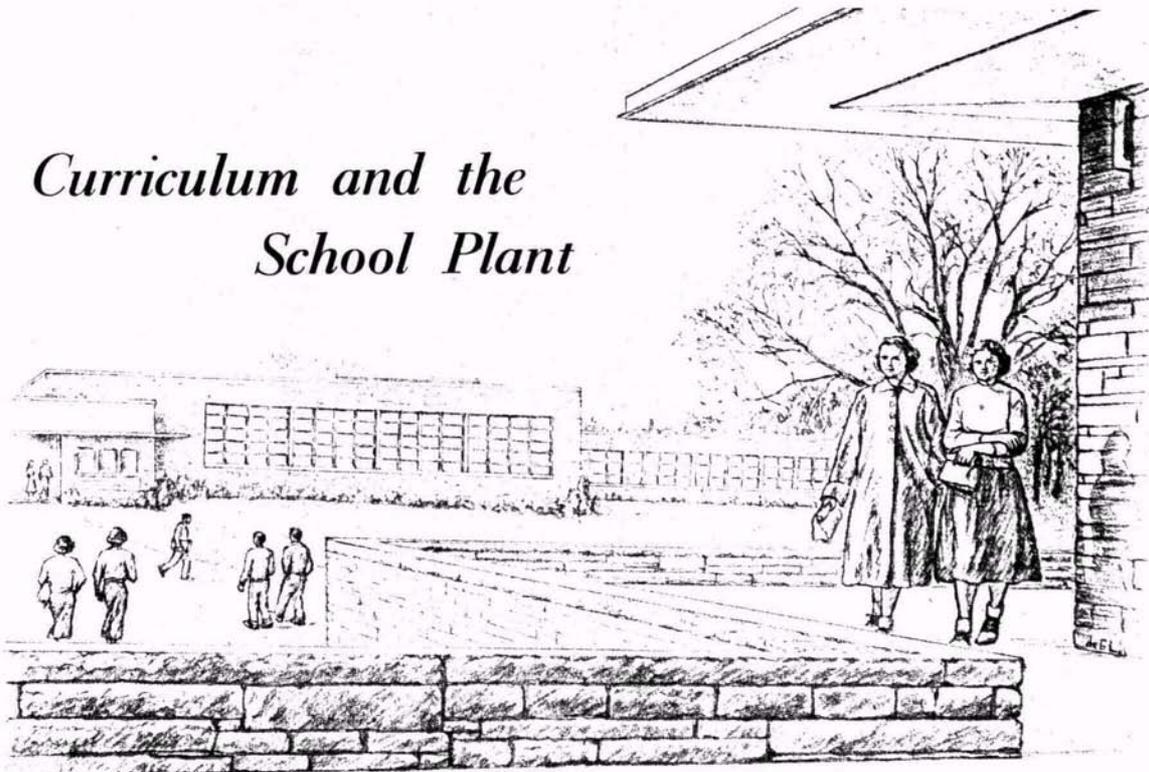


Curriculum and the School Plant



STEPHEN J. KNEZEVICH

The school plant, this author suggests, is "the physical expression of the educational philosophy of the community." Building a more functional school plant necessitates more active participation on the part of curriculum workers during school plant planning periods.

ACCORDING to a recent statement by U. S. Commissioner of Education Earl J. McGrath the amount of floor space needed to relieve existing shortages in elementary and secondary schools is "equal to a one-story building, 52 feet wide, extending from New York City to San Francisco, California." More school plant construction, as measured in area of floor space or in money spent, was completed during 1951 than during any other previous period in our history. And the end is not yet in sight. Estimates of needed school plant construction vary, but all such estimates agree that future con-

struction must be measured in hundreds of thousands of spaces for learning and tens of billions of dollars in expenditures. Few would disagree with the contention that school plant construction for at least another decade must continue at a feverish pace if present and future school enrollments in America are to be adequately housed.

School plants are relatively long lasting structures. Present designs of schools will influence educational programs for at least the next fifty years. Errors made in present plans for instructional facilities will haunt educators for many years. It is important to develop a defi-

Stephen J. Knezevich is associate professor of education, University of Tulsa, Oklahoma.

nite concept of the school plant during this period of great activity in building to better understand its contribution to the educational process. Without an understanding of the purposes of school plants, design and construction will be limited to imitation of past practices. This, in effect, would tend to perpetuate past mistakes for another half century and perhaps longer.

The school plant has been regarded too long as merely a "shelterhouse." Few would argue with the principle that the occupants of school buildings should be sheltered from weather, health and safety hazards. A fundamental purpose of the school plant is obscured, however, when protection is regarded as the sole function. This fundamental purpose is that the school plant must facilitate the educational process. The very existence of the plant is derived from the fact that it is one of the instruments necessary in the execution of an educational program. The protection function gathers even greater significance when viewed in relation to the educational purpose of school plants.

When the building is constructed and maintained to insure the good health and safety of students, the students in turn are able to concentrate their full efforts toward learning. If, on the contrary, children are housed in buildings where there exists a constant fear of falling debris, uncomfortable draughts and resulting chills, poor lighting and accompanying eyestrain, etc., they cannot be expected to devote their entire

energies to learning. Some energy must be dissipated in battling the hazards of an undesirable environment. In this sense the protection function can be construed as part of the educational function as it also serves to facilitate the learning process.

The great majority of present day writers on school plant problems regard the school plant as the physical expression of the educational philosophy of the community. This so-called "functional" concept of the school plant places the emphasis on the educational program developed from the educational philosophy instead of on the brick, steel, glass, etc., of construction and design. The educational philosophy of a community, however, is a general statement of the hopes and aspirations of the people as applied to education.

As stated by Krug (4:1) the "curriculum becomes the instrumentality by which the schools seek to translate our hopes for education into concrete realities." In this sense the statement of curriculum is a more concrete expression of the educational desires of a particular culture. It is the "working statement" of the educational philosophy of the community. In its broadest definition, curriculum would include the methods of facilitating the learning process as well as the necessary and desirable learning experiences to be provided by the school. The curriculum finds its physical expression in the construction and organization of the school plant. Following this line of reasoning it becomes apparent that the school plant can be defined as the space interpretation of the curriculum. The implica-

tions and expansions of these viewpoints follow.

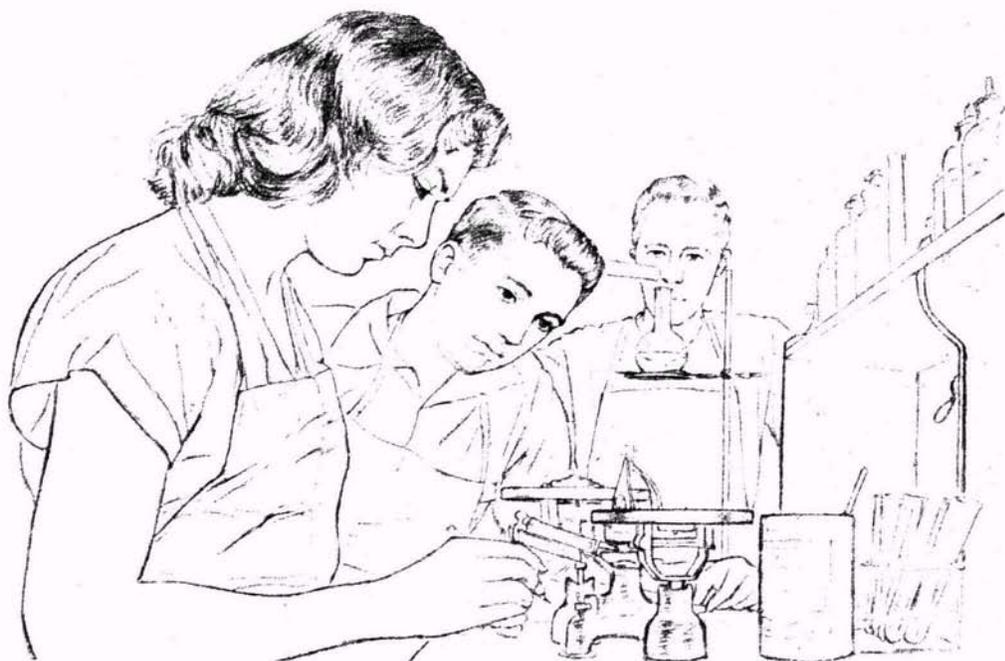
Expression of the Educational Program

That the school plant is an expression of the educational program in wood, stone, steel, brick, glass and concrete has tremendous implications for people interested in curriculum. To begin with, the construction of a school plant can no longer be looked upon as a mechanical process of arranging desired spaces according to the artistic inclinations of architects, school boards and superintendents. Not a single line should be sketched upon the drawing boards until it is clearly known what is to be housed. "Educational plants cannot be planned intelligently until the scope of the program, curriculum content, and basic educational methods have been determined; and the determinations can be made only with a sound philosophy of the aims and objectives of education as a base," is the opening sentence of a publication released by the National Council on Schoolhouse Construction (5:1). It may well be that one of the significant trends in school plant planning to emerge during the 1950's will be the acceptance and use of cooperative planning as means for obtaining better schoolhousing (2). Broader participation of all groups is a necessity when the functional concept of the school plant is accepted. The services of curriculum workers along with others are necessary in at least the planning phase of school plant programs.

The various kinds of spaces to be provided in the educational plant are determined from the school curriculum.

If vocational agriculture, industrial arts, home economics, and music are included as learning experiences within the curriculum, then it follows that spaces for learning in these areas must be provided. The number of each kind of space for learning to be provided is dependent upon the school enrollment. At times the size of the enrollment may not justify a separate instructional area for each field of learning. In such cases a multiple purpose room becomes necessary. What fields of learning can be grouped together to share a single room has not as yet been solved to the satisfaction of all concerned. An analysis of learning activities and their space requirements by curriculum workers could contribute much light on the problem of designing multiple purpose rooms.

The determination of the various kinds of instructional spaces to be included is only the beginning of the influence of the curriculum upon the design of educational plants. The total area and particular design of a room is likewise affected by the curriculum. How many square feet of floor space should be allotted is a function of individual class size and the methodology of instruction. Standards for determining desirable pupil-teacher ratios or class size should be derived from the objectives of present day educational programs rather than from emulation of past practices. It was indicated in the research on class size that was completed during and before the 1920's that if the sole purpose of instruction is the acquisition of predetermined bits of information, as measured by tests of ability to retain factual matter, then large classes of 40 or more can be as efficient



as smaller ones. In such cases individual differences must be ignored for all must learn the required information. The present day emphasis is predicated on the education of the whole child and provision for individual differences. There appears to be a consensus of opinion among educators, although there is as yet little research to support this opinion, that education of the whole child and provision for individual differences necessitate small classes. Class sizes of 25 to 30 pupils are recommended under such conditions. It behooves school communities to determine acceptable standards for class size before actual construction of the plant.

Influences on Schoolroom Design

At various times in history striking illustrations of the influence of educa-

tional methodology on schoolroom design have been noted. In the secondary schools sponsored by Jesuit Orders in Europe during the 16th century great emphasis was placed on prizes, ranks, emulations and rivalry as a means of motivating learning. The classroom arrangement was designed to facilitate rivalry or competition as a method of inducing learning. A single class was split into rival groups that sat separated and facing each other. One group was to outdo the other. A particular boy had a "rival" in the other group and attempted to catch his "rival" in errors made during recitation.

The "monitorial" or Lancasterian schools provide another example of the influence of methods of teaching upon classroom design and arrangement. A simple and mechanical method of teaching made it possible to instruct large numbers of children with but one mas-

ter teacher. The master teacher instructed student "monitors" who in turn taught other pupils in the class. The classrooms had to be large to accommodate the large numbers of pupils that could be instructed by this method. The dimensions for the classrooms in the monitorial schools ranged from 80 to 100 feet in length and from 40 to 50 feet in width. The children were seated along benches with desks. Approximately 20 students were seated in a row; and it was not uncommon to find classrooms with ten to twenty rows of students. Each row was divided into two "drafts" of approximately ten pupils, each in charge of a monitor. At various times the children would leave the benches for "recitation stations," which were indicated by semicircles on the floor along the sides of the room, and where monitors could give "instruction" in the fundamental skills. It is recorded in history that the monitorial system was an advance over the older and more wasteful individual method of instruction but was also less desirable than the modern method of classroom instruction developed by Pestalozzi and improved upon by others. When the monitorial method of instruction was abandoned, the very large classrooms had to be remodeled to suit the needs of another method of teaching.

As early as 1900 John Dewey pointed out that the type of learning activity that goes on within a classroom could be reconstructed from the physical arrangement of the room. He stated:

"Just as the biologist can take a bone or two and reconstruct the whole animal, so, if we put before the mind's eye the ordinary schoolroom with its rows

of ugly desks placed in geometric order, crowded together so that there shall be as little moving room as possible . . . we can reconstruct the only educational activity that can possibly go on in such a place. It is all made 'for listening'—for simply studying lessons out of a book is only another kind of listening." (3:48)

Perkins and Cocking (7:71) declared that the design of the conventional classroom was derived from the particular learning activity that went on in the room. When the emphasis is placed on passive acquisition of pre-determined facts, the classroom need only be large enough to accommodate a specific number of desks with just enough extra space to permit pupils to enter and leave without climbing over one another. The traditional classroom was designed to facilitate instruction by the traditional teacher lecture and pupil recitation method and "no monkey business!" The result of this is that many students came to regard the schoolhouse "with the same affection as the dentist's chair or the woodshed" (6). When classroom design is based on imitation of past practices, traditional methods of instruction are perpetuated and desirable improvements in methods of teaching are hindered. As Caudill so aptly stated:

"Traditional classrooms with stationary seats cannot be adapted to new teaching techniques. The 'activity program' means exactly what the name implies—active children. At times the classroom must be cleared for large projects. At other times the classroom is arranged so that children may work in small groups." (1:13)

The familiar standard for determin-

ing the space allotted each pupil in the classroom is based on the space needed to arrange furniture in a single pattern. The size of desks varied but such variation was usually ignored in favor of pegging the pupil-station standard at 15 square feet per pupil. This pupil-station standard originated almost a century ago and is still utilized. The area of the classroom is computed by multiplying the pupil-station standard by the total class enrollment. When 50 pupils per teacher is the acceptable class size and 15 square feet per pupil the approved pupil-station standard, the room area should be 750 square feet (50×15). A room with dimensions of 32 feet by 23 feet would contain approximately 750 square feet. Classroom dimensions of 32×23 are referred to as "standard." A smaller pupil-teacher ratio would then permit a smaller room area.

Caudill emphasized that it is desirable to have movable furniture in order that various arrangements could be developed to facilitate the different learning activities that go on in the classroom. He concluded that flexible arrangements within the room would necessitate 25 square feet per pupil to satisfy furniture and passageway requirements (1:45). If the teacher and pupils desired to construct a "model" grocery store, Indian tepee, post office, library, etc., as part of the learning activity, then even more space must be provided. Caudill (1:54) estimated that methods of teaching at the elementary school level that are based on pupil activity would necessitate an extra ten square feet above the requirements for flexible furniture arrangements. The pupil-station standard

for elementary school classrooms that would include enough space for flexible furniture arrangements and passageways and also for pupil activity would total 35 square feet per pupil. An elementary school class of 30 pupils would, under such conditions, require a room with an area of approximately 1,000 square feet (30 multiplied by 35). There are some who are of the opinion that Caudill's estimate of 35 square feet per pupil is a conservative figure in view of the many different activities that go on in a "self-contained" elementary school classroom. Others regard 30 square feet of floor space per child as today's accepted minimum pupil-station standard. Whatever the final decision on the pupil-station standard, it cannot be over-emphasized that this standard should be derived from a study of what goes on within the present-day classroom rather than from a single arrangement of schoolroom furniture. The activities that go on in various areas of learning are not the same, and, therefore, the per pupil space requirements will not be the same. The pupil-station standard rightly should vary with the subject or learning experience. More space per pupil must be provided in kindergartens and physical education rooms than in auditoriums and cafeterias.

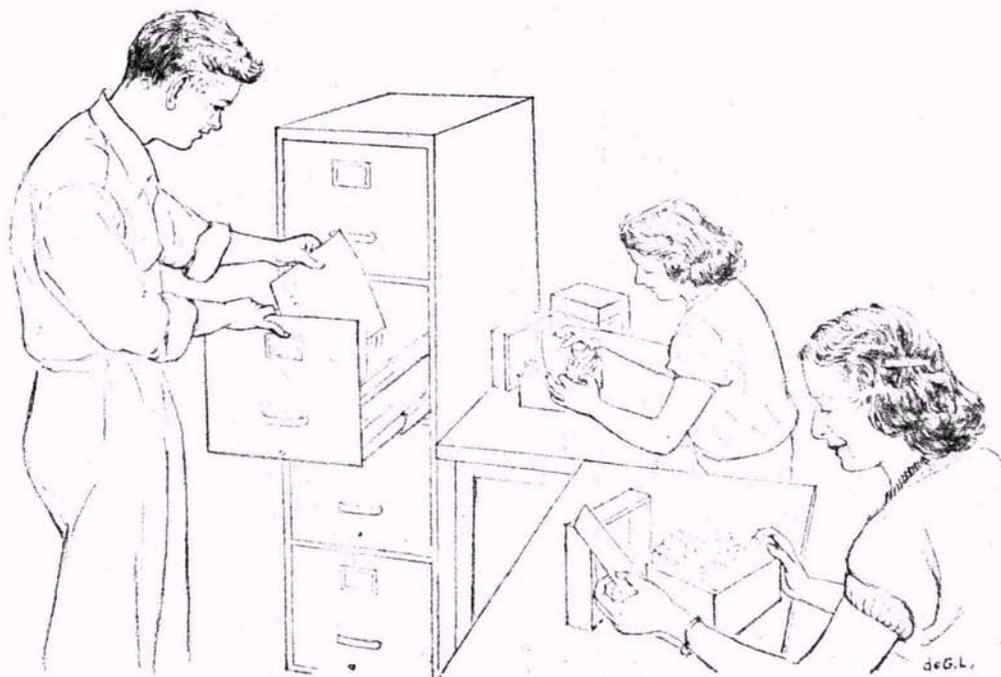
A great deal of further research is necessary to ascertain optimum pupil-station standards for the various learning experiences. Creative thinking is necessary in this area for past practices have been rather narrowly limited to school furniture requirements and an antiquated teacher methodology. Many state departments of education have

published recommendations on floor space to be provided each child in the various instructional spaces in elementary and secondary school plants. Experience in utilizing instructional spaces constructed upon such recommendations is required to validate the standards proposed. In any case, the nature of the activities or functions performed should serve as the basis of determining the pupil-station standard. This is not significantly different from the procedure used in building industrial plants. The space needed to manufacture airplanes determines the size of the plant. The space allotted each department of manufacture is computed after a study of the functions performed in the department. The efficiency of the airplane plant is measured in airplanes produced and the profit gained therefrom. The end prod-

uct of education is somewhat intangible and not as easily measured as the products of manufacturing plants. It is assumed in education that if ample space is allotted for instructional purposes, the attainment of ends in education will be expedited. Here is an area where the curriculum worker can make a significant contribution. The end products in education, however intangible, must be given concrete expression along with the most efficient methods of reaching these goals.

Participation by Curriculum Workers

The active and interested participation of workers in the field of curriculum is particularly important during this era of feverish plant construction. Depending upon the resources of the community to remodel outmoded struc-



tures, the needed expansions and refinements in the school curriculum may be hindered for another fifty years if the curriculum is housed in a poorly planned but newly constructed school plant. Those that seek improvement in the school curriculum are already confounded by the many obstacles in the path toward progress. The school plant can be an aid to curriculum improvement instead of a hindrance. Educators have often desired to provide or improve upon experiences in industrial arts, music, or other areas only to be thwarted by a lack of space and, hence, such welcome expansions and extensions of the curriculum have had to "wait." Teachers have often desired to incorporate more varied learning experiences or projects based on greater pupil activity only to be thwarted by inadequate space in the classroom. Such conditions can be prevented by better school plant planning.

The planning of a new school plant may be just the thing that a curriculum director needs to stimulate interest in curriculum improvement programs. The report of the curriculum study committee should be a vital part of school plant planning. Greater participation of faculty and lay groups in curriculum improvement programs can be stimulated if the group can be shown that the results of their labors will have some concrete influence on the educational program. The committee report is needed as the basis for designing and constructing a relatively long lasting school plant. If educators fail to indicate the space interpretations of the curriculum then, by default, such interpretation will be executed by the so-called school plant "experts."

As one architect expressed it: "The curriculum in its broadest sense, I believe, is the most important single influence in determining the nature of the future school plant." (8) The task of interpreting the modern curriculum in terms of architecture is not a simple one. The space interpretation of the curriculum requires the combined efforts of all interested in curriculum and schoolhousing. It is not suggested that curriculum committees become school plant "architects." It is not recommended that curriculum workers be substituted for school boards, lay school buildings committees, and superintendents in determining the final structures. It is definitely implied that the architect will do a better job of designing educational plants if he is presented with some concrete statements of the functions the structure is to perform. In designing a canning factory, the architect must know the canning process. He must know something about the educational process if he is to design a functional school plant. It is the responsibility of educators to inform the architect of the variety of learning experiences to be provided and the teaching methods to be employed within the educational plant. One criterion in the selection of the school architect should be his ability to work with school people and lay persons who are concerned with the definition of the educational program. Vague statements of policy are not of much help to the person charged with the design of a functional and aesthetically beautiful plant. Curriculum workers along with others must give considerable attention to the space interpretation of their principles.

School plants must be designed from the "inside to the outside" if they are to be functional. The exterior design is executed after the arrangement and design of spaces for learning have been completed. The procedure based on selecting an exterior design with "eye-appeal" and then attempting to manipulate internal spaces in the hope of making the building useful from an educational point of view cannot be too strongly condemned in this day and age. Functional utility and aesthetic beauty are not necessarily opposing forces. School plants should be "livable, roomy, gay, and homey" to provide for the emotional needs of children and also be functional and physically adequate. (6) To plan an educational plant that is functional and beautiful is a challenge to the creativity of the architect. The architect needs the good offices of people working in the field of curriculum to help in the design of a structure that will facilitate the educational process.

BIBLIOGRAPHY

- 1) Caudill, William Wayne. *Space for Teaching*. College Station, Texas: Texas Engineering Experiment Station, 1941.
- 2) Cocking, Walter D. "Educational Building in 1951." *The American School and University*. New York: The American School Publishing Corporation, 1952-53, p. 65.
- 3) Dewey, John. *School and Society*. Chicago: The University of Chicago Press.
- 4) Krug, Edward A. *Curriculum Planning*. New York: Harper & Brothers.

CURRICULUM MATERIALS

1953 ASCD Exhibit

- ★ A catalog of the annual exhibit of locally produced instructional materials displayed by ASCD at its national convention in Cleveland, February 8-12, 1953.
- ★ If you failed to secure a copy of this catalog listing of outstanding curriculum materials at the time of the convention, you may now do so by sending your order to the following address. 42 pages (Mimeographed.)

Price: 25 cents

ASSOCIATION FOR SUPERVISION
AND CURRICULUM DEVELOPMENT,
NEA

1201 Sixteenth Street, N. W.
Washington 6, D. C.

- 5) National Council on Schoolhouse Construction. *Guide for Planning School Plants*. The Council (Secretary: W. D. McClurking): George Peabody College, Nashville, Tennessee.
- 6) Perkins, Lawrence B. "How To Design Livable Schools." *The American School and University*. New York: The American School Publishing Corporation, 1952-53. p. 147.
- 7) Perkins, Lawrence B. and Cocking, Walter D. *Schools*. New York: Reinhold Publishing Corporation.
- 8) Reid, John Lyon. "Changing Educational Policies Will Demand a New Kind of High School Building." *The American School and University*. New York: The American School Publishing Corporation, 1952-53. p. 127.

Copyright © 1953 by the Association for Supervision and Curriculum Development. All rights reserved.