

THE DESIGN OF A GRADE SCHOOL BUILDING

by

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The subject of this thesis is a grade school building, the plans for which were designed, drawn, and the construction supervised by me while I was an associate partner with Mr. H. S. Conrow. It is my object to present this not so much as an example of a problem but as an example of what I at that time under the existing conditions and circumstances considered a solution to the problem. I have divided the subject into three phases: contact, design, and supervision and results. I am presenting under the heading of contact all the conditions and circumstances governing the design of the building, under the heading of design the design of the building itself, and under the heading of supervision and results the construction of the building and the results.

CONTACT

The school was designed for Sedgwick County School District Number 124 and which is known as "Eureka School." This district is located just outside the western city limits of Wichita, Kansas, and is composed of an area approximately eight square miles. It is a district which was formerly composed of farms, large

orchards and truck farms but which within the last few years has been divided up into small acreage plots. This has brought in many new families and has made a large increase in the school population.

The former school boards and certain controlling groups had been satisfied with the two-room frame building and any surplus pupils had been sent into the city schools at considerable cost. The building was badly in need of repair, the lighting was very poor, and the water system and toilet facilities were very unsanitary. The great increase in population and the fact that the city schools had given notice that no more pupils from outside the city could be accommodated there due to crowded conditions made it almost imperative that some building program be undertaken. The present board, two new members of which had just taken office, felt the need of such a program but felt that due to the depression and that certain groups were unwilling to unite in one building program, they doubted that bonds could be raised. These groups desired the board to provide their own locality with a school and keep the present building rather than build anew building large enough for all the district and on the present school grounds located in the center of the district.

I was asked to submit estimates and sketches on three different schemes. The first two schemes were for additions of one and two rooms to the present building, and the third was for a new four-room fireproof building. The one-room addition would cost between five and six thousand, the two-room addition would cost between ten and twelve thousand, and the new building would cost between twenty and twenty-five thousand. It was not difficult for the board to see the advantage of the new building over the additions. It would be entirely fireproof, and would have a modern system of heat, water and sewerage, and above all would be a permanent building. The board then decided on the new building and contrary to their fears they received an almost unanimous vote in favor of issuing the necessary bonds for building.

I was given orders to proceed with the working drawings and to obtain bids for the work as soon as possible. The scheme as presented to them in preliminary was entirely satisfactory; in fact they had very few requests to make in its regard except that they wanted a large community room for community gatherings and general assembly for the school. They felt that such a room would be an asset to the whole district and tend to promote closer cooperation. They felt also that some thought and arrangements should be made for future additions.

DESIGN

The most compact plan was made by placing the two class rooms end to end with the main corridor between. The toilets and stair hall were placed in a rear wing with a passage connecting the toilets and future class rooms with the main corridor. For the present arrangement these passages are used as coat rooms and a storage space for the teacher. The second floor is typical of the first floor with the exception of the library over the entry and a coat room was left open to the corridor to provide an unobstructed passage to the fire escape. The two rooms above the toilets are used at present as a teachers' rest room and an office. When future additions are made, these are to be used for more toilet space with very little additional piping.

The location of the stair hall in the rear wing made it possible to use all the space under the class rooms and main corridor for a large, unobstructed community room. It was also arranged and lighted so that it could be divided up into two class rooms by installing a movable partition across the middle. In the balance of the basement are located the boiler room, pump room and storage space. Parts shaded on the plan were left unexcavated. The boiler room was so located that it is practically isolated from the main part of the building where the

greatest number of pupils would be assembled at any one time, thus removing to a minimum the danger of fire and explosion.

Every floor is provided with two means of egress as required by law, which shall be separate and independent of the others. The first floor has as its means of egress the two entrances, the second floor has the stairs leading directly to the rear entrance and the fire escape, and the basement has as its egress the stairs leading directly up to the rear entrance and an iron ladder, placed in each of the end walls of the community room.

The class rooms were made thirty feet long by twenty-three feet wide. This size has been found to be the most desirable for grade school work as it accommodates thirty-six to forty pupils, which is the number a teacher can supervise to the best efficiency. It can be increased to a larger number in the lower grades if necessary, which always have the greater enrollments. This size of room enables the required amount of lighting area to be placed on one wall, thus eliminating any cross light and all dark pockets. It allows sufficient exterior wall-space for structural support and architectural treatment. The ceilings were made eleven feet high so that the air storage would be large enough to give the pupils fresh air at all times. Each class room is provided with

genuine slate blackboards with tacking strips above for the display of pupils' work, and for the posting of notices. Each class room is provided with a coat room opening directly into the room, all of which are furnished with ventilation and a sufficient number of coat hooks. Each teacher has a closet for the storage of her supplies and personal articles.

The girls' toilet is provided with one lavatory and four water closets which are enclosed with metal partitions with doors. The boys' toilet is provided with one lavatory, two water closets with metal partitions, and a battery of four urinals. These, it was figured, were sufficient to care for the capacity of the present building.

A private water system was installed to take care of the water closets, lavatories, drinking fountains, urinals, boiler, and outside use. A four-hundred-gallon per hour electric pump, automatically controlled between the pressures of forty and sixty pounds per square inch, pumps the water into a one-hundred-twenty-gallon storage tank. The supply of water is unlimited, but there is a large amount of iron in it, though not enough to make it undrinkable. The greatest annoyance is the staining of all water fixtures if left uncleaned for any period of time. A battery of four bubbler fountains each are

located on each of the first and second floor corridors.

The sewage from the building is disposed of through a series of three tanks, each of which consists of two three-by-three round sewer pipes set one on top of the other and each tank connected at the top. These tanks were set in a base of concrete and sealed tight on top by tile covers and mortar with about a foot and a half of dirt over. It is estimated under normal use that they will have to be cleaned out only about every five to eight years. The liquid is drained off into the soil through about five-hundred feet of agricultural tile laid with open joints of about one-half inch. The joints were protected on top from soil working down into them by placing composition shingles over each joint. The soil is very porous so that there has been no difficulty with the water not draining away.

Heat for the building is furnished by a vapor-vacuum system from a gas-fired boiler. As this is a sectional type boiler, when any future additions are made, additional sections can be installed very easily, though the capacity of the present boiler is large enough to care for at least a fifty-per-cent addition without overloading it. All rooms are equipped with direct-radiation radiators with the exception of the community room, which is equipped with two two-speed fan-unit

heaters. This also provides this room with extra ventilating facilities. The advantage with the gas has been that the board was able to get it at wholesale rates, and its simplicity of operation, being thermostatically controlled, has made it possible to do without the full-time services of a janitor.

Electrical power is furnished from the city lines. All light outlets, with the exception of the boiler room, pump room, and storage space, are indirect. Each class room has two outlets of two-hundred watts each and the other rooms one-hundred watts each, the community room being counted as two class rooms.

The exterior design of the building, due to the limited amount of funds, made it necessary to make all ornamentation as simple as possible, and, in fact, simplicity was made a keynote to the whole design. The base of the building from the grade line to the first floor line was laid up of large paving brick. The predominating tone of the building was a blending of light tans to a salmon. The contrast in the quoin work, in the entrance treatment and window treatments was attained by the use of a dark blood-red brick. The parapet was further simplified by the use of ordinary coping tile laid around the entire building.

It was first thought to be cheaper to frame the

building with steel joists, but when the bids for the construction were opened it was found by alternate bids that reinforced concrete construction would cost less than the steel construction. It was decided to use reinforced concrete as it allowed a large saving by the use of gradation sand-gravel. The floors and roof were framed onto wall bearing tile. All piers, around all openings and under all beams solid brick masonry walls were used in place of the tile.

SUPERVISION AND RESULTS

Construction work was started about the middle of July. The bulk of the excavation work was done by horses and slips, and the finished work was done by shovel to the required depths about three feet additional being excavated around the outside walls to allow for water-proofing the walls up to the grade line. The footings were poured first, then the floor was graded up and a thin layer of fine sand spread over this. The floor was poured over this to the approximate center of the wall lines. The walls were then poured up to the under side of the first floor joists. The thickness of the walls below grade were $1'0\frac{1}{2}"$, but above grade it was recessed to 8" to allow for the brick work. The first floor was then poured. The brick work was then started and laid up to the under side of the second floor joists. The

forms were laid over this and the second floor poured. The same procedure was followed on the next story walls and roof. From every day's concrete pouring two test cylinders were taken for a seven-day and twenty-eight-day test. As most of the concrete was poured during the hottest weather, the seven-day tests all showed high, while the twenty-eight-day test showed somewhat smaller increases than the average though all final tests were well above the strength called for in the specifications.

The roof was covered with a built-up composition roofing. The concrete slab and each layer of felt was given a coat of hot asphalt. The inside coping wall was given a coat up to the under flange of the coping tile. The roof was given an approximate pitch to the rear of $\frac{1}{2}$ " to every foot. Two down spouts were provided.

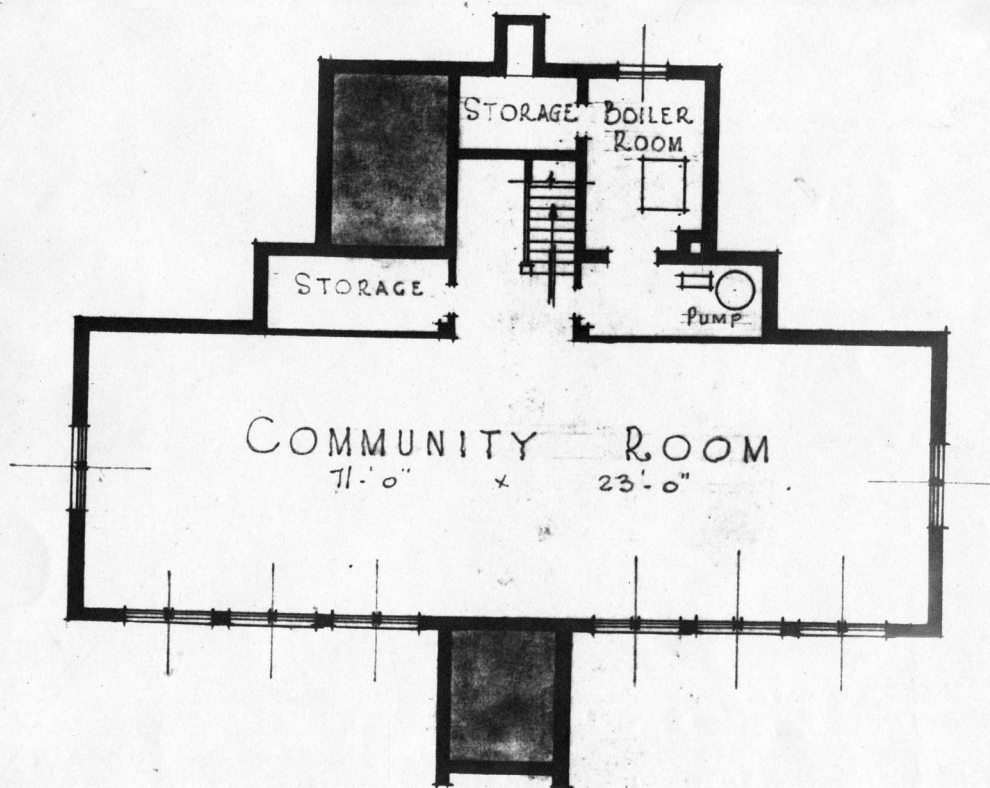
All interior wall exposed to dampness was given a sprayed coat of plaster bond. All plaster work consisted of two coats except over metal lath which had a scratch coat in addition. All rooms with the exception of the toilets were sand finished. The toilet rooms were furnished with Keenes cement and sized for painting.

All floors with the exception of the class rooms were cement finished. The class rooms were floored with maple and given two coats of hot linseed oil. All the interior trim and doors were yellow pine, stained a light

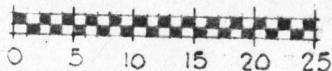
walnut and given two coats of varnish.

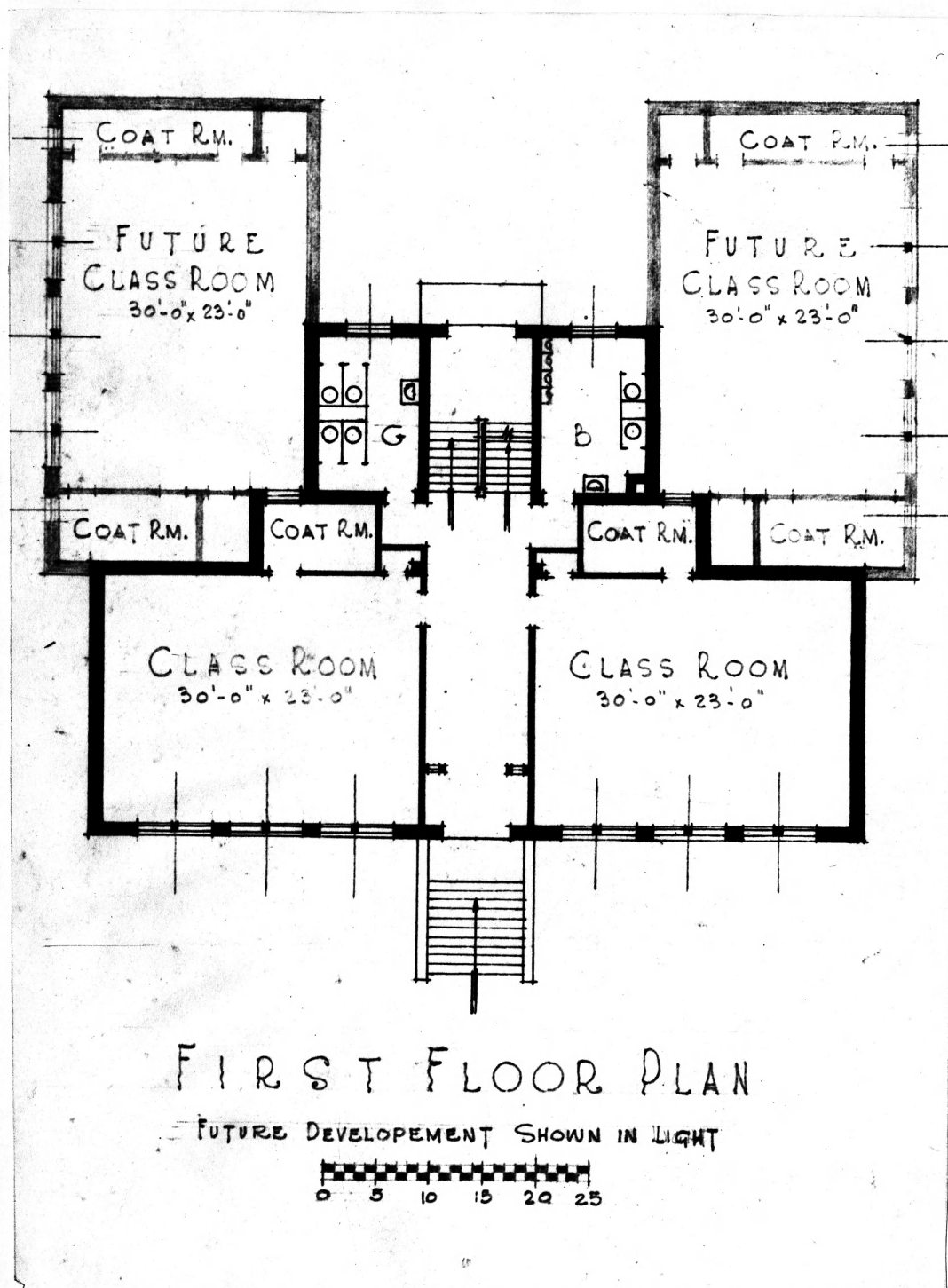
The work was completed for occupancy the first of November. Every contractor and sub-contractor gave his fullest cooperation toward the proper execution of the drawings and the speedy construction of the building. With only one or two exceptions did faulty materials or work have to be rejected, and these were done promptly and with the best spirit. The building cost was approximately twenty-four-thousand dollars without equipment. All equipment, grading, and a few minor construction work was done by the board itself so that the total cost as near as can be figured was twenty-six-thousand dollars with equipment and grading.

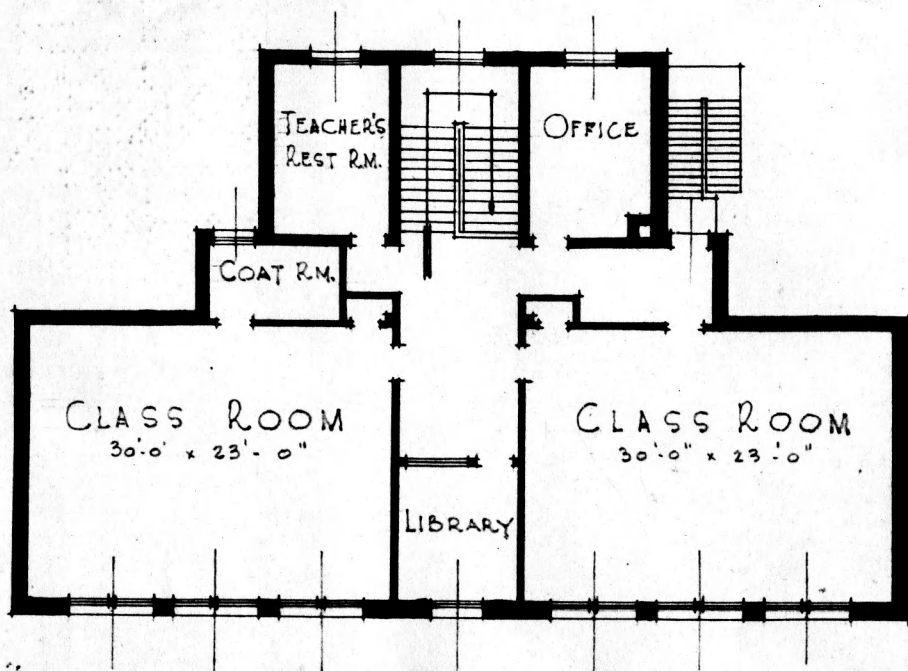
The school has been in use now nearly a year and a half. The community room served its purpose well, and this year it has had to be divided up into class rooms to take care of the steadily increasing number of pupils.



BASEMENT FLOOR PLAN







SECOND FLOOR PLAN

