huckel, Architects.

Public School, Fordham, New York. C. B. J. Schneider, Architect, New York.

Methodist Episcopal Church, Germantown, Pennsylvania. Rankin & Kellogg, Architects.

Ladies' Gymnasium, Radcliff College, Cambridge, Massachusetts. McKim, Mead & White, Architects, Boston.

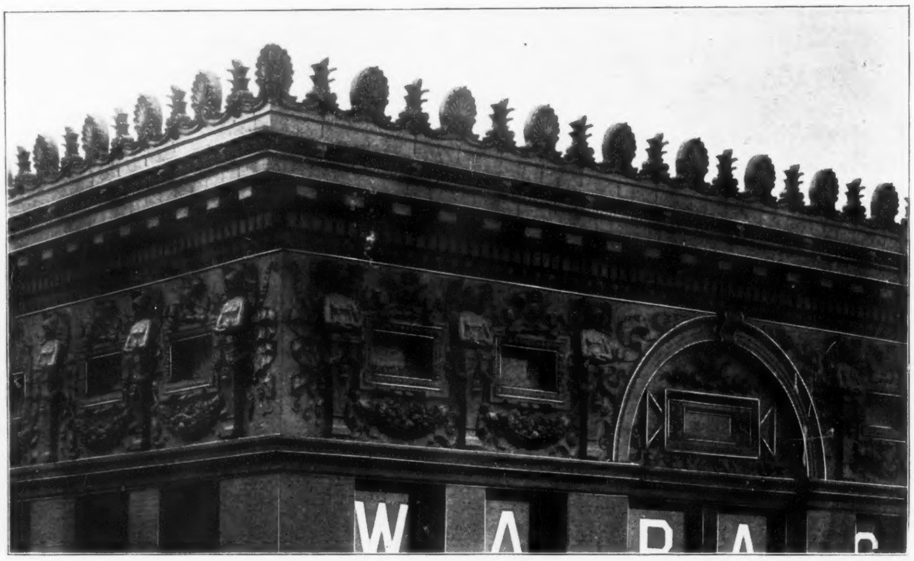
Correction: Referring to photogravure plate, in June number, of Rudolph Spreckel's house, San Francisco, credited to F. H. Meyers, Architect, we are informed that the building contracts were signed under the firm name of Architects Samuel Newsom and Fred H. Meyers.



Second English Lutheran Church
Rev Harlan K Fenner, Pastor.
Kenneth McDonald & J. F. Sheblessy-Archts.

HOUSES, GRAND BOULEVARD, CHICAGO.

PEABODY & BEAULEY, ARCHITECTS.



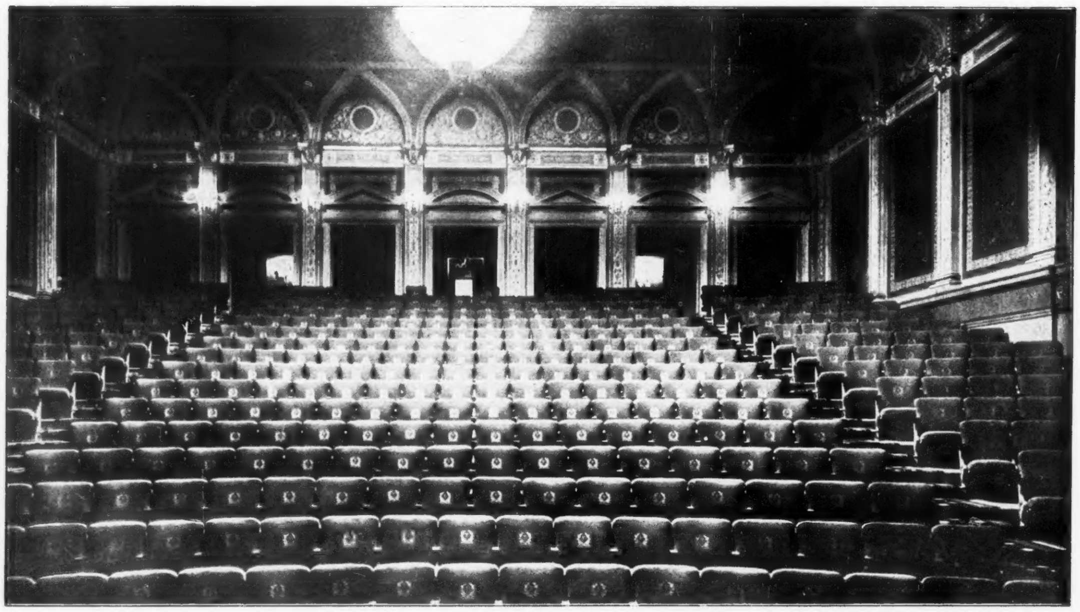
LINCOLN TRUST BUILDING, ST. LOUIS.

Eames & Young, Architects.

STABLE FOR WINTHROP SARGENT, HAVERFORD, PENNSYLVANIA.

LINDLEY JOHNSON, ARCHITECT.

RESIDENCE AT PASADENA, CALIFORNIA.



FULLERTON HALL.

RYERSON LIBRARY.

INTERIOR VIEWS, ART INSTITUTE, CHICAGO.

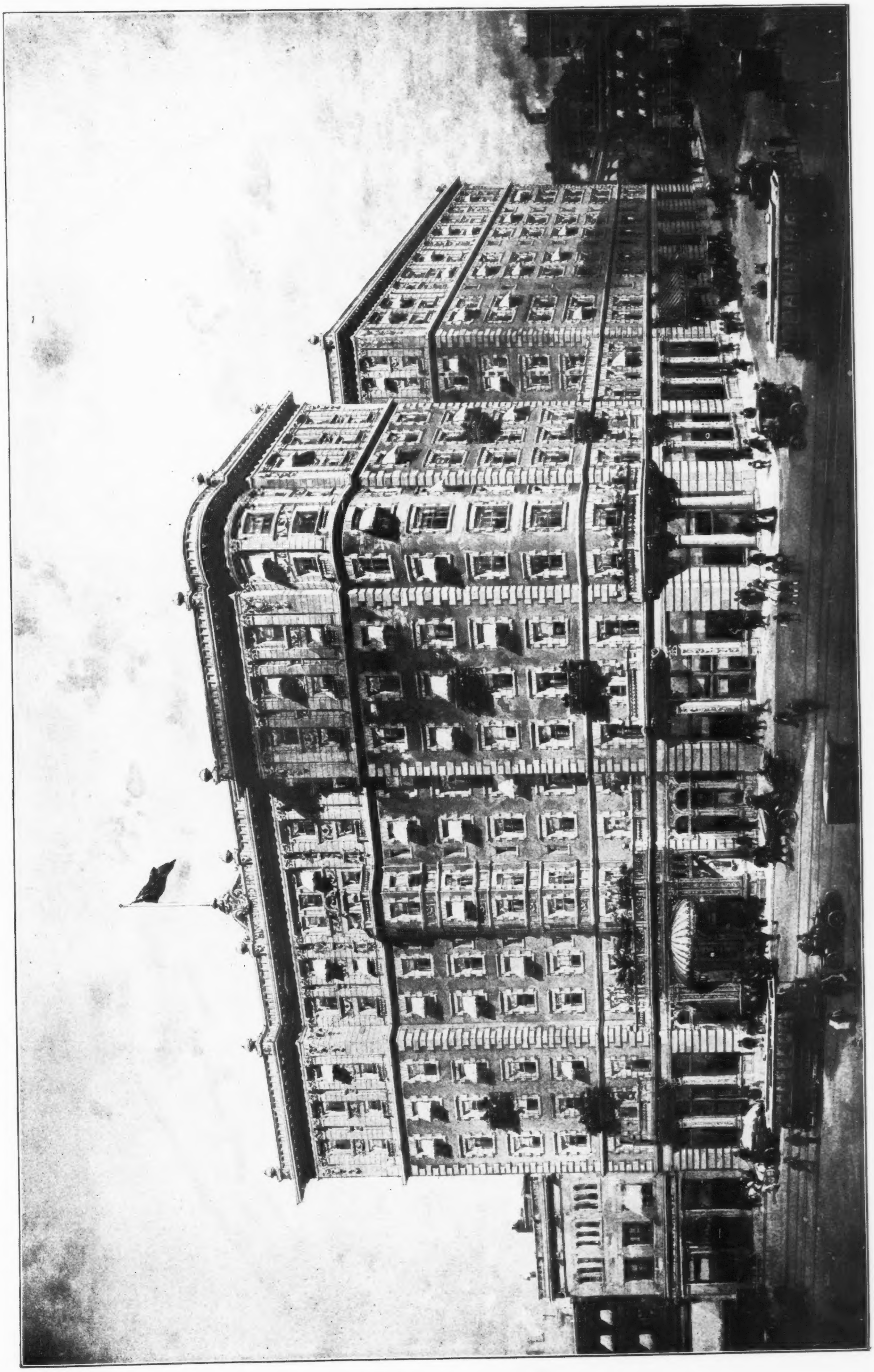
SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS.

Negative by R. W. Williams, Chicago.

Inland Architect Press.

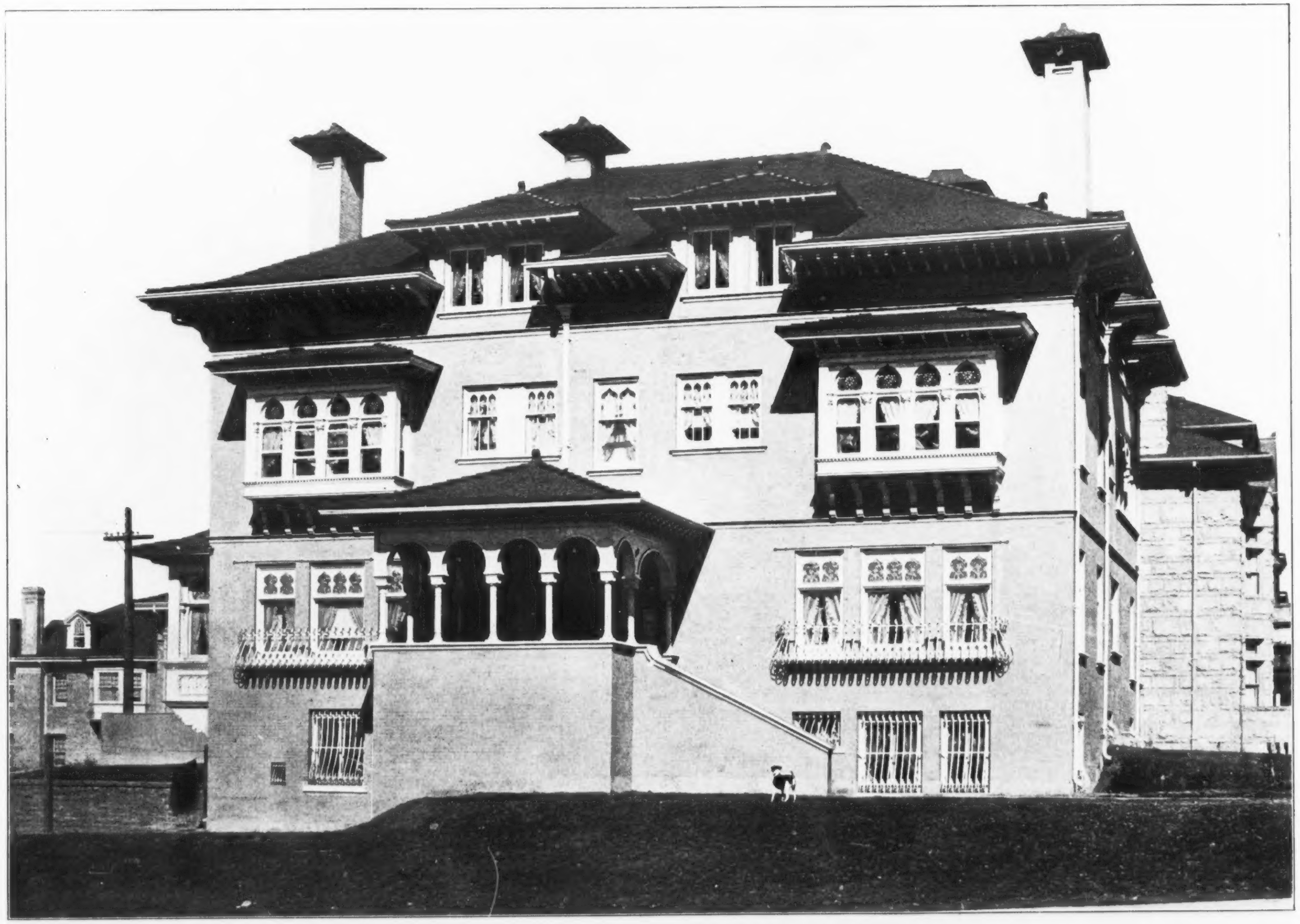
RESIDENCE OF WINTHROP SARGENT, HAVERFORD, PA.

LINDLEY JOHNSON, ARCHITECT, PHILADELPHIA.



KING EDWARD HOTEL, TORONTO, CANADA.

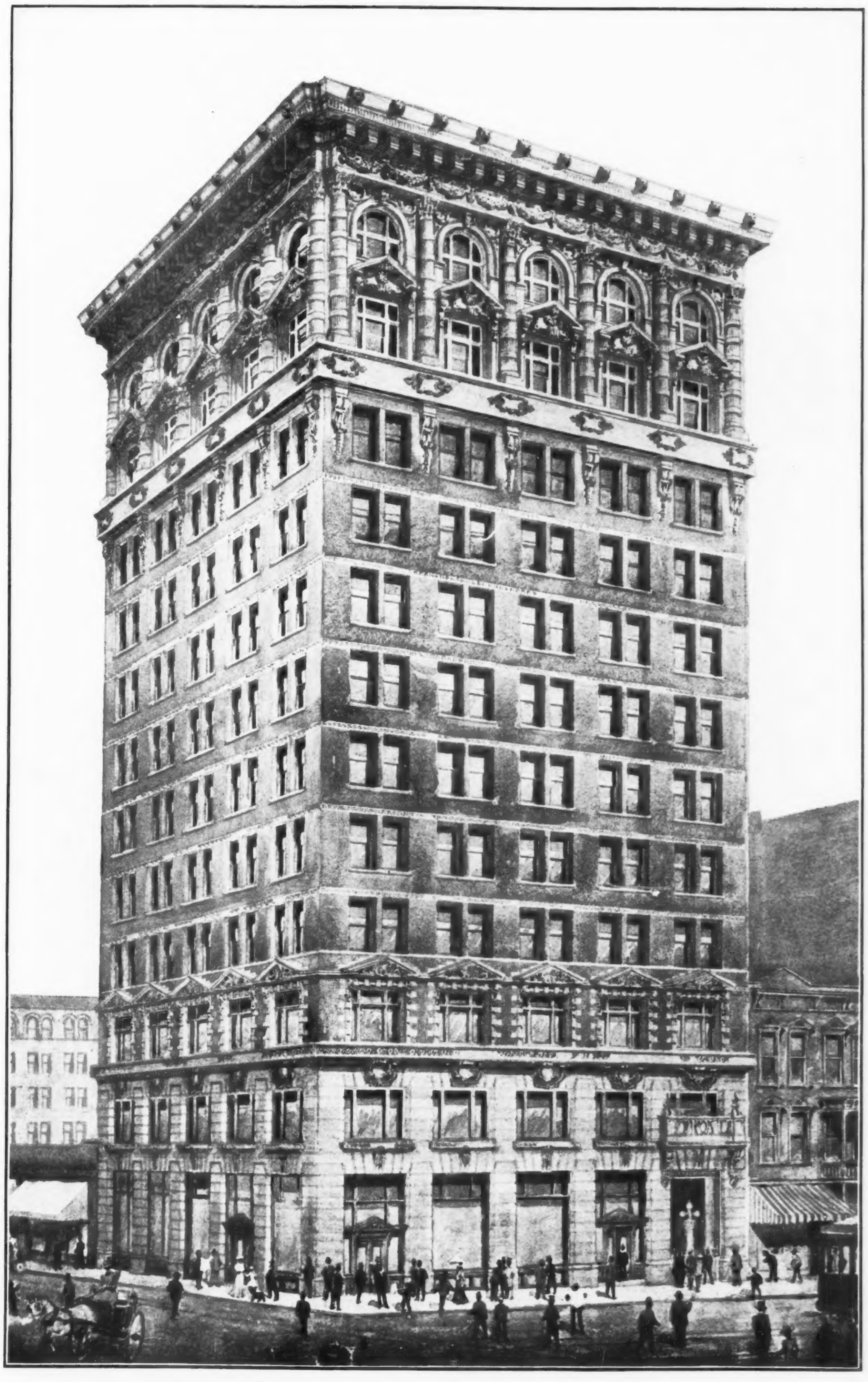
HENRY IVES COBB, ARCHITECT; E. J. LENNOX, ARCHITECT.



RESIDENCE AT DENVER, COLORADO.

F. J. STERNER, ARCHITECT.

RESIDENCE OF W. W. CANDY, ST. LOUIS.
WEBER & GROVES, ARCHITECTS.

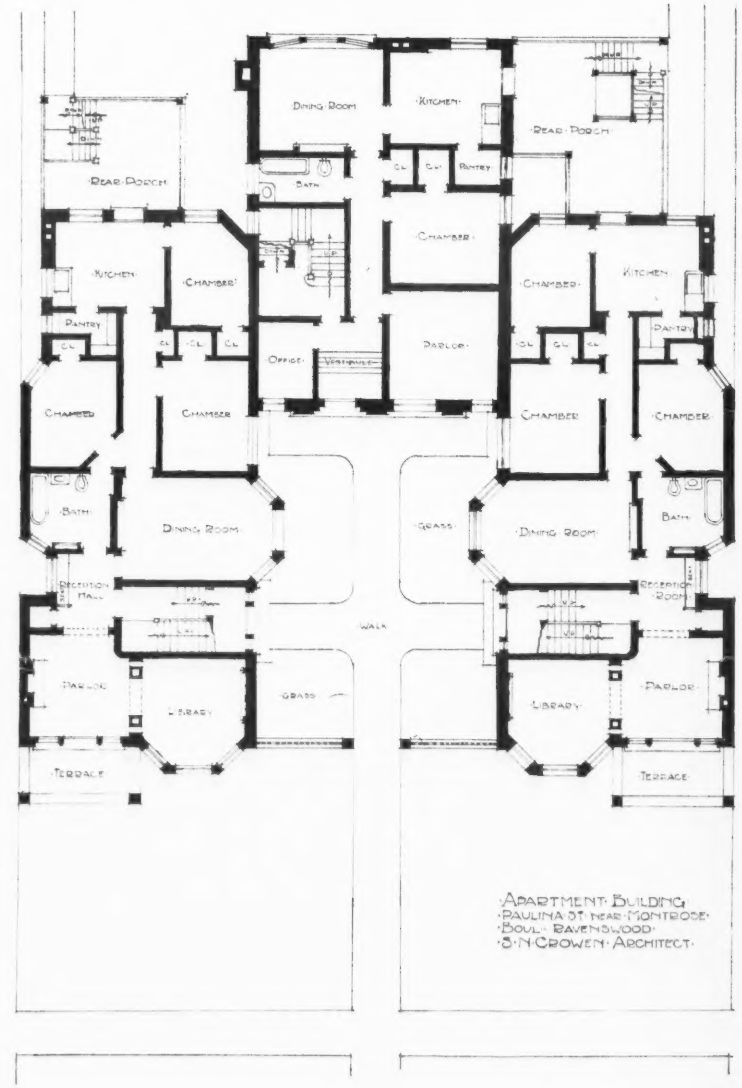


BUILDING FOR SOUTHERN CALIFORNIA SAVINGS BANK,
LOS ANGELES, CALIFORNIA.

JOHN PARKINSON, ARCHITECT.

HOUSES, GRAND BOULEVARD, CHICAGO.

Peabody & Beauley, Architects.



APARTMENT BUILDING, CHICAGO

S. N. Crowen, Architect.