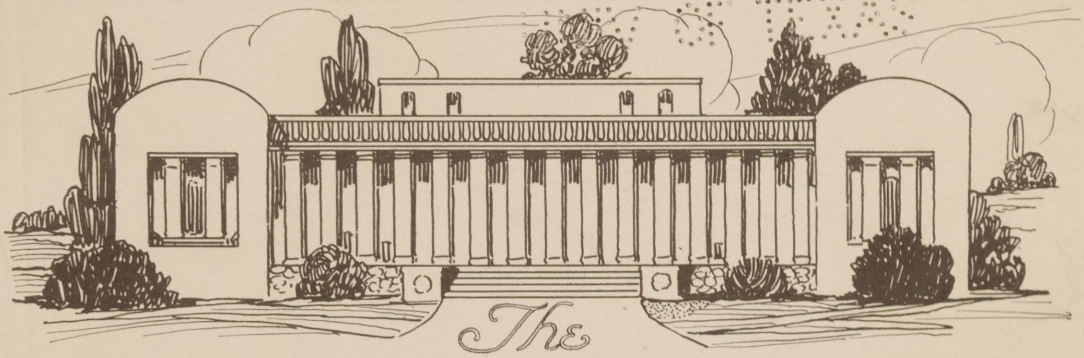
ARCHITECTURE

ENGINEERING



The SOVTHERN ARCHITECT AND BVILDING NEWS

Construction *Landscape*

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H. E. HARMAN, President.

E. R. DENMARK, Editor.

VIRGINIA AVENUE SCHOOL BUILDING, ATLANTA, GA.

Warren C. Powell, Architect.
A. J. Krebs Co., Contractors.
Photo: By Fishbaugh & Lee.

A. Ten Eyck Brown, Supervising Architect.
"VELTONE" Brick furnished by the F. Graham Williams Brick Co., Atlanta, Ga.

SOUTHERN ARCHITECT & BUILDING NEWS

January
1923

Vol. XLIX.
No. 1

Distinguished Features of Southern School Architecture

By W. J. Sayward, A. I. A.

Edwards & Sayward, Architects, Atlanta, Ga.

IN considering school architecture from the standpoint of territorial requirements it is, at first thought, hard to realize that the resulting construction of a building in the South would be essentially different from one in the North, or that one in the West would be essentially different from one in the East. It seems obvious that as far as plan goes, school house standards should be much the same; evidently a standard class room in one locality, provided it is desirable to house the same number of pupils in each and to conduct the same general exercises, and we know that educational standards are rapidly becoming national rather than local.

In the matter of materials, which in earlier days were more or less responsible for the diversification of style, it can almost be said that there is now no such thing as localization. Brick which are burned in the Northern States are used in the Southern, marble from Alabama or Tennessee is used in Minnesota, slate purchased in Virgina is transported the country over, fir from the Pacific Coast is brought to the Atlantic, yellow pine cut in Georgia or Louisiana is employed in New England and so on seemingly through the whole gamut of materials.

As to the matter of architectural design pure and simple, it is a well recognized fact that designers the country over come to the same general source for inspiration. Men educated in Boston or New York are quite as apt to practice in California or Texas, as in the immediate environs of their respective sections. All sections have the same opportunities of travel, and architectural publications of all sorts are freely and widely distributed. Thus at first thought, it is hard to see just what may be the points of distinction between a Southern school building and one to be constructed in any other part of the country. Nevertheless, there are vital influences constantly at work which we hardly realize from a casual survey, and it would be a great mistake to conclude offhand that a building designed for Maine would be equally well adapted to Southern California. To put it another way, a man trained entirely in the traditions of one section of the country will hardly be successful in another section, without a considerable amount of time and energy spent in the study of local conditions.

Perhaps the most obvious differences in requirements are those imposed by climatic conditions. In the North, for example, it is well said that they build to keep warm, while in the South they build to keep cool. In the colder climates a compact plan has everything to recommend it, while in the warmer climates the advantages of a low extended type deserve every consideration. Obviously much less attention can be paid to the heating plant in one case than in the other, and on account of differences in labor obtainable, together with climatic conditions, a radically different plan should generally be followed. Outside the larger cities in the South janitorial service of comparatively meager intelligence is all that can be acquired. This means that as simple and as near fool-proof a type of installation as possible must be employed. It would be the height of folly to install a complicated mechanical system of ventilation without the necessary intelligence to operate it. In compensation for this difficulty we do have, however, a climate which permits ordinarily, of the simplest and most direct form of ventilation, the open window and this should be relied upon almost entirely in the smaller town work. Where we do cross the line first into the domain of mechanical ventiation the "Split System" so called should have first consideration, since in that the actual heating of the building is not dependent upon a complicated system of ventilation. The latter may fall down and be out of comission for an indefinite length of time, but school will not have to be dismissed for lack of heat. Use of this system also permits the installation of a direct system of steam heat at a time when lack of funds might veto the use of a first class equipment, with still the possibility of adding the ventilation at a later period.

Another fact that has to be reckoned with is the smaller amount of funds almost universally provided for Southern schools compared with that of nearly any other part of the country. This curtails to a large extent the degree of elaboration permissable to say nothing of some features which are almost to be classed as necessities in a liberal school curriculum.

As to exterior design, the high pitched roof has not the reason for being in the Southern States that it has further North where snow loads are matters of vital importance. A low pitch roof in the North would be equally out of place.

As to standards of lighting with their direct influence upon fenestration, it is hard to understand why a code formulated in a Northern city under the trying conditions of more compact building and, as in some instances, a gloomy, rainy climate may not be somewhat modified in the "Sunny South." This would leave less wall surface punctured by windows and consequently leave the designer much more free in his composition, a highly desired situation. The factory type of school house which has been brought about by the unfortunate literal observance of lighting requirements would then have some show of being eliminated or at least modified.

Standards, to be of the greatest service, should be known, understood, and finally applied not blindly but with the utmost discretion. In the South, where in the great majority of communities the cost of fireproof buildings is prohibitive, standards of safety obviously have to undergo a judicious pruning, such being the case we must select those which apply to plan rather than material, with the result right away that structures of several stories must be tabooed, and a single story employed where possible.

The conditions imposed by peculiar racial characteristics were mentioned under reference to heating.

It is therefore easy to be seen what a profound influence these few factors have in establishing character in school buildings. To approach the problem of a Southern school with the ideals of one from some other community without a broad and sympathetic understanding of local conditions, would be disastrous indeed. In like manner, it would be unfair to compare the merits of two widely separated institutions, because they simply cannot be conceived upon the same plane.

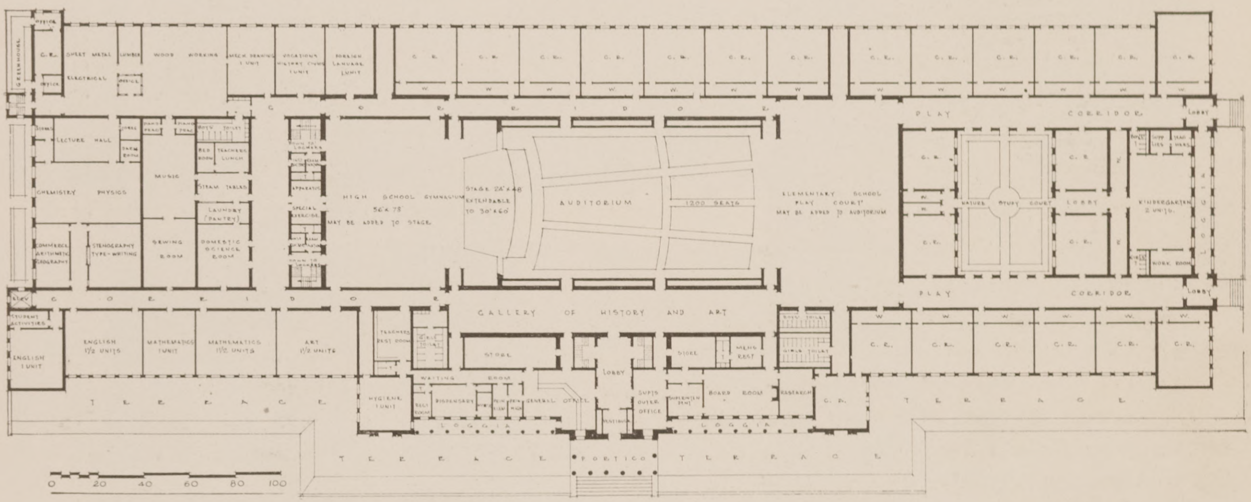
As to style, if historic style is implied, we need worry little about that. We firmly believe that it is even now in the making and that there is little justification in pinning ourselves too tightly to historic conventions in a problem which fundamentally knows no precedent. In the observance of good taste and discrimination, in grouping, massing, proportions, color, texture and materials, there is great latitude; the resultant is sure to stand forth as a product, while not altogether new in form, yet of such disinct type that under the best handling it will be altogether pleasing and satisfactory and of an interesting divergence from that of any other section of the country.

The Handley School, Winchester, Va.

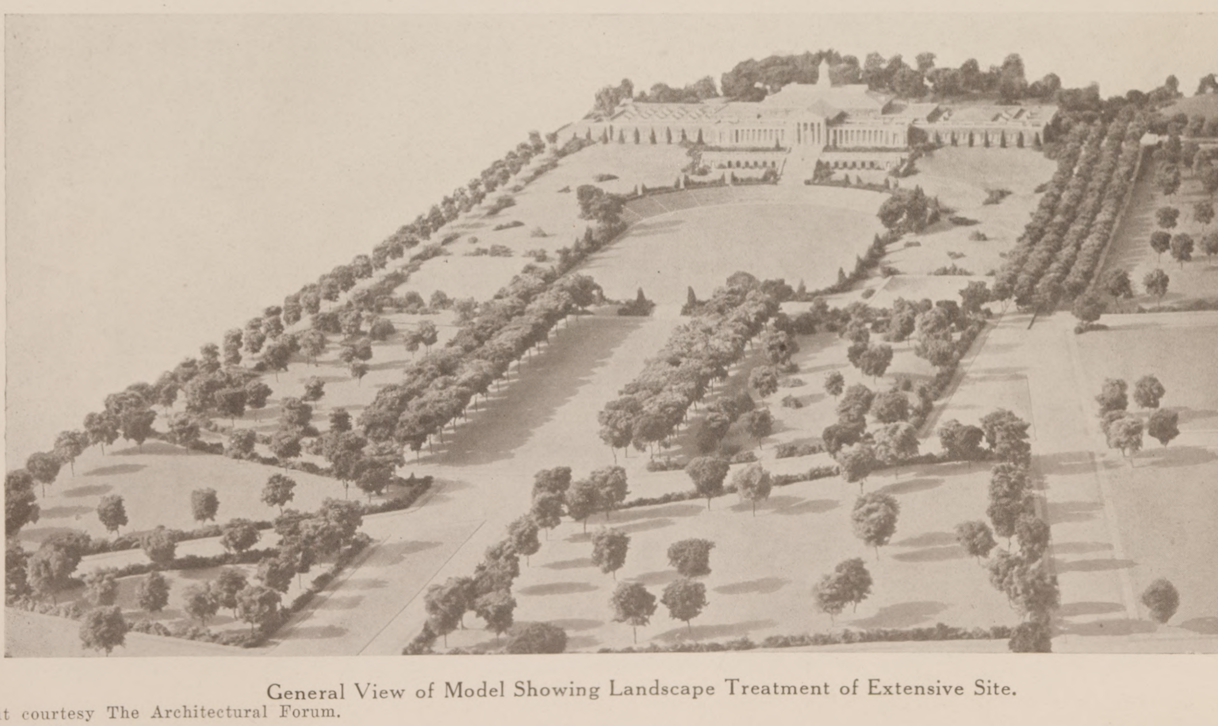
W. R. McCORNACK, Architect
A. I. A.

THIS school, built from a bequest by the late Judge John Handley, is a memorial school conducted under the auspices of the local public school board, and is located in a tract of some 80 acres which is to be laid out with every possible provision for athletics, including tennis courts, an athletic field and stadium, wading pool, playgrounds for little children, golf course and a park for adults.

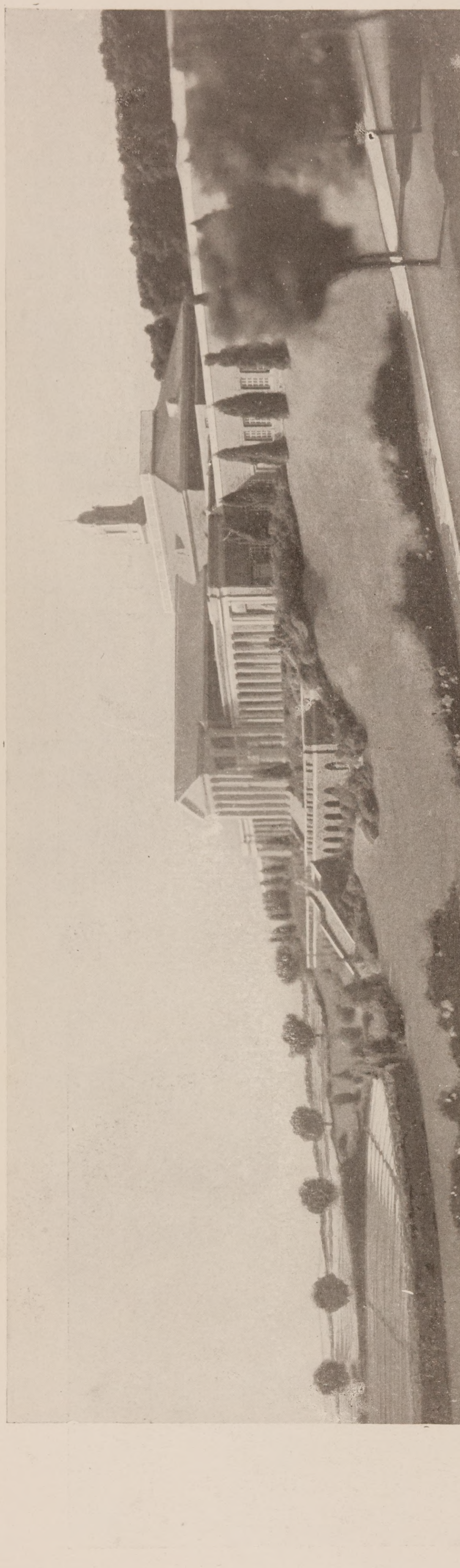
Within the school building, which is designed in the form of a letter H and on the one-story, unit plan with an outside exit from each classroom, are taught the usual kindergarten, elementary, junior high and senior high grades, and in addition to the requisite classrooms with overhead light the structure includes the necessary laboratories, shops, an assembly room which seats 2,000 when extended to include the play court, and also a gymnasium, nature study hall, a swimming pool, cafeteria and a number of other adjuncts not often to be found in even the best equipped school buildings. Carrying out the wishes of its founder, the school is intended to be not only the most completely equipped of public schools but is also to be a community building so broad in its scope as to care for not only the regular school curriculum but to meet also the vocational and recreational needs of all the people in the community.

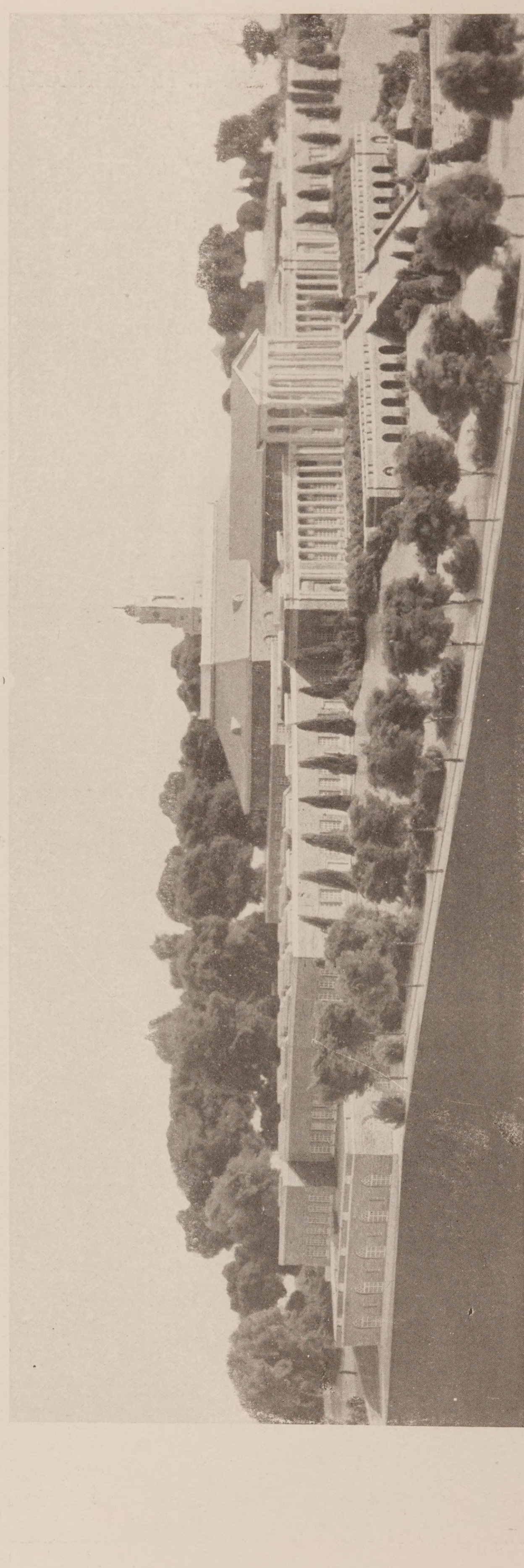


Ground Floor Plan of the Handley School.



General View of Model Showing Landscape Treatment of Extensive Site.
Cut courtesy The Architectural Forum.





HANDLEY CONSOLIDATED PUBLIC SCHOOLS, WINCHESTER, VA.

W. R. McCORNACK, ARCHITECT

GEORGE FOX, ASSOCIATE ARCHITECT

Cuts courtesy The Architectural Forum.

JUNIOR HIGH SCHOOL, SAVANNAH, GA.

WM. B. ITTNER, ARCHITECT

Cuts courtesy The Architectural Forum.

HIGH SCHOOL BUILDING
Durham, N. C.

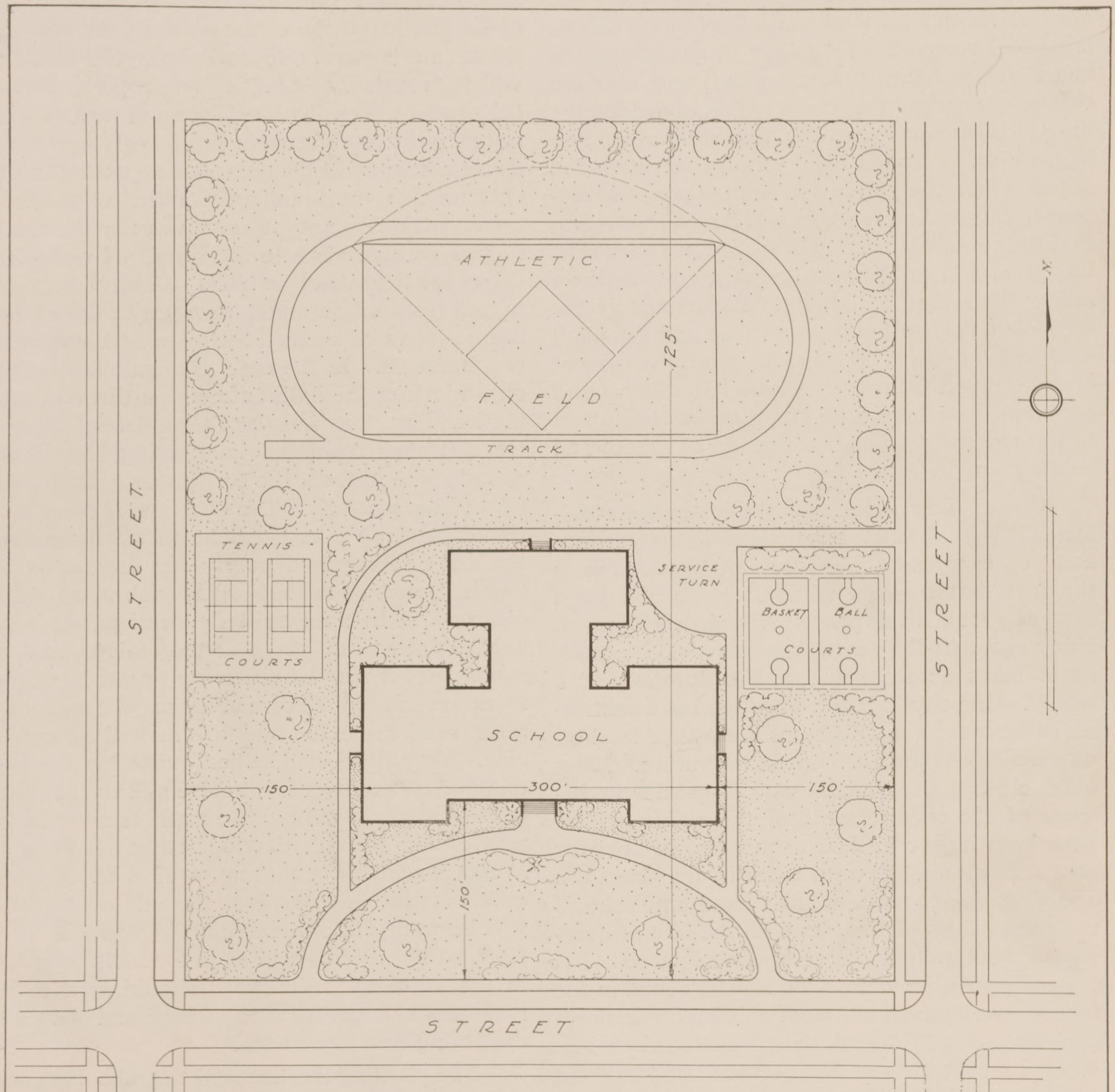
Milburn, Heister & Co., Architects, Washington, D. C.

Landscape Architecture of School Grounds

By E. S. DRAPER, A. S. L. A.

Charlotte, N. C.

IN the development of school grounds the landscape architect should be called upon for advice if possible before the site is chosen in order to give his opinion as to the availibility of the site for development of school grounds. The architect should of course be consulted but the present modern development of school grounds for which considerably larger area is considered necessary than was the case in the past the landscape architect's opinion on the usability of the grounds is oftentimes the deciding factor when several sites are under consideration. If the site has already



E S DRAPER
LANDSCAPE ARCH'T & CITY PLANNER CHARLOTTE, N.C.

TYPICAL PLAN FOR HIGH OR GRAMMAR SCHOOL ON 10 ACRE TRACT SHOWING 4 ACRES DEVOTED TO SCHOOL SITE AND ADJACENT GROUNDS AND 6 ACRES DEVOTED TO RECREATION. THIS PLAN CAN BE REVISED AND ALTERED TO SUIT THE TOPOGRAPHY OF THE LAND AND REQUIREMENTS OF THE SCHOOL been chosen the landscape architect should work in co-operation with the architect and develop his plans for the use of the grounds while the plans for the buildings are being drawn. In this way the proper relation of drives, walks, etc., to the various portions of the building can be assured and various features in which the landscape architect is interested—that of drainage, grading, planting and improvement of the grounds can be taken up in conjunction with the building plans. The landscape architect is paying more and more an important part in the planning of school grounds, as school committees are beginning to realize that a school is not finished until the walks, drives, lawn and recreation areas are properly finished and developed in a manner which will give the children attending the school right ideas along the lines of landscape improvement and beautification of grounds. Very few children who have attended school where the gorunds have been properly improved but will go forth into life with the feeling that the communities in which they live should be improved and public grounds of a city made an asset rather than a liability. Unfortunately the opposite has been many times true and the pupil who in later life is opopsed to improvement and civic development usually comes from towns and communities where little attention has been paid to improvement and beautification of school and public grounds.

One of the reasons why the landscape architect is being called upon for advice in the development of every school grounds of importance is the fact that modern methods require a large area of grounds for proper school development. Many cities in the south have set definite minimum acres as the standard for location of a school. One city in North Carolina has established 10 acres for the minimum acreage of land on which a school shall be built in the future. Many other cities under the stimulus of greater knowledge of the requirements of the children have gone even higher in their acquisition of land for school purposes. Several cities in the Carolinas and Georgia are now building handsome schools on tracts excess of 15 acres with the idea of developing these grounds for recreational purposes. It is hardly possible to have too much ground in the school development although a definite minimum can easily be established. The building should be erected on an area of land of at least twice the frontage of the building. For instance, a 300 ft. front should have a ground frontage of 600 ft. for such a building which would accomodate from 500 to 1000 pupils depending upon the depth and type of building. A minimum of ten acres should be purchased to take care of the development of the grounds. In considering the development of the grounds, school grounds can be divided into two well defined areas:—

First—That portion of the grounds adjacent to the building, front rear and sides which are required for access to and from the streets and should form the setting of the building.

Second—The remainder of the area, usually at the rear of the building, to be developed, for recreational use for the students.

In discussing some of the landscape requirements for development of school grounds, it will be well to discuss these needs under definite headings. Taking up the first area noted above, that of the public portion of the grounds, the first consideration is access to and from the building, which is usually handled by properly located drives and walks. These drives and walks should be primarily established in order to give quick and direct access from the points of approach to thee entrances of the building. Unlike an estate or even a park, directness must always be the fundamental consideration in the layout of walks and drives for the school grounds. Children hurrying to and from school must have provided for their use a system of walks which is direct and meets requirements. In the case of a building located on a block of land with streets on three sides of the building, the walkways should tend to meet the approach from the intersecting streets and would come in from the corners or near the corners of the property. The question of drive location depends to a large extent on whether or not the drive is required purely for service to the building, such as the hauling of coal, wood, ashes, etc., or will be used by the general public when entertainments are given at the auditorium. In some cases it may be necessary to put in a front from the side to take care of the service and at the same time reach the auditorium will be preferable. Very little justification exists for the handling of service by a front drive and the handling of coal, ashes, etc., should be made as unobtrusive part of the grounds development as is possible. Walks should be a minimum of 8 ft. in width otherwise the lawn area at the side of the walk will be trampled on. More often walks of 10 to 12 ft. width will be required in the main approach to the building. Walkways should lead to the recreational areas from the school and should be direct and equally as wide.

The planting treatment of the school grounds should be simple and refined. The areas in the public part of the grounds as distinguished from the receration area should be planted in grass ot the type best suited to the locality, but if no recreation area exists grass can rarely be maintained properly, owing to use of this area by children for

(*Continued on page* 74)

Mechanical Equipment in the School Buildings for Atlanta, Ga.

By F. E. MARKEL, A. S. M. E.

THE building program, for the city schools being built under the present bond issue, is now well under way and promises to amply repay, in satisfaction, the Board of Education and the Bond Commission who are responsible for this careful planning of expenditures. This care was first shown in the school survey and later in the appointment of a supervising architect who has entire charge of the building program.

Mr. A. Ten Eyck Brown, as supervising architect has made it possible to produce designs for the many buildings, in the offices of some eighteen architects, and have them similar in design and in completeness of detail.

The mechanical work is being designed by five engineers. The ones handling the first projects, were called together by the Supervising Architect and the general scheme was decided upon. The engineers were left to interpret these instructions according to their own ideas and have produced plans showing somewhat different plants. In general, however, the buildings embody the equipment described in this article.

The heating is all by direct radiation except in minor cases. Ventilation is by mechanical exhaustion of the air through ducts of the usual type. Fans are in nearly all cases, placed on the roofs in suitable houses and controlled from the boiler room.

Fresh air is admitted to the rooms through openings in the walls behind the radiators. It is directed, through the radiators, by portable box vases.

This method of ventilation was decided upon because of its low first cost and its cheapness of operation. It will be satisfactory because the buildings are to be placed on large lots, in quiet parts of the city. Also the item of "open window ventilation" was considered. A large part of the school year is in weather that invites the open window type.

The writer, in his designs, made a few exceptions to this method of fresh air supply as follows:—

Where the lower floor is very near the yard level we considered that the air might carry odors. These rooms, therefore, are supplied with unit heaters placed in the coat rooms. This air supply is taken through a panel at the top of the coat room windows. The room temperatures are properly maintained by direct radiation.

Auditoriums are heated by direct radiation and supplied with fresh air in much the same way as noted above. Blast heaters are added, in some cases, for fresh air heating and for quicker heating of the room.

The ventilation is planned to handle twenty cubic feet of air per minute, per person. The heating is a little in excess of this so that a little air, admitted through the windows, will bring the room condition up to a very good standard.

Toilets, in most cases are ventilated with the same fans that handle the air from the class rooms. A fe whave been provided with separate ventilating sets and ducts to the roof.

Kitchens are all provided with separate ventilating sets as these rooms are frequently used when the main fans are not running.

Offices, and other rooms that require only moderate quantities of fresh air are equipped with direct radiation only and have no ventilating ducts.

All of the plants, designed by the writer, are for vapor and the radiators have the usual thermostatic traps. The steam inlet has a plain valve. Modulation valves are not used because of the fact that the control disappears with a very slight use in pressure.

Steel boilers are being used in all buildings. No one make, or type has been settled upon. Several are of the well-known portable, fire-box type, Some are of the same type with brick setting. The return tubular type also is being used. In all cases the down draft furnace is provided.

Some of the buildings have boiler rooms that are too shallow for gravity returns. These plants are provided with sets of vacuum pumps to return the condensate.

The writer has carefully avoided the use of pumps as the janitors are not all trained in handling extensive equipment.

Temperature control is recognized as being necessary and estimates have been secured. Owing to the lack of funds this equipment was not placed under contract. It is hoped that the school department may find money for this.

Plumbing

This is planned along conservative lines and of course in accord with the sanitary code for Atlanta. This code, by the way, is one of the most liberal codes used by any of the large cities.

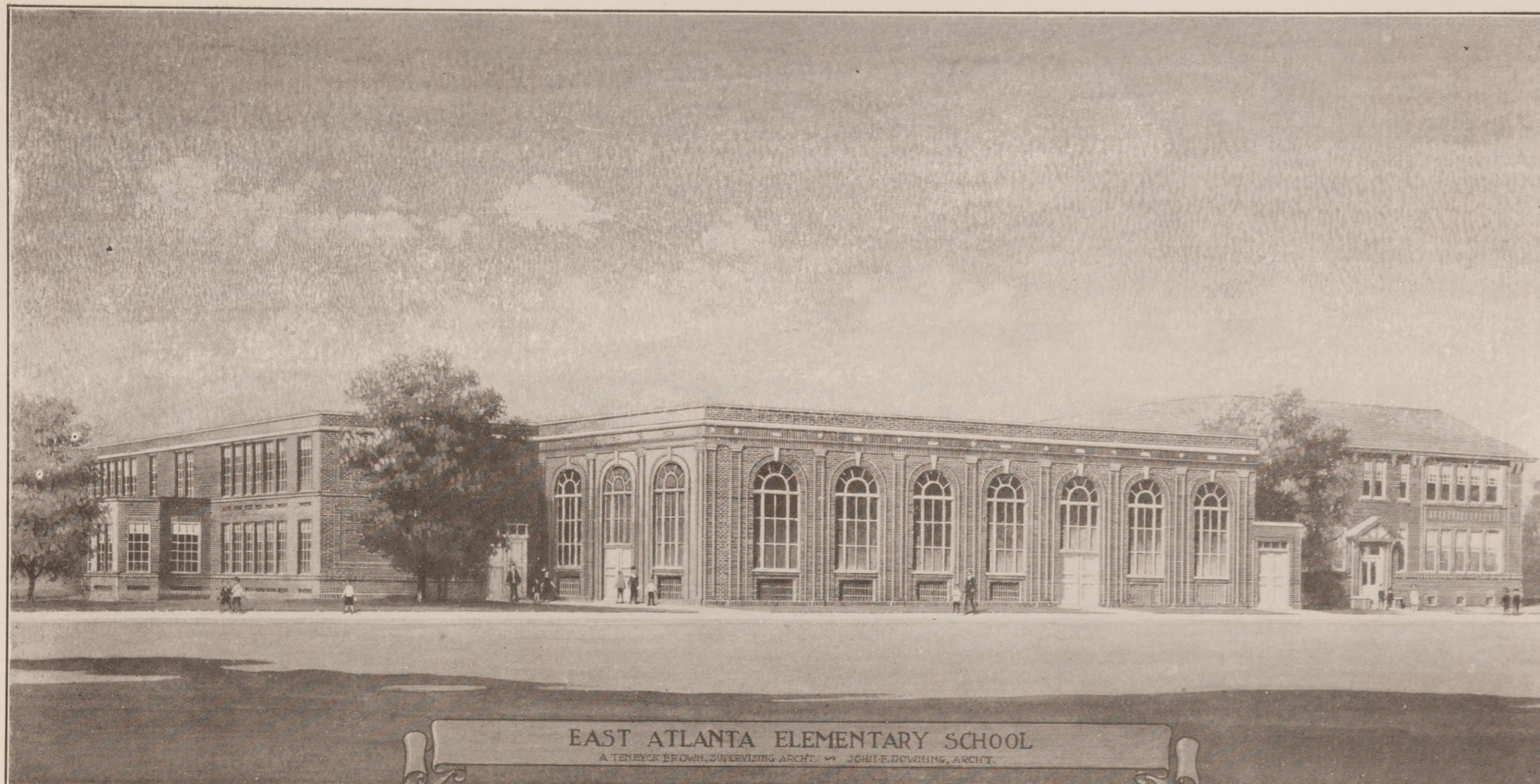
Water closets are of good weight, full syphon

(Continued on page 82)

FAITH SCHOOL BUILDING, ATLANTA, GA.

W. J. J. Chase, Architect.
Southern Ferro Concrete Co., Contractors
Photo: Fishbaugh & Lee.

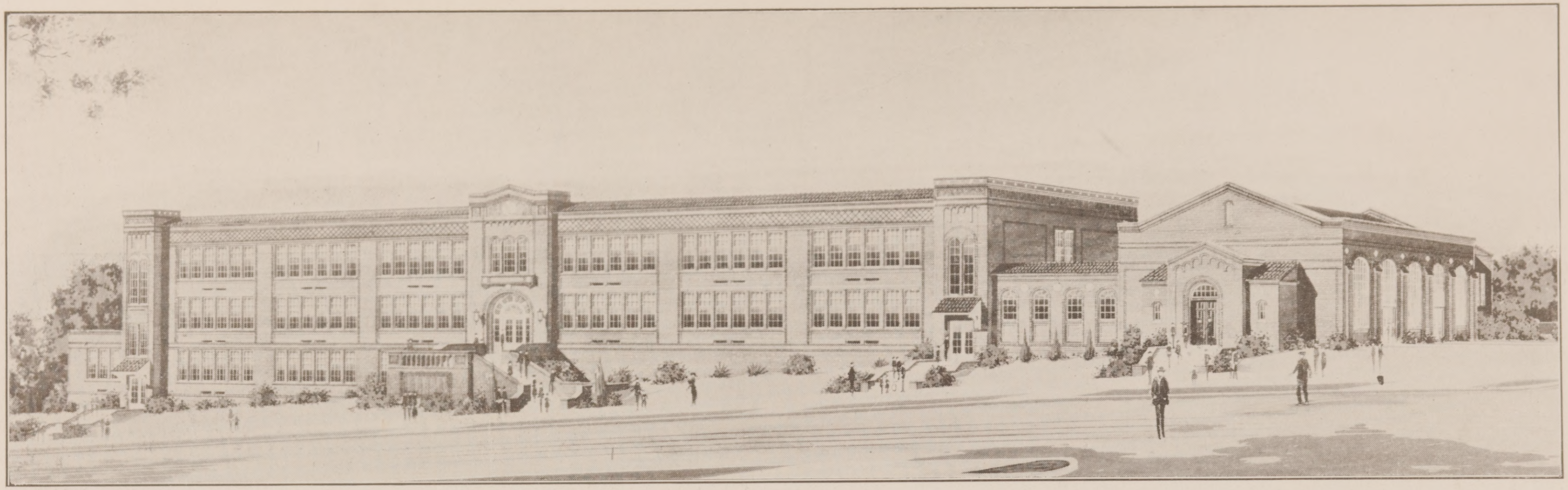
A Ten Eyck Brown, Supervising Architect.
''AIRDALE'' Brick furnished by the F. Graham Williams Brick Co., Atlanta, Ga.



EAST ATLANTA ELEMENTARY SCHOOL BUILDING, ATLANTA, GA.

J. F. Downing, Architect.
R. M. Walker Co., Contractors.
Photo: By Fishbaugh & Lee.

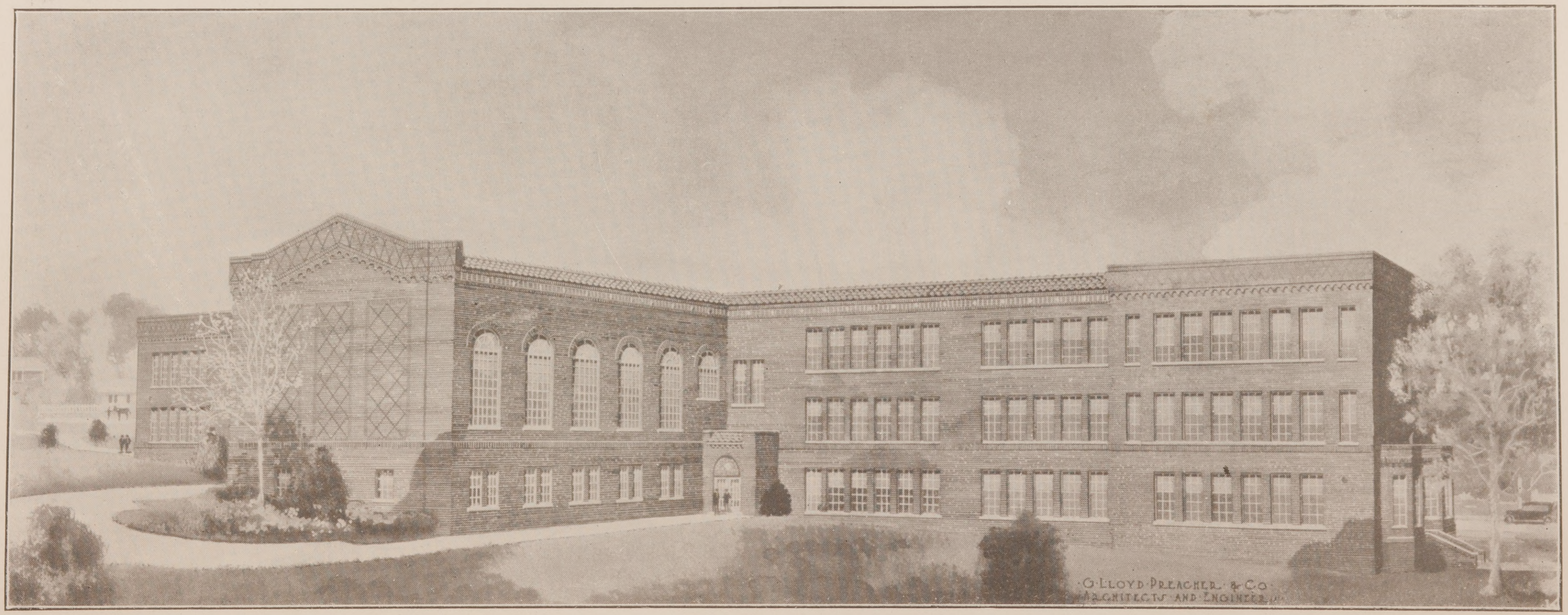
A. Ten Eyck Brown, Supervising Architect.
"Ky-James" Brick furnished by the F. Graham Williams Brick Co., Atlanta, Ga.



FORMWALT SCHOOL BUILDING, ATLANTA, GA.

DeFord Smith, Architect.
Griffin-Hodges Co., Contractors.
Photo: By Fishbaugh & Lee.

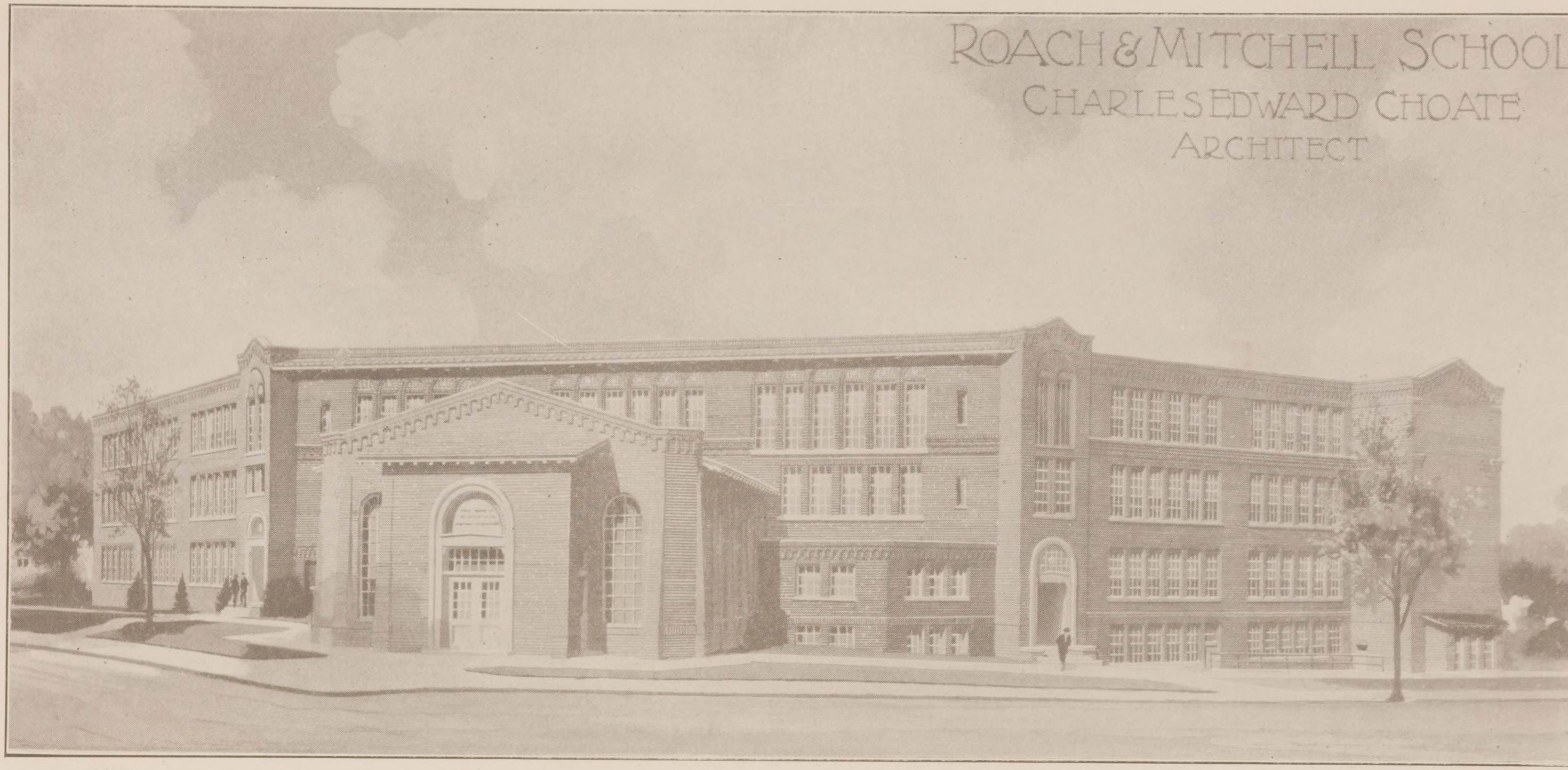
A. Ten Eyck Brown, Supervising Architect.
''VELTONE'' Brick furnished by the F. Graham Williams Brick Co., Atlanta, Ga.



PITTSBURGH SCHOOL BUILDING, ATLANTA, GA.

G. Lloyd Preacher, Architect.
A. J. Krebs Co., Contractors.
Photo: By Fishbaugh & Lee.

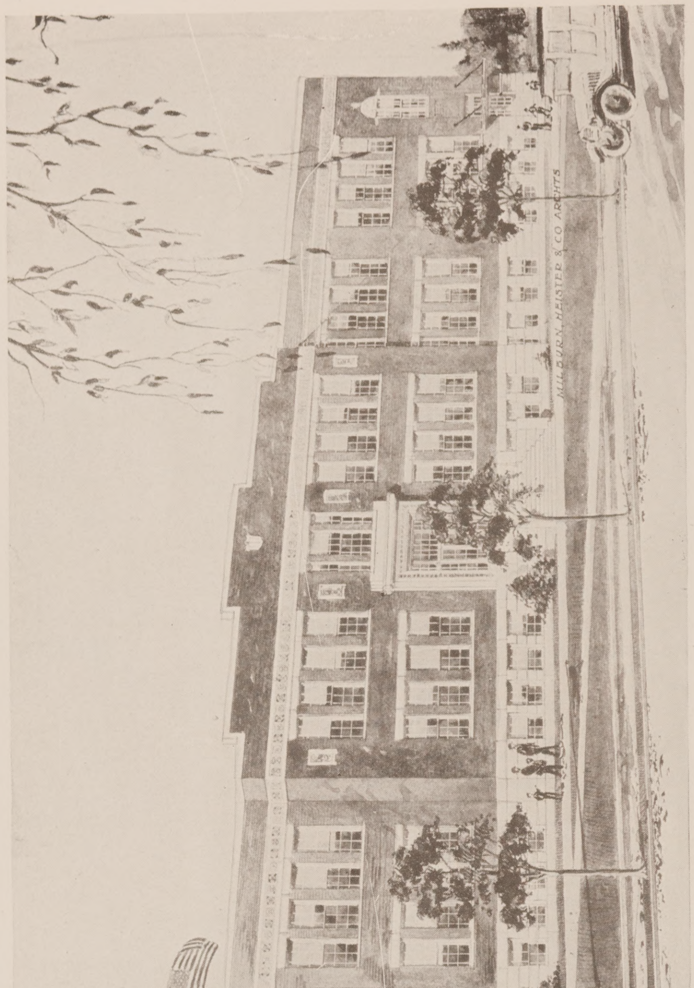
A. Ten Eyck Brown, Supervising Architect.
''ART-TEX'' Brick furnished by the F. Graham Williams Brick Co., Atlanta, Ga.



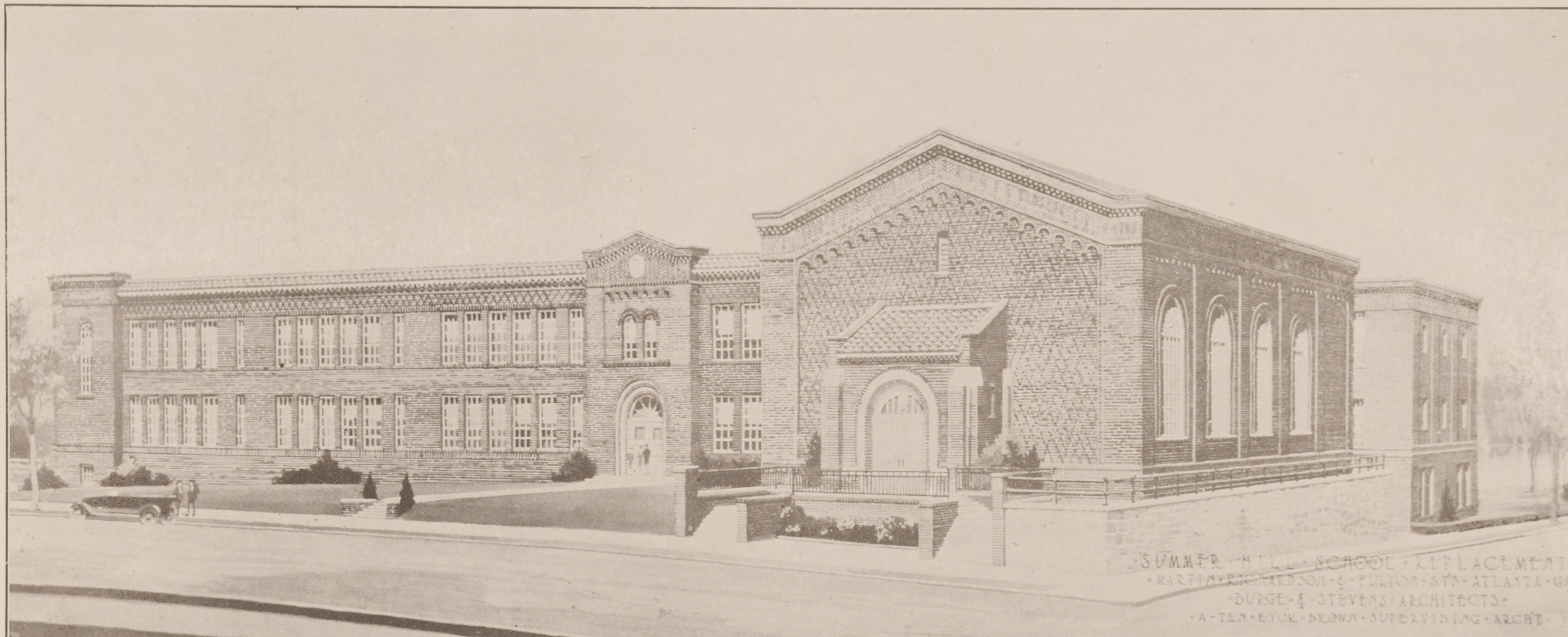
ROACH & MITCHELL SCHOOL BUILDING, ATLANTA, GA.

Charles E. Choate, Architect.
Southern Ferro Concrete Co., Contractors.
Photo: By Fishbaugh & Lee.

A. Ten Eyck Brown, Supervising Architect.
"VELTONE" Brick furnished by the F. Graham Williams Brick Co., Atlanta, Ga.



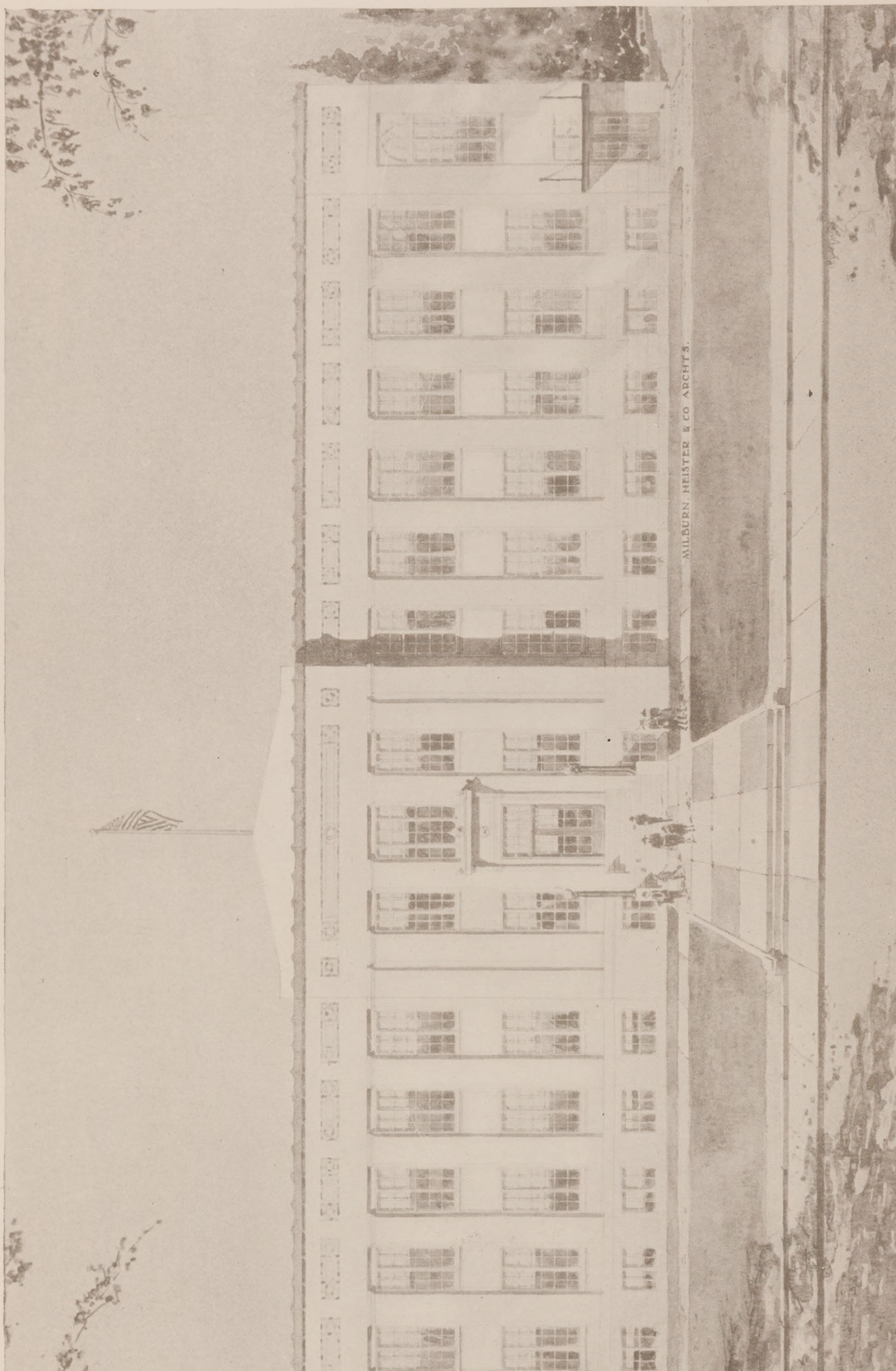
HIGH SCHOOL BUILDING, ELIZABETH CITY, N. C.
Milburn, Heister & Co., Architects, Washington, D. C.



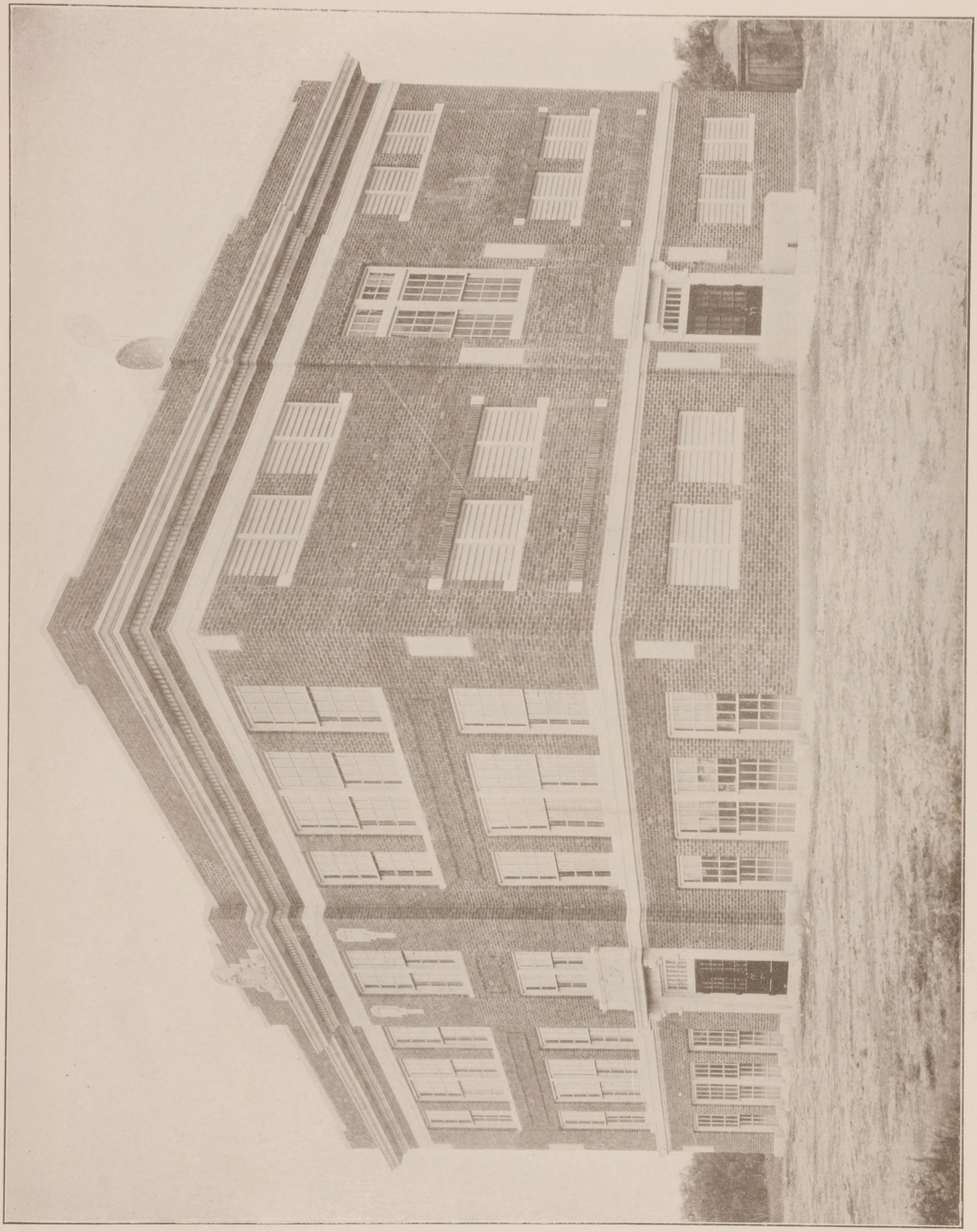
SUMMER HILL SCHOOL REPLACEMENT, ATLANTA, GA.

Burge & Stevens, Architects.
Southern Ferro Concrete Co., Contractors,
Photo: Fishbaugh & Lee,

A. Ten Eyck Brown, Supervising Architect.
"VELTONE" Brick furnished by the F. Graham Williams Brick Co., Atlanta, Ga.



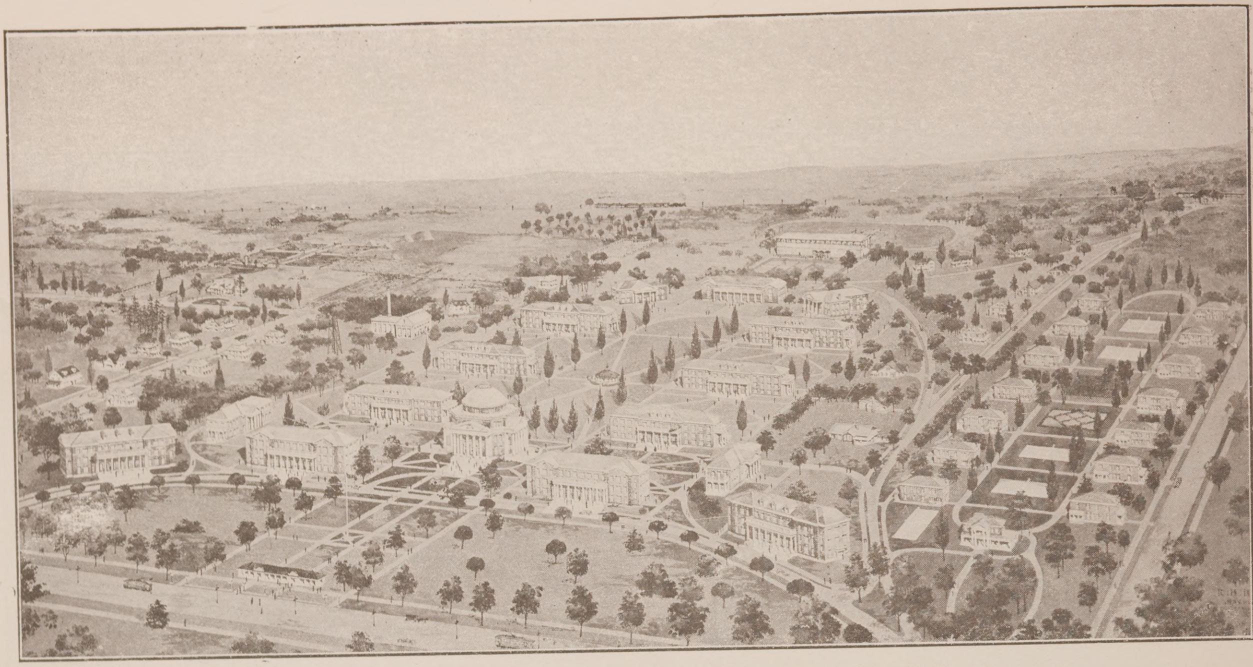
HIGH SCHOOL BUILDING, FAYETTEVILLE, N. C.
Milburn, Heister & Co., Architects, Washington, D. C.



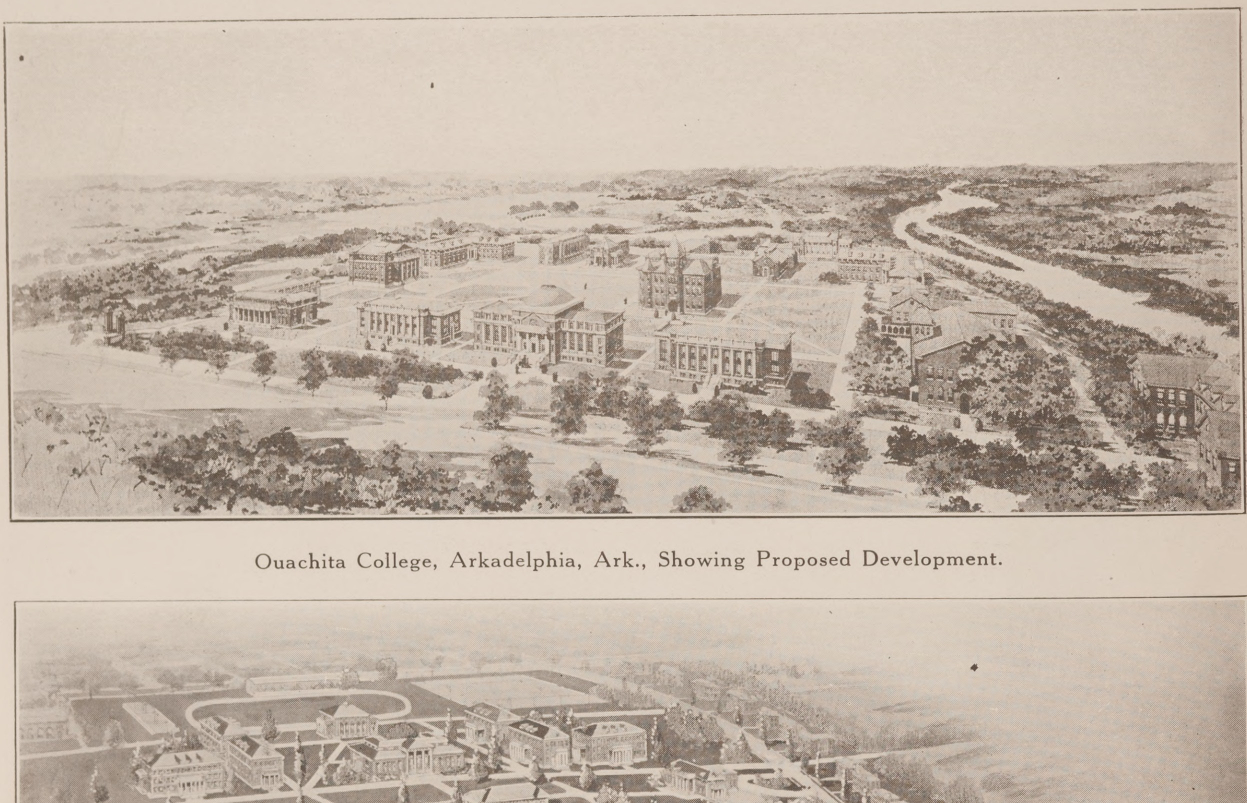
COOPER SCHOOL BUILDING, RANGER, TEXAS.

ASBESTONE FLOORING used throughout. Installed by Franklyn R. Muller & Co.

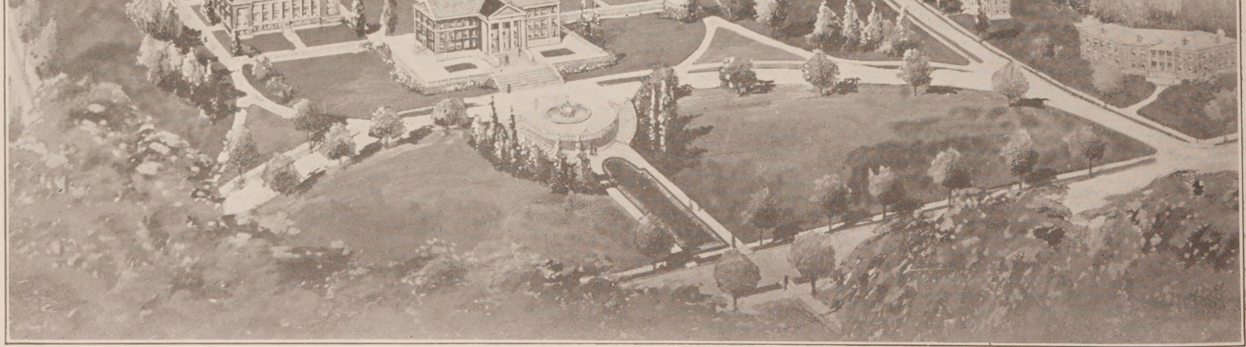
David S. Castle, Architect, Abilene, Tex. Walsh & Burney, Contractors, San Antonio, Tex.



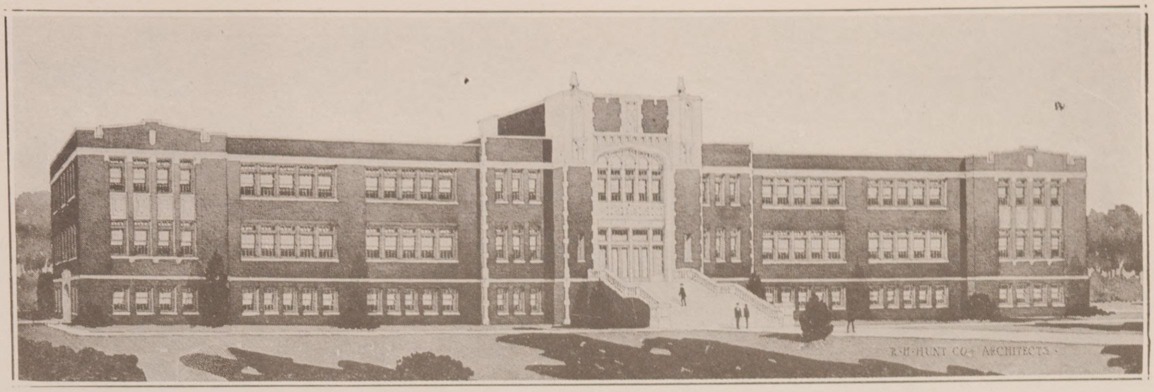
Mississippi Normal College, Hattiesburg, Miss., Showing Proposed Development.



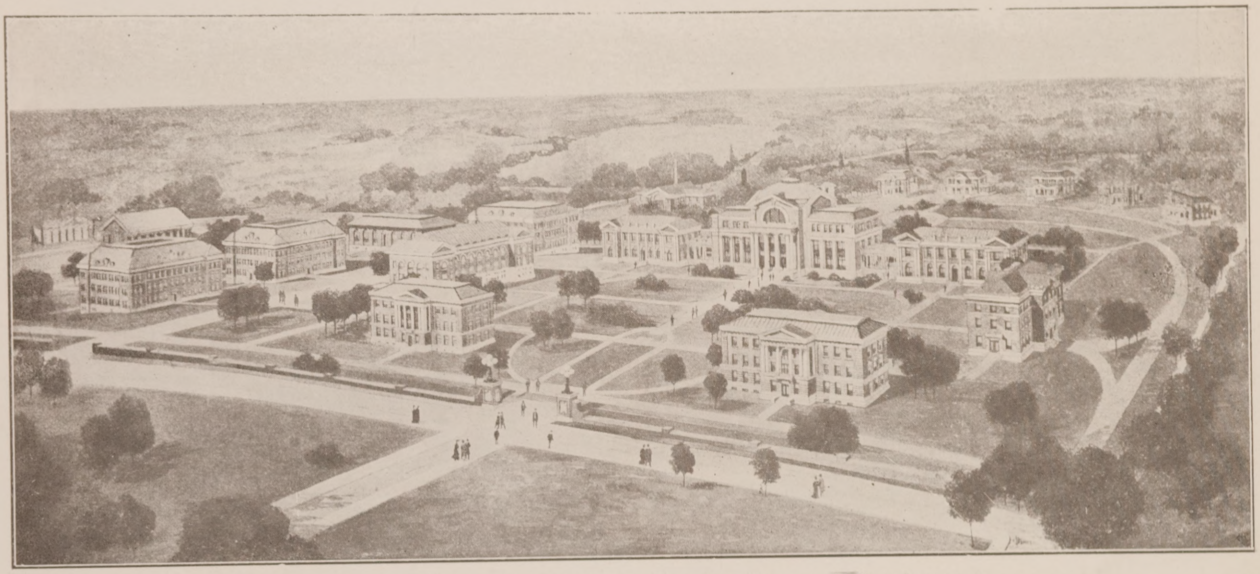
Ouachita College, Arkadelphia, Ark., Showing Proposed Development.



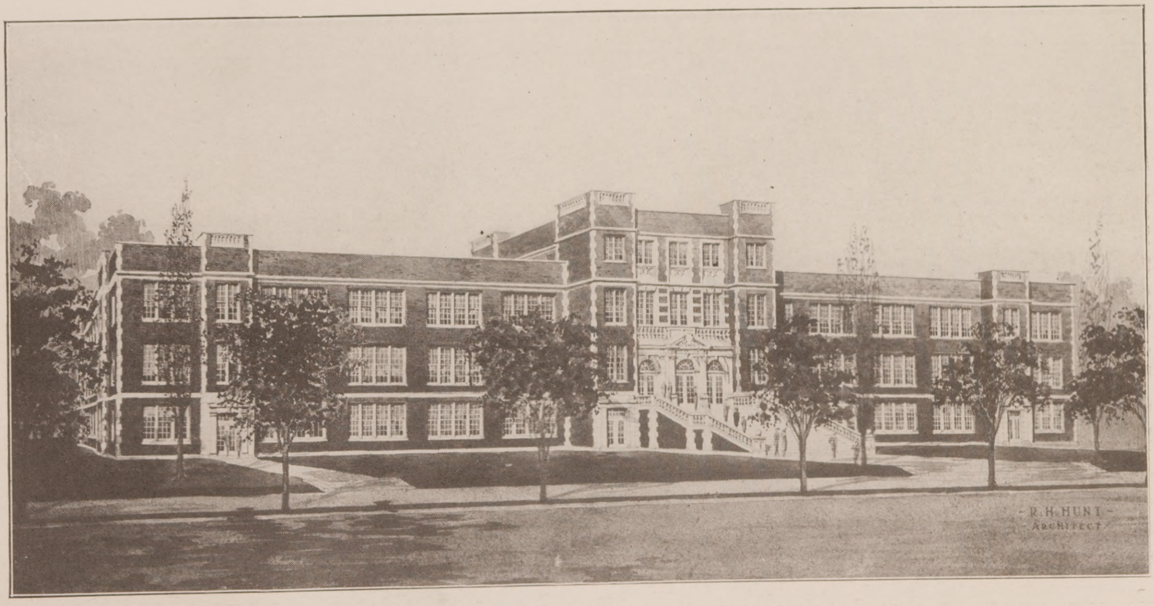
Jonesboro College, Jonesboro, Ark., Showing Proposed Development.



South Park High School, Beaumont, Texas.

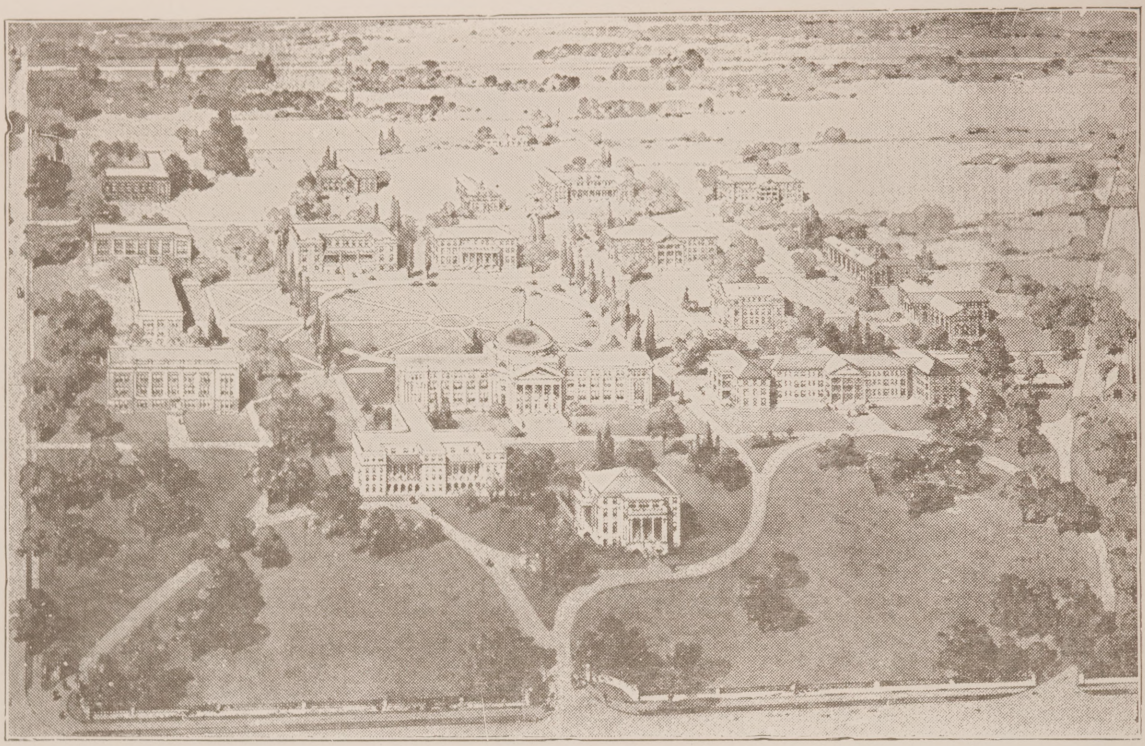


Mississippi College, Clinton, Miss., Showing Proposed Development.



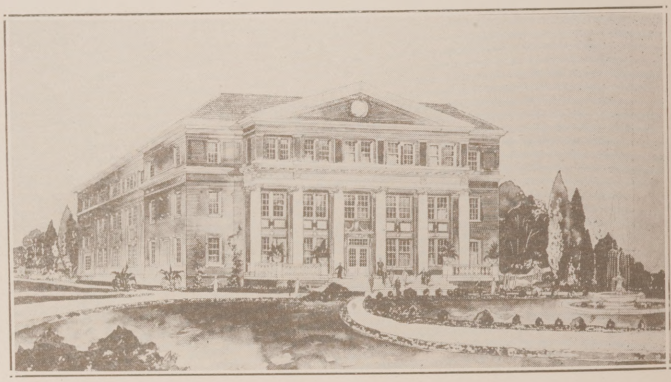
Wyatt High School, Chattanooga, Tenn.
R. H. Hunt Co., Architects

Chattanooga, Tenn. Dallas, Texas.



Baylor College, Including Future Development, Belton, Texas.

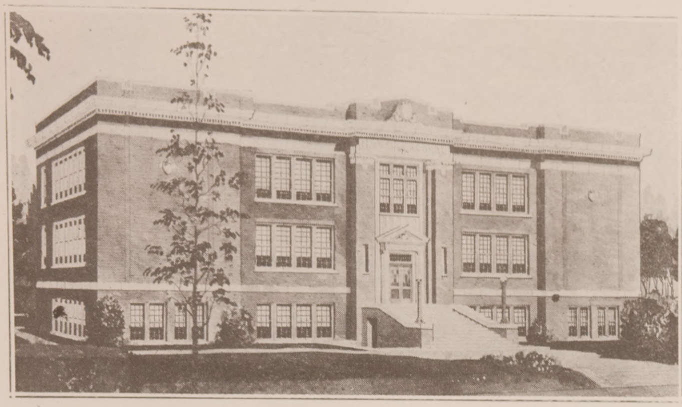
Administration Building, Jonesboro College, Jonesboro, Ark.



Fine Arts Building, Ouachita College, Arkadelphia, Ark.

Chattanooga High School, Group, Including Wyatt Hall and the Proposed Science Building and Vocational Building, Central Heating Plant and Athletic Field, Chattanooga, Tenn.

Chattanooga, Tenn. R. H. Hunt Co., Architects Dallas, Texas.

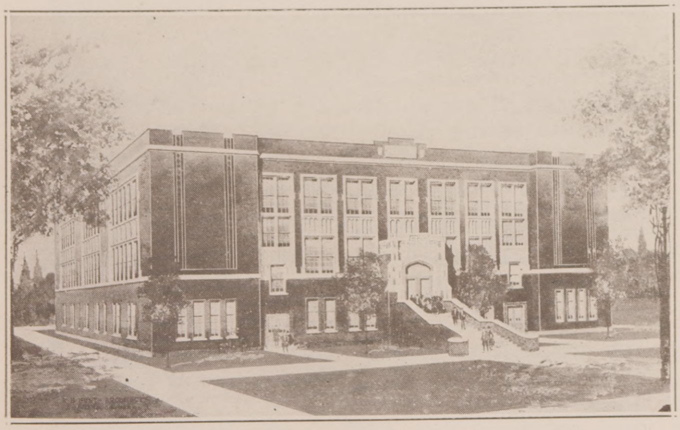


Howell High School, Clarksville, Tenn.

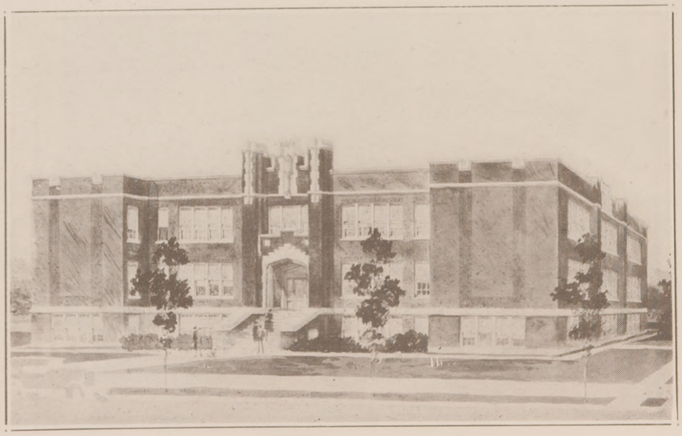
Science Building, Baylor College, Belton, Texas.

Chemical Laboratory, A. & M. College, Starkville, Miss.

High School, Greenville, Miss.



Ridgedale Grammar School, Chattanooga, Tenn.



High School, Brownwood, Texas.

Chattanooga, Tenn. R. H. Hunt Co., Architects Dallas, Texas.

Editorial Comment

The Southern Architect & Building News

Southern Architect and Contractor, Atlanta, Ga., and Southern Building News, Memphis, Tenn., and Southern Building Record, Nashville, Tenn., Consolidated.

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Price $2.00 Per Year.

The School Building.

THE design and construction of the school building should, we believe be given as much if not more attention by our architects and contractors than any other type of buildings.

When we consider the youth of our country, the boys and girls who will be the men and women of tomorrow, the future heads of our industries and the guiding influences in our civic development, we cannot help realizing the great importance of giving our children every opportunity, and every advantage for securing an education. Teachers, principals and superintendents are not the only essentials in the educational system, but the buildings, equipment and surroundings, the housing of the students are equally important. When we think of the youth of our country, spending the greater part of their lives in the school room from the time they are six until they reach the age of eighteen years, when their grammar and high school education is completed, it is no wonder that the school building problem is one of vast importance, and should be given every consideration.

The buildings are of course the main feature, but we should not forget the grounds, the surroundings incorporated in the school building project. The landscape development should be given equal consideration with the planning of the building. The surrounding grounds should be made just as attractive as possible, for by this means you educate the child outside the class room to appreciate all that is beautiful and artistic in the city plan. If the child learns to appreciate beautiful surroundings while in school, it is needless to say that when it is grown that this early appreciation will be shown by more beautiful home grounds, city parks and other civic centers. In choosing a location for our city schools the first consideration should be the amount of territory that can be given to play grounds. During the time that the child is in grammar schools is the time when the body needs the most exercise, and it is essential to the development of a strong body as well as a strong mind that children at this age be given every opportunity for play. Crowded school grounds not only hinder the development of children's bodies but where two many children are thrown together on

THE COVER DESIGN

THE INSERT on the front cover is a reproduction in pen and ink of the entrance detail of the Houghton Grammar School, Augusta, Ga. This drawing was made by Mr. W. Attaway, Commercial Artist, of Atlanta.

The Houghton School was designed by G. Lloyd Preacher, Architect, of Atlanta and Augusta, Ga. The material used is of unglazed Terra Cotta, of buff color, manufactured by the Atlanta Terra Cotta Company. The photograph from which the drawing was made was through the courtesy of the National Terra Cotta Society.

a small plat it is dangerous, as some child is sure to be hurt in play. The development of the landscape feature not only applies in planning the grammar school but should be given equal consideration in planning the high school.

In recent years the school house problem has been handled by our architects with much success, and the whole scheme of school building design and construction is fast developing. During the past few years the growth of the better school house design has had a great influence in changing the mode of instruction in our public schools.

Throughout the United States today we find handsome school buildings, modern in every respect, fireproof in construction, better lighted class rooms, ample ventilation, equipment for every purpose, including special equipment for training the students in the sciences and higher arts. Every method for the welfare and safety of the pupils are now being included in the architects, and engineers plans. While it is true school building construction has now reached a high mark, yet we believe that in the near future we will see still greater developments that will add to the comfort, safety and convenience of both pupils and teachers.

With the coming of bigger, better and more modern school buildings our educational system is sure to undergo a great change for the better. While we pride ourselves in the fast development of our American civilization yet we all realize that a greater educational system is necessary if we expect to keep up the same stride with which we have been traveling.

While in the south we have been slow in developing our educational system, we cannot conclude this article without speaking a word in regard to the increasing educational facilities that are being put into effect in the South at this time. We have been slow in building fine school houses, because until recent years the population has not warranted the expenditure of large sums of money for fine buildings. Our cities have not been crowded, and naturally the number of children within the school age has not been such that it has caused us any serious concern in the matter of building bigger and better schools. However, the time has come when the South is called upon to think seriously along the lines of bigger buildings, more modern schools, and larger grounds, in order to give their youth better advantages and opportunities for an education. Our citizens, which is needless to say, are meeting this situation squarely, as they have always done in the past when called upon to aid in the development of the South. They are giving freely of their money for this cause, and the architects and contractors, as well as the engineers in the various cities in the South are working in union to give to this section the very best school building construction possible.

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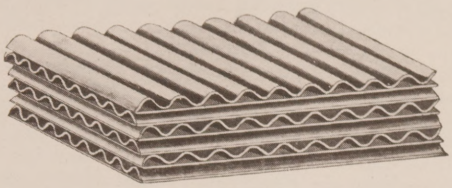

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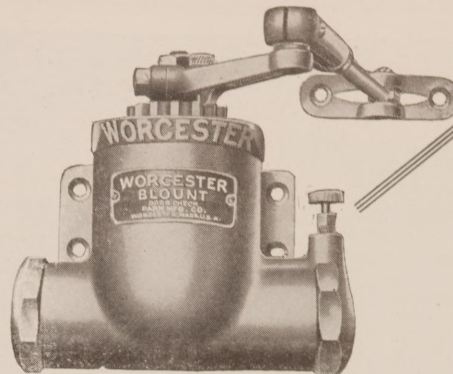

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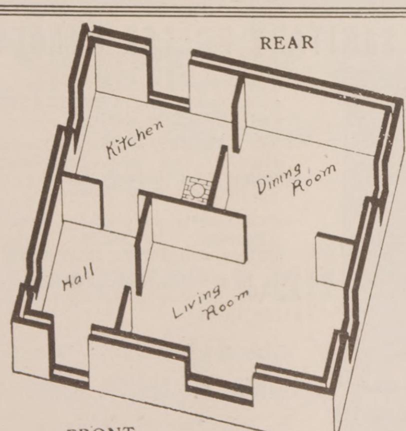

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In this issue we have shown a few of the many buildings that have already been built, and others that will be under construction in the near future. Every article appearing in this issue was written by a southern man, that is directly acquainted with school building in this section.

While this issue does not carry the material that we would like best to submit, yet we hope that in some article or illustration our readers will find some helpful suggestions in planning other school buildings. At least we wish to have it known that we are behind every movement for school buildings design and construction in the South.

Kansas City Awards Contract for $300,000 School.

Kansas City, Mo.—Rosenthal & Co., of this city, have been awarded general contract by the Board of Education for the erection of a $300,000 school building of one and tow stories. Plans and specifications were prepared by Charles A. Smith and the dimensions are 230 by 250 feet. The structure will be of brick and concrete with terra-cotta trim, concrete floors and foundation, and composition slate and shingle roof.

Contracts have also been awarded to the McKinley Plumbing & Heating Co. for heating and plumbing, Wyandotte Electric Co. for electric lighting, and to the Western Terra Cotta Co. for terra cotta.

Huntington Votes $800,000 School Bonds.

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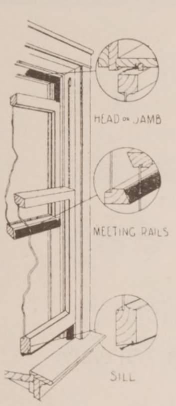

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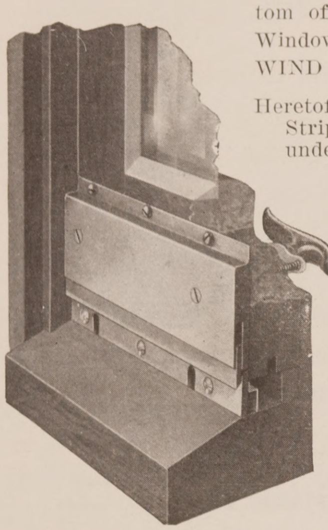

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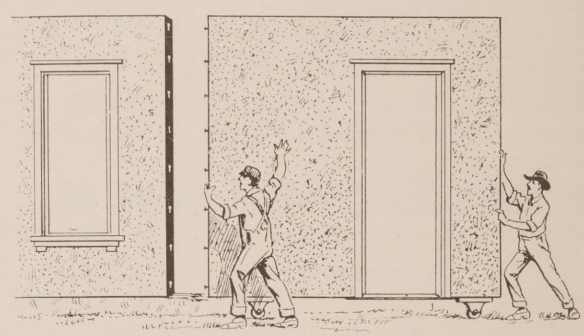

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Electric Equipment and Wiring in the Modern School Building

Part I.

By H. J. C. PEARSON, Mem. A. S. E. E.

IT is only recently that the necessity for more careful consideration of the problem of lighting design for public schools has been forcibly brought to the fore by the growing totals of students developing defective eyesight. Artificial aid to the natural light has been in use for sometime, as dark days, smoky city atmosphere, trees, etc., have been cut down the available light to where some aid was essential. In addition to the use of school buildings for evening classes, and for community centers in some cases is possible only where the schools are lighted. Designs of lighting sources, however, has so far outstripped the general knowledge of their application that in many cases the added light has been a positive detriment, on account of glare and eye strain.

The consideration of electrical installation in schools falls naturally into three principal divisions — the illumination of the building, the method of installing the wiring, and the uses, other than lighting, to which the electric current can be put.

Of these divisions the second, or the method of wiring is probably the least known and considered. It is, however, far from being the least important, as the successful operation of every other part, and the freedom from fire hazard, are dependent on the proper design and installation of the wiring.

In general, the electric current for a school is brought into one central point, where the metering is done, and from where the current is distributed. Generally a switchboard, or feeder panel is installed at this point. From there the current is carried in large feeders to the various distributing centers, where panel boards are placed, and from where the individual circuits are fed.

Various methods of running these wires has been used. The knob and tube method conceals wires in the partitions and between the ceilings and floors, stretching them between porcelain knobs, which clamp on the wires, or around which the wires are tied, and carrying them through joist plates, studs, etc., in the porcelain tubes. In the older methods taps and joints were made anywhere in the wiring, in the loop system, all joints and taps are made at outlets, where steel boxes are installed.

Where wiring had to be installed after a building was finished, it was sometimes stretched between porcelain cleats screwed on the surface, or incased in a flexible insulating tube and fished between walls.

These methods are cheap and unsightly, or dangerous, and practically never allowed in a school building. The use of conduits, rigid or flexible, is almost universal, and gives the best installation known today.

Rigid conduit is steel tubing, which is connected by means of threaded couplings, and is built into the walls and floors of a buildings, and which provides a channel for the reception of the wires. Flexible conduit is steel tubing, formed of a spirally twisted ribbon, which is also built into buildings for the reception of the wires. In most cases this is used with the wires already in place, when it is called "armored conductors." In general, armored conductors are used in wood construction, and behind plastered walls, while rigid conduit is used in brick, tile, and concrete.

The conduit work is entirely concealed, in the finished building. It is fastened into the forms, and the concrete poured around it, or it is built into a brick or tile wall, and plastered over. At every outlet it connects with a steel box about four inches, around which also built in, but which extends to the surface, and takes the light or switch, or receptacle, or whatever connection is requried. These boxes have different covers, designed to take different fittings and these covers are fastened on the boxes before they are installed, so that they become part of the building. The conduits are fastened to these boxes by entering closely fitting holes, or knockouts, and are secured by locknuts, which should be put on both sides of the metal. The end of the conduit is then protected by a bushing, to prevent the wires coming in contact with the sharp corner.

Conduit is cut by means of a hack saw, or a cutter built like a lathe tool, which peels off a narrow ribbon of metal as it is turned about the pipe. A wheeled cutter should never be used, as it leaves a burr inside the pipe, where it is in position to do the greatest damage. Regardless of the method of cutting, the cut-in should be carefully reamed, to remove any possible burrs.

Whenever a threaded joint is made, to be covered with concrete, the joint should be carefully white leaded, not only to protect the newly cut surfaces of the metal, but also to make the joint tight. If the concrete could leak in at a joint, a plug would be formed in the conduit, which would be very difficult to remove later. Care must also be taken that the lead does not form a plug inside a coupling. To prevent this, the lead should be applied to the male thread only, so that all the excess is forced to the outside.

Conduit is bent on the job, by means of a lever tool, and great care should be taken to flattening or kinking the conduit, which would cut down the size of the passage, and to avoid cracking the seam open, which would cause a leak. The minimum radius of a bend should be six times the diameter of the conduit. Very large conduit is sometimes heated and filled with sand before being bent, as the pipe is too stiff to bend cold, without a special machine. Heating should be avoided whenever possible.

In some cases conduit has to be run exposed, either being too large to run concealed, or where accessibility is desired. In these cases the conduit is fastened to the ceiling with pipe straps, and should be carefully lined and located to be parallel to or at right angles with the walls. Cast iron or steel fittings are used for outlets in corners.

The wire used for different systems is insulated or protected by different methods. For open and cleat wor kthe insulation is made up of cotton braid saturated in a fire resistant compound, inclosing a layer of slow burning material. For knob and tube, and for conduit work a rubber insulated wire is used, which consists of a layer of rubber compound on the wire, inclosed by cotton braid saturated with moisture proof compound. On small wires there is a single braid over the rubber, but on larger wires, No. 6 and larger, double braid should always be used. The rubber insulation is rated at six hundred volts for ordinary work, but 1,000 -volt insulation, and even higher voltage for special cases, are obtainable. For conduit work all wires larger than No. 8 or No. 10 should be stranded, as solid wires are too stiff to pull around the bend in the conduit.

Joints in the wire are always made in the outlets. Joints are made removing the insulation, scraping the wire clean and bright, and twisting the different wires together. There is a great variety of joints and twists used, but the one principal applies to all, that the strength and conductivity of the joint be not less than that of the wire itself. Solder should not be relied upon for either strength or conductivity, as it has an inconvenient habit of letting go when subject to strain or vibration, but all joints should be soldered after being made secure, as splices will loosen and oxidation will lower the conductivity, if the splice is not protected.

Joints are insulated by being wound with o rubber tape, which is then held on and protected by a layer of friction tape—a heavy cementing tape, which binds the rubber down, and protects it from abrasion. A tape is sometimes used which is a combination of the rubber compound and the friction tape, and fulfills the function of both. Taping must be very carefully done, as the insulation is essential and the joint must not be too bulky or awkward to work into the limited space available.

The larger feed wires often run to a considerable size, the copper an inch in diameter, and made up of 61, or even more, individual wires. The wires are arranged in regular layers about a central wire, and twist in spiral in alternate directions. Thus a cable is made up seven, nineteen, thirty-seven, sixty-one, or more individual strands, depending on the number of layers.

Where these cables are to be run underground, they are generally made with two or three insulated cables bound together under a common braid, and covered with a seamless layer of lead on the outside. Where a duct or conduit is laid in the ground a plain lead covered cable is used, but cables may be buried in the earth without any duct when they are further protected by one or two layers of steel tapes, over the lead.

A switchboard for use in a school of any size is generally built of slate, and mounted on angle iron supports. The main service switches and all the distributing switches are on this board, and all the copper busses and connections. The general practice is to mount the switches andfuses on the front of the board, and all the connections and busses on the back. Swithchboards are sometimes made up by assembling enclosed safety switches on a wooden frame, but these are more bulky and much less convenient in operation.

Panel boards are used to control the individual lighting circuits, and are fed from the switchboard by mains, or feeders. Panel boards are mounted in steel cabinets, which should be installed flush in corridor wall. There are many different types on the market, but the so-called "safety type" panel, with all the live parts protected from the front, is the only one that should be used. In many panels there are switches on the circuits and switches or fuses in the mains, but where there are wall switches or pull switches on the circuits, switches in the panels are not needed. Also, if each panel is on a separate feeder from the switchboard and is controlled there by a fused switch, there is no need of fuses

or switches on the mains where several panels are fed from a single feeder, main fuses should be used on each panel. In the Atlanta schools all the panels are of the simplest possible type, with a three-wire bus connected directly to the feeders, and two-wire branches, each protected by two plug fuses. The doors are locked, as it is necessary to go into the panels only when a fuse is blown.

The design of the ligthing itself is the most vital factor of all. It involves the consideration of a number of points, illumination on the horizontal plane, such as the desk surface, illumination on the vertical plane, such as the blackboard, the absence of sharp shadows and contrasts, the avoidance of glare, the angle of the light, the brilliancy of the exposed surface, the color and tone of the light, and such other factors, as the correct consumption, the cost and frequency of cleaning, the dependence on other reflecting areas, such as the ceiling, which may vary, the convenience of switching control, and so on. Some of these points are clearly defined, such as the need of from six to nine-foot candles on horizontal and vertical planes, and the brilliancy of the fixture in millilamberts, and the efficiency and distribution curve are all available, but some points, such as color values, glare, effect of dirt and so on, can only be settled by a comparison of different fixtures.

There are several main types of fixtures, and many varieties of each. We have the indirect type, which uses the ceiling or some other reflecting surface. This type gives the best diffusion and is best for absence of glare and shadows, but it is much less efficient, and it is more expensive to keep clean. The direct type of fixture does not depend on the ceiling but directs the light flux by direct reflection in the case of an open unit, or by transmission through a translucent medium in the case of an enclosed unit. This type of fixture is in general, more efficient than the indirect, and less liable to accumulate dirt, but has the advantage of having the light source in view. The semi-indirect fixtures transmit part of the light directly, and part by reflection, but have most of the defects of both indirect and direct.

The requirements of a fixture for school lighting are: Sufficient light on the plane of the tops of the desks, and on the blackboard, even distribution of the light, no glare, or dark shadows, good color light, and lighting fixtures out of the direct line of vision. The fixture should be such that the necessity of cleaning it will be as infrequent as possible.

The type of fixture selected for the new Atlanta schools is a fully enclosed direct unit, made of opal glass or of cased glass. These fixtures are mounted on the ceiling, and are controlled by the working plane with the layout made, which will average slightly over seven-foot candles on th eworking plane with the layout made, which includes nine one hundred watt fixtures to a standard classroom of twenty-three by twenty-nine feet.

In rooms where the work did not demand such close visual attention as in the laboratories, assembly rooms, etc., larger units were used with wider spacing, giving the same average illumination, but not quite so definite freedom from shadows. The library is lighted to about four-foot candles, and floor outlets were provided under each table, for a table reading lamp.

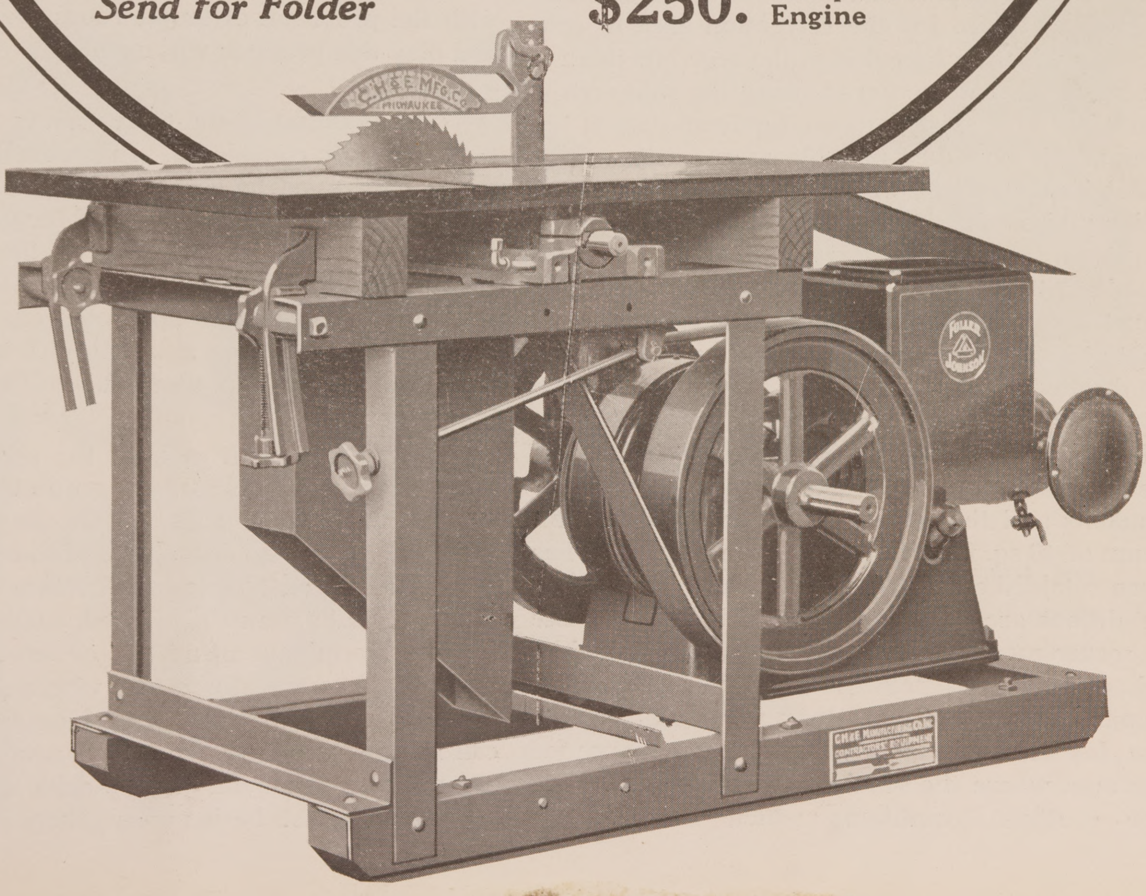
The switching control of these schools is taken from the panels, and placed where it is most accessible and convenient for actual use. The room lights are controlled by switches inside each door, and the corridor and stair lighting controlled by three and four-way switching systems, so that they are available from any floor, and from any stair tower or exit.

The other uses in a modern school building to which electricity should be put include power for various purposes, electric clock systems, program and calling bells, telephones, and fire alarm signals. The power is used principally for ventilating fans, power outlets for motor driven machines in the shops, pumps in the boiler rooms, and vacuum cleaner machines.

The fans are generally located in penthouses, and in that case a remote push button control starting switch is recommended so that the motor can be started and stopped from the switchboard room, without going up to the penthouses. For small motors, under ten-horsepower, switches which throw a motor directly on the full voltage of the line, but for larger motors a compensator, or a switch designed to give partial voltage for starting, until the motor comes up to speed, and then connecting it to the full line voltage.

Where the motors are controlled from a distant point some method of determining whether a motor is running or not should be provided. In the Atlanta school buildings a pilot light on the switchboard mounted under a red bullseye shows when the motor is running. A small transformer, connected to the starting switch, lights this pilot when the switch is on. A set of pilots is also located in the principal's office, to show him which fans are running.

(To be continued in February issue.)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(*Continued from page 32*)

play purposes. Assuming a proper recreation area, grounds in the front and sides can be grassed and kept up satisfactorily. A school building is usually a large, and rather formal building and small shrubbery and small evergreens will rarely be effective against a large building. It is better to rely upon fewer number of specimens of sufficient size to establish a proper relation between the planting and the type of building. These should never be located where they are apt to conflict with the needs of the students. The location of trees is usually an important factor in the setting of the building and should be determined as much by the architectural style of the building as by requirements of shade, etc. Certain classes of trees and shrubbery should be discarded from use of school grounds. Any trees with fruit and nuts will be constantly broken by the children regardless of rules and regulations and should be eliminated from the planting. Any shrubbery or evergreens with dangerous thorns such as Yucca, Mock Orange, etc., should not be used. They are dangerous particularly in the case of the small children and have no place on the school grounds. It is needless to say that a proper drainage system for lawns and walkways should be established so that no wet areas or holes can become a nuisance on the grounds. These well defined requirements should regulate the planning of any school area.

The development of the recreation area is a very important part of the school grounds. The customary place for the recreation area in connection with the school is at the rear but there is no reasonable objection to using the side area if sufficient area exists, or even the front part of the grounds if no other possible area exists, as the most important use of the grounds is for recreation purposes and while the setting for the building is an important feature and should be developed as attractively as possible provision for play must always occupy first place. It is safe to say that at least 50 per cent of the entire tract should be devoted to this purpose, the balance being used for location of building, lawns, walkways, etc. The design of any recreation area is a problem in itself, which depends largely on the ages of the students and the grades of the school. A minimum of 40 sq. ft. per pupil of open play space has been established under city conditions but unless conditions are very crowded and it is impossible to secure more land no such minimum should be taken as standard for it is easy to see that 1,000 pupils should have more than an acre of ground for play unless the land is impossible to secure for the area where the school must be located. Under southern conditions which have always tended to the opposite of congestion sufficient land for proper recreation for students should always be provided. In the primary grades the recreation area should be used for location of play apparatus of different types used under the supervision of the teachers, small base ball diamond, etc. The grammar school will require less play apparatus and more area for basket ball, hand ball and other game courts and sufficient space for a junior base ball diamond. The high school recreation ground should when possible include an athletic field with space for quarter mile track, base ball and football fields. Tennis courts and basket ball court should also be a feature of the grounds and can oftentimes be located in the corners or areas not used for other purposes. On every school grounds from the lowest grade to the high school open space not used for game courts should be provided adjacent to the building so that the students who come out from the building at recess will have plenty of space to move around without occupying definite areas of play. Primarily for his reason, it is usually advisable to separate areas such as game courts from the school building by from 100 to 200 ft. of open space to take care of the spreading out of the students as they come from class. All recreaion areas should have water piped in the form of a bubbler fountain for use on the grounds. The question of separate areas for boys and girls is one that must be decided by the superintendent of each school. Modern tendency seems to be to eliminate the separate areas and with the provision of ample room for recreation and play this problem will usually take care of itself.

The planting of the recreation area must be very carefully considered. In general the use of shade trees must be restricted to the borders of the area away from the land used for game courts and athletic field. In the case of the children's playground it is oftentimes advisable to plant shade trees so that the apparatus can be set up in shade. Evergreens as a rule are undesirable and few shrubs except along the public border of the property.

In the treatment of both the approach and lawn areas and recreation grounds described above it will be well to discuss the use of different materials which go into the andscape construction. In the construction of drives a number of different materials may be used, including Penetration Macadam, Bitulithic or concrete with rough surface, which are best where there is any grade to contend with. Gravel or even cinders can be used where the ground is nearly level but are not as permanent. Every drive should have gutters and catch basins where there is any slope

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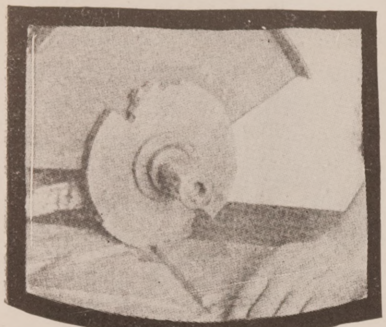

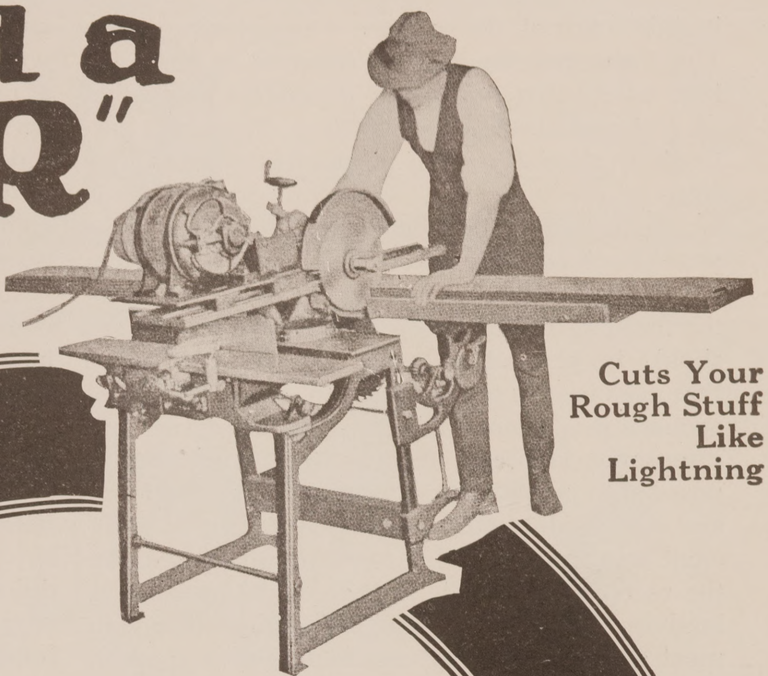

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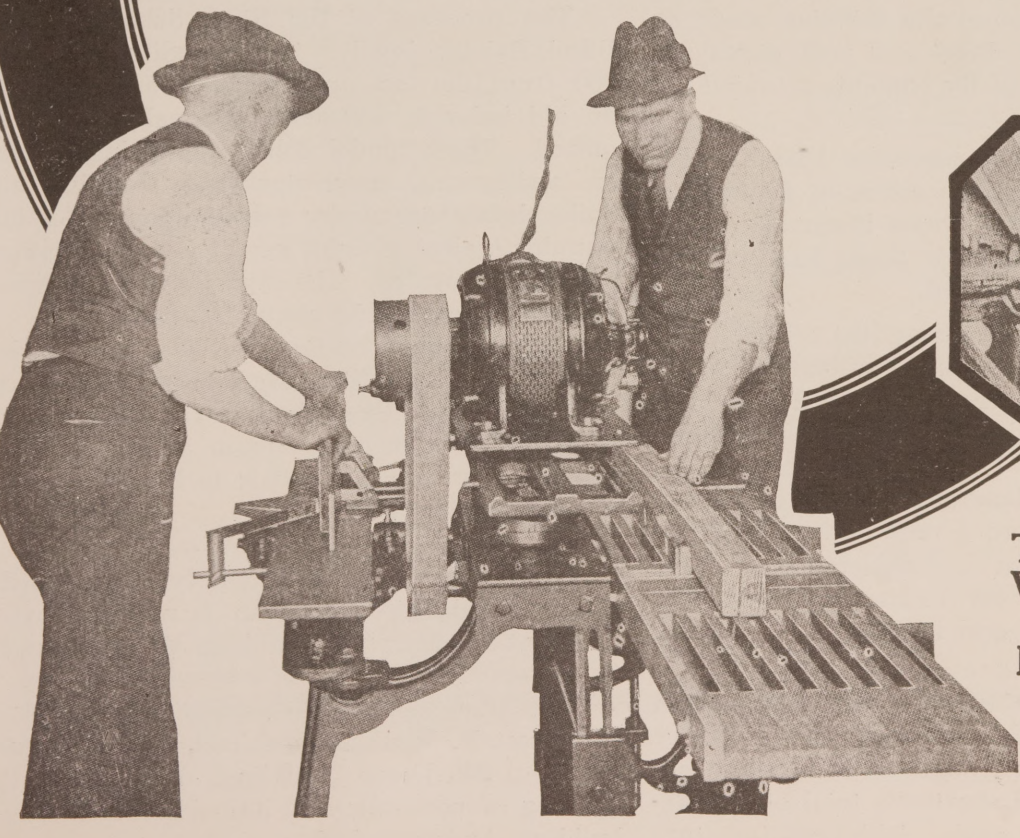

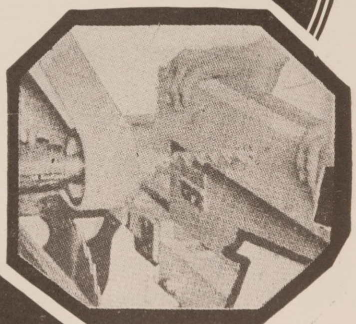

Two Men Can Work at Once Without Inconvenience

to take care of the surface water during rains. The walks may be built of concrete or brick the type of construction being dependent somewhat on materials used in the building. The walks particularly should be of a permanent type as they come in for heavy use. Gravel or crushed stone is satisfactory under certain conditions with the possible objection that certain types of this material will track in on the school floor and make the building hard to keep clean. The lawn areas should be planted with the type of hardy grass that does best in the section. In congested school grounds it is almost impossible to keep grass and oftentimes advisable to substitute gravel but if possible to give a setting to the building the front and side yards should be grassed if there is sufficient area in the rear for recreation purposes. In the recreation area the use of cement or brick is inadvisable due to the danger in connection with most games. The area can be all gravel if small but it is usually better to gravel the game courts, ground under the play apparatus, athletic field with the balance of the recreation area in grass of the hard wearing type.

The landscape development of school grounds is constantly changing due to the progressive ideas that are constantly being introduced into the construction and development of schools. A school committee which neglects the grounds and gives very little attention to this part of the development work is neglecting to do its duty as the building should not be considered completed until the grounds have been properly developed, areas around the building made attractive, approaches direct and well paved and the recreation needs of the students provided for.

North Carolina's Comprehensive Plan for Development of Its Institutions of Higher Learning Making Rapid Progress—Large Sums Now Being Expended.

Charlotte, N. C.—A survey just completed by the Charlotte Kiwanis Club shows that the State's higher education movement launched about two years ago, and for which $7,000,000 was appropriated by the last legislature, is progressing rapidly. Already plans are on foot to present to the next legislature a request for additional funds. This program is considered one of the greatest movements for higher education ever started in any state, and includes a $20,000,000 six year plan.

Four buildings at the University of North Carolina have already been completed, another is ready for occupancy and the others are expected to be finished shortly, a total of $1,490,- being allotted for the work. Additional furniture and equipment will be purchased, the power, water, and sewer lines extended and improved, a railway spur made longer and similar work carried forward. New dormitory buildings provide for 464 additional students, the housing costing a little more than $900 per student as compared with $2000 in the last preceding dormitory erected.

Two buildings at State College have been completed at a cost of $600,000. Ricks Hall, the new agricultural extension building, erected at a cost of $200,000, will house all the extension forces and take care of several college departments. Page Hall to cost $100,000 will provide room for the Department of Mechanical Engineering. By October 1 three new sections will be completed at South Dormitory as well as additions to the dining room costing $65,000. A new laundry is building at a cost of $20,000 and improvements are being made to the grounds. The appropriation for maintenance has been increased from $150,000 to $275,000. With the completion of the present program the college will be prepared to take care of 1400 students, except in dormitory accomodations.

The State Hospital at Goldsboro, for which $300,000 was appropriated, will be greatly improved, but additional funds will be needed. Contracts have already been awarded and the work is under way. It now includes a $70,000 boiler house, $200,000 for cold storage, heating plant, etc., $20,000 for completing the Women's Building and $10,000 for furnishing it.

The program at the State School for the Blind, Raleigh, involves the expenditure of $250,-000 from the last appropriation and $121,000, an old balance; $50,000 additional will be required. Three model college plan dormitories, an auditorium, superintendents' dwelling and boiler house are under construction. Heating, plumbing, electric light, gas and water facilities are being provided. The capacity of the hospital has been increased by about 500 patients

Two buildings costing $100,000 are nearing completion at the State Agricultural and Technical College at Greensboro. The maintenance fund has been increased from $20,000 to $30,-000 per year, and $15,000 is to be expended in buying adjacent land.

C. A. West, architect, formerly located in the Homer building, Washington, is now occupying offices at 315 Maryland building, Washington, D. C.

Ernest R. Watkins, architect, with former offices at 335 Union building, announces the opening of new offices at 347 Farmers' Trust building, Anderson, Ind.