

DEPARTMENT OF THE INTERIOR
BUREAU OF EDUCATION

BULLETIN, 1929, No. 20

CHANGING CONCEPTIONS OF THE
SCHOOL-BUILDING PROBLEM

By

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SPECIALIST IN SCHOOL BUILDINGS

[Advance sheets from the Biennial Survey of Education
in the United States, 1926-1928]



UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1929

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CHANGING CONCEPTIONS OF THE SCHOOL-BUILDING PROBLEM

By ALICE BARROWS

Specialist in School Buildings

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Progress in the school-building field has been so rapid and so much has been written on the subject during the past few years that it would be impossible to cover adequately all the different phases of this work within the limits of this report. Therefore, only a few subjects will be touched upon which are significant of new developments in regard to the school-building problem. For example, although elementary and high school buildings are of equal importance, considerable space is given to the evolution of the elementary school building of the city school systems because it represents a wider departure from previous types; for the same reason the school-building survey is discussed at length because this is a comparatively new field in which new methods are constantly being worked out.

EVOLUTION OF THE MODERN CITY SCHOOL BUILDING

Probably no type of school building represents such a radical departure from tradition as the modern city elementary school building. To understand its development it will be necessary to review briefly the history of its evolution.

Broadly speaking, there have been three stages in the development of the school building, each of them the result of three important changes in our social and industrial life. In the early pioneer days life outside of school contained many activities of great educational value for children. There were crops to be planted and harvested and animals to be taken care of; cooking and sewing had to be done; and there was work with tools that developed mechanical ingenuity. Man in those days had to live close to the elements and had to depend upon his own ingenuity in dealing with them. Children naturally

shared these responsibilities with their fathers and mothers, and so developed a resourcefulness in meeting all kinds of situations which was of the greatest value in enabling them to become men and women equipped for their social group. For these reasons, it was not necessary for the school to teach anything more than the three R's. This in turn meant that the one-room schoolhouse of those days was adequate so far as school facilities were concerned.

Toward the middle of the last century, however, the concentration of large numbers of people in cities brought about changes in our social life which have vitally affected the whole development of our school system. At first, as the cities developed, there was no recognition of the need of changing in any radical way our educational program and school buildings to meet the changed conditions. The people who founded the cities came from the farms and had had the training which we have just described. It was natural for them to bring to the city the same kind of school which they had attended. But, as many children had to be accommodated in a single school in a city, a one-room schoolhouse would not do. Consequently, 4, 8, or 12 one-room schools were put under one roof. This is the period in schoolhouse planning known as the 1848 period. The buildings were usually three stories high, with large, high-ceilinged rooms, with no corridors, or else a "well" in the center of the building. As the science of lighting and ventilation had not yet developed, children were forced to sit in rooms five hours a day under conditions that developed eye strain, bad posture, and bad respiratory troubles.

Undesirable as these physical conditions were, yet they did not constitute the most serious objections to this type of school. The real objection to it was that it was entirely unfitted to meet the needs of children living in cities. The building itself usually was directly on the street and had little more than a small paved yard for play. The result was that more and more children took to the streets as their only playgrounds. Also, this type of building gave no opportunity for anything but the traditional study of the three R's, and in the growing cities of this period children did not find the opportunities for the wholesome work and play which had been part of the life of children in the pioneer days.

While the cities were small and still had vacant lots which served as playgrounds, the inadequacy of the sit-and-study school was not apparent, but as cities grew in size and became so congested that all available vacant spaces were covered with apartment houses, factories, and tenements, it began to be clear that the school curriculum of a generation ago would not suffice for the modern city child; that the school must counteract the effects of city life upon children. The mounting record of juvenile crime and delinquency, and of deaths and injuries to children from playing in city streets, coupled with a

greater vision and sense of social responsibility on the part of the educational group, has brought about radical changes in the educational program of the schools.

In the first place, it is now recognized that cities are not good places for children, first, because there are usually not sufficient spaces and opportunities for play. The need for healthful, wholesome play is one of the fundamental needs of childhood. Too often the average person has the impression that play is something to be indulged in only after the serious business of the day is over. Play is considered as an ornament; something that is desirable if there is time for it. But play is really more fundamental socially and racially than the "business" of life. Children become acquainted with the world through play, through repeating new experiences over and over until they have some sense of mastery over them; and children have a physical need of play. They need to run, to throw at a mark, to hit at something, to climb, to wrestle in order to develop their bodies and get release from nervous tension. Particularly is this true for the city child since his whole environment develops nervous tension.

In the second place, the city does not meet the fundamental needs of children because it shuts children away from contact with the actual, physical world. A child is curious about the world in which he lives. He likes to analyze it, to form theories about it. He is always asking "Why?" In the old pioneer days when the majority of children lived in the country this curiosity was nourished and developed through intimate acquaintance with all aspects of nature—the earth at different seasons of the year, the stars at night, trees, birds, animals, brooks, rivers, the sea. He was always exploring this amazing world about him, soaking up knowledge about it through his very pores, and by a process of trial and error gaining some sense of control over it. He knew the signs of spring, autumn, winter. He had a healthy respect for the ways of nature and animals, the sea at high and low tide or in a storm, a swollen river, a fallen tree, a drouth, a storm.

This is the kind of subject matter upon which every child should have the opportunity to feed his curiosity. Each generation needs these contacts with the actual physical world for the sake of its own growth and for the preservation of the race. For human beings to shut themselves up in skyscraper cities and bring up generations of children on city pavements and in crowded apartment houses, to give growing children little or no opportunity for any first-hand knowledge of the earth's surface upon which we live, is a menace to the whole future welfare of the race.

Another fundamental need of children which is not satisfied by the city environment unless it is deliberately modified by the schools

is the need of children to construct things. Children in cities no longer get the chance to take part in activities about the home or in community life which formerly were educational in character, for the reason that such activities are no longer carried on in the home. Economic changes have taken certain simple, fundamental educational activities out of the home, and neither optimism nor hope will put them back again. The modern city fails to give children the opportunity to create things with their hands which the simpler farm environment of a generation ago made possible.

Another of the serious problems of the education of children which has arisen out of the effect upon them of city environment is the use of their leisure time. Every father and mother knows what a real problem this is. The investigations of the scientific student of social conditions are revealing some of the disastrous effects of a civilization that gives little opportunity for relaxation and wholesome recreation as an integral and essential part of everyday life. The psychiatrist is showing what are some of the unfortunate psychological effects of starving the emotional life of children.

This means that the school in which children spend so much of their time must give the opportunity for the wholesome, happy expression of the emotional as well as the physical and mental sides of a child's nature. Creating, seeing, and hearing good plays, pageants, concerts, lectures, therefore, become a necessary part of school life and give that release of spirit and stirring of the imagination that is so vitally important in the lives of children—so important, in fact, that if it is balked in its wholesome, natural expression it finds an outlet in a world of phantasy.

It is obvious that if the schools are to counteract the effect of city life upon children by giving them in school the opportunities for the many educational activities which they no longer get outside school, then a very different type of school building from that of the early pioneer days or of the 1848 period is needed.

In the attempt to meet the demands of this enriched curriculum there has been a great deal of experimentation, and it is only within the past 20 years that there has come into existence what is known as "the modern school building," which is of a totally different type from those of any previous period. It contains not only classrooms, but shops, cooking and sewing rooms, nature-study rooms, library, drawing and music rooms, auditorium, and gymnasiums. Moreover, these facilities are found not only in high schools but in many instances in elementary schools. The construction of the building in all its details is in striking contrast to school buildings of the pioneer or 1848 period. The building is essentially flexible, i. e., it is so constructed that it can be added to with the minimum of expense; par-

titions are removable so that rooms can be altered in size to meet the needs of a changing curriculum. Instead of the boxlike type with no corridors, many of the buildings are constructed in the shape of an E, H, or U, with rooms built on one or on both sides of a wide corridor running the length of the building and down the wings. These buildings also usually have an auditorium and one or two gymnasiums. Whether the E, H, or U type, or variations upon them, is used depends upon many factors, such as light, exposure, environment, shape of site, etc.

RESULTS OF A SURVEY OF SCHOOL BUILDINGS IN 90 CITIES IN 33 STATES

In order to determine to what extent this modern type of school building, with its variety of activities, particularly in elementary schools, is found throughout the country, the Bureau of Education recently made a study of school buildings in 90 cities in 33 States. Of this number, 26 cities had a population of 100,000 and more, 48 a population of 30,000 to 100,000, and 16 from 10,000 to 30,000. The total population of the 90 cities was 10,486,439. Returns were received from 2,227 elementary schools whose combined school enrollment was 1,513,420. In the case of 32 cities the superintendents reported that they had platoon schools as well as schools of the traditional type and that 373,702 pupils were enrolled in these schools. Since the type of school organization affects the planning of the building, the returns were tabulated by traditional schools (1,817) and platoon schools (410).

As one of the aims of the questionnaire was to discover how widespread was the tendency to include in elementary school buildings other facilities than classrooms, such as auditoriums, gymnasiums, and special rooms, the following returns to this question are interesting.

Of 2,191 elementary schools, 1,085, or 50 per cent, stated that they had auditoriums. Of the 1,781 schools of the traditional type, 752, or 42 per cent, reported auditoriums. Of the 410 platoon schools, 333, or 81 per cent, had auditoriums.

Of the 2,039 schools which answered the question as to whether they had a gymnasium, 746, or 37 per cent, stated that they had gymnasiums. Of the 1,629 traditional schools, 391, or 24 per cent, had gymnasiums, and of the 410 platoon schools, 355, or 87 per cent, had gymnasiums.

Such educational units as libraries, nature-study rooms, drawing and music rooms, shops, cooking and sewing rooms have been grouped under the term "special rooms." Facilities of this sort were reported by 884 of the 1,817 traditional schools, or 49 per cent. Of

this number, 310 had one special room, 213 two such rooms, and 262 three or four special rooms. All the platoon schools reported special rooms, the majority having more than four such rooms.

In considering the above data it should be remembered that many of the buildings referred to in the above summary were old buildings. Suggestive as such data might be as to tendencies to include auditorium, gymnasium, and special rooms in elementary school buildings, yet it was felt that, as many of the buildings were not of recent construction, it would be well to secure the same data in regard to what was considered the most modern elementary school building in each city. This section of the questionnaire included questions on 35 points, of which only the following items will be taken up in this report: Number of floors, capacity of the building, size of the building (number of rooms), number of auditoriums, gymnasiums, special rooms, number of schools having kindergartens. Returns were received from 84 cities, 58 of which had traditional schools and 26 platoon schools. Each of the buildings had been erected within the past 5 years. The following data give a general picture of the types of the buildings:

Number of floors.—Of the 84 modern elementary school buildings 47 had basements. Of this number, 16 had a basement and 2 floors, 6 a basement and 3 floors, and 25 a basement, ground floor, and 1, 2, or 3 floors. Twenty-four schools had a ground floor plus 1, 2, or 3 floors, 14 had 1, 2, or 3 floors without the ground floor, or basement. Only 1 building was a 1-story building.

Size of buildings.—Of the 84 buildings, 68, or 80 per cent, had from 12 to 36 classrooms; 44, or over half, had 16 to 28 rooms. Only one building had less than 8 rooms. Of the 58 traditional schools, 44, or 76 per cent, had from 12 to 36 classrooms; 13, or 22 per cent, had from 8 to 12 rooms. Of the 26 platoon schools, 24, or 92 per cent, had from 12 to 36 rooms. Only 2, or 8 per cent, had from 8 to 12 rooms.

Capacity.—Of the 84 buildings, 23, or 27 per cent, had a capacity of 1,000 to 2,000 pupils; 40, or nearly half, had a capacity of 600 to 1,000, and 21 had 600 or less. Only one had a capacity of over 2,000. Of the 59 traditional schools, only 13 had a capacity of over 1,000. Of the 25 platoon schools, 10, or nearly half, had a capacity of 1,000 or over.

Auditoriums.—Of the 84 schools, 69, or 82 per cent, had auditoriums. Of the 58 traditional schools, 45 reported auditoriums, and of the 26 platoon schools, 24 had auditoriums. In the matter of the capacity of the auditoriums it was found that of the 45 traditional schools which had auditoriums, 34, or 76 per cent, had a capacity of over 500, while 15, or one-third, had a capacity of over 600.

In the platoon schools only 6 of the 26 schools had a capacity of over 500, while only 3 had a capacity of over 600.

Gymnasiums.—Of the 84 modern elementary schools, 51, or 60 per cent, had gymnasiums. Of this number only 28 were in the 58 traditional schools, while 23 of the 26 platoon schools had gymnasiums.

Special rooms.—Sixty-three of the 84 modern elementary school buildings, or 75 per cent, reported that they had special rooms. A further analysis of these returns showed that 38 of the 58 traditional schools reported special rooms as follows: Ten schools had art rooms, libraries, manual-training shops, and home economics rooms; 9 had music rooms; and 3 had nature-study rooms. Of the platoon schools, all had special rooms, 20 had art rooms, 19 had libraries, 17 had music and home economics, 13 had manual-training shops, and 5 had nature-study rooms.

Kindergartens.—Of the 84 cities, 62 replied that they had kindergartens in their modern elementary school buildings. Twenty-two did not reply to this question.

A study of the above data from 84 representative cities in 33 States apparently indicates that it is true that there is a growing tendency in planning elementary school buildings to provide such facilities as auditoriums, gymnasiums, and special rooms, which until comparatively recently have been found only in junior and senior high schools. Schools having the platoon type of organization apparently tend to have a greater number of these facilities, yet it is evident that the traditional type of school also includes them.

DEVELOPING SCHOOL-BUILDING STANDARDS

Having considered some of the features that are more or less common to all modern elementary school buildings, let us now consider some of the problems which have developed in the attempt to provide these facilities. The present elementary school building is a distinct advance on those of previous generations, but, as often happens, the solution of one problem only develops new problems to be solved.

It is one thing to know what educational facilities should be provided in a building; it is another thing to know how to construct a building so that (1) each room may be adequately planned for the work that is to be carried on in it and so that (2) there shall be no waste space. A building constructed for 1,200 pupils and containing classrooms, shops, music and drawing rooms, nature-study rooms, an auditorium, and gymnasiums is far more expensive per pupil than the older type. It is essential that every dollar invested in it should count educationally. If a room is larger than is necessary, this means that the money wasted in this way can not be spent

on additional rooms or equipment. If a room is not adapted in all its details to the requirements of the subject to be taught in it, then the teaching of that subject is made more difficult because of the petty annoyances due to the mechanical mistakes in construction, or money has to be spent on its reconstruction.

The modern school building requires for its construction the combined skills of many people. Since the kind of school building to be erected depends upon the education to be carried on in it, there has to be close cooperation between the school authorities who plan the educational program and the architect. In the larger cities school architects who are part of the administrative staff of the schools or are employed almost continuously on the planning of school buildings give practically all their time to the solution of school-building problems. In addition, the services of the landscape architect and heating, ventilating, and lighting engineers are required. Experts in each of these fields are engaged on working out school-building standards. A survey of the literature on the subject during the past few years shows steady progress in bringing specialists together, particularly with respect to the planning of high-school buildings. Not so much work has been done on elementary schools, due probably to the fact that the additional facilities of the enriched curriculum of the elementary school are of comparatively recent growth. The following data, therefore, in regard to dimensions of classrooms in modern elementary schools, dimensions of special rooms, and the construction of gymnasiums and auditoriums, collected in connection with the school-building survey already referred to, will be of interest to those planning such buildings.

Dimensions of classrooms.—When the dimensions of classrooms in elementary schools are considered it is found that one of the best-known score cards¹ gives the standard for such rooms as 24 by 30 feet. On the other hand, in platoon schools the standard appears to be 23 by 30 or 22 by 30 feet. Although these are generally recognized as the prevailing standards, yet the Bureau of Education survey of the recently erected elementary school buildings in 34 cities shows that there was the greatest diversity in the dimensions of classrooms. For example, in the 50 traditional schools which answered the questionnaire there were classrooms of 33 different dimensions. The dimensions varied from 21 by 28 to 30 by 45 feet. Only 5 buildings had classrooms of 24 by 30 feet. Half the classrooms were larger than 23 by 30 feet. In 21 of the schools the classrooms were wider than 23 feet; in half the schools the classrooms were longer than 30 feet. In the 20 platoon schools which replied to this question 8 had classrooms larger than 23 by 30 feet. So far as these 80 cities are

¹ Score Card for City School Buildings, by Strayer and Engelhardt.

concerned, it would seem that the standardization in regard to classrooms has not gone so far in practice as in theory.

Special rooms.—Very little information is available in regard to the dimensions of special rooms. It appears to be the prevailing practice, however, to make the shops in elementary schools a unit and a half large; the cooking and sewing activities are either carried on in two rooms, each slightly larger than a regular class room, or else there is a combined cooking and sewing room which is either a unit and a half or two units in size. The more elaborate suites for these activities which are found in high schools are usually not provided in elementary schools. In some schools the cafeteria is part of the domestic science suite, and the children prepare the lunches as part of their work in domestic science. In other schools there is a complete separation of these two activities, with the cafeteria in one part of the building and the domestic science in another.

In platoon schools, where considerable attention has had to be given to special activity rooms, such rooms as drawing rooms, music rooms, nature-study rooms are usually the same size as the classrooms, 22 by 30 or 23 by 30 feet. They are specially equipped for their several subjects. For example, the drawing rooms have drawing tables and easels, and usually two sides of the room are covered with cork board for displays. There are cupboards for each child's work. In the music room there are usually tablet-arm chairs instead of desks, and a piano and a victrola. Cork board is also used for the display of pictures of musical instruments, photographs of famous musicians, etc. The nature-study room is usually placed near the geography room, with sometimes a conservatory adjoining both rooms. Both the nature-study and the geography rooms usually have tables and chairs rather than desks, and in the nature-study room there are also sand tables, an aquarium, plants, and often pets in cages. In all these rooms there are cupboards for storing the pupil's materials. The library is usually a unit and a half large, and is fully equipped with library tables and chairs, bookcases, librarian's desk, card catalogue, magazine racks, and bulletin board.

Gymnasiums.—The dimensions of gymnasiums vary greatly and appear to have no relation to the size of the school. The survey showed that although there were very few schools with more than 1,400 pupils, yet the dimensions of gymnasiums varied from 33 by 30 to 60 by 100 feet. There was less variation in schools having the platoon organization. Apparently 40 by 60 feet are the usual dimensions for gymnasiums in platoon schools with a capacity for 1,200 to 1,600 pupils. In schools built from 5 to 10 years ago little provision was made for showers in connection with the gymnasium. For that matter, there were very few gymnasiums in elementary schools. Building plans for more recent schools, however, show that the

tendency now is to provide shower facilities and also locker rooms in which the children may keep their gymnasium shoes and other gymnasium equipment. In many schools there is a small room for corrective gymnastics and also an office for the gymnasium instructor.

Auditoriums.—Judging by reports received on the auditorium, the auditorium in a modern elementary school building is evidently considered to be one of the most interesting units in the building—interesting because of its possibilities and because its purposes, and, consequently, its plans of construction are of very recent development. The modern auditorium is a far cry from the old “assembly room.” The latter room was usually a large, square room with a level floor and a small platform with a speaker’s stand poised precariously on its edge. Originally it was a place where the whole school assembled during the first few moments in the morning to hold “opening exercises.” It was rarely used except for such exercises and special occasions, such as commencement exercises. The pupils took little part in the activities of the auditorium. They usually sat and received announcements from the principal or listened to a talk by some outside speaker.

The auditorium in the modern elementary school, on the other hand, appears to have an entirely different function. The tendency seems to be to use the auditorium more continuously than formerly and to enable the children to develop worth-while tastes for the use of leisure time through seeing in the auditorium good plays, hearing good music, lectures, etc. Increasingly it appears to be the socializing factor in the school, or, as it has been called, “the clearing house for all the activities of the school.” In a recent report on this subject, entitled “A Source Book for Auditorium Teachers,” written by the auditorium directors of the Dallas (Tex.) public schools and published by the board of education of that city, the objectives of the auditorium are summarized as follows:

The purpose of the auditorium period is to furnish opportunities and situations for the exercise and development of abilities for which the usual classroom does not provide.

The ultimate aim, as in all education, is a more thorough development of each child for complete living.

Some of the possible results to be realized by the auditorium work in the lives of pupils are:

1. Discovering and training special abilities in individual pupils.
2. Inspiring and developing initiative, ingenuity, originality, and resourcefulness in response to situations natural in auditorium activities.
3. Making it habitual to use the knowledge and the skill acquired in other departments of school.
4. The appreciation of opportunities to gain valuable knowledge and skill outside of school.
5. The establishment of a livelier interest in school and community life.
6. Acquiring ability to use leisure time wisely.

7. The formation of proper habits of conduct in public assembly.
8. A more accurate and broader knowledge by means of visual education.
9. Motivation of interest in other school work.
10. Increased ability to study effectively.
11. Magnifying the home and the pupil's duties and responsibilities therein.
12. A more wholesome attitude toward other teachers of the school.
13. Valuable training in social efficiency.

As William McAndrew has stated in a report published some years ago:

The assembly is an opportunity, to be used by conscious planning and purpose, to foster the social virtues, to engender *esprit de corps*, ideals of integrity, loyalty, friendship, respect for the feeling and rights of others, sympathy with suffering and affliction, generosity, unselfishness, helpfulness, cheerfulness, love of work, courtesy, chivalry, heroism, courage, love of truth, reliability, love of right, refinement of thought and heart, and the other ideals which are touched upon if at all only incidentally in courses of study. The inspirational possibilities of the assembly exercises are extraordinary. * * *

The assembly must be "gone to with delight," as Shakespeare says of a true man's business. The loftiest, purest, finest presentations of the social virtues may pall upon the children if unvaried by provision for other human appetites, * * *. The assembly must have liveliness and snap, picturesqueness and laughter, motion and color. Amusing stories told and acted are an essential necessity for the full development of the minds of children. There is a wealth of entertaining talent among teachers and pupils which should be capitalized for making school the alluring place which it ought to be. * * *. The possible variety of ends to be secured is fascinating in its abundance. You can instruct, amuse, discipline, inspire, and train.

The programs in the auditorium usually consist of plays, illustrated talks by pupils, lectures, concerts, motion pictures, etc. In platoon schools the auditorium is in use every period of the day, and even in the traditional type of school attempts are now being made to use the auditorium more frequently than formerly. If there is continuous use of the auditorium for the type of programs listed above, then it is obvious that the auditorium must be so constructed that it may be practicable to carry out such programs effectively. As indicated by the returns from the Bureau of Education questionnaire on school buildings, the tendency is to have small rather than large auditoriums. A capacity for 500 or 600 appears to be usual in schools accommodating 1,200 to 1,500 pupils. Much more attention than formerly is now being paid to the planning of the auditorium stage and equipment. The stage in the older type of auditorium is often a compromise between the old assembly platform and a theater stage. It is usually very shallow, with almost no wing space and no dressing rooms. In the modern auditorium, however, the stage in an auditorium with a capacity for about 500 is

*The School Assembly, published by the Division of Reference and Research, Department of Education, City of New York.

often 32 feet long and 40 feet deep, with as much wing space as there is playing space on the stage. Usually, there are also two dressing rooms and a property room with lockers for the properties. There are also footlights, flood lights, spot lights, and bunch lights. In other words, the auditorium in the modern elementary school is much on the order of the little theater.

Reports written during the past two years on the auditorium emphasize the fact that as the auditorium unit is an expensive part of the school plant, and as it costs a great deal to change it after it has once been built, it is important that it should be planned in the beginning so as to be of the greatest practical use. If it is true that the auditorium is likely to become one of the most important units in the school for the socialization of the school, it is essential that all of the details of its construction should be so planned that it may function effectively.

Community uses of the auditorium.—Equally important with the development of the use of the auditorium during the school day is the community use of the auditorium. The indications are that the public school is becoming more and more the community center for the particular district of the city in which it is located, and no part of the school contributes more to such community use than does the auditorium. In it are given plays, lectures, band and orchestra concerts, motion pictures, demonstrations of school work, public meetings for discussion of local problems. In other words, it is coming more and more to serve the same purposes as the town hall in the pioneer days; that is, it is a place to which the local community naturally turns for its recreation and for group meetings of all kinds.

Instead of the auditorium being used only occasionally, it is open in some cities four or five evenings a week for nine months in the year. Such extensive use by the adults and youth of the community is important in many ways. It develops a social group spirit among the people of a given community; it tends to develop local talent and the habit of cooperative work on plays and entertainments of all kinds; and it tends to bring the adults to the school and so develops a friendly feeling and mutual understanding between the school and the community.

THE SCHOOL SITE

The recognition of the importance of having large sites for school buildings has come even later than the realization of the need of the modern type of school building, which has just been described. When those who were responsible for the governing of our cities were men and women who had been brought up on the farm it was difficult to persuade them of the importance of providing large play-

grounds for city children. They had always had adequate play space, and it was hard for them to realize to what an extent the city child had been deprived of opportunities for wholesome play. Now, however, that the men and women who are responsible for the administration of our cities are in many cases those who have been born and brought up in cities, it is easier for them to realize the desirability of having adequate playgrounds for each school building.

The literature upon school sites and playgrounds published in the past few years indicates that there is a growing consensus of opinion in regard to the school site on the following points: It should meet the recreational needs not only of the children attending the school but of the adults in the district served by the school; when possible, it is desirable to include in the site not only playground space but park space; care should be taken that the landscaping of the grounds should be beautiful.

Selection of the site.—The location of the site is, of course, of primary importance and can only be determined after a careful population study for the purpose of determining population trends. This subject is treated at some length in the next section. Not only should the selection of the site be based upon careful forecasting but it is now generally recognized that it is desirable to purchase school sites ahead of the time when they will be needed. Points that are important to consider in selecting the site, after its general location has been determined from the population study, are the size and shape of the site, the general contour of the land, character of the soil, drainage, distance from through boulevards and main-traffic streets, etc.

The size and shape of sites.—For elementary schools the generally accepted standard appears to be 5 acres for a school of 1,000 to 1,200 pupils; for high schools, 10 to 20 acres. In the large cities, particularly in the East, where the city has grown up around schools planned before the need of large sites was realized, it is difficult to attain this standard except at great cost. The reports of those making surveys of such cities indicate, however, that efforts are being made to approximate this standard. More often than would seem probable there is vacant land near school buildings or municipal playgrounds or land that is not valuable. In many cases playgrounds are built upon the roofs of school buildings. Again, by closing a street and leveling the ground between the street and the building the combined space of the street and the school site gives a more adequate playground than would otherwise be possible. In more recently built cities, particularly in the West, not only are 5 acres often provided for sites for elementary schools and 10 acres for high schools but often the sites are as large as 20 or 40 acres.

In Gary, Ind., for example, 12 of the 18 schools have sites ranging from 10 to 45 acres; 8 of these schools have sites of 20 to 45 acres. All but 5 of the schools have parks or natural woods as part of the school site in addition to extensive playgrounds and gardens.

There appears to be a growing tendency in many cities to place school sites near public playgrounds, or vice versa, in case the park is not part of the school site. For example, in Portland, Oreg., in the case of at least three schools, the school sites adjoin a public playground and park so that the total acreage is nearly double what it would be if these two municipal facilities were separated. The public playground is used by the school as if it were part of the school site, and the school auditorium and gymnasiums are used for adult recreational purposes, in this way eliminating the need for a separate community center on the public playground.

Twenty or thirty years ago the tendency appeared to be to select for school sites patches of land of irregular shapes, which were not desirable for other purposes and consequently could be secured at low cost. At the present time, because playgrounds and athletic fields require not only space but layouts of more or less standardized dimensions, the tendency is to select, so far as possible, sites in the shape of standard city blocks, on level land, and with good drainage.

Location of the school building on the site.—In locating the school building on the site one of the first considerations is to make sure that the building is so placed that it will not interfere with securing adequate play space. If the site is 5 acres or less the building is usually placed close to the street with playgrounds at the rear and gardens or tennis courts at the side of the building. If the site is 10 acres or more the tendency appears to be to have a park or natural woods in front of the school, with the playgrounds at the rear and school gardens or primary playgrounds at the sides. The orientation of the building and its position from the standpoint of the prevailing winds are, of course, of fundamental importance.

Playground facilities.—For elementary schools there are usually playgrounds for the older boys and girls, including tennis courts, baseball diamonds, volley ball, and basket ball courts, etc. There are also playgrounds with playground apparatus, wading pools, sand piles, etc., for the younger children. In addition, space is usually provided for vegetable and flower gardens, and in some schools there are animal-husbandry facilities. In the case of the larger schools and high schools athletic fields with football fields, running tracks, etc., are provided. All these facilities require large playgrounds, particularly in view of the fact that they are used by adults after school as well as by children during school hours. The playground should be, preferably, at the rear of the building, with easy access to the

shower baths, dressing rooms, lavatories, and equipment facilities of the gymnasiums. One detail that is important is the provision of fences for the playgrounds. The tendency appears to be to erect an 8-foot fence around the playgrounds and gardens. Another detail which there seems to be difficulty in solving is the question of playground surfacing. The differences in the natural materials available in different localities makes any uniform solution difficult, and yet the surfacing and proper drainage of playgrounds is essential for the successful development of playground activities.

Landscape architecture.—The modern school site must not only be so planned as to meet the requirements of the present day curriculum but it must be planned with an eye to the artistic effect of the whole. Consequently, landscape architecture is now an important part of the planning of the school site. In fact, in many cities the landscape architect reports, before the site is chosen, upon the adequacy of the position and shape of the site and the soil and contours of the land with a view to determining the desirability of the site not only for building purposes but for playground and park purposes.

METHODS OF CONDUCTING SCHOOL-BUILDING SURVEYS

Because the planning of a school-building program which shall provide the type of buildings and site described in the foregoing sections involves the expenditure of a large amount of money, and because such a program should meet the needs of a city for 10 or 15 years, it has come to be recognized that it is important to have preliminary school-building surveys to determine the probable population growth, the number of children to be provided for within 10 or 15 years, the number of schools needed, the location of school buildings, and the probable cost of the program.

During the past two years there has come to the notice of the Bureau of Education at least 30 such school-building surveys in addition to those conducted by the Bureau of Education. The practical value of such preliminary surveys before a school-building program is embarked upon can hardly be questioned. The making of such surveys is, however, still in the experimental stage, and, consequently, a description will be given of some of the methods of conducting such surveys.

In a recent school-building survey conducted by the Bureau of Education the purposes of a city school-building program were given as follows:

General purposes.—The underlying purpose of a modern school-building program is to provide an environment for children within the adult world of the city in which children may have: (1) Opportunities for safe, wholesome, outdoor play activities which they need to give them a foundation of good health for all their future lives; (2) modern school buildings so planned and

equipped that all children may have the opportunity to study under the best possible conditions, to do creative work in shops and special rooms, and to develop tastes for worth-while use of their leisure time. The school should also be so planned that it can be a center for recreational and work activities for adults.

In other words, a school-building program is a problem in social and educational engineering, the purpose of which is to make the city as healthful and satisfying a place for both children and adults to live in as is possible.

Specific purposes.—(1) To eliminate school congestion and provide modern school facilities—including buildings and grounds—both for the present school population and for future growth over a period of 10 or 15 years.

(2) Through a scientific study of population growth to determine population trends.

(3) On the basis of population trends, to recommend: (a) The purchase of adequate sites for both new buildings and additions in those parts of the city where it is evident that buildings will have to be erected; additional sites for existing buildings where necessary. (b) The erection of new buildings and additions which shall provide modern school facilities for the children and which can also be used by adults in the evenings. (c) The reconstruction of existing buildings, where necessary, in order to provide modern school facilities. (d) The abandonment of existing buildings that have outlived their usefulness.

(4) To give a detailed estimate of the cost of new buildings, additions, contents, and sites.

The population study.—The first task in undertaking a school-building survey is to make a population study as a basis for estimating growth in different parts of the city, and, on the basis of these facts and those in regard to congestion and age and size of school, to determine where new buildings and additions should be built and old buildings reconstructed.

A study of reports on recent school-building surveys indicates that there is rapidly developing a scientific technique in the making of population studies. Because the scientific study of population trends in any community should result in a more accurate determination of where buildings are needed, what size they should be, and how many there should be, such studies should represent a distinct financial saving to the cities surveyed.

Another noticeable characteristic of recent surveys is that apparently one of the chief aims of the population study is to so conduct the work that, after the survey is completed, the school authorities may have all the data for carrying on in the future a continuous, up-to-date study of school population growth for each section of the city.

Since there have been many requests for information as to the details of conducting such population studies, the following description of the methods used by the Bureau of Education, which are also characteristic of other school building surveys, is given.

Boards of education asking for school-building surveys usually request that a school-building program be worked out for at least

a 10-year period. In making estimates of the number of children who will have to be accommodated for the 10 years following the survey the building program is based upon the actual number of children living in a city as given by the school census and not upon the school enrollment. The reasons for this are obvious. The purpose of a school-building program is to provide for all children of school age in a city. The school enrollment gives only the number of children enrolled, which is not necessarily synonymous with the number of children of school age living in the city—in fact, is rarely so. When building programs are based upon enrollment the likelihood is that when the new buildings are erected they attract children not formerly enrolled and so it is found that the buildings are congested nearly as soon as they are erected.

Not only does the school census usually give the total number of children from under 1 to 17 or 18 years of age, but also it gives these data block by block for the whole city. The existing school-district boundaries in any city surveyed are usually not based upon studies of population trends, but rather have had to be determined by such facts as the location of existing buildings, which in many instances are not where they should be. Consequently, the tabulation of the number of children, by ages, block by block, and the making of a school population map, showing the number of children in each block by ages, is of first importance. After determining upon the form of school organization upon which the building program is to be worked out, a similar map is made for the different grade groups. If the census for the previous 10 years is available, then similar tabulations are made for that period. Such figures, however, often do not exist.

Important as are the school-census figures, they alone are not sufficient. It is also of fundamental importance to secure the actual and estimated growth in the number of families over a period of years, and it is necessary to secure these data by small geographical areas.

The United States census statistics on the number of families in any given city are available for different 10-year periods, but as these periods do not always synchronize with the year the survey is conducted it is necessary to secure data on the number of families for more recent periods. All groups which make school-building surveys are apparently agreed that the surveys of the telephone companies on the actual and estimated number of families in different cities are among the most reliable and exhaustive studies available. These studies are particularly valuable for school-building surveys because the number of families is based on actual count, because the data are given for small geographical areas, usually called "telephone sections," and because the studies are usually rechecked every three or four years.

Since it is necessary to compare the actual and the estimated number of families with the school-census figures, a map showing the telephone-section boundaries and the number of families in each section is made and the number of children by age groups is allocated within these boundaries, block by block. The percentage of increase in the number of families in each telephone section is then applied to the number of children living in the section at the time of the school census, and thus an estimate of the number of children for 10 years is obtained. Since the original data are by blocks, it is possible to distribute and redistribute the estimated number of children—according to telephone sections—within present or proposed school districts.

In addition to securing the figures on school population and the actual and estimated increase in the number of families over a 10 or 15 year period, it is also desirable to secure from the local building department of the city the number of new buildings actually erected in the preceding 10-year period and the number of families provided for in these new buildings. Furthermore, if there are many apartment houses in the city, data on not only the number of families having children in each apartment house but also the number of children per family are obtained. This information is secured from the school-census cards and distributed according to apartment houses.

Not only are the figures on school population, number of families, number of new buildings, and number of children per family in apartment houses essential but also many other factors have to be taken into consideration in an adequate population study, such as recent population flow from near-by localities into the city, railroad developments, car lines, boulevards, breaking up and development of estates, the character of each section of the city, public improvements, and the location, block by block, of each dwelling, apartment house, and tenement, retail stores, manufacturing and wholesale establishments, libraries, hospitals, churches, clubs, public buildings, parks, etc.

Having secured all this information, the final "population-study" map is made. Since this map is left in the local board of education offices as the basis for a continuous population study which will in the future make such an exhaustive population study as just described unnecessary, it has been found desirable to construct the map on the following lines: The map should be sufficiently large so that every detail can be easily read. As the geographical areas known as telephone sections are the basis for future population studies, these areas are outlined and then the items listed above are indicated, block by block, within these areas. When the new proposed school-

district boundaries have been determined upon as a result of the study of all the factors in the situation the proposed school-district boundary lines are drawn in colors that make them the outstanding feature on the map. The school buildings to be retained are located, as well as the new buildings to be erected.

At the same time that the population study is being conducted an appraisal is also being made of the existing school plant, including buildings and grounds, the age and type of each building, the amount of money invested in it, the educational facilities which it contains, and its physical condition, together with its capacity and the population trend in the district, in order to determine whether it shall be retained; and if so, for how long.

One of the most important factors in the survey is the study of school sites. In the average city the amount of play space around each school is very small. For this reason, data are secured not only on the number of square feet in each site but also the number of square feet of play space for each pupil, by schools. The correct selection of future sites—their location, size, location of the building, and general layout of the grounds—is of the greatest importance to the whole future of the city.

After the population study and the appraisal of the school plant has been completed and the location, size, and number of buildings and sites, together with the estimated costs, have been determined, there remains the question of how the recommendations for the building program shall be presented. It might seem at first sight as though this were a comparatively simple problem, but those making school-building surveys are agreed that it is one of the most difficult.

There are, broadly speaking, three groups in a community which are vitally interested in school-building problems: First, the educational authorities—the board of education, superintendent of schools, and administrative and teaching force; second, the city government and taxpayers; and, third, the general public, more particularly the parents of public-school children. This latter group also includes some of the second group. The interests of these groups in a survey report are not necessarily identical. For example, all parents are, in general, interested in the report from the standpoint of what is going to happen to the school which their children are attending; the educational authorities want a report which gives the findings of the survey and the recommendations both in a summarized text and detailed statistical tables; the taxpayers are interested in what the cost is going to be.

A study of recent survey reports shows that there is recognition of the fact that the report must meet the demands of all these groups—and be so written that it will be read by them. In other

words, these reports are of interest not merely for the light which they throw upon progress in the technique of making school-building surveys; they are also illuminating as evidence of a growing recognition of the fact that the education of public opinion about educational matters is an important part of the whole school-building problem.

SUMMARY

A survey of the school-building problem during the past few years indicates that :

The planning and erection of school buildings is becoming a highly technical task which demands the combined knowledge and skill of educators, health specialists, building and landscape architects, heating, ventilating, lighting, and sanitation experts.

The modern school building, which has been developed during the past 20 years, represents a radical departure from the school building of previous periods. Owing to changed social and industrial conditions which have deprived children in cities of many of the educational activities which formerly existed in the community life outside of the school, the curriculum of the modern school has been enriched so as to give children much greater opportunities than formerly for a variety of play, handwork, and social activities.

The school building has had to be changed to meet these new educational demands. At the same time advances in the science of heating, ventilating, lighting, and equipping school buildings are making it possible to prevent many of the health defects, i. e., bad posture, poor eyesight, respiratory troubles, etc., which developed in children as a result of the conditions in the older type of school building.

The findings of the Bureau of Education school-building study of modern school buildings in 84 cities in 33 States, which was made in order to determine to what extent modern facilities such as auditoriums, gymnasiums, and special rooms were being included in new school buildings, showed that of the elementary schools studied 82 per cent had auditoriums, 60 per cent had gymnasiums, 75 per cent had special rooms, and 74 per cent had kindergartens. It also indicated that, although standards in regard to size and equipment of auditoriums, gymnasiums, and special rooms were gradually being worked out, these matters were still in the experimental stage.

The planning of the school site, its location, size, provision for playground facilities, gardens, etc., is now of equal importance with the planning of the building.

The tendency to have school-building surveys preliminary to working out school-building programs appears to be one of the well-established techniques in the solution of the school-building problem.