

COMMONWEALTH OF VIRGINIA
STATE BOARD OF EDUCATION
RICHMOND

June 5, 1926

Supt. O.L. Emerick
Purcellville, Virginia

My dear Mr. Emerick:

In accordance with your request of June 3rd I am herewith handing you data and information gathered by this division concerning school building costs.

In 1924 we made a rather elaborate and detailed comparison of school building costs, selecting buildings in different sections of the State of the multiple story and the single story type, attempting as far as possible to select buildings of about the same quality of construction, i.e. multiple story buildings were selected of brick, with wood partitions and floors, auditorium, central heating plant, usually of steam, inside toilets, electric lights, office, library, etc., and the same conditions maintained in single story structures selected for comparison.

You will note by referring to the chart under "School Building Costs" that according to the N.E.A. Candle of Efficiency in school house planning that in practically every item the single story structure excelled the multiple story structure. By referring to the graphs indicating the comparative costs you will note that the multiple story structure costs 15.93¢ per cu. ft. while the one story costs 11.40¢ per cu. ft. The multiple story costs \$4.62 per sq. ft. of instructional floor area while the one story costs \$3.61 per sq. ft. of instructional floor area. The difference in these costs comes about in several ways.

First: The actual corridor space utilized in the one story plans prepared by this division is negligible while it is necessary to specify rather expensive corridors in multiple story buildings, and it costs about as much per sq. ft. of floor area to build corridors as it costs to build classrooms and auditoriums.

Second: The single story type of construction utilizes short timbers throughout except in a few cases where long spans are necessary. In the major portion of the construction, however, girders resting on piers run under the classrooms, and 2 x 10's in 12' lengths are employed for floor joists, whereas in the multiple type of construction, particularly on the second floor, it is necessary to use 2 x 12's, 12" o.c., 24' long as floor joists. These timbers are expensive and difficult to get. For the ceiling joists and roof rafters we use a lattice truss over the classrooms and can safely use 2 x 6's, 12' long, which are relative very inexpensive.

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Third: We have no stairways, or only a few steps where stairs do occur, which very materially effects the cost in view of the fact that stairways usually cost about three times as much per cubic ft. as plain classroom construction costs per cubic ft.

Fourth: There is very little load on the walls above the foundation wall, thereby making it quite possible to use an 8" wall broken with pilasters, thus considerably reducing the cost of masonry. This cost effects both the cost of masonry and the steel supporting the masonry.

Fifth: We have found by experience that a one story building erected as nearly as possible on a level site is the least expensive type of construction, and we therefore do not provide any rooms in the sub-floor or basement, except the boiler and fuel room, unless the grade is such that rooms can be provided on one or more sides of the building with little or no excavation.

Sixth: By statutory requirement fire escapes must be provided for the multiple story type of school building whereas on the single story type this is entirely unnecessary, as the buildings are practically 100% fire and panic safe, which eliminates another item of cost.

Seventh: The cost of getting materials to the second floor and higher in the multiple story type of construction is a material item of increased cost for this type of construction. This applies both to the masonry and timbers. The higher a building is constructed there is a corresponding increase in cost in getting the materials in place.

The above represents the chief points in connection with increased costs, as we have found them, in the multiple story type of construction as contrasted with the single story type of construction.

I want to make very clear that the above comparisons, as well as the comparisons on the enclosed chart, must be made with the thought very definitely in mind that the buildings are similar in quality of construction. It would be absurd to make a statement that either type of building is more or less expensive than the other without qualifying the statement to the effect that they are to all intents and purposes similar in quality of construction and materials incorporated in the construction; but on the basis of the investigations which we made in 1924 and as outlined above, in our mind there is no question as to the relative cost of the two types of construction, keeping in mind the fact that similar qualities of construction and materials are employed.

Relative your second question with reference to the cost for maintaining this office, and the total value of buildings erected from plans furnished by this Department, I wish to say that the cost/^{has} varied over a period of years from 1920 to 1925, due to the fact that we have occasionally added an additional man to the division. In 1920 I alone was working the program on a part-time basis. In 1921 an assistant was added. In 1922 an additional assistant was added. In 1925 a third assistant was added. The operating expenses for 1925, representing

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the highest office expense and supervision expense since this division has been organized, totals about \$13,000. This includes all salaries, travel, blue prints and incidentals. I might say that about \$4000 in addition to this is paid by the General Education Board, which represents no expense whatever to the taxpayers of this State, so that in round numbers all the actual expense to the State of maintaining the Division of School Buildings for the year 1925 was \$13,000. Architects commissions on the estimated value of construction for the year 1925 would aggregate at 5% approximately \$48,575.

\$97,500 $1\frac{1}{2}\%$

In addition to this there are certain items of saving represented which have been effected by the Division of School Buildings, as, for instance, on the question of floor oils. There are about 20,000 gallons of floor oil purchased each year under State contract at a net cost of about $17\frac{1}{2}\text{¢}$ per gallon, which is approximately $22\frac{1}{2}\text{¢}$ under the average price paid for floor oils prior to this State contract, or which represents a saving of about \$4,500.

If we are to add to the above saving the approximate saving effected by using the single story type of construction as contrasted with the multiple story type of construction, as explained above, there will of course be a saving of several times this amount. The enclosed bulletin, dated January 1926 explains the activities in brief of this division.

Relative your question regarding the practicability of planning a building at Lincoln to fit the present foundation and also to be adaptable for erection on the other site under consideration, I wish to advise that it would be quite possible to do this. I would advise against this procedure, however. I explained to the chairman of your board when he and others were in the office a few days ago that upon request we would of course be glad to go ahead with the plans detailed for the Lincoln site, and in view of the circumstances I felt we could give them precedence over some other work, but in order to save time and expense I doubted the wisdom of going ahead with the plans until a definite decision had been reached as to the location of the building. To plan a building to fit the foundation at Lincoln would not give you I think all that you would get for practically the same money if the building were located on a plot of ground clear of any old foundation. For instance, as I explained to your chairman, if the plot of ground were level at Purcellville we would recommend placing the toilets on the main floor rather than in the basement. Also we would recommend a little better proportioned auditorium than would be possible in an effort to adapt it to the old foundation at Lincoln. If it is the expressed wish of you and your board that we go ahead and prepare plans for Lincoln, we will of course do so, and I think you could plan on getting them in approximately two weeks after such request had been filed. In order to economize, however, which we are anxious to do in all cases, I think it would be wise to wait until a definite decision had been reached, and if Lincoln is the definitely located site, it would be a matter of not more than two weeks before you would have the finished plans and specifications. On the other hand if some other site is the definitely decided site, it would still be not more than two weeks until you could have the finished plans for a specific location.

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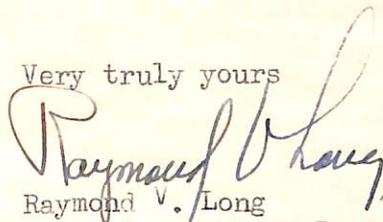
There are so many complications that arise that usually result in misunderstanding between the Owner, the Contractor and the Architect in substituting plans prepared for one site to another site that we have found it far more satisfactory to work out completed plans for each particular site. As you will recall, at one time we attempted to adapt standard plans to different sections of the State but in view of the fact that modifications were invariably called for we found that considerable complications arose which made it impracticable to do this, and we therefore have found it wise and necessary to work out individual plans for each particular location.

With regard to your last question I think I have explained above that under the circumstances you could depend on getting your plans and specifications within two weeks after definite instructions have reached us that you wish the plans prepared for a particular location. If you wish us to go ahead with the Lincoln plans on the old site in the light of the above explanation we shall be very glad to do so.

I trust this has fully answered your inquiry.

With best wishes, I am

Very truly yours



Raymond V. Long
Supervisor School Buildings

Relative Cost of One-Story and Two-Story Buildings.

Savings are effected in one-story building by -

1. Reduction of corridors.
2. Shorter and smaller timbers in one story building. 24 ft. spans in two story floors.
3. Stairways eliminated.
4. Lighter foundation walls 8" wall with pilasters.
5. Fire escapes eliminated.
6. Materials not moved to so great height.

Investigation by State Architect shows multiple story costs \$462 per instruction floor area and one story cost \$361 or about 78 per cent as much.

SCHOOL BUILDING COSTS

1921 - 1924

DISTRIBUTION OF FLOOR AREA

N.E.A. CANDLE OF EFFICIENCY IN SCHOOL HOUSE PLANNING - COMMITTEE OF STANDARDIZATION		AVERAGE MULTIPLE STORY	AVERAGE ONE STORY
CLASSIFICATION	STANDARD		
WALLS & PARTITIONS.	10 % MAX.	9.19 %	6.75 %
FLUES.	3 % MAX.	0.28 %	0.12 %
STAIRS & CORRIDORS.	20 % MAX.	17.90 %	7.36 %
ACCESSORIES - CLOSETS, STORE ROOMS	1 % MAX.	0.94 %	1.55 %
INSTRUCTION - CLASS ROOMS, LABORATORY, AUDITORIUM, STAGE, LIBRARY, GYM, W.R.	50 % MIN.	58.70 %	74.02 %
ADMINISTRATION - OFFICE, REST ROOM, TOILET, HEATING, VENTILATION	16 % MAX.	13.20 %	10.20 %

COMPARATIVE COSTS OF ONE-STORY & MULTIPLE-STORY BUILDINGS - SIMILAR IN QUALITY

MULTIPLE-STORY - 15.93¢ PER CU.FT.	100.0 %
ONE-STORY - 11.40¢ PER CU.FT.	71.5 %
MULTIPLE-STORY - \$2.73 PER SQ.FT. TOTAL FLOOR AREA.	100.0 %
ONE-STORY - \$2.65 PER SQ.FT. TOTAL FLOOR AREA	97.2 %
MULTIPLE STORY - \$4.62 PER SQ.FT. INSTRUCTION FLOOR AREA	100.0 %
ONE-STORY - \$3.61 PER SQ.FT. INSTRUCTION FLOOR AREA	78.2 %

ESTIMATES BY L