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TITLE AN INVESTIGATION OF TECHNIQUES USED IN DETERMINING SCHOOL BUILDING NEED

AUTHOR JOHN WESLEY ENGLISH

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AN INVESTIGATION OF TECHNIQUES USED IN DETERMINING SCHOOL BUILDING NEED

by

John W. English

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of the requirements for the degree of
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Committee in charge:

Dean James B. Edmonson, Chairman
Doctor Douglas Carroll
Professor John Hyde
Professor C. T. Larson
Professor Howard Y. McClusky

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CHAPTER I

THE PROBLEM

Introduction

The United States is facing an unprecedented need for new schools. Conservative estimates of public school enrollments indicate an increase from the present twenty-fivemillion to a high point of thirty-two million by 1960. In addition to providing classrooms for this increased enrollment, the need for new schools is accentuated by the lack of normal school building during the past twenty years. First the depression and then World War II prevented communities from replacing obsolete school buildings.

There has been feverish activity in the school building field since the end of the war. The need for buildings is so great that more classrooms must be built in the next ten years than have been built during the last twenty years merely to keep pace with the increasing enrollments and to replace the most decrepit of the older buildings.

Recent writings of persons familiar with the educational scene emphasize the urgency of the problem of providing adequate schoolhousing. Quattlebaum writing for School and Society says:

> The extent to which the findings from several recent studies of the need for school construction corroborate each other is noteworthy. Some of the more significant conclusions from these studies may be pointed out in brief and in substance as follows:
>
> Senate Committee on Labor and Public Welfare
>
> Recent marked increases in public school enrollments may be expected to continue for several years. Many thousands of children, possibly one fourth of the total enrollment are housed in obsolete, unsafe, or inadequate buildings.
>
> The Council of State Governments
>
> School plant needs are acute throughout the nation. According to estimates made by the states, adequate housing of the public schools will require new construction of 440,000 to 480,000 classrooms with accompanying facilities costing altogether between $9,000,000,000 and $11,000,000,000 within the next decade.

The New York Times

A nation wide survey conducted by The New York Times has shown that public school buildings in the United States as a whole are in deplorable condition. Millions of children are attending classes in buildings that are obsolete, potential fire-traps, or utterly inadequate for education needs.

National Education Association

Over half the states have reported a "very large" shortage of city elementary school buildings and about one-fourth of the states a "very large" shortage of rural elementary school buildings.

The United States Office of Education

Adequate improvement of physical plant facilities for the public schools will require a capital outlay of between ten and eleven billion dollars from 1950 to 1960. The race to regain the 1930 relationship between school children and school housing can be won but it will require immediate action and long-range planning at the local, state and Federal levels.

According to forecasts by the Bureau of the Census, the population of the United States will increase from an estimated 149,947,000 on October 1, 1949 to between 154,669,000 and 155,745,000 on July 1, 1955. Of special interest in the present study are expected changes in the age structure of the population. By 1955 an increase of about 4,246,000 or thirty-five per cent of the 1947 population is expected in the five to nine year age group, and an increase of 3,246,000 or thirty per cent in the ten to fourteen year age group.

Studies made by the Educational Policies Commission and the United States Office of Education indicate:

More children are now enrolled in the elementary schools than ever before in history; and it appears probable that elementary school enrollments will markedly increase annually for another decade. Secondary school enrollments will begin to grow about 1952, will begin increasing rapidly about 1956 and will continue growing at a fast rate until at least 1960.[1]

A table recently prepared by the United States Office of Education shows the growth of enrollments in public and non-public schools over the past twenty-four years with forecasts of enrollments for each year from 1950 to 1960.

---

1 — Quattlebaum, Charles A., "Financing Public School Construction", School and Society LXX (September 9, 1950) pp. 161-164.

Table 1

Public and Non-public School Enrollment

School Year Ending	Enrollments in elementary and secondary schools (kindergarten through grade 12)		
	Total	Public	Non-public
1926	27,259,227	24,770,073	2,489,154
1928	27,879,233	25,209,272	2,669,961
1930	28,388,346	25,705,301	2,683,045
1932	29,159,525	26,347,366	2,812,159
1934	29,358,859	26,595,728	2,763,131
1936	29,206,054	26,516,035	2,690,019
1938	28,854,121	26,112,467	2,741,654
1940	28,229,664	25,569,719	2,659,945
1942	27,351,496	24,687,879	2,663,617
1944	26,115,426	23,388,426	2,727,000
1946	26,288,541	23,437,546	2,850,995
1948	27,134,126	24,036,505	3,097,621
1950	29,000,000	25,591,000	3,409,000
1951	29,828,000	26,259,000	3,569,000
1952	30,636,000	26,907,000	3,729,000
1953	32,327,000	28,329,000	3,998,000
1954	33,861,000	29,610,000	4,251,000
1955	35,209,000	30,722,000	4,487,000
1956	36,159,000	31,484,000	4,675,000
1957	36,784,000	31,966,000	4,818,000
1958	37,186,000	32,251,000	4,935,000
1959	37,105,000	32,117,000	4,988,000
1960	37,138,000	32,080,000	5,058,000

Figure 1 shows these statistics in graphical form.

The first of the children born during the high birth rate years immediately following World War II are just entering the schools this year. The elementary grades are expected to have a million more children in the 1950-51 school year than they had the previous year and are expected to increase at the rate of 750,000 per year for the next ten years. This will mean a 28.1 per cent gain in elementary enrollments by 1960. The trend toward smaller class size accentuates the need for

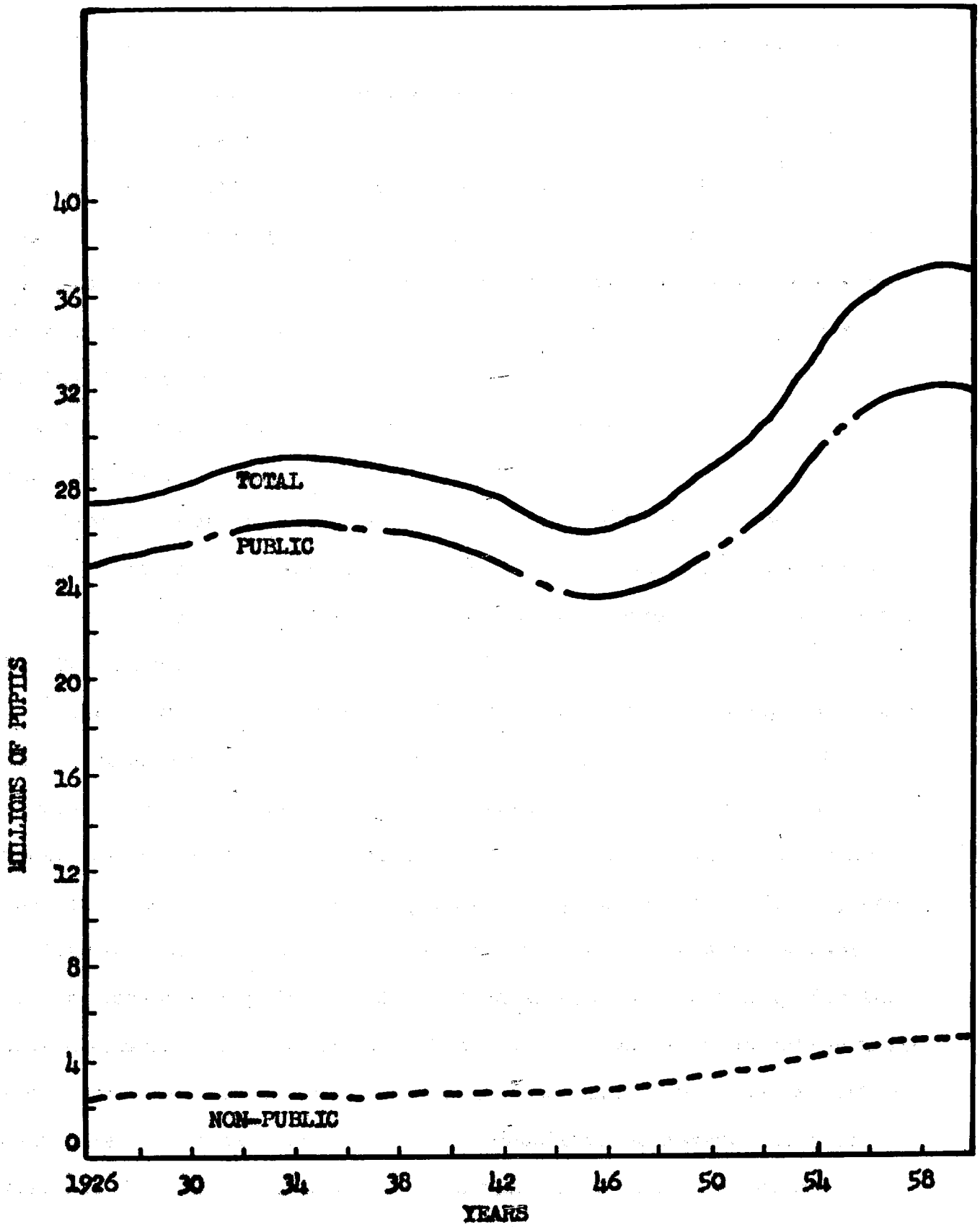


FIGURE 1. ENROLLMENT TRENDS IN U.S. SCHOOLS

more classrooms as present plants are no longer considered adequate to house the number of pupils they were designed for.

A nation wide study made by the United States Office of Education reports that 25,000 new classrooms will be needed during the next ten years to accommodate enrollment increases only. In addition to this tremendous need for rooms to house the increased numbers of students, there is the vexing problem of replacing worn out school buildings. The building of new schools which has taken place since 1945 has merely been sufficient in number to replace buildings which are obsolete and unsafe.

Careful planning is essential now because of the extremely high school construction costs of the present time. Construction costs are estimated to be fifty percent greater than they were in 1945 and double the 1926 costs.

This crisis in the educational field is further complicated by the lack of educators qualified by training and experience to meet the leadership demands this urgent need thrusts on them. During the past twenty years educational problems receiving most attention have been those of finance, teacher supply, curriculum, in-service training, and problems of a similar nature. The administrator who has had school building experience prior to 1947 is an exception. Some help for the superintendent is available through state departments of education which often employ one or more school building specialists who devote most of their time to school plant problems. Consultive assistance is often available from the department of education of the state university or state college. The superintendent may also make use of the services of educational consultants in solving his problem of providing school housing for the children of his community. He may be fortunate enough to secure

the help of an experienced school architect who can assist him in analyzing the school building needs of the community. However, the final responsibility rests with the superintendent to conduct or supervise the research required to develop a master plan which will detail the needs of the school district and the steps necessary to meet these needs.

The analysis of the needs of a school district commonly takes the form of a survey which brings to light the basic information required for planning a course of action.

Purpose of the investigation

This investigation seeks to identify the most desirable techniques and the essential information required to determine the school plant needs of a given school district. An examination of textbooks on administration and comparison of school building surveys made by different authorities in the school building field results in confusion for the school man who has not had experience in planning a school building program. This study attempts to provide information which will be of assistance to the "average school administrator" who is faced with the responsibility of making a survey of building needs preparatory to recommending a school building program. Such a guide must be considered in general terms, as the most valuable type of survey for one community may not necessarily meet the needs of another community of a different size and nature. Local needs must play an important part in determining the exact form of the report produced to indicate need for a school building program, but it is assumed that there are essential topics to be considered by all studies of school building need. It is also assumed that a complete study of school building need will include the presentation of basic

information about the community and school district in the form of maps, population data, and enrollment figures. This study then, seeks to provide a guide which will serve as an instrument for systematizing the research involved in making a school building survey.

Working hypothesis

The basic assumption involves the hypothesis that there are elements of general agreement among the opinions of the authorities in this field which can serve as a guide for the novice. This does not necessarily mean that those elements most common to school surveys are the most important elements for all surveys, but does mean that these common elements should be considered by persons making school building surveys. Topics which invariably appear in school building surveys must have considerable importance due to the universality of their occurrence. In a similar manner topics which appear in several outlines for school buildings surveys prepared by competent authorities in this field are probably significant enough to be considered by any person engaged in the process of determining school building needs.

The evidence to prove or disprove this hypothesis will be sought by examining the following sources:

1. Articles on planning school building programs in educational periodicals.
2. Textbooks and professional books on the topics of school plant planning and educational surveys.
3. Reports of school building surveys.
4. Professional writings of school architects.
5. Professional writings of city planning authorities.
6. Experience in making a school plant survey of the elementary schools of Flint, Michigan.
7. Case histories of self-surveys in other Michigan communities.

8. Opinions of educational authorities and school architects, secured by questionnaire.

Limitation of the problem

The school survey movement has been adequately described in its historical aspects by many writers and will be reviewed in the next chapter. A large amount of literature on the techniques of the school plant survey appeared during the early years of the movement from 1915 to 1930 and presents a voluminous amount of opinion and description of early efforts to accurately appraise school building needs. This study will only deal with enough of this early writing to show the relationship between present and past attitudes on this problem. Arthur B. Moehlman, Jesse B. Sears, Fred Engelhardt, and N. L. Engelhardt all were authors of books dealing with school surveys written before 1930 and since each of these men is a recognized authority on educational administration, valuable information on the problem can be gained from their writings.

In studying the reports of school surveys, only those made since 1940 have been examined since it is assumed that the more recent survey committees have made use of the best techniques of the pioneer workers in the field and improved on them wherever possible. Only one survey of each survey committee has been analyzed since repetition of a single point of view or philosophy would not seem to add to the value of the study.

The review of the literature relating to city planning and school architecture is not considered to be complete, but represents the thinking of some authorities in these fields.

The significance of the problem

The problem is especially important because of the tremendous waste of money and resources resulting from hastily planned, poorly located,

school buildings. School buildings, once, erected, continue in service often for fifty years or more with little or no alteration, promoting or hindering the educational process they were intended to serve. The mistakes made in educational planning and school site selection are permanent ones. Only by careful advance planning on the part of school officials and boards of education, can the best interests of the community and its children be served. This advance planning must be done on the basis of objective knowledge of the facts of the individual situation studied. The actual planning is the development of a program of advancement which provides a basis for progress toward a recognized goal. The survey method then represents the connecting link between research and action in that it seeks to base human thought and human conduct on facts objectively measured rather than on the assertion of authority. The survey provides the meeting place of theory and practice. If the survey is to enable the community to provide adequate schools for its children, good techniques are essential in the process of determining the kind and extent of the educational program and the development of a long range building program. Persons involved in the determination of the school building needs of a community include lay citizens, school employees, Board of Education members, state officials, education specialists, architects, and engineers. The survey approach causes all of these persons to pool their ideas and specialized talents in order to provide better school buildings to house the educational program.

Superficial planning for school buildings results in consideration of quantitative needs only, in order to provide sufficient pupil stations to accomodate the anticipated enrollment. This type of planning may provide a sufficient number of school buildings of adequate size, but

usually neglects the qualitative aspects of school building need. Standards of quality are potent factors in establishing need and are continually being revised upward. Just as the modern automobile represents recognition of higher standards of transportation compared to the requirements of earlier years, so the school building of today must provide for the requirements of a modern school program. This implies that to be truly worthwhile a school building survey should devote considerable attention to qualitative as well as quantitative aspects of the future educational needs of the community. These problems of qualitative projection are more important in depth, but are generally difficult to assay as standards are continually in the process of revision.

Summary

1. The considerable amount of school building taking place at the present time makes emphasis upon careful analysis of need for buildings particularly important.
2. The problem of this study is to determine the most approved procedures to be used and the most essential information required to establish the physical plant needs of a school district.
3. The procedure followed by the investigation is that of analyzing reports of surveys and the writings of educational authorities, school architects, and city planning authorities to determine these approved techniques and essential items of information. This list of procedures and data required was then submitted to authorities in the school plant planning field for validation.
4. The surveys and literature examined consisted chiefly of material published during the past twenty years.

CHAPTER II

PERTINENT STUDIES AND RELATED LITERATURE

Historical background of the survey movement

The modern survey movement was studied intensively by Caswell as the subject of his doctoral dissertation in 1929. He gives the following outline of beginnings of the movement:[1]

> "The Boise, Idaho, survey of 1910 marks the beginning of the movement. In 1911 and 1912 the East Orange and Montclair, New Jersey and the New York City surveys were made. By 1914, the idea had become so popular that surveys of nine city school systems were made by outside experts during the year. In that year also the Carnegie Corporation made, in Vermont, the first state wide survey. Dr. Leonard P. Ayres, then with the Russell Sage Foundation, in 1916, directed the most comprehensive survey of the Cleveland, Ohio, schools. This study was by far the most detailed of any made up to that time. During the years immediately following 1916 the results of surveys and the future of the movement were widely discussed. Many educational meetings throughout the nation gave prominent places on their programs to such discussion. In this process of popularization such extravagant claims were made for surveys that the movement later came to be considered an educational fad by many leaders. In fact, many inferior surveys were made during this period by those who lacked the necessary training to direct them successfully. It is not strange that much bitterness was caused by certain of these surveys which were used for partisan rather than professional purposes.
>
> "Following the World War, the popularity of locality surveys waned somewhat. Within the past few years, however, the number has gradually increased until in 1927 more surveys of city school systems by outside experts were published than in any previous year. It now appears that locality surveys have passed the period of widespread popularization, weathered a time of depression and are now increasing in favor. Fewer extravagant claims are being made either in favor of or in opposition to surveys."

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[1] Caswell, Hollis Leland, City School Surveys, pp. 5-6. Teachers College Contributions to Education, No. 358. New York: Teachers College, Columbia University 1929.

Caswell stated that surveys have made their most significant contribution in the development of scientific standards and objective methods of measurement used in the analysis of housing needs of city school systems. He refers to Horace Mann's report on the "Supply of School Houses" submitted to the Massachusetts State Board of Education in 1838. Mann's report discussed seven subjects: (1) ventilation and warming (2) size (3) desks and seats (4) location of schoolhouses (5) light and windows (6) yards and playgrounds and (7) duties in relation to school houses.

He gives as one of the first listings of school building standards, the annual report of George A. Walton, Agent of the Massachusetts State Board of Education, made in 1885:

> I have seen during the year, a number of schoolrooms whose capacity affords less than one-half the air demanded for good health; one gave but 84 cubic feet of air space per pupil; another but 72; another, a recitation room, but 30; while health demands 250 cubic feet of space per pupil.
>
> Many of the rooms visited are poorly ventilated and many, too, imperfectly lighted. A prevailing fault consists in having the light in front of the pupil. One in a house comparatively modern, 28 feet by 30 feet, had to 15 feet of floor space, but one foot of window; while the ratio of space for lighting to the floor surface should be as one to six or eight." [1]

Caswell says, "The importance of the housing problems was increasingly recognized, but subjective methods of measurement were still relied upon. In the development leading from these subjective methods to those of a more objective nature surveys contributed in two ways. The first of these was in the testing, consolidation, and objective interpretation of standards for buildings and sites; the second in the development of techniques which made possible the anticipation of future housing requirements and thus the development of continuing building programs.

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[1] Caswell, op. cit. p. 83

> "Among the earliest surveys which gave a special attention to buildings was the study of Harrisburg, Pennsylvania in 1912, by Henry Snyder which dealt only with buildings. It may be considered the best of that time. In the investigation the buildings were all carefully inspected. The report pointed out certain good and bad features in planning and construction with suggestions for improvements. The standards, however, were entirely subjective and were not definitely stated. In the following year 1913, the Portland Survey became more specific in certain items. Definite standards were stated for the following: (1) playground space per pupil (2) size of sites (3) construction of sufficiently fire-resistive types of buildings (4) environment and orientation of buildings (5) classroom lighting (6) size of classrooms and (7) methods of ventilation."

The score card developed in 1916 permitted the standards slowly developed to be applied in an objective form. This advance came as a result of the work of G. D. Strayer and N. L. Engelhardt, of Columbia University and was first used in the Framingham, Massachusetts, survey. This survey also introduced the concept of a continuing building program which would make provision for the shifting population of the city. The Omaha survey of 1917 undertook to determine: the adequacy of the present school plant; the relationship which should exist between the building program and the educational program; the school building facilities to be required during the next fifteen years; the location of the new buildings; the cost of the new buildings and the city's ability to pay for the recommended program.

Caswell points out that these techniques developed by Strayer and Engelhardt caused nearly all school building studies made after 1918 to include an analysis of population trends and residential developments. The prediction of population trends which was first introduced at this time adapted to school needs the methods of the Bell Telephone Company.

Caswell's conclusion in 1929 was that "the best modern school building surveys consider five major problems: (1) an analysis of the existing

school plant (2) the building program as it is related to the education program (3) the future building needs of the community (4) a building program with definite steps of development covering a period of years and (5) the method of financing the program."

The relationship of school plant planning to city planning

A most comprehensive account of the development of city planning is the doctoral study of Robert Averill Walker.[1] Much of the following material is taken from his book, "Planning Function in Urban Government."

The development of school plant planning in the United Stated followed closely the increased activity in city improvement which came immediately after the turn of the century. The Pittsburg Survey of 1909 financed by the Russell Sage foundation included information on working conditions, housing conditions, health and sanitation, civic improvement possibilities, hospital and institutional needs of the city, aspects of the crime situation, playground and recreation and a number of related questions. This first systematic city survey did much to arouse interest in urban housing and living conditions.

The first national conference on city planning was held in Washington in 1909 and its major concern was the utilization of planning in dealing with social problems. This conference was an outgrowth of a number of urban reform movements. Jacob Riis had published his important work, "How the Other Half Lives," as early as 1890 which led to agitation for reform legislation to improve tenement house conditions in New York City. In 1895, the "Hull House Maps and Papers," prepared by the Resident of Hull

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[1] Walker, Robert Averill, Planning Function in Urban Government, Chicago: University of Chicago Press, 1941 pp. XXI / 376.

House, told of the slum conditions of Chicago. Lincoln Steffens published his book "The Shame of Cities" in 1904.

The close relationship of school plant planning and city planning is indicated by the following facts: the first social survey in the country was the above mentioned Pittsburg Survey of 1909; the first national city planning conference was held in Washington in 1909; the Boise, Idaho school survey came in 1910. The Russell Sage Foundation financed the Pittsburg Survey which was a social survey and also the Cleveland School Survey of 1916.

The City-Beautiful movement followed the Chicago World's Fair of 1893 and stimulated several communities to develop city plans between 1900 and 1907. Among these Walker lists the "Report on a Plan for San Francisco" prepared in 1905 by Daniel H. Burnham for the Association for the Improvement and Adornment of San Francisco. In 1907 two similar plan reports were published: "Los Angeles, the City Beautiful" by Charles M. Robinson and "Remodeling Roanoke" by John Nolen. These plans emphasized a civic center, parks and thoroughfares and were typical of the early city plans. The "Plan of Chicago" prepared by Daniel H. Burnham appeared in 1909 and set a pattern for future city plans. It dealt with rapid transit and suburban growth, a comprehensive park system, transportation and terminals, streets and subdivision control, and problems of the central city. These early plans were all characterized by a predominant architectural emphasis, according to Walker, but they were deeply rooted in the desire to ameliorate social evils of the congested areas of the cities.

Walker defines comprehensive zoning as "the districting of land as to use, concentration of population, and the height and bulk of

buildings employed for the purpose of carrying out a land use plan." The New York City zoning ordinance was adopted in 1916. Henry Morganthau of the New York Committee on the Congestion of Population had suggested zoning as a remedy for the evils of congestion in his paper presented to the first planning conference held in 1909. Zoning, as a restriction of land use, was not enthusiastically received by planning groups until its function of protecting property values of residential districts was emphasized rather than its original purpose of instrumenting the planned development of the community. Zoning was an especially valuable development for the school plant planner for it gave some indication of the future land use of a city.

City planning, like school plant planning, underwent a period during which most of the plans were produced by consultants working on a contract basis. Walker points out that the plan produced in this manner tends to be the end product of the planning process. To be effective, planning must be a continuous process and this requires an adequate permanent staff. Walker reported that officials do not often refer to a consultant-made plan and in a number of instances they were unaware of the existence of such a plan. He recommends a resident planner attached to the executive office of the city government.

The doctoral study of Russell A. Holy made in 1935 gives the most comprehensive treatment of the intimate relationship of city planning and school plant planning. He says,[1]

> Neither city planning nor school plant planning can be considered adequate unless each considers the other. City planning that does not consider the community's need for school buildings omits what should be among its major concerns. A school building plan that is not conceived in terms of the

[1] Holy, Russell A., The Relationship of City Planning to School Plant Planning, p. 4. Contributions to Education No. 662, New York: Teachers College, Columbia University, 1935.

> anticipated development of the city as a whole is likely to be without a sound foundation. For it is futile to keep a fixed school building program where the development of the other aspects of the physical city are not controlled by a plan. For one thing, both cope with similar problems, the rapid growth of cities, changes in methods of transportation, and the gravitation of industrial plants and commercial undertakings to definite areas. Such problems as zoning, transportation facilities, major streets, city parks and other recreational facilities are the concerns equally of children and adults.
>
> Then again the school is constantly serving from eighteen to twenty per cent of the total population in a variety of ways. Various social and community services which have been performed by other agencies are being taken over by the school. The school is the institution to which the community looks for the promotion and advancement of civic and social ideals and to no other institution more than to the school is the destiny of the community entrusted. In view of the significance of the school to the welfare and development of the community neither city nor school planners can afford to overlook the activities of the other.

Holy analyzed a number of city plans and school plant surveys to determine their interrelationship. He also examined city planning literature for references to school plant planning. He compiled a list of information city planning commissions should supply to boards of education and a list of information which boards of education should furnish city planning commissions. He submitted his lists to school plant planning authorities and to city planning experts for validation. He found from his research and from personal visits to city planning departments that there was but little cooperation between city planners and local school plant planners. One of his recommendations is that a member of the school administrative staff be made a member of the city planning commission.

The planning process

Walker[1] has a number of observations on the nature of the planning process which have value for the student of school plant planning. He identifies "city planning" as dealing with the physical pattern of the

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[1] Walker, Robert Averill, op. cit. pp. 113-114.

community, while "planning" is a term of broader significance.

> The over-all planning agency is designed to assist officials in formulating a public policy which treats the problems of the community as a closely knit whole. This indeed is its unique function; and if it is content with less, if it bogs down in the minutiae of administrative detail in any particular field, it loses its reason for being. The several operating departments can and should plan for their respective spheres of activity. The contribution of the planning agency is not found in a duplication of this work, but rather in supplying the element of "comprehensiveness" and hence integration to planning the future development of the city. This calls for a systematic program of assembling information about the city (research); discovering what it means (analysis); and indicating what action it seems to call for (planning and specific recommendations).

Before the planning agency can approach its task intelligently something must be known about the probable future of the community. It should have available as thoroughgoing information upon current trends as it is possible to obtain; and while it is not intended to present here an exhaustive list of all the questions upon which an active planning agency needs data, certain categories may be suggested for purposes if illustration.

First, information must be obtained bearing on current economic trends in the area. Is the industrial base of the local economy firm or changing? What are the probable effects of visible technological trends? Is the local economy balanced or dependent upon one industry? What are current employment and relief trends? What is the proportion of home ownership?

Clearly, the planning agency will need also to know what is happening to the physical plant of the community? Are transportation and terminal facilities adequate? Are street and parking facilities adequate? Are sufficient open spaces and recreation areas available? Is the city decaying at the center? Is the rural-urban fringe suffering from land speculation? What is the housing situation?

Population trends are a basic factor in local planning, and the planning agency will need to know whether the community is growing, declining or stable in population. Are ethnic groups being assimilated? Are adequate educational facilities available? What is the infant-mortality rate? What are the acute disease problems? Where are the areas of delinquency crime disease, etc.?

Likewise of fundamental importance to intelligent planning

> is some knowledge of the limitations placed upon the community's ability to solve its own problems. What are the legal limitations placed upon the community with respect to finance and taxation? Does the city have flexible powers under state law? What limitations do political boundaries place upon an attack on problems which exceed those limits?

In assembling the information required to provide answers to these questions, Walker points out that much data is available as a result of research done by local public and private organization. Universities and government research bureaus are prepared to render considerable assistance in many cities. The telephone companies compile population statistics. Utility companies can furnish information relating to the distribution and shifts of the local population. Valuable information with respect to deteriorated areas and relief is available from private social and welfare agencies and the public welfare department. The United States Census reports supply a tremendous wealth of material on population trends, migration, employment and other matters of essential information to planning agencies.

Planning for a large city must extend beyond the present limits of the city as the city represents the hub of the metropolitan area. City planning must in many cases consider even the area beyond the limits of the county and Walker urges further integration of city and regional planning. Another conclusion he draws is that present technical planning staffs are inadequate because they consist largely of persons trained in engineering, drafting, and the architectural professions. Persons trained as statisticians and in the social sciences are not often present.

John D. Millett in describing the planning process, after serving as staff member of the National Resources Planning Board, holds much the same point of view as that expressed by Walker. He regards objectives as statements of need or purpose and considers the determination of objectives to be the most important single phase of the planning process.

The setting of objectives is complicated by the fact that standards do not remain static, but are constantly in a state of revision. This emphasizes that planning must be flexible in order to adjust to varying condition or circumstance. Millett points out that our current conception of desirable recreation standards may be greatly modified tomorrow. In a similar manner, library standards may be altered by expansion of adult education programs or a major shift in publishing practices.

Millett stresses the importance of a clear comprehension of the existing situation as a means of measuring the gap between what a situation is and what it should be. He says,[1]

> Thus the knowledge of the existing situation is an essential part of planning. The job ahead is measured in terms of the difference between what we have and what we want. Indeed, the work to be done may be nothing more spectacular than a maintanance of the existing situation or condition. But this too needs to be known in quantitative terms. Planning almost never begins with nothing. It starts with something and must expect to build on that toward the ultimate objective. No planning can proceed very far without detailed knowledge of the present condition whether it concerns an inventory of physical plant, present conditions of soil erosion, current land use practices, or the current record in providing educational facilities for American youth. The planner must know what <u>is</u> as a part of projecting what should be.
>
> When objectives have been set in terms of desirable goals and in terms of the gap to be filled the planner then faces his real challenge to devise a program of action to meet his goals. In some respects this may be the most difficult part of the planning job. Sometimes the needs are so self evident that there is little question about what the course of action must be.

John Guy Fowlkes, Dean of the School of Education of the University of Wisconsin, expressed much this same philosophy in a leaflet entitled, "Planning Schools for Tomorrow" which he prepared for publication by the United States Office of Education in 1942. Dean Fowlkes said:

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[1] Millett, John D. <u>The Process and Organization of Governmental Planning</u>, p. 45, New York: Columbia University Press, 1947.

Education as a basic social enterprise must have an important consideration and it behooves those who are interested in educational service to concern themselves with plans and policies for the future. Educators and laymen who are interested in adequate provision for the education of all the prople have to recognize that new conditions demand both an expansion of successful practices and policies that have been developed and the devising of new ways to meet the new situations.

Planning facilitates social progress in several ways. First, through planning there can be agreement concerning what is to be done; everyone can understand what is proposed and can accept or reject it. This is in accordance with democratic traditions and practices. Second, individuals and groups can cooperate more easily if plans have been made than if no course has been laid out. Third, effort and funds can be saved by following a well laid out scheme and the results are likely to be much more satisfactory than if sole reliance is placed upon trial and error in attaining the desired purpose. Only by systematic and carefully executed planning can educational needs be met adequately and economically.

Educational planning has long been accepted. The educational survey conducted in accordance with scientific procedures has been widely employed in evaluating educational practices and policies and in planning improved educational services and facilities.

Today, however, there is greater concern than ever before over the integration of educational planning with social planning in general. What does comprehensive planning involve? In a recent report of the National Resources Planning Board the pattern of social and economic planning insofar as it can be said to have a pattern is summed up as follows:

1. The determination of goals.
2. The inventory of conditions.
3. The discovery of needs as the inventory is compared with the goals.
4. The projection of alternative solutions.
5. Policy making or the choice of the most feasible alternatives.
6. The absorption and execution of the plan by the community, State, or Nation.[1]

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[1] Fowlkes, John Guy, Planning Schools for Tomorrow. U. S. Office of Education Leaflet, No. 64. Washington: Government Printing Office, 1942 pp. iii / 26.

The planning process applied to school building problems

School building authorities seem to follow much of the pattern of social and economic planning expressed by the quotations from Walker and Millett. It may be desirable to examine the recommendations of a number of writers in the school building field. Caswell[1] stated that the best of the surveys he examined divided the problem of analyzing need into five major parts. His outline follows:

I. Present School Plant
   - A. Analysis of each building
     1. Site
     2. Building
     3. Service systems
     4. Classrooms
     5. Special rooms
   - B. Building utilization
   - C. Renovation program

II. Educational Program in Relation to Buildings
   - A. Type of school organization
   - B. Curricular offerings
   - C. Persistence of pupils in school

III. Future Building Needs
   - A. Population trends
     1. Growth in school enrollment
     2. Growth in city population
     3. Births by areas for years
   - B. Residential development

[1] Caswell, op. cit., p. 87.

1. Residential saturation
2. Location of new homes
3. Where children live
4. Population centers
5. Industrial areas

IV. A Building Program with Definite Steps of Development for

A. Elementary schools

B. Junior High schools

C. Senior high schools

V. Financing the Building Program

A. Financial requirements of the program

B. Ability of the community to support the program

C. Procedure in financing the program

Sears[1] writing on this subject in 1925 emphasized that a school building program must be written in terms of educational needs. His plan for making a building survey included the following main parts:

1. Educational needs defined

a. Extent

(1) Number of children to be educated

(2) General plan of organization and management

(3) Extent to which parks, libraries, and other public plants may be utilized

(4) Climate and physical conditions

b. Character

(1) Nature of the curriculum and extra-curricular activities provided

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[1] Sears, Jesse B., The School Survey, pp. 116-118, Boston: Houghton Mifflin Company, 1925.

(2) Teaching methods employed

(3) Size of class groups

(4) Form of school organization

(5) Health needs and climatic conditions to be met

c. Location of buildings and playgrounds

(1) Distribution of the population

(2) Industrial geography of the district

(3) Accessibility of the place

(4) Freedom from noise and other distractions

(5) Health conditions

(6) Freedom from light obstructions

(7) Drainage facilities and available space

2. Efficiency of present facilities

a. Complete inventory of the plant as it stands

b. Involves analyzing and evaluating each part of the plant in the light of accepted standards

c. Score card method provides a carefully assembled collection of standards

3. Ability of the city to meet its educational needs

a. Careful analysis of the entire financial status of the city

(1) Wealth, income, tax-rate, financial obligations, credit status

4. Constructive program for the present and the future

a. The extent to which present needs are being met

b. The good and bad points in the policy under which the schools have been operating

c. The extent to which the city can afford to meet its needs

d. The financial plan best suited to the conditions of the city

Sears points out that in defining the extent and character of building needs, certain population studies must be made since the size, character, and distribution of the population so directly affect the building needs.

Moehlman[1] lists a similar group of items which he considers essential in determining need:

1. Character of the community
   a. Type of community
   b. Racial composition
   c. Social conditions
2. Possibilities of growth
   a. Total population
   b. School population
3. Determination of community educational responsibility
   a. Legal requirements of the state
   b. Tradition and custom of the community
   c. The needs of the community for educational service
   d. The social progressiveness of the community
   e. Finance
4. Educational organization
   a. Past practice
   b. Accepted philosophy of education
   c. Character of the instructional program
   d. Organization of the program

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1 Moehlman, Arthur B., Public School Plant Program New York: Rand McNally & Co. 1929 pp. 52

e. Method of administration

5. Analysis of the present plant

a. Adopted policies of the board of education

b. Character of the physical plant

c. Spacing standards

d. Location with regard to drawing power and the presence of hazards

e. The site

f. Present use

g. Possible future educational demands for the plant

h. Additions and remodeling

i. Time of replacement

6. Determination of the ultimate plant

7. Preparation of the financial program

a. Estimate of cost

b. Financial condition of the community

c. Method of financing

Moehlman suggests that the survey data may then be organized into report form for presentation to the board of education. The following are his suggestions for chapters:

I. Character of the city

II. The school population

III. The educational policy

IV. The present plant

V. The ultimate plant

VI. Finance

VII. Conclusions and recommendations

The above discussion indicates the thinking of school building authorities at the time of the school building boom of twenty years ago. It may be worthwhile to next examine the more recent literature in order to determine what present opinion is on these same problems. A concise outline is found in a recent publication of the Michigan State Department of Public Instruction.[1]

Determining the Need

> The first phase of the planning process is the determination of the educational need and the development of an ultimate school plant program for the community. This can only be done by a throough and complete school plant survey. The word "survey" need not be a frightening one. The survey really consists in finding out all that one can, in organized fashion, about all of the factors which may have an influence upon the problems, and then forming some conclusions as a result of a study of the facts.

The School Plant Survey

> Space limitations here permit the presentation of only a rather broad survey outline. This should be expanded, revised, and adapted according to the size of the community, the complexity of the problems, and other local factors.

1. THE NATURE OF THE COMMUNITY

   a. What is the natural community service area—— square miles——roads——geography——valuation?

   b. What is the commercial and industrial life?

   c. What is the history of the community, especially in regard to growth, changing industrial and occupational life, public school organization, and development?

   d. What is the nature of the general population——social composition, stability, population trend, age groupings, population density, as shown by spot maps?

   e. What are the possibilities of expansion or contraction of population?

   f. What is the child population——age groupings——per cent in the public school, per cent in non-public school,

[1] Michigan State Department of Public Instruction. A Guide for Planning School Buildings. pp. 20-21, Bulletin No. 338, Lansing: The Department, 1945.

per cent not in school, by age groups---farm and non-farm?

2. THE EDUCATIONAL PROGRAM

a. What should be the extent of the school program?

b. What may be the possible extensions to include younger children and grades thirteen and fourteen?

c. How should the educational program be organized--- K-6-3-3, K-7-3-4, etc.?

d. What should be the pupil-teacher ratio in various parts of the program?

e. What should be the elementary organization, grade rooms or platoon, or modification of both?

f. What are the trends in elementary education?

g. What are the trends in secondary education?

3. THE PRESENT SCHOOL PLANT

The existing school plant should be objectively appraised in terms of safety from fire and panic, health and sanitation, instructional efficiency, utilization, operating efficiency, mechanical efficiency, location, and adequacy of sity. Objective rating devices are available to assist in such an appraisal.

4. THE ULTIMATE SCHOOL PLANT

Having determined the possible demand for school services, the nature and extent of the program and the condition of present buildings, it should be possible to develop an ultimate school plant program for the community. Such questions as the following will need to be answered: Which buildings, or part of buildings, should be abandoned at once? Which buildings can be retained for a few years? Where should buildings be located? What additional sites will need to be acquired? What buildings justify remodeling and modernization? What new construction is immediately necessary? How soon should other needed construction be undertaken?

5. THE FINANCIAL MEANS OF ACCOMPLISHMENT

Many of the questions in the previous section depend upon financial considerations for sensible answers. It is desirable, however, to develop first an ultimate plant program. The speed with which this ultimate goal is reached will be governed at least partially by the financial situation. If the plan is first developed carefully and completely, then each step taken can be

towards the attainment of the ultimate. It should be emphasized that it is better to build only partially, in terms of a total plan and to build well what is built, than to try to build without a plan or to try to build too much by cheapening the entire structure.

Studying the financial means will include a study of present assessed valuation as compared to equalized valuation and actual cash value, a study of present tax rates on property of all governmental units for operating and debt service purposes, possibilities of raising funds in advance by a building and site sinking fund, possibilities of spreading the tax base through school district reorganization, amounts needed for operating purposes, and bonding limitations.

Engelhardt[1] emphasized the cooperation of school officials and city officials in planning the school plant program in order to prevent duplication of facilities. He recommends the following procedure in planning:

Comprehensive School Building Survey

No single school building should be planned except as part of a complete school building survey of the community. Such a study will include the following:

a. Full study of adult and school population with future projections

b. Examination of prevailing school organization and proposals for advancement

c. Analysis of existing plants and decisions covering their future use

d. Proposals for renovation and modernization of buildings to be retained

e. Comprehensive plan of all new buildings that can now be anticipated for future use

f. Integration of school plan with programs as far as they have been proposed by a planning commission or other city departments

g. Preparation of maps, charts and other data for public interpretation and clarification

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[1] Engelhardt, N. L., "Planning the Postwar School Building Program," pp. 12-16, American School and University, XVII, 1945.

h. Recommendations of buildings to be built at various intervals in a long-time program

i. Decisions on immediate planning

The Utah School Plant Conferences[1] held during the summer of 1948 developed an outline of steps to be taken in planning school building programs. The following outline is taken from the report of these meetings:

I. Population

1. Analyze the U. S. census population statistics for the district over a period long enough to show trends. The rise or fall of total population and marked shifts in age composition should be noted.

2. Analyze the accumulated data from the annual school census. Again look for trends. It is helpful to include infants and pre-school age children in the annual census. A fair estimate can then be made of future age-grade enrollments.

3. Make and keep current a spot map of the district showing not only residential dwellings but industrial and commercial units as well. Both single family and multiple-family units should be shown. New construction should be spotted. From the above, the direction of movement and rate of growth or residential areas can be revealed.

4. Note all provisions for future expansion and extension of public services—sewage, water, drainage, street and highway development, telephone lines, and electric power.

5. Give careful consideration to foreseeable industrial and economic changes that may have an effect upon population movement to and from the district as well as within the district.

II. Economic factors

1. Conduct a complete occupational survey of the district. This involves a determination of the number of persons

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1 Campbell, R. F., Developing School Plant Programs, Salt Lake City: Department of Elementary Education, University of Utah, 1949, pp. 76.

employed in each gainful occupation. These numbers should be broken down according to age and sex. Desirable additional data may be gained from employers, e.g. estimate of expansion and future needs. It is helpful to secure a sponsoring agency for the survey. Preferably the sponsor should be a public or semi-public agency in the local community. Much help may be had from such state agencies as the Utah Department of Employment Security.

2. Analyze tax roll data over a period of years to show the makeup and changes in kinds of taxable property.

3. Secure payroll data from the State Department of Employment Security and from local agencies such as the Chamber of Commerce. Analysis of this information will reveal increases or decreases and will point to the factor of stability.

4. Make an inventory of natural resources to indicate the possibilities of new and expanded economic activities. Such state agencies as the Department of Publicity and Industrial Development may be of help both in outlining the inventory and as a source of data.

5. Closely related to the inventory of natural resources is the need for taking into consideration any announced or projected plans for promotional development initiated by federal or state agencies.

III. Land use

1. A map is prepared showing in color how each piece of property in the area is now used—vacant, residential, commercial, industrial, recreational, agricultural, forest, hillside, or waste land not subject to development. The map should also show rivers, swamps, railroads, major highways and other barriers to population expansion or daily population movement.

2. A second map is prepared showing in large blocks the desirable future use of land in the district.

3. The area is zoned—that is, divided into districts for commercial use, residential use, etc.

4. Natural or man-made barriers or boundary streets forming an area more or less one square mile in an urban area are selected to form the boundaries of the "neighborhood."

5. An analysis of the land now in residential use and zoned or recommended for future residential use is made to show the potential total population of the neighborhood and the location of the existing and potential residential areas.

6. The location and size of the school are determined by the population and land use combination.

7. The size of the "neighborhood", and hence the location of the school, will be larger or smaller depending on expected rate of growth, transportation of students, number of families per acre as provided by zoning, and standards of individual school size.

IV. Geographical factors

In determining the number and extent of school plants necessary adequately to serve a school district, it is essential that the geography of the area be given proper consideration. Natural barriers (such as rivers, gorges, or mountain ranges) will in many cases determine one or more of the boundaries of the service area of a single school. Because of safety hazards it would in some cases be undesirable to transport students across such barriers even though it may be physically possible to do so.

Climatic conditions such as ice, snow, wind, floods, and extreme temperatures are in many cases limiting factors. The limitations imposed by excessive distances also require detailed study and evaluation. Transported students should not be exposed to more than the normal hazards of transportation. Bus routes should not require one-way traveling time in excess of forty-five minutes for elementary students or one hour for high school students.

V. Social and cultural characteristics

Further studies may reveal social or cultural needs which can best be provided through facilities included in the school plant. Camp-sites, stage facilities, play areas, amphitheaters, dance halls, libraries art studios, etc., are examples of facilities which may be planned into a school plant after a thorough study and analysis of the community show an existing need.

Gregg[1] lists a number of steps in planning the school building program which agree closely with those of other writers on this subject. The steps necessary for the determination of need are:

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[1] Gregg, Russell T., "Steps in Planning School Building Programs" pp. 23-25, The American School Board Journal, CXVIII, February, 1948.

1. Decide upon a plan for studying school building needs in the community.
2. Carry on studies of pertinent community characteristics.
3. Determine the nature of the educational programs to be housed.
4. Develop administrative policy related to school building problems.
5. Decide upon the boundaries of the various types of attendance areas.
6. Study existing plant and site facilities.
7. Integrate school building planning program with general community planning.
8. Develop the proposed building program.
9. Estimate costs, determine ability to pay, and develop a financing plan.

A number of writers in school plant planning have mentioned the necessity for a "master plan". This is a term borrowed from the city planner's technical vocabulary. Bursch and Reid[1] stress the importance of this type of planning:

> An emerging characteristic of all school building program was the exception rather than the rule; this was also true during the 1930's but to a less extent. During World War II when population figures grew with amazing rapidity and construction was all but stopped by the wartime restrictions most school plants were filled to the bursting point. Not being able to do anything but cope with the situation as best they could on a temporary basis and look ahead to the time when they would again be permitted to build, many districts realized for the first time where their unplanned programs of the past had led them; they found themselves with an educational plant which had grown piecemeal for years, finally reaching a point where their plant was functionally unsuitable and represented varying degrees of wasted capital outlay resources. Many of these districts had the vision to see where similarly unplanned future building programs would lead them; this had much to do with the establishment of the long range plan as an instrument of building policy. Long range planning became even more firmly established by a growing scientific attitude toward all

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1 Bursch, Charles Wesley and Reid, John Lyon, You Want to Build a School? pp. 43-46 New York: Reinhold Publishing Co. 1947.

matters of school house planning and construction.

The master plan is a complete comprehensive and long range plan made by a school district to meet the anticipated growth of a school system over a period of years. It must be flexible enough to allow for unforeseen contingecies. It must be regarded as a document of considerable authority and yet it is not so sacred that it cannot be revised if changed conditions seem to warrant it. When adopted by the governing board of a school district it serves as an instrument of policy to guide all future building programs as long as it remains in force. Each school plant knowing beforehand through its master plan, what its ultimate shape and size is to be can grow slowly into it with the assurance that there will be none of the usual characteristics of unplanned growth.

There are usually the following four major parts in a master plan:

1. Recognition and evaluation of the school district's needs. Involves mature thinking and judgment in long range terms and goes much farther than "four classrooms are needed right away and after that we will sit tight and see what happens".

2. The declaration of educational policy which grows out of a study of the needs of the district; briefly it is a statement of how the district intends to do its job of educating and consists of policy decisions regarding grade group organization, school plant locations together with the areas served by each, administrative and district organization, curriculum content, the districts attitude toward community activities and other closely related matters.

3. The architectural master plan which furnishes a scheme for housing the needs and requirements voiced in the preceding parts.

4. A long range financial plan to provide the funds for the building programs as they are needed.

Summary

1. The analysis of the recent literature in the field of school plant planning indicates but little change in thinking regarding the major items to be included in the studies needed in planning a school building program from the outlines proposed by Caswell or Moehlman some twenty years ago.

2. The consensus of the writers on this seems to be that the essential

parts of the school plant survey should be:

a. The nature of the commmunity.

b. The educational program.

c. The school population.

d. The analysis of the present school plant.

e. The ultimate school plant.

f. The financial plan.

3. Each writer stresses one or more parts of the survey and tends to neglect the other portions.

4. There is a marked similarity between school plant planning, city planning, and general social planning. School plant planners may profitably examine planning procedures used in other fields.

5. Planning may be said to consist of the following processes:

a. The inventory of present conditions.

b. The setting of goals.

c. Devising a program of action to achieve the goals.

CHAPTER III

A STUDY OF RECENT SCHOOL PLANT SURVEYS

Additional information on the problem of determining school plant needs may be secured through examination of school plant surveys recently completed. The great contribution of the survey movement in education has been the bridging of the gap between theory and practice. The college professor of education has been brought to the field to help diagnose and solve the difficult practical problems encountered by the school administrator. The school administrator has on the other hand been brought up to date on the research findings and recent theories of the university schools of education. Caswell expresses this point of view when he writes:[1]

> The survey has served to relate the work of the educational expert in schools of education and state departments to individual local school systems. The problems of the field have been brought to the professor of education and educational theory and methods have been carried to the field. Through this interaction a considerable body of scientific administrative standards and methods of measurement has developed.

Building surveys may be made separately as the preliminary step for preparing for a building program or they may constitute a portion of a comprehensive survey of a school system. Good, Barr and Scates have this to say regarding building surveys:[2]

> They normally embrace an appraisal of the existing school buildings as a basis for determining what buildings should be rehabilitated or replaced at once and for estimating when other buildings should be rehabilitated or replaced at once and for estimating when other buildings will need to have additions, extensive repairs or replacements . . . . . .
>
> A second important element of a building survey is the estimation of present and future needs. This step involves a study of the present utilization of buildings to ascertain how completely

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[1] Caswell, op. cit. p. 81

[2] Good, Carter V., Barr, A. S., and Scates, Douglas. The Methodology of Educational Research, p. 462-463. New York. Appleton-Century Company, 1936.

> the existing plant is filled and it involves a prognostication as to the general population growth of the city as well as an estimation of the growth in school population. Further, an estimation of the direction in which cities will extend and of the growth in population density in various parts of the city is necessary in order that specific recommendations may be made as to location of new buildings. The recommendations must, of course, be made with consideration of the present plant, the ultimate plant that is thought to be desired and the financial program that will be required.

The school building surveys to be briefly reviewed were chosen because of their recency, the fact that they were made by experts in this field who hold different points of view, and are representative of techniques applied to cities of different sizes.

The outcome of this chapter is the formulation of an outline which presents the important points covered by a representative group of school plant surveys made by recognized authorities in this field. The outline of topics covered, the list of tables included, and the list of charts presented in each of these studies are included in the appendix. The inclusion of this somewhat voluminous array of data is believed to be necessary in order to justify the composite list formulated in a later chapter. It is assumed that the common areas studied in each of the studies represent essential topics which should be included in any similar survey or study.

Method of selection

The surveys selected to be analyzed were all completed during the last ten years and thus present the best current opinion regarding information to be included in studies made to determine school building needs. The six surveys outlined represent the work of five different institutions and thus probably avoid duplication of any single point of view. Although two of the studies were conducted under the auspices of the Institute of Field Studies

of Columbia University, they represent the work of different directors and emphasize entirely different approaches to the problem.

The basis of selection of the survey reports chosen for review then was recency, availability in printed or mimiographed form, representation of differing points of view, and consideration of techniques to be applied to cities of different sizes.

Reports selected for analysis

A brief statement regarding each report is included to familiarize the reader with the author and the report.

1. Hill, Clyde M. and Brownell, S. M., Directors. Report of the Co-operative Study of the Public Schools of Lincoln, Nebraska. Lincoln: Board of Education 1947. pp. XLV + 867.

This is a comprehensive educational survey covering all phases of Lincoln's educational program. The section on "The Physical Plant" was written by Calvin Grieder, Professor of School Administration at the University of Colorado and the section on "Finance" was written by Leslie C. Chisholm, Professor of School Administration at the University of Nebraska. The directors of the study are professors of education at Yale University.

2. Holy, T. C. and Herrick, John H. A Survey of the School Building Needs of Cincinnati, Ohio. Bureau of Educational Research Monograph No. 28. Columbus, Ohio. Ohio State University, 1945. pp. 184.

Building need is the sole concern of this report which was made just prior to the beginning of a huge school building program estimated to cost at least $21,500,000. The first bond election was held shortly before the

completion of the final report and resulted in the approval of the issuance of $16,000,000 worth of bonds. The report was a joint project of the research departments of Ohio State University and the Cincinnati Public Schools. T. C. Holy was Director of the Bureau of Educational Research at Ohio State University and John H. Herrick was Director of Research, Cincinnati Public Schools at the time of the study.

3. Linn, Henry H., Director. Report of the Survey of the Plant Facilities of the Public Schools of Worcester, Massachusetts. New York: Teachers College, Columbia University, 1949. pp. xviii + 346.

This study was made by members of the professional staff of Teachers College, Columbia University and represents a survey of building needs made by "outside experts." It is a complete study of building needs and also deals with standards of operation and maintenance as well as the building service personnel. Henry H. Linn is Professor of Education at Teachers College.

4. Moehlman, Arthur B., and VanZwoll, James A. The School Plant Needs of the School District of the City of Port Huron. Port Huron: Board of Education, 1942. pp. xii + 254.

Arthur B. Moehlman was Professor of Educational Administration at the University of Michigan at the time this study was made. James A. VanZwoll, now Professor of Education at the University of Maryland, was a graduate student at Michigan. The study completely analyzes the building needs of Port Huron, Michigan and recommends that the school district be expanded to include the present boundaries of the natural community. All factors relating to building need are considered in determining the most desirable school plant program for the city. All of the survey work and report

writing was done by the two authors.

5. Strayer, George D. and Engelhardt, N. L. The Report of a Survey of the Public Schools of Newark, New Jersey. New York: Bureau of Publications, Teachers College, Columbia University, 1942. pp. xviii + 581.

These authors were pioneers in the school survey field and developed the first score card devised for evaluating school buildings. This comprehensive study of the entire educational program of Newark includes sections on the "School Building Program" and "Financing the Schools". The authors each held the title of Professor of Education at Teachers College, Columbia University at the time this survey was made.

6. Survey Report, Battle Creek Public Schools, Battle Creek, Michigan. Committee on Field Services, Department of Education, The University of Chicago. Battle Creek: Board of Education, 1945, pp. viii + 453.

This comprehensive survey of the Battle Creek School system was made by the Department of Education of the University of Chicago with the assistance of a number of additional consultants from other institutions. It was essentially a survey made by outside experts. The section on "The Battle Creek Community" was prepared by Newton Edwards, Professor of Education at the University of Chicago. The chapter on "School Sites and Buildings" was written by William C. Reavis, Professor of Education and Chairman of the Committee of Field Services of the University of Chicago. He was assisted by Selmer H. Berg who was Superintendent of Schools at Rockford, Illinois. Nelson B. Henry, Professor of Education at the University of Chicago wrote the chapter entitled "Financing the Schools".

Methods used in making the surveys

Four of the surveys presented were made in the classic survey manner. A committee of university professors visited the community, secured the cooperation of local persons in obtaining documentary information regarding the status of the schools, visited each school building to secure additional information through first hand observation, then prepared an analysis of the school building needs and recommendations for meeting these needs. The report was then prepared on the basis of the comparison of the present status of the school plant with nationally accepted standards.

In the case of the Cincinnati survey, the survey staff included three members of the research department of the Cincinnati Public Schools. The Battle Creek survey and the Lincoln survey were comprehensive surveys involving a large number of consultants in addition to the directors and staff members of the universities conducting the survey. In each of these two studies, the school plant section happened to be prepared at least in part by persons not on the staff of the university making the study. The Newark report was made under the direction of Strayer and Englehardt of Columbia University who have made more surveys than any other persons in the field. Incidentally, this report represented one of the last surveys made by this famous team.

The Port Huron survey was made by Professor Arthur B. Moehlman of the University of Michigan and his graduate student research assistants. They had the complete cooperation of the superintendent and his staff who needed the information obtained through the study in order to prepare for a building program. This survey was a study of building needs.

The study made by Henry Linn was concerned with the school plant facilities of Worcester. Linn was assisted by six members of the profess-

ional staff of Teachers College, Columbia University.

The surveys studied thus, consisted of three building need surveys and three surveys of the comprehensive type which consider plant facilities as only one aspect of the total school problem.

Plan for analyzing the surveys

After considerable experimentation with the data the following plan was devised for reporting the similarities and differences in the six surveys:

1. A detailed outline of each survey was made including a list of all tables, graphs, maps and charts. These outlines are found in the appendix of this report.
2. A comparative analysis of the six studies was made discussing the points of similarity and difference by topics found to be common to most of the surveys.
3. The major topics of the analysis are (a) the nature of the community, (b) the school population, (c) the school program, (d) the present school plant, (e) the ultimate school plant, (f) the financial means of accomplishment.

The surveys will be discussed in detail according to the above plan.

THE NATURE OF THE COMMUNITY

An examination of recent surveys made by university school of education staff members indicates that the essential parts of this section of a survey are as follows:

1. General characteristics and growth of the city
   a. History
   b. Economic and social considerations
   c. Transportation facilities and governmental organization
2. Population
   a. Estimated present and future populations
   b. Composition of population
3. Housing characteristics
   a. Density and residential construction
   b. Home ownership
   c. Zoning and traffic thoroughfares
4. The natural community

Each of these topics will be briefly discussed:

General characteristics and growth of the city

This section answers the questions such as: "What factors caused the city to grow where it did and how it did? What major economic activities account for its growth, are the foundations of its present existence, and will likely condition its future? How much may the city be expected to grow in the next generation or two? What are likely to be the amount and character of this growth in various parts of the community and the surrounding area? What are the composition and characteristics of the population and what changes may be expected to occur in the near future?"[1]

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[1] Local Planning Administration, International City Managers' Association, p. 59. Chicago, 1948.

These are only a few of the many questions to be answered as the planner attempts to adjust the plans he is to prepare to the individual requirements of the community.

If it is to be effective, the school should not be a pedagogical island in the community. This necessitates considering the background of the community. This information can be secured from the public library, the Chamber of Commerce, real estate boards or local historians. "Sound planning must be preceded by a searching inquiry into all facts, trends, and forces —— the historical background, past developments, present conditions and future prospects —— that have influenced and are likely to shape the future development of the community."

History

Some surveys include a rather detailed history of the community being studied as is found in the Port Huron Survey conducted by Moehlman. The trend, however, judging from the surveys examined, appears to be in favor of eliminating the history of the community from the report or limiting it to a very brief treatment. Indeed, Moehlman himself makes no mention of the history of the community in his study of Niles, Michigan, made in 1947. He limits his discussion in this area to (1) economics (2) transportation (3) government (4) social organization and (5) land use. If a survey is to consider the historical aspects, it might be well toemphasize the economic activities which account for the past growth of the community.

Economic and social considerations

The majority of the surveys examined made some reference to the economic life as it might affect the growth of the city. Holy and Herrick merely list the products of the Cincinnati industries. They do, however, describe the topography of the city as the rugged terrain and separate

municipalities within the city have complicated the location of school buildings.

Moehlman considers the following topics in this area worthy of some discussion in the Port Huron survey: industry, natural resources, retail trade, pruchasing index, postal receipts, communication, labor and power. He describes societies and churches under social organizations.

Linn does not include economic and social considerations in his study of Worcester, Massachusetts, except as they receive incidental mention as he discusses population. In his introductory statement he mentions the chief industries, per capita savings, recreational facilities and educational institutions other than the public school system.

Newton Edwards develops these topics rather fully in his comparison of the cultural-economic index of Battle Creek with that of other communities. He also reviews the economic and industrial patterns by listing the industries and their products and tabulating by occupational groups, the placements made by the United States employment service.

Strayer and Engelhardt discuss geographical limitations, but do not attempt to analyze the economic and social background of Newark.

Grieder in his study of the building needs of Lincoln, Nebraska, is concerned with economic and social considerations as they may affect the growth of the city. He briefly discusses employment prospects and civic opportunities such as colleges, universities, hospitals, transportation facilities, etc.

City planners[1] suggest that the community survey should include some mention of the major public and private institutions such as schools,

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[1] Action for Cities: A Guide for Community Planning, pp. 10-12, Public Administration Service Pamphlet No. 86 Chicago: Municipal Association, 1943

hospitals, libraries, museums, parks, churches, etc. They also recommend inclusion of a description of the community organization, describing briefly the council of social agencies, the community chest, citizens councils, service clubs, neighborhood groups, etc. Another important area to be treated in this section is the personality of the city comprising the local traditions, local aspirations, and community spirit.

Transportation and governmental organization

Moehlman's report is the only one of the group which specifically considers these topics except as they are mentioned in connection with other incidental items. Most reports of this type are concerned with the location of railroads and main thoroughfares as they affect school building location which is another problem. Certainly transportation has a bearing on the growth of a city. Mention should be made of the major air, rail, road and water ways leading into the city. Transit within the area and parking facilities have an influence on the growth of a city as too much congestion results in persons seeking less congested areas in which to live.

Governmental organization affects a community in a very direct manner and thus should be included in any attempt to describe the nature of the community. Topics to be described are the municipal administration, the independent boards and agencies, the political background which may bear on the situation and the degree the municipal government is related to the county and state governments.

Population

Each of the studies devotes considerable attention to the problem of population. City planners recognize the importance of population studies. "Making a study of the population is essential to an understanding of the

needs of a community, its growth, its activities, its services and its layout. Population data are needed to understand the past and to foresee the future, to know the number that can support the community or must be supported by it."[1]

There are a number of sources where population information may be secured. The U. S. Census reports are used by all planners as source material.

Estimated present and future populations

The problem of estimating populations is a difficult one, but refined techniques are now available which enable more accurate predicting than was formerly possible. Each study compares the population by ten year intervals for the city, the state, and the United States. It is customary to compare the percentage increases of each of these governmental units in order to determine whether or not the community is growing at the same rate as the larger units. Comparison with the growth of other cities in the region is also useful in analyzing growth possibilities.

An examination of the tables constructed by the various survey staffs gives some indication of the type of information essential for these estimates. Hoehlman included in the main body of his Port Huron report, tables comparing the Port Huron and Michigan birth and death rates from a sixteen year period. He also included tables on territorial growth and population density and the growth of the cities population by decades over the past eighty years. The appendix of his study contains tables on Port Huron total births and deaths and rates per 1000 of population; marriages in St. Clair county by years; native and foreign born white,

1 Action for Cities: A Guide for Community Planning, op. cit. p. 14.

negro and other males per 100 females; females in Port Huron by age groups; and Port Huron population by age group classifications 1920-1940. He finally discusses future growth in the light of stimulating factors and depressive factors.

Holy and Herrick present tables showing the population of Cincinnati by decades over a period of 130 years; the indexes of population of Ohio cities with populations of 100,000 or more by decades; the percentage of total population under five years of age and over forty-four years of age in Ohio cities; population of Cincinnati by age groups; and live births and deaths of actual residents of Cincinnati 1925 to 1943.

Each of the other surveys contain similar information in the form of either figures, tables or maps with the exception of the Battle Creek survey which reviews the census figures from 1870 to 1940 and makes an estimate of the population at the time of the survey by means of the ration book registrations.

Grieder makes a most detailed study of the possibilities of population increase in Lincoln, Nebraska, using three different methods. The first method was the Pearl-Reed formula $y_n = \frac{1}{a + bc^x}$ where y_n is the population and 'a' 'b' and 'c' are population figures for three past census years. The second method was the survivorship plan which applied fertility and mortality rates to the last census reading. The third method was the commonly used "past trend" method which assumes that future growth will follow a pattern similar to past growth. Where the various methods indicated that the assumptions might be questioned, alternative assumptions were made and two sets of predictions were produced. Each of the five sets of estimates were graphed on the same pair of axes and the project

estimate curve was drawn, which was a composite of the other curves.

Apparently there is no generally accepted method for estimating the future population of a city. Estimates made as a part of school building surveys probably have sufficient value to be included in these studies, but must be accepted as only tentative and not accurate forecasts of the future population of the city.

Strayer and Engelhardt consider the reasons contributing to the population decline in Newark. They also study the increase in Negro population and population changes by sections of the city. The population trends for each section of the city are carefully plotted. This same method is used by these writers in their study of the school population which will be considered later.

Linn studies population trends with particular interest in the trends of Worcester (City), Worcester (County), Massachusetts, and the United States. He also studies the population trends by wards and relates population shifts to school membership. His estimate of the future population to 1970 appears to be based on the past trends and his knowledge of local conditions and the general factors which influence community growth.

Composition of population

The surveys examined generally analyzed the census reports to determine the racial composition and the age group distribution of the population. Tables are commonly constructed to indicate the census report findings of the last few decades. Moehlman has a table showing the Port Huron population composition in the main part of his report and includes tables on native and foreign born white, negro and other males per 100 females; Port Huron population by age group classifications; females in Port Huron by age groups; foreign born white by country of birth; and

population by sex and by parentage. Each of these tables gives information for the past thirty years.

Holy and Arnold include a table on the characteristics of the population in large Ohio cities in 1940 which indicates the percentage of total population which is native white, foreign-born white, and Negro. A similar table compares the percentages of total population under five years of age and over forty-four years of age in the same cities for the past sixty years by twenty year intervals. A third table indicates the population of Cincinnati by age groups over the same period of time.

Linn considers the characteristics of the local population in terms of racial composition, educational level, and the percentage of business and professional workers compared to similar figures for the state of Massachusetts. He feels that the number of business and professional people living in a community is indicative of the community's potential and capacity to produce a high grade educational system. All of these items of information may be obtained from the United States Census reports.

Strayer and Engelhardt are particularly concerned with the study of the population changes by sections of the city. They analyze the composition of the 1940 population of each section of the city by age group and race. Theyconfine their presentation largely to a narrative discussion although a careful analysis of each section of the city compares the per cent of population change over the past decade, the composition of the 1940 population by age group and race, the residential saturation and the population trend of the district. This procedure seems to be particularly well adapted to larger cities of 50,000 population or more as each city is made up of neighborhood communities having totally different characteristics.

Excellent suggestions for this part of a survey are found in the Public Administration Service publication "Action for Cities".[1] The need for additional facts besides the number of people is stressed. The most important of these facts are:

1. Age and sex composition
2. Minority groups: Data on race and origin
3. Health: Balance between birth and death rates
4. Education: Index of cultural level of the community and is significant as an economic index
5. Occupations: Tabulations of employed persons 14 years of age and over by employment status, class of work, industry group and sex

Housing Characteristics

The topics generally considered under this heading are those which indicate land use and those which relate to the number of children a given area will produce. "As industry expands and commercial areas expand, existing schools in those areas tend to lose their enrollments, the school environments become noisy and undesirable and replanning of school facilities in new residential areas becomes necessary. The school building facilities of a large growing city are thus constantly in a state of flux."[2]

Density and residential construction

Density figures are usually reported by the number of persons per square mile for large areas and the number of persons per acre for small areas. These figures when available by wards, census tracts, or school districts give valuable information regarding populations shifts. Moehlman has a table on territorial growth and population density, while Holy and Arnold use maps to show the change in total population by census tracts.

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1 Action for Cities op. cit. p. 16

2 Engelhardt, N. L., "The School Building Survey of San Francisco, California" p. 41, The American School Board Journal CXVII (October, 1948)

Linn compares the population, land area and density of ten New England cities and finds that Worcester ranks eighth with an average density of 5,056 persons per square mile. Strayer and Engelhardt discuss building saturation and density of Newark. They also include residential saturation as one of the items in their analysis of each school district.

Residential construction is included in Linn's study of Worcester and in Grieder's study of Lincoln, Nebraska. Linn lists the number of dwelling units erected by intervals of five years or more back to 1859. He also introduces a map showing residential structures built since 1940. This information is valuable in that it shows which sections of the city will probably need new elementary schools or additions to existing schools. Moehlman includes new construction in his section on land use. He also discusses built up and vacant property. Grieder refers to new construction only as an aid in estimating the future population of Lincoln.

Density and residential construction are valuable factors to consider when available by wards, census districts, or elementary school attendance districts as they indicate areas of sparce population and crowded residential areas; information regarding residential construction locates areas of recent rapid growth.

Home ownership

Linn is the only surveyor who includes home ownership in his study. He asserts that the relatively low percentage of home ownership in Worcester has many implications such as that many of the residents may have no serious interest in community improvement and may readily move from the community if more favorable conditions await them elsewhere. Communities with a high percentage of home owners tend to be more stable and make better use of their resources.

This type of information is available by wards and blocks in the United States Census Report on housing.

Zoning and traffic thoroughfares

The city zoning map shows the industrial, business and residential areas of the city and is helpful in locating sites for schools in what will probably be residential areas. Linn's study is the only one of the six which includes a city zoning map and a map showing the main traffic arteries. Moehlman considers each of these topics under the heading of land use. Certainly information regarding major traffic thoroughfares is essential in planning the location of elementary school buildings and in establishing school attendance districts. Information on zoning should be included in studies which deal with the city by residential neighborhoods or school districts.

The Natural Community

The concept of the natural community is one which has developed as a result of the trend toward the consolidation of rural school districts and the progress in the area of transportation. Certainly there is common sense in bringing the children living beyond the boundaries of a city into the city for school, if the city school, because of its size, can offer a superior program at lower cost than the limited program available at the one room school in the country.

The families living just outside a city generally come into the city to work and to do their shopping. They are really part of the community and the boundary of the city represents an artificial barrier. Moehlman has emphasized the natural community in each of his later surveys and perhaps has magnified its importance. He reviewed previous studies relating to the Port Huron School Community Planning Committee and the

expansion of the present school district to include the present boundaries of the natural community. Holy and Arnold at the other extreme did not even discuss the possibility of absorbing the school systems of the independent municipalities lying within the corporate limits of the city of Cincinnati. Linn makes no mention of any school outside the city limits of Worcester. Edwards considers the natural community in his study of Battle Creek with particular emphasis upon the trading area served. He points out that there are twenty-three school districts in the four townships in which the city of Battle Creek is located and points to the number of non-resident pupils in the Battle Creek Schools as evidence that families beyond the city limits are willing to use the city schools. He recommends the establishment of an educational council representing the larger community to point the way to cooperative action in the solution of educational problems.

Strayer and Engelhardt consider possible annexation but do not make a detailed study of the natural community. Grieder does not consider serving the educational needs of the area beyond the city limits of Lincoln.

The consideration of the areas contiguous to the legal limits of the school district or city is a particularly important factor in the case of cities surrounded by a group of fringe communities. Since these satellite communities are often annexed by the city, failure to include them in determining school building needs can result in expensive duplication of school facilities. Those areas or regions which are intimately connected with the city and its future must be included in the planning. City planners[1] recommend that this larger metropolitan community be studied

[1] Action for Cities, op. cit.

by means of maps showing the metropolitan district as defined by the Census Bureau, telephone rate zones, newspaper home delivery areas, retail delivery service areas, and areas served by central utilities. Geographical features such as rivers, mountains, and drainage areas should be carefully studied as they often affect the boundaries of the natural community.

Figure 2 illustrates the concept of the natural community more clearly than it can be developed through a detailed explanation.

In general, it should be emphasized that boundaries of a school district are not necessarily coterminous with the political boundaries of the municipality in which the school is located. Consolidated school districts are becoming more numerous each year testifying to the advantages offered by larger school districts. Natural communities are constantly expanding as growth takes place at the outer or fringe areas and efficient planning cannot wait for annexation before preparing to meet the educational needs of all the people who make up the community and who depend on it for services and benefits.

THE SCHOOL POPULATION

All surveys include a study of the school population. The study commonly attempts to analyze the present and past enrollment records in order to determine trends which will affect the future. The purpose of this analysis is to ascertain "as accurately as possible the future school enrollment and the distribution of that enrollment among the major divisions of the school system."[1]

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[1] American Association of School Administrators, American School Buildings p. 50, Twenty-Seventh Yearbook. Washington, D.C.: the Association, a department of the National Education Association, 1945.

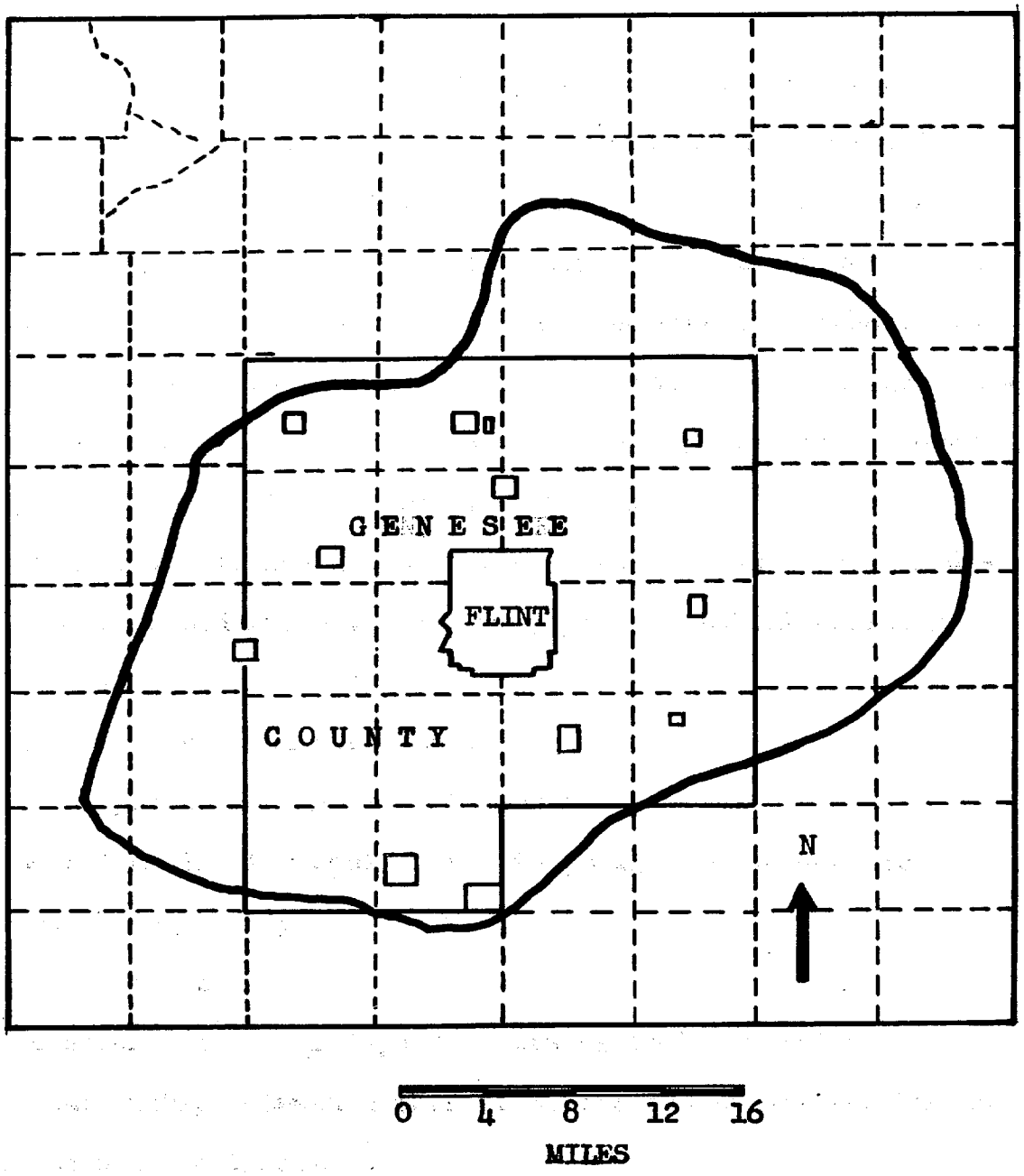


FIGURE 2. THE NATURAL COMMUNITY AREA OF FLINT, MICHIGAN[1]

Based on studies of department store, apparel store, and newspaper areas of dominance combined with a study of commuting habits of the population in towns surrounding Flint.

1 — Dunlap, Marian Elisabeth. The Urban and Metropolitan Status of the City of Flint. Social Science Research Project, University of Michigan, February, 1948. Pp. 23.

A number of methods of predicting school populations have been developed. These are: (1) Forecasting school population from total population which assumes a fairly constant ratio between total population and school age population. (2) Forecasting by growth curves which assumes that the proportion of the total population attending schools in comparable communities will be similar. (4) Forecasting by the survivorship method which assumes that the average per cent of survivorship over a period of years represents the future survivorship.

An inspection of the topics listed for each of the six surveys indicates that the major considerations for this part of a school building survey might well be:

1. Past school census and membership
    a. Total population and school census
    b. Relationship of school census to public and non-public school membership
2. Birth rate trends
    a. Relationship of marriage rate trends to birth rated
    b. Relationship between number of births and school enrollment
3. Future school enrollment
    a. Estimates based on birth rate trend
    b. Estimates based on school census estimates as related to total population estimates
    c. Estimates of enrollment by school divisions

<u>Past school census and membership</u>

The review of the records of past years in census and membership is valuable in determining major trends regarding the school population growth or decline. The school census figures reveal the potential school

membership and indicate whether the community may need more classrooms or fewer. Some state studies have developed estimates on the basis of classrooms needed, some on the basis of children for whom facilities are needed and some on the basis of the money needed to provide adequate school housing facilities. The problem of determining school plant needs on the local level must make estimates in each of these areas but invariably begins with the attempt to determine how many children must be housed?

Total population and school census

A definite relationship exists between the school census and the total population. Moehlman studies carefully the relationship between these figures in the Port Huron Survey as Grieder does in the study of Lincoln. A valuable technique here is to determine what per cent the school census is of the total population and to use the estimates of total population to predict school census for the future. Edwards compares the trends in school census and total population in the Battle Creek study but does not introduce a table as do the two previously mentioned writers. He also compares the number of children and youth (five to nineteen) per thousand adults in the productive age group (twenty to sixty-four) for two different census years.

Holy and Herrick present tables showing the average daily membership over the past twenty years by five year intervals. They reduce these figures to index numbers in order to show the trend more clearly. Index numbers are also used by them in studying the average daily membership by grades over the twenty year period and here again data is presented for five year intervals. The same technique is used in the table on trends in average daily membership in the first six schools which studies

individual schools.

Linn shows the average number of pupils on public school rolls for a twenty-seven year period. He also has a table on school attendance by age groups for the city of Worcester taken from the 1940 U.S. Census Report. He introduces tables showing the grade distribution of pupils for the city and for each school. His school analysis sheet includes a table showing the average enrollment record over the past fifteen years and a graph showing the average enrollment trend and projections for the future.

Strayer and Engelhardt confine their study to the analysis by district, which groups the schools of a certain district of the city and studies the enrollment and average daily attendance record.

Relationship of school census to public and non-public school membership

Moehlman compares the school census and school membership figures over a period of years in order to find relationships which may be used to determine future membership. Grieder compares the average daily attendance of each school division to the school census figures presumably for the same reason.

Only Moehlman and Linn introduce information regarding the non-public school enrollments. The growth of membership in non-public schools is expected to have an increasing effect upon public school enrollment and certainly records relating to this factor should be included. A clear picture is obtained with a table showing the actual numbers enrolled and the per cents of the total school age population enrolled in public schools, enrolled in non-public schools, and not enrolled in any school.

Moehlman includes tables on acceleration and retardation but these data are not included in the reports of the other surveys. He also includes

age-grade reports for public and non-public schools. This information is not included in other surveys and may thus be considered as non-essential data.

Birth rate trends

Recent surveys include considerable material relating to birth rate trends. Linn and Grieder use birth figures to estimate future school enrollment or school census. However, attempts to forecast the number of births that will take place during future years in any given community probably will not produce important results as such efforts must be based upon technical factors, generally ignoring economic factors and influences such as wars, continued threats of war, depressions, technological advances, and similar phenomena which cannot be accurately predicted.

Relationship of marriage rate trends to birth rates

Some investigators seek to predict the number of births through studying the number of marriages. This probably is a fairly accurate method of securing advance information on births as more marriages should produce more births, while a sharp drop in the number of marriages probably results in fewer births. Moehlman includes a table giving the marriages in St. Clair county by years. The most satisfactory method to study this relationship is by means of a table showing the marriages and births of a city by years. Since the marriage must precede the birth by a year or more it is possible to determine the ratio of births to marriages and make a prediction for a year or two ahead that should be relatively accurate.

Another method of estimating births is to establish the relationship between the number of births and the number of women in the community in the childbearing age from fifteen to forty-five years of age. None of

these writers use this method.

Relationship between number of births and school enrollment

The rapid changes in birth rates taking place during the decade from 1940 to 1950 came as a result of the unusual war-time conditions. Moehlman, Edwards, Strayer and Engelhardt, and Holy and Herrick do not attempt to forecast the future school enrollments from the number of births, but Grieder and Linn study the relationship between the number of children born in a given year and the number entering kindergarten five or six years later. This is the method Linn uses in his study of Worcester. He found that the kindergarten enrollment averaged seventy per cent of the number of births five years before from the experience of the previous eight years and he was able to use this to forecast future enrollments.

Grieder introduces a table showing the effect of the birth rate on school census in which he assumed that the number of births would increase until 1946 and would then decrease until 1950 when the number of births would equal those occuring during 1938. His basis for such an assumption was a bulletin on population growth published by the Metropolitan Life Insurance Company in 1946, which stated that the birth rate (of the United States) was expected to remain high for the next year or two and then decrease to about the prewar level. This has proved to be an erroneous assumption as have those made by population specialists to the effect that the increase in birth rate during the war period and immediately thereafter would be followed by a decline.

Joseph S. Davis[1] writing a criticism of the population forecasts

1 Davis, Joseph S., The Population Upsurge in the United States, pp. 37-38 War Peace Pamphlet No. 12 Stanford: Food Research Institute, Sanford University, 1949.

which have proved to be incorrect for this period says, "If any speculative investor had been led so far astray by forecasters on whom he relied, he would be bankrupt. If any businessman had been so misled by forecasts of business conditions he would put no further trust in them. Surely the time has come for us to admit that our best population specialists cannot make dependable forecasts of our population for five or ten years ahead. We must quit demanding the impossible of them. Rather we should insist that a competent team or teams of social scientists analyse the reasons for this amazing upsurge, elucidate the errors that led to the false forecasts and re-examine the whole basis of analysis and forecasting.....

"What has just been said applied to forecasts of the total population of its age composition, and of births, all of which are vitiated by the demonstrated inability to predict births."

It is because of this inability to predict births that most school building surveys do not attempt to predict future school populations with any degree of certainty. Grieder makes separate estimates assuming low, medium, and high fertility after the manner used by Thompson and Whelpton. It may be safe to project five years ahead on births, but even for this modest attempt to foretell the future, careful consideration must be given to economic factors which may suddenly cause a decrease in the number of marriages occurring in the community or may cause families to enter or leave the community in large numbers.

An estimate of the births that will occur in a community for each of the next five years may be made by inspection of the number of births recorded for each of the past ten years and inspection of the annual record of marriages. In general, the marriage record gives some indication

of what may be expected in births for the next two years, for while each marriage does not immediately result in a birth, it may be safely assumed that an increased number of marriages will result in an increased number of births. This estimate of births to come during the next five years plus the school census records on the number of pre-school age children make possible an estimate of the school membership of the community for each of the next ten years.

Future school enrollment

The techniques of arriving at estimates of future enrollments have not been refined to any great extent and can be challenged regarding their accuracy. Regardless of the possible inaccuracy of such estimates, they are essential information for advance planning in terms of building needs and thus must be attempted.

Estimates based on birth rate trend

Information on state, regional, and national birth rate trends enable the planner to make reasonably accurate forecasts particularly when he has a thorough knowledge of local conditions and trends. Estimates for a single community are much more difficult to make accurately than are estimates for a state, region, or nation as estimates of larger units tend to introduce compensating errors which often cancel out over or under-estimates resulting from the growth of an industry, war-time displacements, or population shifts caused by a depression.

Most attempts to predict future school enrollment involve some reliance upon birth rate trends. Holy and Herrick noted that the annual number of resident live births in the city increased by fifty per cent between 1933 and 1942. They assumed that the pattern of the first World War period would be repeated, that a high point in births would be reached

in 1947 followed by a gradual decrease. Their school membership predictions are based upon this assumption.

Grieder constructed a table showing the surplus of babies over previous years increasing to a maximum for the years 1943 through 1946, followed by a rapid decrease to pre-war level for 1947, 1948 and 1949. These figures showing changes in numbers of births were then translated into census figures, then into average daily attendance figures for the elementary school and finally into average daily membership figures for the junior high school. The results showed an increase in elementary school enrollment to a maximum in 1952, 1953 and 1954 as changes in number of births produce corresponding changes in the kindergarten enrollment five years later. Grieder's procedure is standard practice in predicting school enrollment, but his technique differs in his computation of surplus births over those of the previous year.

Linn made a detailed study of birth rate trends in the United States, Massachusetts, and Worcester. He pointed out that enrollments can be forecast with a fair degree of reliability for five years ahead as all the children who will be enrolled up until that time are now born. He estimated the number of births for future years by assuming a slow increase in the total population and a decreasing birth rate. He next computed the average for a nine year period of the ratio between kindergarten enrollment and the number of births occuring five years previously. Finally he determined the ratios between enrollments in successive grades from kindergarten through the twelfth grade. Using these figures and the estimates of births he constructed a table showing the enrollment by grades from 1948 to 1960. This is the previously mentioned "survivorship" technique.

Moehlman's estimates of the future demands in terms of school population were not based directly upon birth rate trend, but rather upon composites of all factors and especially upon the Port Huron total population estimates.

Estimates based upon school census projections related to total population estimates

The United States Census material and the school census enable estimates of the school enrollment to be made when records for a long period of time are studied. It is desirable to construct a table showing the relationship between the school census and the total population over a period of at least twenty years. This will enable predictions of school census to be made from any available forecasts of total population. Moehlman presents a chart showing the relationship of the school census to the total population in his Port Huron study. He and the other survey writers apparently make their predictions of future enrollment on the basis of the most recent trends apparent when the total population, school census, and school enrollment records are compared for a period covering the past twenty years or more. This technique, if it is to be refined more than mere inspection, involves expressing the relationship between the total population and the school census as a per cent and the ratio of the school enrollment to the school census as another per cent. These per cents may be averaged for a five or ten year period in order to secure a figure to use in making the forecast or if a definite trend of increase or decrease is discernible it may cautiously be projected. Estimates secured through this technique may be checked against those obtained by application of the "survivorship" method previously described.

The weak link in this process is that generally it is as difficult to project total population as it is school census, or for that matter, school enrollment itself. However, many agencies are interested in total population forecasts and such estimates may often be secured from city planning departments, water bureaus, utility companies, telephone companies, post offices, real estate offices and Chambers of Commerce. While all of the forecasts made by such agencies may be inaccurate they provide a means of validating the estimates made by the school plant planner.

It is desirable to include a study of the growth of non-public schools in this part of the survey as an increasingly large segment of the total school age population are being educated in such schools. A study of school enrollment of schools in the county, but beyond the city limits may provide pertinent information.

Estimates of enrollment by school divisions

Linn and Grieder each present tables giving the estimated future enrollment by divisions: kindergarten, elementary, junior high school and senior high school. This is extremely important data as upon this information depend the estimates of the additional classrooms needed. Holy and Herrick base their estimates for Cincinnati school membership upon the expected pattern of an increased birth rate reaching a peak in 1947 and then receding below the 1945 level by 1953. This would result in a twenty-seven per cent increase in elementary school membership by 1953-54; a twenty-eight per cent increase in junior high school membership by 1955-56; and a thirty per cent senior high school increase by 1958-59. They estimated that this bulge would pass and school enrollment would return to the 1943-44 level by 1965.

They also emphasized the uncertainty of making valid estimates as

many factors must be ignored in making predictions such as possible exodus of people from the city, the possibilities of annexation, or the probable increased holding power of the high schools and junior high schools.

Edwards reviewed the school census figures for the past ten years and discussed the membership fluctuations of individual schools but made no attempt to estimate future enrollments in the Battle Creek Schools.

Strayer and Engelhardt traced the population trend for each of the seven sections into which they divided the city and analyzed each school district in terms of its probable building needs. No formal estimates of the future school population were made. They did, however, suggest that the school system should have a group of its teachers, principals, and administrative officers constantly studying the city population to determine its educational implications.

Moehlman did not present tables showing the future enrollment by school divisions but after reviewing tables showing past membership by divisions he estimated the future demands in terms of the number of elementary youngsters and the number of secondary students to be served.

Probably this unwillingness to make clear cut statements regarding the future membership by school divisions has come as a result of unfortunate past experiences. It appears that the experienced surveyors prefer to furnish sufficient background information to enable the local school people to make their own estimates and thus assume the responsibility at the time buildings are constructed.

THE SCHOOL PROGRAM

Since the function of school buildings is to house the school program, school people must be prepared to define the program in terms which are

meaningful for both the layman who is to pay the bill and the architect who is to prepare the working drawings and specifications. Unfortunately many laymen and architects are of the opinion that school people do not know what they want.

Information to be included in this section of the survey might be organized as follows:

1. Philosophy of educational responsibility
    a. Extent of school program
    b. Future trends
2. Organization
    a. History of present form
    b. Recommended future organization

Philosophy of community responsibility

The importance of recognizing the point of view of the community being studied must be clearly understood by the persons making a survey of building needs as it is closely tied to community acceptance of recommendations. Generally speaking, in communities having a relatively high standard of living and a large proportion of college graduates, an advanced educational program will be acceptable and will receive adequate financial support. A table comparing the educational level of the adult population of Worcester and the state of Massachusetts is included by Linn in the analysis of the local population. He also states that the number of business and professional people living in a community is indicative of a community's potential and capacity to produce a high grade educational system. He presents a table showing the occupational distribution of the population of Worcester and the Commonwealth of Massachusetts. Since the survey is a means of informing the community regarding its educational

responsibility the survey committee should not hesitate to define a desirable educational program even though the indications are that it may not be entirely acceptable. Moehlman defines the purposes of education as a basis for determining board policy relating to the school program. Strayer and Engelhardt likewise take the opportunity to instruct the Newark Board of Education regarding the purpose of education. Linn discusses the purposes of education at the beginning of a chapter entitled "Educational Philosophy and Plant Facilities." He quotes the Educational Policies Commission of the National Education Association in its aims for elementary education and lists "The Ten Imperative Needs of Youth" as the framework for the secondary school curriculum.

Extent of the school program

The current policy of the local Board of Education regarding the organization of the schools and the amount special education offered must be included in any survey. Moehlman uses a chapter of his Port Huron survey to describe the educational policies. He devotes a section of this chapter to a discussion of the extent of education. This includes considering what the board policy should be with regard to provisions for nursery school education, adult education, and special education for handicapped and mentally retarded children. He also discusses the need for the community college type of education in terms of board policy.

Holy and Herrick present a section on "Present Policy in Cincinnati" which defines the attitude of the board toward junior high schools, vocational education, special education, nursery schools and junior colleges or extended high school program in grades thirteen and fourteen. They also discuss the implications of the policies in respect to types of school buildings and list the uncertainties which complicate the planning of elementary school units.

Linn discusses the philosophy of education as he evaluates individually the lunchroom, kindergarten, special education, mentally retarded, vocational and secondary school facilities of the Worcester school plant.

The general school surveys generally include a careful evaluation of the extent of the school program as chapters are devoted to an appraisal of and recommendations for improving the elementary, secondary, vocational, special, and adult education programs of the school system under examination. This is true of the surveys of the Battle Creek, Newark and Lincoln school systems. The Battle Creek survey has a chapter on nursery schools and another on the education of exceptional children as well as chapters on health education, guidance and library service. This particular survey also has a chapter dealing with instruction in each subject division.

Future trends

Since the life of a modern school building is fifty years or more it is most desirable to anticipate trends in curriculum, class size policy, or scope of education which may require building modifications. Moehlman apparently provides for this by recommending such an advanced program of education that he is protected against any innovation which may have even a remote possibility of being made in the school program. He dramatizes the need for nursery school programs, community colleges and one school system serving the entire natural community with such realism that only the unpleasant factor of financial limitations prevents the immediate construction of building facilities to house these programs.

Holy and Herrick indicate that if nursery school centers in public school buildings are generally established in the future, enlarged elementary school facilities may be required. They also point out that

modifications in the curriculum, increased community use of school buildings and the definite trend toward smaller classes implies a need for larger elementary school buildings. Such trends indicate need, they believe, for maximum flexibility and expansibility in all buildings to be constructed. They discern trends in the senior high school field toward the addition of grades thirteen and fourteen, increased holding power of high schools, work experience or compulsory national service for youth, and the establishment of regional vocational high schools. Because of the uncertain future they recommend extreme flexibility and expansibility.

Linn has little to say regarding future trends in curriculum or school services. He does indicate the facilities which he feels must be improved in order to make reasonably adequate programs possible. He emphasizes standards to be met for the present program rather than attempting to anticipate the future.

The comprehensive school surveys do not generally make specific statements regarding future trends with regard to the problem of building adequacy but attempt to indicate trends with respect to the curriculum, instruction in subject matter fields, and the extra curricular programs. Strayer and Engelhardt indicate that schools must become community centers, open day and evening, serving as educational, social, and recreational centers for adults as well as children. They recommend provision for school gardens in planning the school site.

Organization

Some discussion of the type of school organization is essential information for the intelligent planning of a school building program. Flexibility and expansibility are desirable, but a plant designed for

the K-8-4 type of organization cannot readily be adapted to permit the efficient operation of the K-6-4-4 plan. An elementary building designed for the platoon type of organization does not lend itself well to the self-contained home room plan which generally requires large classrooms.

History of present organization

Moehlman does more than any of the others in tracing the development of the present organization. He goes back more than a century to describe the private effort at furnishing education, then discusses the ungraded rate schools, the early union schools, and the organization by changes up to the present form.

Holy and Herrick present a paragraph on the organization development in Cincinnati with particular emphasis upon the junior high school and K-6 elementary school. They present a table showing the types of organization by four year intervals over the past twelve years. At the time of the survey, although progress had been made toward uniform organization on the 6-3-3 plan, the great majority of elementary schools still housed grades K-8; there were no schools that were exclusively junior high school in nature, housing only grades 7-9; there were no three year senior high schools, housing grades 10-12.

Linn does not devote a special section to the history of the school organization, but describes the present type of organization with a table showing the individual school enrollments by grades. Worcester had the same type of mixed organization that characterized Cincinnati. Some elementary schools housed grades K-6 while others housed grades K-8. Three junior high schools housed grades 7-9 and all of the high schools housed grades 9-12.

The Battle Creek survey made by the University of Chicago, in a chapter on organization and administration written by William C. Reavis, includes a chart showing the present organization by which children pass through the Battle Creek Public Schools. The schools are organized to provide for an educational program of the 6-3-3 type. In the case of five schools, certain departures were made from this organization.

Grieder includes a section on school organization in his study of the physical plant of the Lincoln, Nebraska School System. He does not attempt to trace the development of the present form of organization.

Strayer and Engelhardt, in their analysis of each school in the city, indicate the grades housed in the building but do not attempt to give the history of the present organization.

The general school surveys included consideration of the use of the platoon, semi-platoon or self contained home room plan of organization in the elementary schools. The school plant surveys did not mention this particular item but it should have been included.

Recommended future organization

All surveys examined included a recommendation for the future organization. Moehlman recommends the K-6-4-4 plan for Port Huron. Holy and Herrick recommend the K-6-3-3 plan for Cincinnati, purposely not recommending grades thirteen and fourteen because of the existence of the municipal university. Linn recommends the K-6-3-3 plan for Worcester also omitting consideration of grades thirteen and fourteen because of the presence of seven institutions of higher learning. The Battle Creek survey recommends the K-6-3-3-2 plan with the junior college to be included with the senior high school. Strayer and Engelhardt recommend the K-6-4-4 plan for Newark.

Grieder recommends the K-6-3-3 plan for Lincoln omitting consideration of grades thirteen and fourteen because of the location of the University of Nebraska in Lincoln. Reavis uses a chart to excellent advantage in depicting the present organization of the Battle Creek school system and another chart to show the organization he proposes.

This part of the planning for the future plant should include some statement of policy regarding the community use of the school facilities, nursery schools and the extended curriculum. The future policies on class size should be formulated and stated, as many more rooms are required to house classes of twenty-five than are required for classes of thirty or thirty-five.

In summary it should be emphasized that there may be more radical organization proposed and accepted than the K-6-4-4 plan mentioned above. Some communities have already adopted proposals for organizing on the K-3-3-3-3 plan or the NS-K-3-3-4-4 plan. The curriculum is even more subject to change than the type of organization, and instruction is most effective when instructional spaces can be used for the programs for which they were planned. The school people and the community must first determine the school organization and the curriculum for which to build even though flexibility and expansibility should be stressed to enable the building to accommodate changes which cannot now be anticipated.

THE PRESENT SCHOOL PLANT

The evaluation of the present school plant is one of the most important portions of the school plant survey, and the evaluation must be made on the basis of established standards if it is to be accepted without differences in opinion. Fortunately standards are available regarding the distances children can be expected to walk to school, the size of

school sites, reasonable adequacy of site and building, and standards for determining the utilization of the present school plant. Some writers include the maps showing the residential location of the school population in the section of the report analyzing the school population. It appears more logical to include this data in the appraisal of the present school plant as it relates to the adequacy of the school facilities. For a similar reason, the review of the present educational policies relating to organization of the school system should precede this section as an understanding of the present form of organization is essential for a proper evaluation of the school plant.

The topics commonly considered in this portion of the school plant survey are:

1. Evaluation of school sites and buildings
    a. Size and location of sites
    b. Placement of present school buildings
    c. Age of buildings
    d. Score-card evaluation of school plant
2. Utilization of existing school plant
    a. Elementary school building utilization
    b. Utilization of secondary school buildings
        (1) Room utilization
        (2) Pupil-station utilization
3. Summary analysis of each building and district

In the case of large cities it appears more convenient to consider the elementary and secondary school plants separately in order to not include too much detail under one classification. Moehlman, Holy and Herrick, Linn, and Grieder all follow this general plan. Reavis and

Berg study all of Battle Creek's schools as a group, as there are only seventeen schools to be considered.

Evaluation of school sites and buildings

The school building survey always includes this section of the report no matter how brief or superficial the study may be. Generally the surveys give more space and attention to this evaluation than is directed toward any other part of the report. Occasionally each school is studied intensively and a few general statements are made regarding the sites, classrooms, lunchrooms and gymnasiums of the whole plant. In other cases each facility is studied and described with respect to the degree in which the school system meets reasonable standards of adequacy. In these latter cases, the attention given each school consists of a brief paragraph describing desirable changes. Probably the intensive study of each school is preferable.

Some investigators use a score card procedure for evaluating the present school plant while others recommend constructing criteria for each system studied. Linn and Moehlman use pictures rather effectively in making clear the difference between good and poor school buildings in the community.

Size and location of sites

The location of school sites is a study in itself. Reavis and Berg in their study of the Battle Creek school plant list the standards for school sites as criteria for evaluating the school grounds of that city. They rated each site with respect to:

a. Location of site in relation to center of population of the district

b. Location of the site with respect to environment

c. Travel hazards to pupils

d. Distances traveled

e. Elevation and drainage of site

f. Adequacy of present site

g. Possibilities of enlarging the present site

h. Prevailing opinion in the community with respect to the present school site

They also presented a table showing the acreage of each school site and the acreage which would have to be added to meet minimum standards.

Moehlman uses a similar scheme for this part of his survey of Port Huron schools. He considers the elementary and secondary school plants separately in terms of:

a. Location of children

b. Location of buildings

c. Adequacy of sites

d. Playground area

e. Traffic hazards and noise

f. Screening of sites

g. Landscaping

h. Drainage

i. Unused sites

His technique consists of describing the desirable standards in each case and then presenting a table showing each school site rated as excellent, good, fair, or poor. The size of the school site is shown by means of a table which compares the number of acres included in each site. Another table shows the size of the elementary school playgrounds. Other tables give his appraisal of sites for traffic hazards and interfering noise;

appraisal of the screening of elementary sites; and appraisal of elementary school site landscaping. Moehlman is the only one of the surveyors who introduces the concept of "screening" as a desirable characteristic of a school site. Screening attempts to provide, through fencing and landscaping, protection from neighborhood nuisances and annoyances by deadening noise and eliminating the possibilities of trespass.

Strayer and Engelhardt use their score card method as a basis for their appraisal of school sites. Linn also uses the score card which Strayer and Engelhardt developed in 1923. This score card classifies and defines site standards as follows:

1. Location
    a. Accessibility
    b. Environment
2. Drainage
    a. Elevation
    b. Nature of soil
3. Size and form

Holy and Herrick use a similar score card developed by Holy and Arnold in 1936. Grieder also uses this score card in his study of the Lincoln, Nebraska school plant. This score card states standards for sites with regard to:

1. Location
    a. Accessibility
    b. Environment
2. Physical features
    a. Size of site

b. Form

c. Nature of Soil

3. Improvements

a. Arrangement of space

b. Landscaping

All of the surveys examined, with the exception of the Newark study made by Strayer and Engelhardt, include tables showing the size of the present school site and usually a recommendation as to the optimal size for each site. Grieder's table listed the total site in acres, the playground area in square feet, and the play space per pupil in square feet. The generally accepted standard for school site size are the following recommendations of the National Council on Schoolhouse Construction:

Elementary schools - 5 acres plus 1 acre for every 100 pupils of predicted ultimate enrollment

Secondary schools - 10 acres plus 1 acre for every 100 pupils of predicted ultimate enrollment

Secondary schools accommodating grades 13 and 14 - 30 acres plus 1 acre for every 100 pupils of predicted ultimate enrollment

Placement of present school buildings

This topic refers to the location of the building with respect to the residential location of the children attending the school. It also refers to the location of other school buildings. The standards in this case are in terms of walking distance to school and generally accepted maximum distances are: elementary school children 3/4 of a mile; junior high, 1 1/2 miles; and senior high, 2 miles.

The customary procedure in studying these relationships is to construct spot maps showing the location of the schools and the residential location of the school population. Ordinarily three maps are required in order to show the elementary, junior high, and senior high schools with the residential location of the school populations. Circles of 1/2 mile radius are drawn with each elementary school as the center of a circle. The spots not included in any circle represent elementary school children who must travel more than 3/4 mile to school as the 1/2 mile radius represents a straight line distance to the school and children must follow streets in order to reach the school. A considerable number of overlapping circles may indicate elementary schools spaced too closely together. Similar circles with a one mile radius are drawn to study the junior high school building placement and circles with a two mile radius are drawn for the senior high school residential location map.

Some school plant authorities place this unit under the heading of "recommended future school plant." Holy and Herrick are among those who hold this point of view as they place their maps showing the residential distribution of pupils in each organizational division in the chapter entitled "Recommended School Plant." Linn has three maps showing the residential location of elementary, junior high, and senior high pupils included in the chapter on the school population. Both Moehlman and Grieder include sections in the consideration of the present school plant which deal with location of the students and the location of the buildings. Maps are customarily used to show this information in the most convenient form. These spot maps are used by Linn, Holy and Herrick, Moehlman, and Grieder. Berg and Reavis include a section on the location of school buildings but do not present spot maps showing the residential location

of students. They do, however, present a map showing the location of the sites of elementary school buildings and another showing the site location of secondary school buildings. They use circles of one-half mile radius for elementary schools, one mile for junior high schools and two miles for senior high schools in order to show the area from which each school may draw its students. Grieder and Moehlman use squares instead of circles to show these areas. Maps of this type show at a glance those areas of the city not adequately served by the present school plant as the dots outside of any circle or square represent pupils who must travel more than the recommended maximum distance in order to reach school.

A map showing the location of school buildings with respect to the major street plan is presented by Grieder. Linn presents a map showing the main traffic arteries of Worcester, but unfortunately does not indicate the location of the schools on this map which is included in the chapter which describes the nature of the community. Other surveyors do not present maps but consider this point in the individual evaluation of each school building usually under the heading of hazards.

Age of buildings

A rough appraisal of the condition of the school buildings of a system may be obtained from a study of the age of the buildings. School houses like factories and homes have a limited life service span and have little instructional or operational efficiency after fifty years or so of use. School buildings that are more than fifty years in age must generally be rated poor because of the type of construction, lack of required instructional facilities, lack of expansibility and internal flexibility, lack of safety to life, and low efficiency of operation and upkeep.

Linn, Holy and Herrick, Berg and Reavis, Grieder, and Moehlman each

present tables showing the age of the buildings. Strayer and Engelhardt do not present a table showing building age but do discuss the age of the Newark's school buildings. They also include the date of erection and the date of additions to the present building in their analysis of each school building.

Operating and maintenance efficiency

Several of the surveys examined attempted to make some comparisons of the operating and maintenance efficiency of the various school plants. Reavis and Berg present a table showing the per-pupil expenditures for building maintenance in Battle Creek, the State of Michigan and the United States for the past five years. They point out that since Battle Creek maintenance costs are well under the state and national averages, it is probable that maintenance has been neglected beyond the point of prudent economy. Linn presents a table showing the expenditures for the care of school houses for the year preceding the survey. Since he does not attempt to reduce these figures to a per capita basis they are not of much value. Grieder attempts to indicate which elementary schools of Lincoln are operated most efficiently by means of a table showing the average annual operating cost of elementary school buildings per 100 pupils over a ten year period.

Moehlman has a section of the elementary school appraisal which deals with operating efficiency and a second section dealing with maintenance efficiency. He presents a table showing the average cost of operation per 100 square feet over a five year period and a similar table showing the average heating cost per 1000 cubic feet for the same length of time. A third table studies the average cost of building maintenance based on membership over a five year period. Six tables in the appendix of his report deal with operating, heating, and maintenance costs distributed

by buildings, memberships, and units of floorspace area and cubic content. A seventh table ranks the schools in terms of cost of maintenance and of operation.

Neither the survey conducted by Holy and Herrick nor the Newark survey made by Strayer and Engelhardt appraise the school buildings on the basis of maintenance and operation costs.

The comparison of maintenance and operation costs with costs in other cities in terms of expenditure per pupil is always possible by means of the annual studies made by the Federal Security Agency Office of Education. Such information enables the surveyor to determine if the system is making a reasonable effort to maintain and operate the school plant efficiently.

The comparison of average annual unit operating costs of individual school buildings attempts to identify those buildings which should be eliminated or reconditioned due to the difficulty of operating them efficiently. The study of average annual unit maintenance costs by individual buildings is an attempt to identify those buildings which cannot be efficiently maintained.

Score-card evaluation of the school plant

The standards commonly used in appraising a school plant have been developed over the past thirty years by specialists in the school plant field. A score card is commonly used such as those developed by Strayer and Engelhardt in 1923 or Holy and Arnold in 1936. Strayer and Engelhardt secured the assistance of more than three hundred architects, superintendents of schools and school building experts in developing their score cards. Holy and Arnold formulated a set of tentative standards which they submitted to members of the National Council on Schoolhouse Construction, architects and others competent to pass judgements and make suggestions for validation.

Subsequent to the publishing of these standards many changes in school house design have occurred which tend to make them rather obsolete. However, since they represent a convenient method of appraising all of the facilities of a school plant they are extensively used for this purpose.

Linn used the Strayer-Engelhardt score card in the evaluation of the Worcester school plant and Strayer and Engelhardt, of course, used their own score card in studying the Newark schools. Holy and Herrick in their study of Cincinnati schools use the score card technique developed by Holy and Arnold. Grieder also used the Holy-Arnold score card in his appraisal of the Lincoln, Nebraska school plant. Moehlman uses no score card in the evaluation of the Port Huron schools, but defines desirable standards for each particular facility of the physical plant and then indicates his rating obtained by comparing the local facility with the standards. Reavis and Berg use a similar plan in studying the schools of Battle Creek dividing the school plant into four categories: A-Modern buildings of fairly recent construction; B-Substantial buildings around twenty-five years old; C-Fairly good old buildings still capable of rendering considerable future service; and D-Obsolete buildings unsatisfactory for modern school purposes and requiring high maintenance cost.

Score cards probably are rather unsatisfactory in regard to the current acceptability of the standards by which the building is appraised. In spite of this disadvantage, it appears that they are the most expedient means for a school system to use in studying its own school buildings as attempts to evaluate buildings without such criteria tend to make the value of the evaluation entirely dependent upon the competency of the person making the evaluation. In general, unless a competent experienced school

building surveyor is making the appraisal more valid results will be obtained through use of a score card.

Whether of not a score card is used, common practice dictates a general appraisal and interpretation of findings in terms of major classifications such as academic classrooms, special classrooms, general service rooms, administrative rooms and service systems. Holy and Herrick discussed each of the above items and compared Cincinnati schools with schools in other cities. Linn reviewed sites, auditoriums, gymnasiums, special activity rooms, libraries, administration rooms, teachers rooms, kindergartens, classrooms, health rooms, custodians' rooms, boiler rooms, storage facilities, and toilet rooms in his study of the Worcester schools. Moehlman's appraisal involves a discussion of instructional facilities, safety to life, and sanitation. Strayer and Engelhardt present a section on the good features of the Newark school buildings and another section on the outstanding faults found in the school plant. In this latter section, they discuss sites, auditoriums, gymnasiums, lighting, heating, ventilation, acoustical treatment, toilet facilities, interior decoration, partitions and corridors, basements, weathering of new construction, and planning for educational use. They also show the per cent of enrollment housed in buildings rated as inferior, inferior and poor, superior, superior and good. Linn also includes a table showing the number of pupils enrolled in buildings rated very good, good, fair and poor. Grieder did not attempt any detailed treatment of the findings revealed by evaluating the Lincoln school plant with the Holy-Arnold score card. He listed the items which were rated below average in the several buildings in the order of the major divisions of the score card. He considered the elementary and secondary school plants separately and after each item listed the schools considered

below average in that particular respect.

Strayer and Engelhardt, Holy and Herrick, Linn and Grieder each include tables showing the point scores and per cent scores of each school in each of the major categories. The total scores enable the schools to be ranked in order of excellence if desired. Separate tables are used to show the elementary and secondary school evaluations.

While score card ratings tend to be more subjective than a rigorous, scientific evaluation would demand, they do provide a method of obtaining the relative worth of the different buildings of a school system, particularly when the same persons apply the cards to all of the buildings.

Utilization of existing school plant

An investigation of school plant utilization is customarily made to provide additional information essential to sound planning for the future. The data collected in this part of the survey gives information relating to (1) the extent of building utilization for the present school year; (2) the school plant adequacy in view of the expected enrollment trends; and (3) the problem of relieving buildings which may be becoming congested and providing better use of school houses which may be carrying a light load. Since the techniques of determining utilization in elementary and secondary school plants are quite different, these topics will be discussed separately. All of the surveys included some attention given to this problem of the utilization of existing school plant.

Elementary school building utilization

The problem of determining actual room requirements for an elementary school is relatively simple as the pupils remain in one room for most of their instruction except in the case of the platoon type school which are still in vogue in densely populated cities. The self-contained classroom

plan and the semi-platoon plan of organization require the same number of teachers and same number of rooms.

A comparison of average daily membership and capacity was the technique employed by Holy and Herrick in their study of the utilization of elementary school buildings of Cincinnati. In computing capacity all rooms judged to be satisfactory for classroom use, including all usable rooms in buildings that should be abandoned were included. The normal capacity of all rooms was assumed to be thirty-five pupils with the exception of kindergarten rooms where an average of thirty pupils per class was used. These capacities are somewhat higher than those recommended by many other cities. The table presented by Holy and Herrick listed the elementary schools, their total capacity, the average daily membership for each, the excess capacity if the building was not used to capacity, and the excess average daily membership if the building was used beyond its capacity.

Moehlman studied Port Huron elementary school capacity and use in terms of working capacity based on twenty square feet per child in classrooms, thirty square feet in kindergartens and forty square feet in gymnasiums. His table lists each school, its working capacity, its membership at the close of the previous school year, and the per cent of use computed on the comparison of membership and working capacity.

Linn does not include any study of utilization but gives the data on capacity and past, present and future enrollment in his analysis of each school. Reavis and Berg study the utilization of seating facilities in elementary schools as a basis for determining the degree to which elementary schools are utilized. Strayer and Engelhardt study building capacity in their analysis of each school. They compare the principal's estimate of building capacity with enrollment figures, and average daily attendance

figures for the previous year. They also consider the number of vacant rooms and the number of basement rooms and the number of classrooms above the second floor. Grieder studied the Lincoln elementary schools to determine their capacity assuming a maximum of thirty-five pupils per room and assuming 80 per cent of theoretical maximum use. He presented a table summarizing elementary school enrollment, capacity and utilization. He also studied the number of vacant classrooms, their area and capacity based both upon 100 per cent theoretical utilization and 80 per cent practical utilization.

The utilization problem is closely related to the boundaries of elementary school attendance districts and the residential location of the pupils.

Utilization of secondary school buildings

Two bases are commonly used in determining school building utilization, room utilization and pupil station utilization. Room utilization is determined by the length of time that each room is used regardless of the number of pupils using it. A room that is used 350 minutes in a 400 minute day is said to have a room utilization of 87.5 per cent even though it may be only partially filled each period it is used. Pupil station utilization refers to the extent of use of seats, work benches or other stations at which pupils may work. In this case a room used every minute of the day, but having only half the seats occupied, has a pupil station utilization of 50 per cent.

Complete building utilization cannot be expected due to the difficulty of controlling completely the factors of size of class, program of studies, and schedules. Most school plant authorities agree that an 85 per cent utilization of the academic classrooms of a secondary school

building represents a high degree of efficiency in the use of the building.

Holy and Herrick present a table giving for each school the percentage of room utilization for academic classrooms and for special classrooms; another section of the table gives the percentage of pupil station utilization for academic and special classrooms.

Linn does not study the utilization of secondary school buildings. Moehlman studies the use of the secondary school buildings of Port Huron presenting separate tables on the use of the junior high school building, the senior high school building and the junior college.

Berg and Reavis present a table showing the utilization of classroom space in the junior and senior high schools. The table has a column showing the number of pupil stations available daily, the number of pupil stations used daily and the percentage of pupil station utilization. Their conclusion is that Battle Creek secondary schools could accommodate a 30 per cent increase in enrollment without over-crowding the classroom facilities.

Strayer and Engelhardt consider utilization in their study of the individual buildings of Newark. Grieder determined the capacity of individual rooms on the basis of their floor space area using Holy and Arnold's standards for the number of square feet per pupil required for each type of classroom. He did not estimate the capacity of any room at more than thirty pupils with the exception of gymnasiums and libraries. He studied each secondary school building in terms of room utilization and pupil station utilization, writing a paragraph on each for each secondary school building. He presented a table for each school showing the number of rooms, the periods in use, and the per cent of use. He deter-

mined pupil station capacity by first finding the maximum possible capacity on the theoretical 100 per cent base obtained from his floor space study. He next determined the practical maximum capacity by applying the 80 per cent factor and assuming that no more than thirty pupils would be assigned to any academic classroom. A table summarizing his data on room and pupil station utilization had columns showing per cent of room utilization, present enrollment, maximum practical capacity, per cent of pupil station utilization, and possible enrollment increase.

THE ULTIMATE SCHOOL PLANT

The future school plant recommendations do not necessarily represent needs requiring immediate action. They do represent a long range plan toward which future building should be directed. Such a plan is sometimes called the "master plan", to borrow a term from the vocabulary of the city planner. These recommendations must specify both the immediate and ultimate building programs. The major questions to be answered are:

1. "Of the buildings which according to the appraisal ought to be abandoned, which ones can be entirely eliminated, and which ones must be replaced at their present location?
2. Of the buildings which can be entirely eliminated, which require additions to nearby buildings to care for the enrollments thus displaced?
3. Of those buildings which must be replaced, what capacities are required? Also is the present location the best that can be found?
4. What new areas within the school district either now developed or likely to develop in the near future, are not now suitably covered by existing attendance areas? What building accommodations are required for these areas?

5. What land is needed for new sites and at what approximate locations? Also what site additions are needed for present buildings?
6. What additions are needed for existing buildings? These should be in terms of specific facilities such as classrooms, library, lunchrooms, auditorium, gymnasium and the like.
7. What buildings can be satisfactorily rehabilitated? For each of these there should be developed a bill of particulars on what is to be done.
8. Make careful estimates in the light of present building costs, the cost of the program needed in the immediate future and more general estimates of the projects which on the basis of present information may be needed sometime in the future.
9. In the light of the appraisal of the existing buildings the estimated cost of the immediate program and the financial condition of the school district determine the priority of the building projects to be recommended and the method of financing."[1]

These questions must be answered with a high degree of accuracy as the decisions made as a result of the recommendations may involve the expenditure of large sums of money.

The recommendations made will depend to a large extent upon the adopted policies of the board of education. Holy and Herrick emphasize that the recommendations made are designed to satisfy certain basic principles or criteria. These they explain as follows:

1. The kindergarten -6-3-3 plan of organization will be retained.

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1 — American School Buildings, pp. 63-64. Twenty-seventh Yearbook of the Department of Superintendence. Washington: National Education Association, 1949.

2. Junior high schools will be established in separate buildings and not combined with other types of schools.
3. Special schools to be continued or provided include vocational high schools, an adjustment school for adolescents, the school for crippled children.
4. The present policy should be continued of allowing Negro children to attend regular schools or Negro schools.
5. Existing buildings continued in use should be used for the purpose for which they are best adapted. The use of all portable buildings, frame buildings, and rented buildings should be discontinued.
6. New elementary school buildings should be planned to accommodate at least 500 pupils with an average of thirty-five pupils per classroom.
7. Each new elementary school should have auditorium and gymnasium facilities, a lunchroom, a practical arts room, a visual aids room and a kindergarten-primary playroom.
8. Secondary school buildings should accommodate at least 500 pupils and should be planned on the basis of seventy per cent pupil-station utilization.
9. The number and size of the school districts should be such that all pupils enrolled live within a radius of three-fourths of a mile of an elementary school, a mile and a half of a junior high school, and two miles of a senior high school.
10. No new buildings should be placed near the boundaries of the school district without consideration of the location of school buildings in adjoining school districts which might possibly be brought into the city school district by annexation.

Linn points out that the survey staff recommendations are based upon the kindergarten -6-3-3 plan. The school plant recommended provides sufficient schools so that all pupils will live within one-half mile of an elementary school, one mile of a junior high school, and one and one-half miles of a senior high school. An average class size of thirty is recommended to be reduced to twenty-five after the peak enrollment period is passed.

Possible Future Plant Requirements

All surveys examined had something to say regarding the future plant requirements of the community. Holy and Herrick were extremely definite in their study of Cincinnati as they analyzed the distribution of pupils by means of spot maps showing the residential location of senior high school, junior high school, and elementary school pupils separately. They next consider each existing building to determine whether it should be retained or abandoned. They recommend new buildings, additions to present buildings, interior alterations to present buildings and the enlargement of some school sites.

Linn states that he is seeking answers to the following question among others:

"How many school plants are needed to care for the anticipated future school enrollment over the next ten to twenty years and where should they be located?

"What new plants are needed, which existing plants should have additions and what plants might be closed (at least temporarily) or abandoned?"

He considers the ultimate school plant by divisions with recommendations for new buildings, buildings to be abandoned, and buildings to be

retained in the elementary, junior high and senior high divisions considered separately.

Moehlman considers separately the future school plant needs of the elementary division and secondary division. He prepared specifications for each attendance area to be included in the ultimate school plant master plan. A small map is included showing the outline of the proposed elementary attendance area, the location of the school building, non-residential areas, and the main traffic arteries. His analysis includes consideration of probable future land use census count of children residing within the area, and probable future census figure. His recommendations include the disposition of the present site and buildings and the size and description of required new facilities.

Strayer and Engelhardt include their recommendations with their analysis of each building and as their report is a comprehensive survey they do not make as detailed specific recommendations as are customarily found in a survey dealing exclusively with buildings.

Grieder summarizes the suggestions he has made throughout the report in the section he devotes to future school plant needs. He emphasizes that due to the low degree of utilization, no substantial building program is justified, but he suggests projects to be considered at some future date.

Reavis and Berg discuss each building in detail in lieu of any score card evaluation. They recommend that two of the oldest buildings be replaced and recommend additions to several other buildings. Reconditioning is recommended for several buildings.

Recommended Disposition of Present Plant

The most complete studies of school building needs include a detailed

plan for the future use of all present buildings of the school plant. Generally speaking, all buildings more than fifty years old are scheduled to be eliminated or replaced. In some cities the changing characteristics of the attendance district have caused former residential districts to shift to commercial or industrial use and the number of children residing in the district is not sufficient to justify maintaining a school.

Holy and Herrick discuss each school building separately, giving its normal and ultimate capacity and make specific recommendations for its future use and include recommendations for remodeling and additions that may be required. The problem is complicated by the great variety of grade combinations existing in the Cincinnati schools and the adopted policy of organizing the schools on the 6-3-3 plan. These surveyors are guided to a considerable extent in their recommendations by the scores allotted individual schools by use of the Holy-Arnold score card. Those buildings scoring less than 500 points are recommended to be rebuilt or abandoned almost without exception. They recommend that buildings which are no longer needed be razed or sold. They present a table listing these surplus properties recommended for sale together with site areas and estimated tax valuations. The tax valuations apparently are presented as an indication of the probable sale price of the buildings and sites. They finally present a summary of all recommendations under the headings of senior high schools, junior high schools, elementary schools, vocational schools, special schools, administrative buildings, site enlargement, and unused buildings and sites. They also include a map showing the recommended school buildings and districts for the senior high school plant and similar maps the junior high school plant and the elementary school plant. These maps indicate by symbols the recommended new buildings,

additions to existing buildings and buildings to be continued in service, reconstructed or abandoned. The maps also show the proposed district boundaries and include circles with centers at the school buildings to show the coverage and spacing arrangements. They also present spot maps showing the residential distribution of elementary, junior high, and senior high school pupils.

Linn follows much the same pattern in his recommendations for the Worcester present school plant. He divides his discussion into considerations of the proposed ultimate senior high school building program, the ultimate elementary school building program. Each of these sections contain recommendations concerning the disposition of each of the present buildings as well as proposals for new buildings. He also divides the city into sections and discusses the ultimate school housing needs of each district. Linn also presents maps showing the recommended locations of the elementary, junior high and senior high school buildings provided for in the recommendations regarding the ultimate school plant. He also uses circles described about the building locations to show coverage and spacing. Present buildings to be retained in the plans for the ultimate school plant are identified by name on the maps, while the word "proposed" identifies new buildings. He does not present any summary of the recommended alterations to present buildings or lists of buildings to be abandoned or replaced. His analysis sheet for each school building includes recommendations regarding the future use of each building and lists the improvements needed.

Moehlman considers each attendance area individually, making recommendations for boundary changes, describing the future land use, and including recommendations for the disposition of the present building and site as well as describing new buildings and sites required. He includes

detailed instructions regarding the advisability of retaining or not retaining buildings and lands now used for school purposes. Some property is recommended to be sold, while other buildings are to be razed to increase playground space, still other buildings are to be modernized.

Recommended Locations for New Buildings

An important part of any building survey is the study of the proper location of new buildings. This study includes selection of sites for possible future needs and often includes recommendations regarding attendance boundary changes.

The technique used in locating new buildings appears to be an analysis of the present school plant location from the spot maps prepared to show the residential location of pupils attending the various schools. The circles described about the school buildings show clearly the areas not adequately served by the existing school plant. The zoning regulations of the city also have considerable influence on the location of new school buildings. The record of building permits issued over each of the past five or ten years for the district under consideration gives some indication of the future of the area as a residential district. Study of the city zoning map indicates whether or not the proposed school attendance area will eventually be hemmed in by expanding industrial and commercial development. The Commission on American School Buildings states:

> In school districts where it is anticipated that there will be a growth or spread of population, sites should be located to avoid undue overlapping of the areas to be served by each school. In attempting to determine the geographic boundaries of such areas five variable or controlling factors must be considered: (a) the enrollment range for each school type, (b) the permissible types of residential development as they may affect the probable number of children per unit of area, (c) the policy of the school district concerning transportation of children, (d) the hazards and natural barriers which affect the accessibility of a given school and (e) the policy

on maximum size of school.[1]

The surveys examined generally stated a policy on the placement of schools. Holy and Herrick give the following criteria for locating Cincinnati schools:

> The number and size of the school districts should be such that all pupils enrolled live within a radius of three-fourths of a mile of an elementary school, a mile and a half of a junior high school and two miles of a senior high school. Where this is impossible without undue expense the schools should be so placed as to be most accessible to the greatest number of pupils.
>
> The placement of buildings and the establishment of school boundaries should be designed to serve the entire city with the minimum number of school buildings consistent with reasonable travel distances. Where this results in the isolation of small groups of children, transportation rather than extra buildings should be provided. In areas which are now sparcely settled and far removed from a school building, consideration should be given to the acquisition of sites for later use, and transportation should be provided until such time as a building is erected.[2]

Linn expresses much the same point of view in his analysis of the elementary school locations of Worcester. His statement is as follows:

> In general an attempt should be made to place the elementary buildings at locations that will require the young children to walk no more than one-half mile to attend school. Map nine shows the location of the existing elementary schools, Grades K-8 with circles drawn with a radius of one-half mile. This map clearly points out the fact that so far as travel distance is concerned, there are far more elementary school locations in the central section of the city than would be needed. Children, of course, cannot fly in a straight line like a bird, so some slight overlapping of district boundaries may be justified to shorten the walking distance; and proper cognizance must be taken of traffic arteries, natural barriers such as water courses and steep hills, and the utilization of ground areas for industrial and commercial purposes. Nevertheless, even after these factors are taken into consideration it is clear that there are more elementary school locations than required in the central part of the city. On the other hand,

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1 — American School Buildings op. cit. p. 73

2 — Holy, T. C. and Herrick, John H. A Survey of the School Building Needs of Cincinnati, Ohio. p. 94. Bureau of Educational Research Monograph No. 29. Columbus, Ohio: Ohio State University, 1945.

some peripheral areas are not adequately served at present so far as travel distance is concerned, but it is not reasonable to attempt such complete coverage where population density is too sparse to justify it. Some transportation of pupils is almost a necessity in a widespread community such as Worcester and some pupils may be expected to travel more than the usual accepted maximum walking distance.[1]

Implementation of the Recommended Program

The total school building needs of a community are generally too great to be immediately satisfied and must therefore be broken down into groups of projects to be undertaken in order of the priority established for each group.

Holy and Herrick present a table showing the recommended sequence of site and building projects. This table divides the proposed program into steps of site acquisition, vacant land available; site acquisition, partially vacant land available; immediate construction to be completed within five years; construction to be completed by the end of a ten year period; and projects to be undertaken beyond the ten year period.

Linn proposes a program for Worcester to be completed during the next fifteen years. He recommends the definite acquisition of two new sites for future elementary schools that will be needed by 1955 and suggests that a third site be acquired for a possible future school. He divides the building needs into four categories:

1. Immediate elementary school additions and junior high schools to care for the heavy increase in enrollment in the lower elementary grades by removing seventh and eighth grade pupils.
2. Elementary school plant needs in the way of additions and new buildings to be ready by 1955.
3. The secondary school requirements which should be met before 1958 -60.

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1 — Linn, Henry H., Director. Report of the Survey of the Plant Facilities of the Public Schools of Worcester, Massachusetts, p. 129, Institute of Field Studies, New York: Teachers College, Columbia University, 1949.

4. Replacement of existing buildings that are bad fire risks and obsolescent for educational purposes and should be cared for as soon as feasible.

He next lists the steps for meeting the needs of the first three categories. Each of the three steps names the additions and new buildings proposed together with the estimated cost of each project. The first step contains projects for immediate action (1949); the second step deals with projects to be completed by 1955, and the third step specifies the buildings and additions which should be abailable by 1958-60; most of these latter projects are recommendations for rebuilding present school buildings.

Moehlman presents an extremely clear summary of recommendations listing the order of achievement by school years for each district with a separate recommendation or each site and building concerned which details the entire building program in two pages. The site recommendations gives the location and size of the plot to be secured while the building recommendation lists the number of classrooms and the specialized instructional facilities required. Buildings or sites no longer required are recommended to be rased or sold.

Generally speaking the comprehensive surveys examined include no specific time schedule for the implementation of the program. Grieder concludes that no new schools are needed by the Lincoln system but that a program of site development and building modernization should be undertaken immediately to be completed within a ten year period. He lists additional senior high school physical education facilities needed by two senior high schools, one to be provided immediately, the other to come at some future date. He also suggests additional shop facilities

for each of these buildings. He concludes his recommendations by observing that at the end of the ten year period, population trends will be clearer than at present, and school district bonded indebtedness will have been reduced to the point where new buildings may again be considered. Projects suggested for that time include two new junior high schools, one new elementary school, and additions to at least two elementary school buildings.

Strayer and Engelhardt include recommendations regarding the future of each building but do not attempt to determine priorities or time schedules showing the dates by which building projects are to be completed.

Reavis and Berg imply that buildings rated as "D" should be replaced but do not attempt to determine priorities or time schedules.

THE FINANCIAL MEANS OF ACCOMPLISHMENT

The surveys which considered the building needs exclusively, each included a description of the financial requirements of the program and some recommendations regarding the method of financing the proposed capital improvements. The comprehensive surveys on the other hand did not include the above information, but did include a chapter on financing the schools. Since the two types of studies are made for different purposes they naturally contain different kinds of information. However, a building survey by Moehlman, made in 1949[1], combined to a great extent the information generally included in both specialized building surveys and surveys of a more comprehensive nature. The chapter entitled "Niles Fiscal Ability" discusses (1) fiscal resources, (2) obligations, (3) probable future demands, and (4) community ability. Under the heading of local resources he discussed local resources, local effort, and state support. The section of the chapter dealing with obligations dealt

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1 — Moehlman, Arthur B. The School Plant Needs of the Niles, Michigan School District. Niles: Board of Education, 1947. pp. xii + 150. Mimeo.

with current expense, capital outlay and debt service. Future demands were broken down to include current expense, capital outlay and total requirements.

Sufficient valuable information relating to the financial means of accomplishing the proposed building program is included in the finance chapters of the comprehensive surveys to warrant some consideration of their contents.

Information regarding finance as it relates to school building programs will be presented in terms of: (1) financial requirements of the program, (2) ability of the community to support the program, and (3) method of financing.

Financial Requirements of the Program

Holy and Herrick present a table which gives the estimated cost of each proposed project. This table classifies each estimated expenditure as new building and equipment, site for new building, addition to buildings, building alterations, or site enlargement and gives total costs in each classification as well as the grand total. Another table gives the recommended sequence of site and building projects showing the amount of money to be spent for each step of the total program. This table classifies each expenditure as either site cost or construction cost.

Linn lists the building costs of the projects recommended for Worcester grouping the projects under headings of senior high schools, junior high schools, and elementary schools giving the total cost for each group and the pupil capacity of each building. He also lists the cost of each project when he presents the plan showing the grouping of projects to be completed immediately, at the end of five years and at the end of ten years.

Moehlman presents a detailed description of the cost of the proposed plant program covering the cost of providing adequate facilities to accommodate the anticipated increase in elementary school membership as well as a complete modernization and replacement program. Estimated costs are based on a probable construction cost of $20,000 per classroom plus the cost of equipment and land. In each attendance area the building estimate includes the cost of classrooms, service facilities and specialized facilities such as gymnasium, auditorium, library, and lunchroom. The total cost of the building program is summarized in a table which lists the project, gives the building cost, the equipment cost, the land cost and the total cost of each project. A second table lists the projects in the suggested order of achievement and shows the proposed expenditure for buildings, equipment, site and total expenditures by years.

The three comprehensive surveys, while each including a chapter on school finance, do not present estimates of modernization, replacement, or plant extension costs. This type of survey appears to be concerned with preparing an inventory of school building needs as part of the overall study of the educational program and leaves details of cost and implementation to be determined by the local authorities at some future date.

Ability of the Community to Support the Program

Holy and Herrick do not include a study of the financial status of the school district in the Cincinnati school building survey probably due to the fact that such information had already been studied in detail by the local school authorities. A similar survey of the school building needs of Royal Oak made by Holy and Flesher in 1946 gives a concise picture of the financial status of that school district. They emphasize

the desirability of such a study as follows:

> In a study of school building needs a factor of paramount importance is the financial status of the school district. The major items to be studied in connection with the ability of a community to finance a program of school plant improvement are the wealth, school bond debt, and tax rates of the district. These factors must also be related to statutory and constitutional limitations concerning the securing of funds to finance school plant imporvements.[1]

The table presented in this section of the report dealing with assessed valuation shows the total assessed valuation by years over the last ten years with index numbers showing the percentage increase for each year over the first year. This table also traces the valuation per public school child over these years again using index numbers with the first year as the base year. The writers observe that the total assessed valuations increased thirty-seven percent during the period, whereas the total enrollments increased only seven per cent and the valuation per pupil twenty-nine per cent.

In the study of the school district bonded indebtedness over a ten year period, a comparison is made with the bonded indebtedness of the municipality. A table shows the amount and the per cent of the total debt for each of these governmental units for each of the ten years. The Board of Education is reminded that a debt service levy must be maintained for nineteen years to liquidate existing school bonds. Another table shows the schedule of bond and interest payments in the Royal Oak City school district.

The tax rates for the school district are shown in mills for a ten year period. School tax rates are expressed as per cents of the total

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1 -- Holy, T.C. and Flesher, W. R. A Study of the School Building Needs. City of Royal Oak, Michigan. p. 58. Bureau of Educational Research. Columbus, Ohio: Ohio State University, 1946.

tax while the debt service and current expense tax are expressed as per cents of the school tax rate. Another table shows the distribution of total tax rates between the county, city and school units by alternate years with the rates expressed in mills and as per cents of the total tax rates. The statutory limitations on the issuance of school bonds are discussed and analyzed.

Linn recommends in the Worcester study, that the educational needs and safety of the children of the community should be given high priority. He points out that at the present time the local public school bonded indebtedness amounts to only $50,000 out of a total public bonded debt amounting to $9,475,000. He lists the municipal projects which have been fully authorized or that have received legislative approval and expresses the opinion that a school bonded indebtedness of $12,000,000 would not prove to be alarmingly high if other civic needs are kept within reasonable bounds. He emphasizes that the present debt burden is relatively light and that the city occupies an enviable position among cities of comparable size with regard to indebtedness and credit rating. No tables are included in this analysis of fiscal ability.

Comprehensive surveys

The comprehensive surveys of all aspects of a school system generally include a rather detailed study of the financial status of the community and school district. Since statistical information is relatively easy to secure in the area of finance, a number of tables are customarily presented. Much of the information found in this type of study is not applicable to the school building survey but is suggestive of techniques that may be used to advantage. The Battle Creek study was made by Nelson Henry. The chapter includes sections on the present status of operation funds, the

local tax for school purposes, the local tax burden in Battle Creek, the financial needs of the schools, the level of school expenditure and school costs and tax burden. Tables presented deal with the budget recapitulation for the current year; estimated income for the current year and the assessed valuation, current tax receipts, state aid funds, and operating expenses by years for the last five years. Other tables compare Battle Creek with other cities of similar size on the basis of adjusted total tax rates, adjusted school tax rates, the percentage the school tax rate is of the total property tax rate, the cost per pupil in average membership or the current expense per pupil in average daily attendance.

The Newark survey financial chapter has sections on the cost of public schools per year, the analysis of the major items of school expenditure, the trend of expenditures per pupil, Newark's school expenditures compared to cities of similar size, Newark's financial ability, New Jersey state support of education compared to other states, amount the city can spend for its schools, the amount the city should spend for its schools, an analysis of the present budget, and future school costs. Tables include an analysis of annual expenditures; the cost per pupil in average daily attendance; the ratio of school age children to number of pupils in average daily attendance in day schools and to the total population in Newark and comparable cities. Other tables compare Newark with cities of comparable size in terms per pupil cost per year and per day; the cost per pupil in average daily attendance of the major items of current expense; the assessed value of taxable property and estimated true value of taxable property, and the estimated true value of taxable property per person, per census child, and per A.D.A. pupil. The school receipts are analyzed in a table which

studies the percentage of school receipts from taxation and appropriation from state sources for New Jersey and four other neighboring states. A final table lists receipts from state and local sources for a six year period.

The finance chapter of the Lincoln survey was prepared under the direction of Leslie O. Chisholm. It is composed of a section analysing the income of the school district, a section on the school budget, and a third section presenting recommendations. The topics studied under income include the sources of income, assessment of property and the collection of taxes, the ability of Lincoln to support good schools, Lincoln's financial ability and school costs, income from the sale of bonds, the general management of income, and forecasting future income. Tables are presented showing the school tax collections in relation to school tax levy; disbursements from tax revenues for general, bond sinking, and bond interest funds in relation to collectable levy. Five tables study the receipts of the school district, some comparing Lincoln with the national norms and others comparing state support of education in Nebraska and in other states. Two tables study Lincoln's ability to support good schools, one of them comparing indexes of wealth in Lincoln with those of seven other cities. A bar graph compares the annual amount spent for operation of schools by Lincoln with average expenditures in cities of comparable size. Other bar graphs illustrate the status of the school district with respect to bonded indebtedness over a period of years.

The analysis of the school budget considers the content and form of the budget, analysis of the budget figures by major divisions, budget adoption procedures, and research on school costs. Three tables are presented in this part of the report: the first merely compares the budget and actual expenditures by years over a six year period; the second presents the same information in percentage form; while the third compares the

percentage of budget allocated to major items of current expense capital outlay; interest, and other debt service with the average of other cities of comparable size.

The recommendation section presents the suggestions of the survey staff with respect to securing more adequate income and improving the administration, preparation and public relations aspects of the budget.

Method of Financing

Holy and Herrick point out that a $16,000,000 bond issue had been approved by the Cincinnati voters two months before the survey report was published. The survey was begun a year and a half before the election, which indicates the decision of the school staff and survey staff to depend upon bonding rather than pay-as-you-go had been made as a result of considerable study. Since the total program was estimated to cost $21,500,000, they carefully point out that the amount of construction which can be financed as a result of the issuance of $16,000,000 in bonds depends, of course, upon price trends during the five year period and the availability of other funds. Possible sources of additional income to complete the program considered are: another bond issue, a small building levy voted by the people, possible Federal aid, and the sale of surplus land and buildings. The survey staff expresses the opinion that no recommendation regarding the method of financing the remainder of the program should be made at present, but that the most suitable plan be selected when present funds are exhausted. A suggestion is made that at the conclusion of present building program a continuing building levy be established to spread the cost of building replacement uniformly over the years.

Linn does not make specific recommendations regarding the method of financing the Worcester school building program. He implies that bonding is the most feasible method in his observation to the effect that there

are only $50,000 of local public school bonds outstanding and his reference to the excellent credit rating of the city. He expresses the opinion of the survey staff that a school bonded indebtedness of $12,000,000 to $14,000,000 should not prove alarmingly high if other civic needs also are kept within reasonable bounds. He also states that the financing problem may be relieved in part by state aid. The most obvious indication of his preference for bonding come in his final statement that economies effected in the operation and maintenance of plant should partially offset the cost of financing the bond issue.

Moehlman suggests a bond issue, a sale of elementary school buildings and sites not needed, and possible state aid for capital improvements as means of financing the school plant program of Niles, Michigan.

The comprehensive surveys urge greater assistance from the state to increase revenues but do not make specific proposals for financing building programs.

Summary

The purpose of the comparative analysis of recent school building surveys was to identify the most essential topics which are treated by such studies. The surveys selected for review were made by persons who are widely recognized as competent authorities in the field of school plant planning. Thus an analysis of the topics considered by these surveys, investigation of the data collected for each study and consideration of the techniques employed may be said to constitute research in that it is an attempt to make possible classification, generalization, and verification of the methodology and scope of school building surveys.

In order to obtain a clear picture of these procedures considerable attention was devoted to the recommendations of persons concerned with community surveys from the city planner's and city manager's point of view.

The accuracy of forecasts of general population and school populations was questioned and emphasis was placed on the importance of careful consideration of the school program in all of its aspects as a guide to the architect. The problem of identifying professionally accepted standards for school sites and buildings was briefly described. The following conclusions were tentatively reached regarding the present status of the contents and methodology of surveys conducted by "outside experts."

1. The accelerated consolidation of school districts has emphasized the importance of planning school facilities to meet the needs of the entire natural community rather than disregarding the areas beyond the city's political boundaries. The tendency of cities to spread out beyond their original limits and the existance of satellite communities around large cities make broader consideration of educational needs imperative.
2. The continuous change of school populations and school programs makes necessary a perpetual inventory of building needs in most school districts.
3. Standards for school buildings are in a constant state of flux. Many surveyors do not favor the score-card method of appraising school plant facilities due to this continual revision of standards. The work of the National Council on Schoolhouse Construction in preparing periodic "Guides for Planning School Plants" attempts to substitute principles and objectives for standards in planning school facilities in an attempt to solve this problem.
4. Intelligent planning of educational plants requires determination of the program, curriculum content and basic educational

methods.

5. In many communities, travel time is more important than walking distance in the spacing of schools. The standards of 1/2 mile for elementary school, 1 1/2 miles for junior high school, and 2 miles for senior high school students must not be considered as inflexible maximum distances as many pupils no longer walk to school.

6. The findings of any survey should constitute a guide for planning. Considerable doubt has been expressed regarding the value of surveys which do not involve local educators and laymen as such studies sometimes fail to be translated into building programs after the experts have presented their reports and left town.

7. The ultimate aim of any study to determine school building needs is to provide a sufficient number of well designed school buildings on well located, adequate sites.

8. Since schools constructed today may not meet the quantitative or qualtative needs of educational programs and school populations of tomorrow, expansibility and flexibility should be stressed in building design.

The following outline includes those topics which were common to the school surveys examined:

I. Nature of the community

1. General characteristics and growth of the city

a. History

b. Economic and social considerations

c. Transportation facilities

d. Governmental organization

2. Population

a. Estimated present and future populations

b. Composition of population

3. Housing characteristics

a. Density and residential construction

b. Home ownership

c. Zoning and traffic thoroughfares

4. The natural community

II. The school population

1. Past school census and membership

a. Total population and school census

b. Relationship of school census to public and non-public school membership

2. Birth rate trends

a. Relationship of marriage rate trends to birth rates

b. Relationship between number of births and school enrollment

3. Future school enrollment

a. Estimates based on birth rate trend

b. Estimates based on school census estimates as related to total population estimates

c. Estimates of enrollment by school divisions

III. The school program

1. Philosophy of educational responsibility

a. Extent of school program

b. Future trends

2. Organization

a. History of present form

b. Recommended future organization

IV. The present school plant

1. Evaluation of school sites and buildings

a. Size and location of sites

b. Location of present school buildings

c. Age of buildings

d. Score-card evaluation of school plant

2. Utilization of existing school plant

a. Elementary school building utilization

b. Utilization of secondary school buildings

V. The ultimate school plant

1. Possible future requirements

2. Recommended disposition of present plant

3. Recommended locations for new buildings

4. Implementation of the recommended program

VI. The financial means of accomplishment

1. Financial requirements of the program

2. Ability of the community to support the program

3. Method of financing

CHAPTER IV

CASE HISTORIES OF SELF SURVEYS

The surveys previously considered have been in the nature of studies made by outside educational experts. Such surveys are costly but are very effective and objective. The experts have usually projected a modern educational program as well as a school building plan. In some communities the recommendations of a committee of educational experts will receive more favorable consideration than will the recommendations of a local committee. In other communities the criticism of the reactionaries in the community will be directed toward the outside survey committee while the local school administration may then make plans for a changed school program without opposition.

Self surveys are made by many larger school systems particularly those faced with a long range program of capital improvement. Some systems set up a separate survey organization. This is often led by the superintendent who may be assisted by a small staff of full time workers using teachers, principals, and others only incidentally. In this case the survey staff has the responsibility of planning the survey, gathering the data, interpreting the data, and formulating the recommendations and the ultimate plan. If the superintendent is not familiar with the techniques and methods of a survey he can secure assistance from educational experts in state universities.

The better self survey made by many of the smaller school systems has the advantage of providing an excellent program of in-service training and professional awakening. Teachers and community leaders participate in the survey and recommend the changes to be made in the school system. This participation results in very decided public relations advantages

as participants adjust to newer methods and procedures with little or no resistance after having themselves made the recommendations which result in the changes.

A cooperative survey made by educational experts and members of the school staff can many times combine the advantages of the outside expert type of survey and the self survey. It provides an opportunity for the school staff to become acquainted with specialists in educational planning and tends to bring the staff up to date in the area of educational trends and philosophies. The possibility of faulty conclusions is eliminated in this type of survey as the consultant brings wisdom and assurance to the staff recommendations.

This chapter will review the procedures used and the information collected by three Michigan communities as they attempted to determine their school plant needs. The communities selected for study are Midland, Flint and Dearborn and represent small, medium and large sized cities. Dearborn is a rapidly growing urban community with many special problems.

THE MIDLAND, MICHIGAN SCHOOL BUILDING STUDY

Typical of the cooperative self study type of survey was the report of the "Committee on Unmet Needs" which sought to discover the needs of the schools and recommend a plan for school improvement. The "School Study and Planning Conference" brought together the chief officers of all known organizations as well as teachers, staff members, and interested individuals. The conference was sponsored by the Board of Education and was presided over by the president of the P.T.A. council and was opened by a discussion of Board of Education practices and policies led by the president of the Board. The persons assembled were asked to make suggestions regarding school needs. These suggestions led to the formation of

six small study groups each studying a special area of need. The report of each study group was mailed to each member of the Board of Education and to all organizations represented at the meeting. The Board of Education next appointed three of its members to serve as the steering committee for a self survey program. The steering committee recommended four study committees and a reviewing committee, each committee to be composed of a Board of Education member and a nucleous of laymen. The entire personnel of the five groups comprised the "Committee of Unmet Needs." The reviewing committee was charged with the responsibility of putting the final report of the four study groups in form for presentation to the Board of Education. The areas covered by the four study groups included:

1. The nature of the Midland school community
2. The physical plant and school sites
3. Educational offering and organization
4. Special and extended services

An important advantage of the community self survey in Midland was the wide participation on the part of laymen and school personnel which resulted in understanding of the needs of the schools. Another advantage to this type of procedure was that the Board of Education reviewed the work of the committees and recommended only the needs of first priority. The committees were assisted by outside specialists in the field of educational planning. The expense of such services was shared by service clubs, the Parent-Teachers Associations and the Board of Education. The specialist usually spent the morning analyzing the problem with committee members. After further observations in the afternoon, the consultant met with laymen and teachers in a workshop session and in the evening generally addressed a public meeting on the area of school need under

study. The specialists consisted of university professors and staff members of the State Department of Public Instruction. Local people who served as resource persons for the committees included school staff members, city officers, local professional people, and the members of the City Planning Commission.

The main body of the report will be briefly summarized by chapters to indicate the information included and the techniques used.

Learning in Midland

The function of schools in society was defined in the light of the pronouncements of the Harvard Committee, the President's Commission and the Annual Report of the American Association of School Administrators. The responsibility of the schools accepted by the committee included (a) cultivating the potential skills and latent abilities essential for complete living, (b) providing the necessary resources of knowledge for development, (c) presenting the materials or subject matter which is essential food for personal growth.

The frame of reference adopted by the committee stated that society wants the school to provide:

1. A well qualified and efficient corps of teachers
2. Physical plant and equipment adequate to meet the most exacting needs of every learner
3. Experiences for effective learning
4. An educational leadership which courageously and ably leads to continuous school improvement

The geographical frame of reference accepted was that the school district's responsibility for grades kindergarten through eighth grade was to provide facilities for children residing within the legal limits of the school district, students in grades nine through twelve would

include students residing throughout the Midland Trading Area, while students for the proposed thirteenth and fourteenth grades would be accepted from beyond the Trading Area limits.

The primary criterion for determining the effectiveness and value of the school program was considered to be the nature of its effect upon the individual learner. Objectives evolved by staff members and committees were an adaptation of those formulated by the Educational Policies Commission of the National Education Association. The committee also presented brief statements on the physiology and psychology of growth and described briefly the manner in which learning is adjusted to growth in the Midland schools. A chart was presented to depict the manner in which learning in the Midland schools is adjusted to take advantage of the growth patterns as the child matures.

Historical and statistical survey

Sections of this chapter discussed the history of the community, industry, employment, population, home construction, birth rate, population growth, cultural levels and interests, recreation, public education, and parochial schools. A graph showing the trend of growth curves records the past growth of homes in Midland and the increase in numbers of employees of the Dow Chemical Company and Austin Construction Company. The curve was extended to provide estimates of employment up to 1970.

A table compared the populations of Saginaw, Bay City and Midland by decades over the past sixty years, giving the percentage change by decades. Another table gave the number of new houses constructed each year for the past twenty years and gave the total number of homes in the city by years.

A graph compared the population growth, past and estimated future of the city and county of Midland. The comparison of birth rates of

Midland, Michigan, and the United States indicated that Midland's population was increasing at a rapid rate due to its higher rate of births.

The discussion of cultural levels and interests included enumeration of the cultural, religious, patriotic, and professional organizations of the city.

The recreation programs of the city, community center, Dow Chemical Company, and schools were described and their facilities listed. Public education was described with a brief consideration of its local history and growth. The chapter closed with a statement regarding the extent of non-public school development in the city.

School growth

A rather detailed study of school growth in the Midland school district, the Midland community, and Midland county was made. The first table presented showed the future enrollment in grades, kindergarten through six, projected on the basis of past drop-out experience. Estimates were made for eight years ahead and took the pre-school census figures into consideration. A second table presented another set of estimates of the same enrollment projected on the basis of past drop-out experience and past pre-school increase experience. The two tables were in approximate agreement, one representing minimum and the other maximum enrollment.

Additional tables presented estimates of enrollment for two heavily crowded elementary schools and gave estimates of minimum and maximum enrollment for the next eight years in junior and senior high school. A graph pictured enrollment changes showing the percentage of drop-outs between adjacent grades. Other tables presented information on the student population distribution in Midland by areas in order to obtain figures on enrollment possibilities of two proposed junior high schools.

The impossibility of the Midland school district providing housing for non-resident students in grades K-8 was shown by a table showing the projected junior high school load of resident students compared with projected enrollments in schools beyond the school district but in the area served by the Midland high school. A graph showed the growth trend curves and projected growth of Midland school enrollment. Future enrollment was shown in terms of maximum and minimum estimates.

A study of Midland as a community which included the townships of Larkin, Homer, and Midland presented a table showing the present enrollment by grades in these areas. Another table showed the possible ninth grade enrollment by years based on the present enrollment if an alternative boundary proposal were adopted. A graph showed enrollment and school census records of these townships while a map illustrated the location of the present schools and gave their 1947 enrollment figures.

Similar data was presented showing the need for further study of the county program. Enrollment by schools and grade was studied over a six year period for the forty-eight rural schools of Midland County which send their high school students to Midland. Other tables gave current enrollment figures for rural schools in the area outside of Midland County which are served by Midland High School and those Midland County rural schools not served by the Midland High School. Still another table gave the current enrollment data for all schools in the county and those areas outside the county which are served. A map showed the location of all the area which may eventually form the enlarged school district of the Midland natural community.

<u>The educational program</u>

The study of the educational program was considered in terms of the (1) basic offerings and (2) extended services. The present organization

was identified as a K-6-2-4 type and a chart traced the allocation of school periods to vocational preparation, general education, tool studies, and home nurture.

The program of each level of school organization was discussed in considerable detail with particular emphasis upon the philosophy and objectives. The areas discussed included kindergarten, lower elementary, and later elementary. Recommendations made by the committee called for an entrance age of 4 5/6 for kindergarten and a teacher load of twenty-five in the first three grades. It was recommended that each elementary school building be provided with (a) school library room or space, (b) art room and materials storage space, (c) soundproof instrumental and band practice room, (d) one pianist for every two elementary schools, and (e) multiple-sensory aids to instruction.

The junior high school recommendations called for a modified core curriculum and a four year school for grades seven to ten thus committing the school district to a K-6-4-4 plan. This intermediate high school should be equipped with gymnasium and physical education facilities, as well as facilities for homemaking courses, cafeteria, shops, laboratories, library, visual education, study and assembly rooms adequate for a modern school of this size and proposed curriculum. Evidence was presented from a study reported by Professor L. V. Koos indicating the superiority of the four year intermediate high school.

Education beyond the tenth grade was recommended to take the form of the "community college" offering work from grades eleven through fourteen inclusive. The community college function should be to provide unbroken continuity of education through the fourteenth grade. It was recommended that accredited courses be offered in the thirteenth and fourteenth grades which could be transferred to any college or university

without loss of credit. Terminal courses should be offered for those not going on to college and courses should be offered for those persons already employed in the nature of cooperative work experience programs with the employer. The committee accepted as its guiding principles those portions of the Harvard report and the report of the President's Commission which apply to the Midland educational situation.

The committee further recommended a program of adult education which would be a part of the public school system and which would start modestly allowing public response to determine its growth. This program would be greatly aided by the existence of the Community College.

The proposed functional organization of the Midland school was illustrated by a chart showing the blocks of time allocated at each grade level to vocational preparation, general education, tool studies and home nurture.

The extended or auxiliary services recommended included (a) education for mental and physical deviates, (b) aids to staff personnel, (c) aids to student personnel such as health services, lunch program, physical education, and related services, (d) facilities for administration supply storage and maintenance, and (e) transportation. Particular attention was given to the physical facilities required by these extended services in the way of building needs. Diagrams presented showed the suggested basement layout of the new administration building and the routing of educational and school service supplies through the receiving and dispensing office. The decision made regarding the provision of transportation facilities was that the necessary classrooms and buildings to accommodate the increasing resident enrollments be completed before school busses were acquired. The committee recommended also that each school building be provided with central library housing and services.

Physical plant

The study of the physical plant included consideration of the location, condition and design of the present buildings and grounds as well as projecting a building program. A map was presented showing the location of present school units and indicated the projected building program. Circles of 3/4 mile radius were drawn about the elementary schools considered worthy of retention showing the proposal to eliminate three existing elementary schools was feasible with respect to the travel distance factor.

A table presented showed the adequacy of the present elementary school buildings in terms of the following facilities: gym-auditorium, playroom, shop and crafts, lunchroom, kindergartens, library, art, music, administration quarters, teachers rooms, visual education, and health service. Each grade school building was considered separately with special attention focused on the unmet needs. A similar brief study was made of each junior and senior high school building. The amount of information given about the present condition of each building varied from short paragraphs regarding each elementary school building to a half page describing the junior high school building and a full page on the senior high school facilities. No spot maps were provided to show the residential location of pupils as the circle maps show that the proposed plant facilities will cover the city adequately.

The physical plant building program was presented in terms of the needs of the elementary schools, junior high school and senior high school for the next five years. One table presented analysed the present elementary school plant in terms of number of rooms, date built, capacity, number of acres in site, and number of square feet of playground per pupil. Another table presented the future elementary school program

terms of total classrooms in each building, classrooms added, auxiliary rooms recommended, total student capacity and grounds to be added if possible. Similar tables showed the present secondary school facilities compared to those proposed.

A map showed the location of the buildings required to take care of the future expansion of the school district. The new buildings recommended included the "community college" plant, a new intermediate high school and two new elementary schools.

School finance

The section on finance included a table showing the record of building projects completed since 1920 with the cost of each. Another table showed the state equalized valuations, the local equalized valuation, the operating budget, and the amount and percentage of the operating budget raised by local taxes over a period of years. Still another table recorded the operating budget, number of teachers, amount spent for instruction and the percentage of the budget spent for instruction over a period of eleven years. The conclusion reached was that Midland had always been willing to support good schools since at the time of the report 55 per cent of the school budget was raised by local taxes. The cost of the building program was estimated and a plan was proposed to finance the program by extending the millage increase. A favorable vote on the extension was anticipated since Midland has voted three times in the last fifteen years to exceed the fifteen mill constitutional limit in order to build or modernize school buildings. The cost ofoperating the proposed new units was considered and estimates were made. It was pointed out that the operating budget would necessarily be greater in order to support the expanded school program.

Recommended action

The final chapter summarized the findings of the committee emphasising the need for providing facilities for the seventh and eighth grade students of the nearby natural trading area. The estimates of enrollment and necessary classrooms was reviewed with a recommendation that in integrating the seventh and eighth grade rural students into the city school program, the sending districts pay tuition sufficient to completely cover operation and maintenance costs and to amortize school building costs over a forty year period.

The recommendations regarding the school program was reviewed, mentioning the consideration given pre-primary, thirteenth and fourteenth school years and adult education. The physical plant recommendations were reviewed indicating the desirability of closing of one elementary school and future elimination of two more. The senior high school was recommended to be used for junior high school purposes. Immediate building projects were a new junior high school to house 750 students, an eight room addition to one elementary school, purchase of a site for the new senior high school or community college, and modernizaton of the present junior high school buildings. Future needs listed for early consideration were the adoption of the K-6-4-4 plan, an adult education program, a central kitchen for the preparation of hot lunches, and continued study of the health needs of the school.

A school improvement calendar completed the report. The steps to be taken during each of the next five years were carefully described with plans for the second stage of the program and a referendum listed for the fifth year. The first step listed is an election to authorize purchase of sites, construction of new building and issuance of bonds therefor.

THE FLINT SCHOOL BUILDING STUDIES

City Planner's Analysis of the Physical Basis of the Flint School System

The study of the building needs of the Flint school was first begun in 1946 by City Planner, J. M. Mosier. His report states that the study was to serve the double purpose of providing basic information through which the school system could be tied into other elements of the plan for the city and providing information helpful to the Board of Education in its future planning. His study was authorized by a city ordinance which states that the master plan for the physical development of the city shall show among other things "the general location of public buildings and other public property." Since school buildings are public buildings, the planning commission assumed that the master plan would be incomplete if information regarding them was not included in the plan. Mosier's study consisted of a four chapter report which will be briefly summarized by chapters:

Relation of school sites to population and transportation

Since no school buildings have been built since 1929, the present school plant does not adequately meet the needs of the city due to shifting population, changing land use, and population increases. Mosier presented much of the basic information he collected in the form of maps. The first map showed the elementary school attendance districts of the city with information regarding the date each elementary school was built; its capacity based on the number of pupil stations provided; the enrollment at the time of the study; the total area in acres of the school site and the playground area expressed in acres. Another map provided this same information with respect to the secondary schools of the city. Mosier pointed out that in many cases the older elementary schools

were located in the center of their sites thus cutting up the recreational area into strips of land of such size and shape as to make them of little use.

Information regarding population distribution was provided by a map showing the residential location of the 1940 population while a census tract map showed the population distribution of all children under nineteen years of age. This latter information was clearly expressed by another map showing the Federal Government Census Tracts of the city with the ratio of the number of children to total population of each expressed as a per cent. These percentages ranged from fifteen per cent in a business area to fifty-six per cent in a sparsely settled area near the city limits. A table gave the total population by census tracts and the percentage of population make up of children below the age of nineteen.

Other maps presented in this section included:

1. Dwelling construction spot map showing the location of all dwellings for which building permits were issued during the last five years.
2. A map showing the vacant land of the city.
3. A spot map of the residential location of all elementary school children of the city.
4. A spot map of the residential location of all junior high school pupils.
5. A spot map of the residential location of all senior high school pupils.
6. A map showing the city bus routes.
7. A map of the major street system of the city.

Mosier quoted the University of Michigan Social Science Research

Project as estimating that the vacant lands in the city of Flint absorb 111,000 more persons. He also pointed out that the Project had estimated that Flint would reach a population of 169,000 by 1950 and 192,000 by 1970. He emphasized that this expansion will necessitate substantial capital investment in facilities such as schools, roads, sewers, water, etc.

He analyzed the present distribution of attendance by individual schools and reported pertinent facts regarding traffic hazards, travel distances, and enrollment trends. The maps showing bus routes and major thoroughfares were analyzed in terms of transportation needs and safety factors. Mosier recommended that, wherever possible, school district boundaries should conform with neighborhood boundaries which are the major thoroughfares.

Present physical condition of school buildings

The school buildings and sites were evaluated by Mosier by means of the Holy-Arnold score card system.[1] The shortcomings of the buildings and sites were tabulated by schools and a table showed the score given each individual school together with the date it was built. A map was presented with small bar graphs indicating the scores made by each school in the areas of total score, site, building, academic classrooms, general service rooms, and service systems. General recommendations regarding replacement were made for schools whose scores fell in the various ranges. The five schools with the lowest scores were recommended for immediate replacement, the three schools with the next lowest scores were recommended for minimum rehabilitation to last the school until it must be

1 — Holy, T. C. and Arnold, W. E. Standards for the Evaluation of School Buildings. Bureau of Educational Research, Monograph No.20 Columbus, Ohio: Ohio State University, 1936.

replaced. The remaining schools were recommended for retention in the long range plan.

Proposed future pattern of school sites

The future pattern of school sites was presented in the form of a map indicating the elementary school sites to be retained, the buildings and sites to be abandoned, and the suggested location of new sites. Similar maps showed the recommendations for the junior high school plant and the senior high schools. The proposals for converting one of the junior high schools into a senior high school and one of the elementary schools into a junior high school were explained. The boundaries of the proposed elementary school districts were shown on the elementary school map and a table indicated the elementary school district total population, the percentage of the total population of district represented by the elementary school pupils, and the number of elementary school pupils in the district.

The description of the new buildings required pointed out the need for eliminating the present temporary school buildings, providing elementary school facilities for an area not served by any school within reasonable walking distance, and replacing schools no longer satisfactory because of age.

Summary, conclusion and recommendations

The summary statement pointed out that while the findings of the survey of the conditions and characteristics of the existing sites and facilities were factual, the conclusions and recommendations were the opinions of the City Planner.

The conclusions were in brief:

1. Present schools cannot adequately serve the newer outlying residential areas.

2. Closer consideration should be shown new district boundaries to major thoroughfares to minimize confliction of student and vehicular traffic.
3. The size, location, esthetic development and flexibility of over fifty per cent of the existing schools are inadequate.
4. The lighting, heating, auditorium, and health facilities are unsatisfactory in most schools.
5. At least ten new elementary schools and a new high school are needed to serve areas now without schools or served by temporary buildings or buildings too old to be satisfactorily modernized.
6. At least three new sites for elementary schools should be acquired in the near future.
7. A well developed program for capital improvements should be planned whether or not there is money available.

The appendix listed desirable standards for elementary, junior high and senior high schools with respect to number of pupils, walking distance, and size of site. It also included criteria for site selection. Photographs of each of the school buildings were included in the appendix.

Report of Mayor's Fact Finding Committee

This report was completed in 1948 and represented public recognition of the capital outlay needs of the Flint school system. Board of Education members and members of the school administrative staff appeared before the committee to present information relating to the needs of the schools. The committee recommended that immediate action be taken to provide an addition to one high school, a new junior college and administration building, and three new elementary schools. Estimates of cost were made for each of these projects as well as an estimate of the cost of deferred maintenance and modernization needs.

Research Department's Study of Elementary School Plant Needs

The Director of Research of the school system conducted a study of the plant needs of the elementary school division during the 1949-50 school year. This study attempted to compliment the earlier study made by the City Planner. It consisted of four main parts (1) the general characteristics of the city, (2) the population, (3) the school population, and (4) the present elementary school plant needs. Each of these sections will be briefly described.

The general characteristics of the city

This part of the report consisted of information regarding the size, location, topography and economic life of the city. Mention was made of the wide sphere of influence of the city as the largest city of its immediate vicinity. The dependence of the economic life of the city upon the automobile industry was emphasized.

Population

Population trends were traced by means of a table showing the population by ten year intervals of Flint, Genesee County, the State of Michigan and the United States. Estimates were included of the present population of each of these units. Another table showed the percentage increase in population over the previous census for each of the last four census periods and the present estimated population. It was observed that during the last twenty year period the county population had increased rapidly while the city population marked time.

The composition of the population was analyzed in terms of number and per cent of native white, foreign born white, negro and other persons for the last three census periods. Another table showed the national origin of foreign born white persons residing in Michigan, Genesee County, and Flint at the time of 1940 census.

The school population

The growth of the school population was compared to the growth of the general population by a table showing for the last five census periods, the total population, its per cent of increase by decades, the school census and its per cent of increase by decades and the per cent the school census was of the total population. A graph was presented showing the past and estimated future growth of total population, school census, and public school membership.

The number of live births to residents of Flint was compared to births to Michigan residents by a table giving the number of births per year since 1933. Estimates were made of annual births for the next five years and the ratio of Flint births to Michigan births was calculated. The annual number of marriages in Genesee County was compared to the annual number of births in the city. A sharp drop in the number of marriages was interpreted to indicate a corresponding decrease in births as a close relationship between these two variables exist with fluctuations in the annual number of marriages reflected by corresponding changes in births taking place during the next two years.

The relationship between births and the kindergarten enrollment of five years later was investigated by a table tracing this dependence over a ten year period and forecasting the enrollment of kindergarten children for the next ten years. The ten year average ratio between births and enrollment five years later was used to predict enrollment. A similar table compared number of births with enrollment in first grade six years later; predictions were again made for the ten years ahead.

Future enrollments by grades were calculated by determining the average ratio of survivorship over the past ten years. The second grade enrollment, for instance, was found to be on the average 86.6 per cent

of the previous year's first grade enrollment. This study of survivorship made possible a prediction of grade enrollments for the next ten years. A check on the accuracy of these forecasts was presented in the form of a table showing the relationship of school census, public school membership and non-public school membership for the past ten years with forecasts for the next five years. A bar graph showed the distribution of children by ages as revealed by the last school census. A line graph traced the past growth and estimated future growth of membership in county, city, and non-public schools.

The present elementary school needs

The elementary school districts anticipating the greatest increases in enrollment were identified by means of a table comparing the percentage of the city's pre-school children residing in the area with the percentage of the city's elementary school membership attending the elementary school of the district.

A careful analysis was made of each elementary school district to determine its present and anticipate future needs. Factors considered were the location of the district, the non-drawing area included within the district boundaries, the hazards to children, the number of children, present and future, and the present facilities. Specific recommendations were made for each school regarding the additional classrooms required, proposed boundary changes, future status of the present plant in the long range plan, and suggested means of accommodating enrollment increases until new facilities are available. The study of the individual school districts included a spot map of the district showing the residential location of pre-school age children of each district. A circle with half mile radius was drawn about the school building to show the number of children included in this distance of the school. A table for each

elementary school showed the enrollment by grades for the last ten years and presented a forecast of future enrollment for the next six years. The table also showed the classrooms needed and the number of vacant classrooms.

A summary of the findings and recommendations was placed at the beginning of the report so that the reader would have this essential information readily available. The recommendations called for three new elementary schools and additions to two existing schools to be constructed immediately.

THE DEARBORN CONTINUOUS SURVEY

Rapidly growing school districts must adapt usual procedures in determining need for school buildings to meet the peculiar problems brought about by long continued population increase. The Dearborn school district has established a Department of Planning and Information that seeks to keep a perpetual inventory of the factors that determine need for new buildings. The staff of the department consists of the director, a draftsman, and two secretaries. No completed reports are prepared, but information is collected and posted each month, which provides an accurate picture of what is happening in each of the elementary school districts. This information is kept in the form of tables, graphs, and maps. Much of the information relating to the whole school district is arranged in the form of large graphs which can be easily displayed at staff meetings or meetings of the Board of Education. The information relating to each individual elementary school district is kept in loose-leaf note book form so that it can be revised each month and is available quickly for special progress reports. The following lists indicate the records which are kept always up to date:

Information regarding the entire school district

1. Land use map of the city
2. Table showing births by years and months to residents of the city
3. Map showing location of schools with circles showing walking distances in minutes
4. Map showing school locations and school district boundaries
5. Table showing number of pupils in each grade of the city
6. Building permit map of city with different symbols showing houses for which building permits have been issued, construction actually begun, and house occupied
7. Graph showing number of pupils enrolled in different school divisions over a period of years such as kindergarten, elementary school, junior high school, senior high school and junior college
8. Chart showing progress of school building projects
9. Graph showing population of the city over past years with projection for future years
10. Map showing location of all school property in the city

Information regarding the individual elementary school attendance areas

1. Map showing building permits issued and status of construction for residential dwellings of the area
2. Lot saturation report. Indicates number of vacant lots available
3. Child accounting records by months showing enrollments and the number of children of each age residing in the area
4. Record of non-public school pupils residing in the attendance area
5. Estimates of total population of the attendance area based on assuming 3.5 persons per dwelling unit
6. Contractors plans for housing projects to be located in the attendance area

7. Recommended locations for school sites to be acquired on the assumption that residential building projects will make additional schools necessary
8. Spot maps showing residential location of present enrollment and pre-school age group
9. Records of current building utilization including vacant rooms and use of temporary buildings or rented quarters

The information collected by the Dearborn planning staff is essentially the same as would be assembled for a building need survey. The difference lies in the fact that the process of gathering information is continuous as the building program is expected to continue over a period of at least ten years. An advantage of this type of study is that sites are acquired well in advance of actual need and thus tend to be well located and of adequate size. Another advantage is that special reports on the total needs of the district or the needs of any individual school attendance area may be prepared on very short notice as the information is always available.

The director of the Department of Planning and Information works with committees of teachers and laymen in carefully planning the appointments and special features of all new school buildings. He also prepares progress reports for the Board of Education and informational reports in the form of illustrated booklets for the general public. The teacher participation in planning the instructional facilities of new buildings is one of the outstanding features of this program.

SUMMARY

The topics selected for study in each of these communities represent essentially the same areas as were studied in the six surveys analyzed in the preceding chapter. The most significant differences observed in the

three studies lay in the methods used in conducting the survey. The fact that each school system was successful in interpreting the needs to the people, as evidenced by the ease with which the bond issues carried, indicates that the methods used were appropriate to the communities involved. The following summary statements thus deal with methods more than content.

1. Midland, a small homogeneous community, used the committee plan of survey. Large numbers of lay people and school personnel were involved as committee members, thus learning the needs of the schools first hand as they assisted in the preparation of the committee reports.
2. Midland made use of specialists in the school plant planning field who served as consultants to the committees and emphasized modern trends in curriculum and educational planning.
3. The organization, scope, and sequence of the educational offerings of the Midland schools received intensive study by the committees with special attention to the special and extended services. The function of the local schools was defined in the light of the recent pronouncements of nationally known educational committees and commissions.
4. The school needs of the Midland natural community were carefully studied as well as the needs of the Midland school district. Alternative proposals were made for extending the present boundaries of the school district in order to include more of the natural community area.
5. Effective control of the committee work was obtained by having a member of the school staff serve as the secretary of each committee and the inclusion of one Board of Education member on

each committee. The completed committee reports were edited by the superintendent and compiled into a complete building need survey report.

6. The effectiveness of the techniques used in Flint lay in the adequate study given the problem for a period of three years prior to the bond election. The city planner's report was given wide publicity in the newspapers while the report of the Mayor's Fact Finding Committee approved as essential needs many of the city planner's recommendations.

7. The report of the Flint school research director on the elementary school needs merely further documented a case which had already been made by the city planner and the civic committee. Thus, the three reports on the need were very convincing as they represented the findings of the city planner, an impartial committee of lay citizens, and the school authorities. Since the reports were completed at intervals of one year, it was apparent that the problem had been adequately studied.

8. The Dearborn situation points up the need for continuous study of school building need particularly in a fast growing urban community. Since the addition of new neighborhoods continually creates the need for new schools, it is essential that Dearborn keep informed regarding the plans of real estate developers and builders. The addition of a 200 home housing project can create an immediate school housing problem.

9. There is no standard procedure for developing a long-term school building program since the necessary latitude in planning is too great. School administrations, situations, and communities all differ. There are, however, common elements in all school

building programs and essential information which must be obtained as a base for the decisions to be made.

10. Since school curriculums change and communities grow, flexibility and expansibility are essential elements of modern school building design. Space must be readily adapted to meet the needs of a changing curriculum and provision must be made for adding additional rooms and special facilities which an increasing school population may demand.

CHAPTER V

BASIC INFORMATION SUGGESTED FOR BUILDING SURVEYS

This chapter attempts to formulate a general program for the study of present and future school plant needs and the ability of the community to finance plant improvements as they are needed. Such a program will prove of greatest value to communities attempting a self-survey. In many cases school officials maintain continuing surveys that provide data on anticipated school loads and anticipated needs. For most school communities the erection of new school plants is a major undertaking. It is good administrative practice to be assured that the total picture is available. Assumptions of need should be verified and supported by convincing data.

It should be clearly understood that the lists of topics and data are not all-inclusive. Certainly not all of the topics or data will be needed or will be applicable to all surveys.

Jury technique

The jury technique was selected as the most appropriate method of validating the choice of topics to be studied and the data to be secured in making a study of school building need. This method was selected because it is commonly used in formulating lists of principles of administration or in determining the topics to be included in a subject matter course. The information secured by this method represents a consensus of expert opinion regarding the problem studied.

In this investigation, procedures to be used in making the survey were identified through study of the literature relating to school plant surveys, an analysis of recent surveys, and studies of the procedures used by communities in determining their own needs. The lists of topics

to be considered and data to be secured in such a study were then submitted to the jury for validation. The results are considered as an indication of what a general study of this type should include. Several members of the jury emphasized that surveys cannot all be made to conform to any one pattern as the size of the community, the purpose of the survey, and the audience to whom it is addressed are all factors determining the nature of the study.

Size of the jury

It was assumed that ten jury members would provide a representative sampling of competent professional opinion with regard to types of information to be included in any general study of school building needs. This assumption can perhaps be questioned but the fact that the jury members are generally well known in school plant planning circles should give considerable weight to their opinions.

Since ten replies were considered to be necessary for each questionnaire, approximately seventeen questionnaires of each type were sent out. This proved to be a wise provision as one member of the jury had recently died, two were interested but unable to give the time required to fill out the questionnaire, and no reply was received from ten of the persons to whom questionnaires were sent. Nine replies and one suggested outline were received from the questionnaire sent to one group, while ten replies were received from the second group. The reason for two juries was that each questionnaire was rather long and it was believed that a questionnaire covering both the "topics to be studied" and the "data to be secured" would discourage jury members from taking the time to reply.

Selection of the jury

The selection of the members of the jury was made on the basis of the following considerations:

1. Training

All Jury members hold professional degrees in either architecture or education. One respondent holds degrees in both fields. Fifteen of the twenty respondents have doctors degrees in education.

2. Position

Jury members selected were employed as college or university professors, members of research staffs of universities, school plant planning specialists of state education departments, school plant planning specialists of the U. S. Office of Education, assistant superintendents in charge of school plant of large city school systems.

3. Demonstrated competence

The professional competence of the jury members has been demonstrated by their contributions to the school plant planning literature and their participation in school plant surveys.

The jury members who responded to the questionnarie entitled, "Topics to be Included in Study of School Building Needs" were:

Professor William W. Caudill
Research Architect
Texas Engineering Experiment Station
Texas Agricultural and Mechanical College

Mr. Wilfred F. Clapp
Assistant Superintendent
Department of Public Instruction
Lansing, Michigan

Dr. Walter D. Cocking
Professor of Education
New York University
Editor: American School and University

Dr. Don L. Essex
Director of School Buildings Division
New York State Education Department

Dr. Calvin Grieder
Professor of School Administration
College of Education
University of Colorado

Dr. John H. Herrick
Head of Survey Division
Bureau of Educational Research
Ohio State University

Dr. Henry H. Linn
Professor of Education
Teachers College
Columbia University

Dr. Paul Seagars
School of Education
Indiana University

Dr. Alfred D. Simpson
Professor of Education
Harvard University

Dr. Nelson E. Viles[1]
Specialist for School Plant Management
United States Office of Education

The jury members who responded to the questionnaire entitled, "Data Required in Study of School Building Needs" were:

Dr. Harold D. Church
Director, Division of Research and Field Services
Indiana University

Dr. Dan H. Cooper
Professor of Education
University of Iowa

Dr. W. R. Flesher
Head of Evaluation Division
Bureau of Educational Research
Ohio State University

Mr. John W. Lewis
Assistant Superintendent of Schools
Baltimore, Maryland

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1. Submitted an outline of school plant survey procedures. See appendix.

Dr. E. B. Sessions
Bureau of Educational Research
Ohio State University

Dr. Henry L. Smith
State Department of Public Instruction
Bloomington, Indiana

Dr. M. E. Stapley
Associate Professor of Education
University of Indiana

Mr. Robert J. Stoffer
Assistant Superintendent of Schools
San Francisco, California

Dr. William R. Wilson
Division of School Planning
New York State Education Department

Mr. Willis A. Whitehead
School Building Consultant and Architect
Cleveland, Ohio

Criteria for the selection of items

The selection of the items to be included in the master list submitted to the jury was done on the basis of the following criteria:

1. Frequency of occurrence of the item in educational literature dealing with survey procedure.
2. Similarity to items included in recent surveys.
3. Need for this type of information as discovered in the process of making a self survey.
4. Similarity to items contained in lists of topics to be studied in building need surveys formulated by school building surveyors during the school building era of 1920 to 1930.
5. The recommendations regarding survey topics made during the last ten years by school building experts, architects, and city planners.

The questionnaire was divided into two parts covering essentially the same areas. The first questionnaire listed topics to be included in

a study of school building needs, while the second listed data for such a study in the form of tables, graphs, charts, and maps. A criticism of the two questionnaires might be that the first is not sufficiently specific, while the second is too specific. The two questionnaires were sent to separate juries.

Analysis of replies

In analysing the replies of the first group no item was included in the list of topics rated essential by the majority of the jury unless at least five of the nine respondents had checked the item as being essential and at least one more respondent had checked the item as desirable. This meant that not more than three members of the jury could have rated the item as "not necessary." Actually only one item rated as essential by five members of the group was rated as "not necessary" by more than one jury member. This would indicate that the professional opinion of specialists in this field would in general follow the decisions made by this jury. In the case of major and secondary headings of the outline, it was assumed that an item was accepted as essential if the majority of the detailed items under it were accepted as essential by a consensus of the jury members. This was a necessary assumption since many jury members checked only the items of the outline denoted by small letters, disregarding those indicated by Roman and Arabic numerals. There were no comments to the effect that these major and secondary items of the outline were not acceptable. A detailed tabulation of the results of the questionnaires is found in the appendix of this study.

The analysis of the replies of the second group followed the same procedure with the exception of requiring six ratings of essential in order that an item be included. No item included in the list received more than two ratings of "not necessary".

Several members indicated that no final pattern could be acceptable for all surveys as the type of community and the purpose of the survey must enter into decisions of what topics to study.

Topics to be Included in a Study of School Building Needs

The major areas of study were (1) the nature of the community, (2) the school population, (3) the school program, (4) the present school plant, (5) the ultimate school plant, (6) the financial means of accomplishment. Each of these topics will be discussed in detail.

The nature of the community

The outline topics rated essential by the majority of the jury were:

1. General characteristics
   a. Geography and topography
   b. Economic structure
   c. Recreation facilities
   d. Transportation network
   e. Educational institutions
2. Population growth
   a. History of population growth
   b. Estimates of present and future population
   c. Occupational distribution of the population
   d. Population changes by area
3. Housing characteristics
   a. Population density, total and by areas
   b. Use of land: residential, commerical, industrial, civic and vacant
   c. Zoning restrictions
   d. New housing
4. The natural community

a. Development of area adjacent to city

b. Sphere of influence of the city

Topics rated desirable but not essential were history of the community, social organization, governmental organization, educational level and home ownership. Clapp pointed out that the extent of the investigation of these topics will depend on the size of the community and the nature of the problems. Herrick indicated that study of the economic structure and the transportation network should be related to the future population growth. He emphasized the importance of studying community recreation facilities in order to avoid duplication by the school system. Linn commented that consideration of the natural community may or may not be important depending upon individual communities. Seagars suggested that in rural or suburban areas topics such as churches, telephone development and service, water main service, sewer service, motion picture theaters and banking area might well be considered in connection with the natural community. Simpson stated that consideration of the natural community was dependent upon the place, scope and problems of the survey.

The school population

The topics considered essential by the majority of the jury members were:

1. Past school census and membership
   a. Analysis of trends over past years
   b. Relationship of school census to public and non-public school membership
2. Relationship of number of births to school enrollment
3. Future school enrollment
   a. Estimates based on birth rate trend and school survivorship ratio

b. Estimates of enrollment by school divisions and grades for future years

c. Analysis of school census report in terms of age distribution and elementary school districts having greatest number of pre-school age children

4. Residential location of school population

a. Location of elementary school children

b. Location of junior high students

c. Location of senior high students

Grieder suggested that non-public school population should also be studied especially in some communities where it is a substantial element. He emphasized the importance of accurate spot maps showing the residential location of children of each level of schooling. Accurate spot maps are absolutely essential for this purpose and for showing the new housing starts by means of building permits issued. Linn observed that maps showing residential distribution of junior and senior high school pupils were most useful in cases where more than one junior or senior high school is needed and are not so important if there is only one school. Herrick stressed the need for accuracy in school census data. Seagars stated that many of the topics to be included in this section of the study depend upon whether a school census method is used or a density method with sampling. Simpson pointed out that some attention to qualitative as well as quantitative projection would be desirable for oftentimes these problems which are more important in depth cannot be assayed under the provisions for a survey. Viles included consideration of the number of adults of child-bearing age.

The school program

This part of the report is extremely important and unfortunately

is often inadequately treated. Determination of the educational objectives of the community and the development of an educational program involves the best thinking of many groups. The composite judgements of teachers, school administrators, lay groups, parents, and pupils are all required in the formulation educational policy. It is particularly essential that the proposed program be well understood and approved by the community in order that community financial support be forthcoming. The topics to be included here are basic information for the architect. The jury consensus favored the inclusion of the following topics:

1. Philosophy of educational responsibility
    a. Extent of school program
        (1) Nursery schools
        (2) Community college
        (3) Vocational education
        (4) Adult education
        (5) Special education
        (6) Extra-curricular school activities
    b. Future trends
    c. Recommendations
2. Organization
    a. Present policies
        (1) 8-4, 6-3-3, etc.
        (2) Self contained homeroom or platoon plan for elementary schools
    b. National trend
    c. Proposed organization
3. Policies on class size

a. Present

b. Proposed

Clapp stated that all of these topics were of primary importance. Simpson questioned the use of the term philosophy but considers study of the school program to be very important. He stated that consideration of the items of organization and class size policies was desirable, but felt that there was little to the common formal patterns. Viles' outline included the topics of policy on school building sizes and enrollment. He also included such topics as subject offerings, teaching methods, and special rooms needed. He pointed out that community and out-of-school use of school plants must be considered along with the educational program.

The present school plant

The consensus of the jury was that the following topics were worthy of inclusion in this part of the survey:

1. Evaluation of school sites and buildings
   a. Size and location of sites
   b. Location of present school buildings
   c. Age of buildings
   d. Appraisal of buildings
      (1) Score-card evaluation
      (2) Analysis of individual buildings in terms of professionally accepted standards
2. Utilization of existing school plant
   a. Elementary school building utilization
      (1) Study of number of vacant rooms, temporary buildings, and basement rooms
   b. Utilization of secondary school buildings

(1) Room utilization

3. Summary analysis of each attendance area and building

a. Location

b. Non-drawing area

c. Hazards

d. Residential building

e. Number of pupils

f. Present facilities

g. Recommendations

An interesting aspect of the opinions of the jury is the status of score-card evaluation of buildings and sites and the failure of the topic of pupil station utilization to achieve the approval of the majority of jury members. Score-card evaluation was rated as essential by five of the eight members and one of the five stated that score-card evaluation was perhaps of questionable value. Herrick stated that no one organisation of the narrative material could be considered best in the summary analysis of each attendance area and building. Simpson stated that this topic should be considered community wise rather than for each individual elementary school district. Viles' outline suggests consideration of the factors of safety, repair and upkeep in studying conditions of school buildings. The topic of building capacities appears in his outline, with the suggestion that it be studied in terms of rooms available and loading.

The ultimate school plant

There was more unanimity with respect to topics to be included in this area than in any of the other areas studied. The topics approved by majority vote of the jury were:

1. Possible future school plant requirements

a. Facilities required due to school population increase

b. Plant needs due to organizational and curricular changes

c. School buildings required to replace temporary or sub-standard school buildings

d. School plant extention to meet needs of areas not adequately served as revealed by spot maps

2. Recommended disposition of present plant

a. Building and site to be eliminated

b. Buildings to be retained

c. Buildings to be remodeled

3. Recommended locations for new buildings

a. Analysis of city map on basis of schools to be retained and spacing standards for schools

b. Sites to be acquired for possible future needs

c. Changes recommended in attendance area boundaries

4. Implementation of the recommended program

a. Site acquisition schedule

b. Schedule of new structure and additions

c. Schedule of remodeling projects

d. Provision for essential equipment

Herrick suggested that the topics listed under "Possible future school plant requirements", might not be classified in the same manner in the report. He also questioned the advisability of recommending changes in attendance area boundaries. His attitude was that boundary changes might be considered but not fixed in the report; boundaries should be flexible in most cases. Linn expressed the same viewpoint, "This may be a local administrative policy at times and not always so clear-cut that a survey can override local considerations, but the

question certainly should be considered." Seagars stated a word of caution regarding the preparation of schedules, "Much depends on the financial structure of the corporation. The schedule should not go beyond the period of ability to finance." Viles' outline expressed the essential parts of the section he called "A summary of plant needs" as (1) Total needs less capacities to be retained. (2) A recommendation of needs, (a) Set up in a series of steps and (b) Show priorities.

The financial means of accomplishment

The topics considered essential by the majority of the jury members were:

1. Financial requirements of the program
   a. Itemized estimates of outlay for
      (1) New sites
      (2) New buildings
      (3) Additions to existing buildings
      (4) Remodeling of old buildings
2. Ability of the community to support the program
   a. Analysis of financial status of the city including wealth, income, tax rate, financial obligations and credit status
   b. Analysis of financial status of the school district
3. Method of financing
   a. Legal limits on bonded indebtedness
   b. Suggested bonding program

Under the topic "Method of financing", the item of "possibility of pay-as-you-go plan" was rated either as essential or desirable by the majority of the jury.

Grieder pointed out that the state's part in financing should be studied if any provision is made for state help. Linn suggested that

consideration of wealth, income, and credit status of the city was not essential although study of the tax rate and financial obligations was essential. Viles was very careful not to make recommendations in his outline. He listed (1) existing obligations, (2) financial capacity including (a) reserves, (b) tax levies, (c) bonding ability, (3) possible funds from outside sources including (a) state, (b) federal, (c) other and (4) anticipated tax loads including (a) assessed valuations, trends and (b) legal taxing limits and possibilities.

Data Required in a Study of School Building Needs

The problem of deciding the exact form in which the data collected is to be submitted is apparently dependent upon so many factors such as the type and size of community, the audience to whom the report is addressed, and the personal preferences of the surveyors, that no large degree of uniformity is to be obtained. A check list of data required in the study of school building needs was submitted to a second jury of school plant planning experts.

The following tables were checked as essential data by the majority of the jury members:

1. Population of the city by age groups.
2. Live births and deaths of residents of the city over past years.
3. Births by years for past years and estimated annual births for future years.
4. Ratio between kindergarten enrollment and number of births five years earlier over a period of years
5. Ratio between enrollment in successive grades for the past ten years.

6. Estimated enrollment by grades and school divisions for the next ten years.
7. Estimated total enrollment for each of next ten years.
8. Total population and school census figures over past years with projections for the future.
9. Twenty year record of school census, public school membership, non-public school membership, and out-of-school group showing per cent of school census in each classification.
10. Grades housed in each building
11. Size of school sites and acreage which would have to be added to meet minimum standards.
12. Dates of original construction and additions to school buildings.
13. Summary of elementary school enrollment capacity and utilisation.
14. Number of rooms in temporary frame buildings currently in use.
15. Number of elementary school vacant classrooms, their area and capacity.
16. Summary of data on room and pupil-station utilization in secondary schools.
17. Site recommendations for new buildings including data on ultimate pupil capacity, proposed size, and minimum standard size.
18. Recommended site expansions including data on present and proposed site size and playground area, addition in acres and standard minimum acreage.
19. Disposition of elementary buildings.
20. Disposition of secondary school buildings.
21. Sequence of replacement of existing buildings.
22. Financial ability of school district including ten year record

of taxable wealth, tax rate in mills, value of school property, school debt, and expenditures for schools.

23. Assessed value of taxable property and estimated true value of taxable property in city studied and seven cities of comparable size in the region.

Figures consisting of graphs, maps, and diagrams to be included in a study of school building needs which were approved by the majority of jury members were:

1. Population trend of city for past fifty years with estimated trend for next twenty years
2. Zoning map of city showing location of schools and school sites
3. Map of city showing main traffic arteries, transportation lines and school locations
4. Spot map showing residential building over past ten years as evidenced by building permits issued
5. Map showing location of all parks, playgrounds, recreational centers and public buildings
6. Map showing vacant land of the city
7. Three spot maps showing residential location of elementary, junior and senior high schools respectively
8. Chart showing present organization by which children pass through the schools of the system
9. Map showing location of present elementary schools and elementary school attendance district boundaries
   a. Include circles of half-mile radius with centers at each elementary school
10. Map showing location of present junior high schools and junior

high school attendance district boundaries

a. Include circles of one and one-half mile radius with centers at each junior high school

11. Map showing location of present senior high schools and senior high school attendance boundaries

a. Include circles of two mile radius with centers at each senior high school

12. Map showing ideal ultimate school plant and attendance districts if no present buildings needed to be retained

13. Map showing location of proposed new buildings and additions to existing buildings

14. Map showing location and size of recommended sites to be acquired for future use

15. Enrollment trend graph showing past and future enrollment for each school building

Comments and suggestions

Flesher warned that there was danger that a too specific guide might destroy desirable flexibility. He emphasized the need of rather complete data on the educational program including organisation, subjects offered, type of curricular organisation, etc. He questioned the implication that the score-card appraisal is essential but pointed out that some type of appraisal is necessary and factors to be considered must include health and safety. He suggested a summary table showing the differences between present plant and proposed plant in terms of buildings, classrooms, auditorium, gymnasium, library, cafeteria and similar facilities. He recommended a table reviewing the willingness to support school tax levies and bond issues as expressed by votes for and against such proposals in cases where voting is required.

Cooper emphasized that in his opinion it is impossible to say that a particular table or figure is essential or only desirable in every case. In some communities one type of data may be essential while in another community other data may be required. Even figures on pre-school population which are usually the heart of enrollment predictions might be irrelevant in certain extreme situations such as in the case of a small district which has extra space but desires a survey to secure advice on site development. He pointed out that births for past years and estimated births for the next years could be considered as the key factors. He stated that presentation of recommendations regarding the ultimate school plant is dependent upon the type of survey as a survey may leave recommendations up to the community after presenting the facts.

Lewis stated that many factors of educational policy must be determined and studied in relation to existing conditions. These may include class size, policy on type of organization, policy regarding transportation, and policies regarding size of buildings.

Wilson indicated that maps showing location of present secondary schools with their attendance districts are necessary only where there is more than one junior or senior high school building. He does not use any of the current school building score cards as he feels they do not give the information needed. His attitude was that no long range plan of school plant expansion should go into details of costs for costs and ability to buy will change over the years and only time will tell whether a school plant can be afforded. He saw no value at all in comparing school costs with those of other districts as the study is not made to see if the district under study can "keep up with the Jones'."

SUMMARY

1. The hypothesis that there are elements common to all studies of school building need was verified by the agreement of the two juries upon certain topics and certain kinds of data which should in general be included in such studies.
2. Several of the jury members indicated that while the items they checked were applicable to building surveys in general, they could not safely be assumed to be essential for all surveys. The purpose of the survey, the nature of the community, and the audience to whom the report is addressed are factors affecting the character and contents of the report.
3. Qualitative space requirements as well as quantitative requirements must be determined. This implies a more careful analysis of present and probable future curriculum in order to determine the optimum space requirements for each area of the school program.
4. Determination of educational policies of a community as a basis for estimating school plant needs is often treated in rather a superficial manner. These critical problems of policy regarding school size, class size, organization, and the extent of the school program should be studied by the school administration, teachers, Board of Education, and lay groups in order that the decisions reached shall represent the best thinking of the entire community.
5. The following outline represents the jury concensus regarding "Topics to be Included in the Study of School Building Needs":

I. The Nature of the Community

1. General characteristics

a. Geography and topography

b. Economic structure

c. Recreation facilities

d. Transportation network

e. Educational institutions

2. Population growth

a. History of population growth

b. Estimates of present and future population

c. Occupational distribution of the population

d. Population changes by area

3. Housing characteristics

a. Population density, total and by areas

b. Use of land: residential, commercial, industrial, civic and vacant

c. Zoning restrictions

d. New housing

4. The natural community

a. Development of area adjacent to city

b. Sphere of influence of the city

II. The School Population

1. Past school census and membership

a. Analysis of trends over past years

b. Relationship of school census to public and non-public school membership

2. Relationship of number of births to school enrollment

3. Future school enrollment

a. Estimates based on birth rate trend and school survivorship ratio

b. Estimates of enrollment by school divisions and grades for future years

c. Analysis of school census report in terms of age distribution and elementary school districts having greatest number of pre-school age children

4. Residential location of school population

a. Location of elementary school children

b. Location of junior high students

c. Location of senior high students

III. The School Program

1. Philosophy of educational responsibility

a. Extent of school program

(1) Nursery schools

(2) Community college

(3) Vocational education

(4) Adult education

(5) Special education

(6) Extra-curricular school activities

b. Future trends

c. Recommendations

2. Organisation

a. Present policies

(1) 8-4, 6-3-3, etc.

(2) Self contained homeroom or platoon plan for elementary schools

b. National trend

c. Proposed organisation

3. Policies on class size

a. Present

b. Proposed

IV. The Present School Plant

1. Evaluation of school sites and buildings

a. Size and location of sites

b. Location of present school buildings

c. Age of buildings

d. Appraisal of buildings

(1) Score-card evaluation

(2) Analysis of individual buildings in terms of professionally accepted standards

2. Utilisation of existing school plant

a. Elementary school building utilisation

(1) Study of number of vacant rooms, temporary buildings, and basement rooms

b. Utilisation of secondary school buildings

(1) Room utilisation

3. Summary analysis of each attendance area and building

a. Location

b. Non-drawing area

c. Hazards

d. Residential building

e. Number of pupils

f. Present facilities

g. Recommendations

V. The Ultimate School Plant

1. Possible future school plant requirements

a. Facilities required due to school population increase

b. Plant needs due to organizational and curricular changes

c. School buildings required to replace temporary or

sub-standard school buildings

d. School plant extention to meet needs of areas not adequately served as revealed by spot maps

2. Recommended disposition of present plant

a. Building and site to be eliminated

b. Buildings to be retained

c. Buildings to be remodeled

3. Recommended locations for new buildings

a. Analysis of city map on basis of schools to be retained and spacing standards for schools

b. Sites to be acquired for possible future needs

c. Changes recommended in attendance area boundaries

4. Implementation of the recommended program

a. Site acquisition schedule

b. Schedule of new structure and additions

c. Schedule of remodeling projects

d. Provision for essential equipment

VI. The Financial Means of Accomplishment

1. Financial requirements of the program

a. Itemized estimates of outlay for

(1) New sites

(2) New buildings

(3) Additions to existing buildings

(4) Remodeling of old buildings

2. Ability of the community to support the program

a. Analysis of financial status of the city including wealth, income, tax rate, financial obligations and credit status

b. Analysis of financial status of the school district

3. Method of financing

a. Legal limits on bonded indebtedness

b. Suggested bonding program

6. The jury concensus regarding "Data Required in Study of School Building Needs" was:

Tables

1. Population of the city by age groups.
2. Live births and deaths of residents of the city over past years.
3. Births by years for past years and estimated annual births for future years.
4. Ratio between kindergarten enrollment and number of births five years earlier over a period of years.
5. Ratio between enrollment in successive grades for the past ten years.
6. Estimated enrollment by grades and school divisions for the next ten years.
7. Estimated total enrollment for each of next ten years.
8. Total population and school census figures over past years with projections for the future.
9. Twenty year record of school census, public school membership, non-public school membership, and out-of-school group showing per cent of school census in each classification.
10. Grades housed in each building.
11. Size of school sites and acreage which would have to be added to meet minimum standards.

12. Dates of original construction and additions to school buildings.
13. Summary of elementary school enrollment capacity and utilization.
14. Number of rooms in temporary frame buildings currently in use.
15. Number of elementary school vacant classrooms, their area and capacity
16. Summary of data on room and pupil-station utilization in secondary schools.
17. Site recommendations for new buildings including data on ultimate pupil capacity, proposed size, and minimum standard size.
18. Recommended site expansions including data on present and proposed site size and playground area, addition in acres and standard minimum acreage.
19. Disposition of elementary buildings.
20. Disposition of secondary school buildings.
21. Sequence of replacement of existing buildings.
22. Financial ability of school district including ten year record of taxable wealth, tax rate in mills, value of school property, school debt, and expenditures for schools.
23. Assessed value of taxable property and estimated true value of taxable property in city studied and seven cities of comparable size in the region.

Charts, graphs, and maps

1. Population trend of city for past fifty years with estimated trend for next twenty years

2. Zoning map of city showing location of schools and school sites
3. Map of city showing main traffic arteries, transportation lines and school locations
4. Spot map showing residential building over past ten years as evidenced by building permits issued
5. Map showing location of all parks, playgrounds, recreational centers and public buildings
6. Map showing vacant land of the city
7. Three spot maps showing residential location of elementary, junior and senior high schools respectively
8. Chart showing present organization by which children pass through the schools of the system
9. Map showing location of present elementary schools and elementary school attendance district boundaries
   a. Include circles of half-mile radius with centers at each elementary school
10. Map showing location of present junior high schools and junior high school attendance district boundaries
    a. Include circles of one and one-half mile radius with centers at each junior high school
11. Map showing location of present senior high schools and senior high school attendance boundaries
    a. Include circles of two mile radius with centers at each senior high school
12. Map showing ideal ultimate school plant and attendance districts if no present buildings needed to be retained

13. Map showing location of proposed new buildings and additions to existing buildings

14. Map showing location and size of recommended sites to be acquired for future use

15. Enrollment trend graph showing past and future enrollment for each school building

CHAPTER VI

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

History and growth of school building survey movement

The first school survey was made in Boise, Idaho in 1910. Other city school surveys soon followed with the Cleveland survey made by Dr. Leonard P. Ayres in 1916, as the most detailed of any made up to that time. After World War I the popularity of surveys waned somewhat, but revived gradually until in 1927 more surveys of city school systems by outside experts were published than in any previous year.

Horace Mann discussed school building standards in his report on the "Supply of School Houses" of 1838. George Walton, Agent of the Massachusetts State Board of Education, considered school building standards in his annual report made in 1885. Harry Snyder, in 1912, made a study of Harrisburg, Pennsylvania schools which dealt only with buildings. The Portland survey made in 1913 stated definite standards for the evaluation of school buildings. The score-card technique was developed by George Strayer and N. L. Engelhardt and was first used in the Framingham, Massachusetts survey in 1916. Strayer and Engelhardt also developed techniques which caused nearly all school building studies made after 1918 to include an analysis of population trends and residential developments.

Relationship of school plant planning to city planning

The school survey movement developed at the same time as the city planning movement was gaining momentum. The Pittsburgh Survey of 1909 was the first systematic city survey and the first national conference on city planning was held in Washington the same year. The first school survey was the Boise, Idaho survey made in 1910. Several communities

developed city plans between 1900 and 1909. Among these were the plans for San Francisco, Los Angeles, Roanoke and Chicago. These early plans were all made by outside experts, were characterized by a predominant architectural emphasis, but were expressions of the desire to ameliorate social evils of the congested areas of the cities.

Russell Holy pointed out the interdependance of city planning and school plant planning in that they both deal with problems of the rapid growth of cities, changes in methods of transportation and the gravitation of industrial plants and commercial undertakings to definite areas. He formulated a list of items of information which city planning commissions should furnish boards of education and a similar list of items of information which boards of education should furnish city planning commissions. His research revealed little cooperation existing between city planners and school plant planners.

Many writers in the field of city planning, governmental planning, and school plant planning point out that plans made by outside experts are often filed away and forgotten after the report is made. They emphasize that to insure maximum effectiveness, planning must be a continuous process, preferably done by local people with assistance from outside consultants when necessary.

Present status of survey techniques

Building need surveys are frequently still made by outside experts, but the increase in school age populations and the heavy residential building taking place over the country is tending to make it necessary for communities to revise upward their early estimates of need. It is evident that continuous study of school building need can best be done by local school people with some technical assistance from school plant planning specialists of state universities and state departments of

education.

In the study of the nature of the community, recent surveys emphasize the importance of considering the existing recreation facilities which were generally disregarded in survey made prior to 1935. The importance of this topic lies in the desirability of combining park and school recreation facilities as means of avoiding expensive duplication. Park and recreation areas of the future will in many instances be cooperatively planned by park, school, and recreation agencies.

The concept of the natural community is another topic that has been added to surveys made in the last ten years. The fringe areas surrounding many large cities are often eventually annexed by the city. The school system of the city should certainly consider this possibility in its plans for the future, particularly with regard to the location of new buildings. The artificial division created by city limits often has little real effect upon community growth and thus consideration of the community defined by natural rather than artificial boundaries in most cases gives better insight into the future school plant need.

There is universal agreement that estimates of future school enrollment by grades and school divisions is essential information for all surveys. Methods of preparing such estimates vary, but birth rate records and school survivorship ratios are among those enjoying current popularity. Study of the residential location of the school population and preschool populations by means of spot maps is a procedure generally endorsed.

The use of citizens committees in the planning process is proving to be an effective means of enlisting community support for school building programs. Such committees appear to function best when a member of the school staff serves as the secretary of the group, thus insuring that the report will be prepared in an acceptable form and will not be delayed.

All committee reports are generally edited by the superintendent and a steering committee of the board of education members.

Conclusions

Since this study was not made on a strictly scientific basis, only rather general conclusions can be made. School buildings have not been standardized any more than houses have been and thus personal opinion and preference have continued to have a large part in the decisions to be made. The following conclusions are therefore cautiously proposed:

1. The lists of essential topics and data presented at the end of Chapter V represent a general guide for school building surveys. The compilation of such a list and its validation by means of the jury technique proves the hypothesis formulated in Chapter I.
2. No single pattern of a building need survey can be satisfactory for all situations. The type of community studied, the audience to whom the report is addressed, and the purpose of the report are each factors having considerable bearing on the character of the document prepared.
3. Good techniques are essential in planning for school buildings. Unless the kind and extent of the educational program are carefully defined, the architect is seriously handicapped in his attempt to design suitable facilities to house the program.
4. The present and future educational needs of the community must be known and defined before a long range educational program can be satisfactorily planned.
5. Determination of educational policy is a community responsibility delegated to the Board of Education and not to be usurped by the professional educator in planning school buildings.

6. The school survey represents an approved method for systematically determining the school plant needs and should generally be employed to determine such needs.

7. Self surveys employing school plant specialists on a consultant basis and involving lay citizens, principals, teachers, and pupils in the process of determining school plant needs are proving to be very effective in educating the community to the needs of the school.

8. The findings of the survey serve the architect as a guide in his task of planning the school building. A well designed building on a properly located, adequate site is the ultimate goal.

9. Since continuous change is the outstanding characteristic of many communities and since the best survey can but dimly forecast future needs, <u>flexibility</u> and <u>expansibility</u> must be essential elements of school building design in order that buildings may be readily adapted to meet unforseen requirements.

10. Good school plant planning recognises that school district boundaries are not necessarily coterminous with political boundaries and considers the educational needs of the entire natural community in determining the long-range educational needs of a community.

11. Future school buildings should always be better than present buildings. This implies that standards are constantly changing and new standards are being developed faster than old standards are being dropped. It follows that in evaluating any school building the standards serving as criteria must be carefully defined.

12. No satisfactory methods exist for predicting city or school pop-

ulations for more than five or ten years ahead with any high degree of accuracy.

13. Most surveys do not relate school programs to the building needs in the most satisfactory fashion.

14. The building score-card appraisal is considered unsatisfactory by many persons in this field due to the fact that the existing score-cards are at least fifteen years old and thus do not adequately represent present standards. Some writers in this field apparently believe that due to constantly changing standards the score-card technique can never be satisfactory.

15. In a situation where several bond issues will be required to complete a school building program, a continuous study of the changing conditions is necessary. A planning department which collects information and keeps it up to date is more valuable here than an outside survey of building needs, although such a survey may be of assistance in initiating the program.

16. Specific plans for financing a building program can generally best be made by the local school authorities rather than outside experts. The outside assistance may be in the form of suggested alternative solutions to the finance problems.

17. The school plant planner can obtain a great deal of important information regarding population trends, land use, and residential construction from the city planning department. Close cooperation between city planners and school plant planners is of mutual advantage.

18. Self surveys or cooperative surveys have advantages over the survey made by the outside expert in that the local school authorities are generally in favor of the recommendations made

and thus will probably seek to put the plans into action immediately. Surveys by outside experts frequently are filed away and forgotten.

19. There is rather common agreement that the general areas to be considered in any study of school building need should include consideration of: (a) the nature of the community, (b) the school population, (c) the school program, (d) the present school plant, (e) the ultimate school plant, and (f) the financial means of accomplishment.

Recommendations

The recommendations proposed are believed to be in harmony with the findings of this study:

1. More attention should be given to defining the present and anticipated school program as a basis for determining school building needs.
2. Since existing score-cards are not well adapted to modern school buildings, a new score-card for evaluating school buildings should be developed as a guide for persons attempting to make such evaluations for the first time.
3. Self surveys should enlist the assistance of school building specialists of state departments of education or university schools of education in order to achieve the most satisfactory results in extensive surveys of building need. Such assistance serves to validate the findings of the survey and gives assurance to the recommendations made.
4. More attention should be given to the school census as a means for obtaining information relating to school building needs. The enumeration of pre-school age pupils is particularly valuable

in determining future elementary school enrollments. Spot maps of the residential location of pre-school age children should be prepared for each school attendance area concerned when boundaries are revised or new attendance areas created. Such spot maps give a reasonable indication of the minimum school age population to be expected in this area seven years later.

5. Since many communities have great difficulty in determining the type of school buildings they should have, greater <u>standardization</u> of school buildings would be helpful in preventing poorly designed, inadequate schools from being constructed in the years just ahead when a record number of new schools is anticipated. Such standardization should not result in stereotyped buildings but should establish recommended minimum requirements which would make better design mandatory. Some such technique of <u>quality control</u> is needed in order to insure better school buildings.

6. School surveys should in general consider the educational needs of the entire natural community rather than only those of the area defined by the political boundaries of the city. Trends toward consolidation, annexation, and rapid growth of city fringe areas emphasize this procedure in order to provide better schools for the community and to prevent expensive duplication of facilities.

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APPENDIX A

Flint Public Schools

Flint, Michigan

W. BILLS
ERINTENDENT

March 8, 1951

Dear

Your reputation as an authority in the field of school plant planning has led me to seek your assistance. I am attempting to complete a doctoral investigation under the direction of Dean J.B. Edmonson of the University of Michigan. The purpose of the study is to prepare a specific guide for school people in the field as an aid in making studies of school building needs. If you care to receive a summary of the results of the investigation, I will be happy to furnish you with an abstract showing the findings. Please check one blank opposite each item on the following pages and add any additional topics which you feel should be included in each division.

Please do not remove this sheet as it identifies your reply. Your cooperation will be sincerely appreciated. A self-addressed envelope is enclosed.

Yours sincerely,

John W. English
Director of Research
Flint Public Schools

JWE:ejs

Enclosure

Check here if you wish to receive a summary. _____

APPENDIX B

Topics to be Included in Study of School Building Needs

	Essential	Desirable But Not Essential	Not Necessary
I. The nature of the community			
1. General characteristics			
a. History	2	7	0
b. Geography and topography	5	4	0
c. Economic structure	7	2	0
d. Recreation facilities	7	1	0
e. Social organization	2	6	1
f. Transportation network	8	1	0
g. Governmental organization	1	8	0
h. Educational institutions	7	1	0
2. Population growth			
a. History of population growth	7	2	0
b. Estimates of present and future population	9	0	0
c. Composition and characteristics of the population	4	2	1
(1) Age and sex composition	4	2	1
(2) Ethnic composition	2	3	5
(3) Educational level	2	5	1
(4) Occupational distribution	5	3	0
d. Population changes by area	5	1	0
3. Housing characteristics			
a. Home ownership and tenancy	3	8	0
b. Population density, total and by areas	7	1	0
c. Use of land: residential, commercial, industrial, civic and vacant	8	1	0
d. Zoning restrictions	6	1	0
e. New housing	8	0	0
4. The natural community			
a. Development of area adjacent to city	6	3	0
b. Sphere of influence of the city	5	1	2
c. Newspaper circulation	2	2	4
d. Trade area and markets	3	4	2
e. Place of work of persons residing beyond city limits	3	3	2

Comments or additions

	Essential	Desirable But not Essential	Not Necessary
II. The school population			
1. Past school census and membership			
a. Analysis of trends over past twenty years	9	0	0
b. Relationship of school census to public and non-public school membership	8	0	1
c. Relationship of school census to total population	4	3	1
2. Birth rate trends			
a. Relationship of marriage rates to birth rates	4	1	4
b. Relationship of number of births to school enrollment	6	1	1
3. Future school enrollment	6	0	1
a. Estimates based on birth rate trend and school survivorship ratio	7	0	0
b. Estimates based on school census estimates obtained from estimates of future total population	5	1	2
c. Estimate of enrollment by school divisions and grades for next ten years	9		
d. Analysis of school census report in terms of age distribution and elementary school districts having greatest number of pre-school age children	6	2	0
4. Residential location of school population			
a. Location of elementary school children	9	0	0
b. Location of junior high students	9	0	0
c. Location of senior high students	9	0	0

Comments of additions

	Essential	Desirable But Not Essential	Not Necessary
III. The school program			
1. Philosophy of educational responsibility			
a. Extent of school program	7	1	0
(1) Nursery schools	7	1	0
(2) Community college	7	1	0
(3) Vocational education	7	1	0
(4) Extra-curricular school activities	5	2	1
(5) Adult education	6	2	0
(6) Special education	7	1	0
b. Future trends	7	1	0
c. Recommendations	7	1	0
2. Organization	6	1	0
a. Present policies	6	1	0
(1) 8-4, 6-3-3, etc.	7	1	0
(2) Self contained home-room or platoon plan for elementary schools	5	3	0
b. National trend	3	5	1
c. Proposed organization	6	3	0
3. Policies on class size	5	2	0
a. Present	7	1	0
b. Proposed	7	1	0
Comments or additions			

IV. The present school plant			
1. Evaluation of school sites and buildings			
a. Size and location of sites	9	0	0
b. Location of present school buildings	8	1	0
c. Age of buildings	7	1	0
d. Appraisal of buildings	7	1	0
(1) Score-card evaluation	5	3	1
(2) Analysis of individual buildings in terms of professionally accepted standards	8	0	0
2. Utilization of existing school plant			
a. Elementary school building utilization	5	1	0

	Essential	Desirable But Not Essential	Not Necessary
(1) Study of number of vacant rooms, temporary buildings and basement rooms	7	0	0
b. Utilization of secondary school buildings	3	1	0
(1) Room utilization	6	2	0
(2) Pupil station utilization	4	2	0
3. Summary analysis of each attendance area and building	6	1	0
a. Location	7	0	0
b. Non-drawing area	6	1	0
c. Hazards	7	0	0
d. Residential buildings	6	1	0
e. Number of pupils	7	0	0
f. Present facilities	7	0	0
g. Recommendations	7	0	0
Comments or additions			
V. The ultimate school plant			
1. Possible future school plant requirements	5	0	0
a. Facilities required due to school population increase	9	0	0
b. Plant needs due to organizational and curricular changes	8	1	0
c. School buildings required to replace temporary or substandard school buildings	9	0	0
d. School plant extension to meet needs of areas not adequately served as revealed by spot maps	7	1	0
2. Recommended disposition of present plant	7	1	0
a. Buildings and site to be eliminated	8	1	0
b. Buildings to be retained	7	1	0
c. Buildings to be remodeled	8	1	0

	Essential	Desirable But Not Essential	Not Necessary
3. Recommended locations for new buildings	5	1	
a. Analysis of city map on basis of schools to be retained and spacing standards for schools	9	0	0
b. Sites to be acquired for possible future needs	9	0	0
c. Changes recommended in attendance area boundaries	6	2	1
4. Implementation of the recommended program	5	0	0
a. Site acquisition schedule	7	1	0
b. Schedule of new structure and additions	7	1	0
c. Schedule of remodeling projects	5	2	0
d. Provision for essential equipment	6	1	1
Comments or additions			

VI. The financial means of accomplishment			
1. Financial requirements of the program	6	1	0
a. Itemized estimates of outlay for:			
(1) New sites	4	1	0
(2) New buildings	6	2	1
(3) Additions to existing buildings	6	2	1
(4) Remodeling of old buildings	6	2	1
(5) New equipment	4	4	1
(6) Landscaping and playground development	4	4	1
(7) Professional fees	4	3	0
2. Ability of the community to support the program	5	1	0
a. Analysis of financial status of the city including wealth, income, tax rate, financial obligations and credit status	7	1	0

	Essential	Desirable But Not Essential	Not Necessary
b. Comparison of tax rates with rates of cities of comparable size of the region	2	6	1
c. Analysis of financial status of the school district	7	1	0
d. Comparison of school costs with costs in cities of comparable size	1	6	2
3. Method of financing	4	0	0
a. Legal limits on bonded indebtedness	7	2	0
b. Possibilities of pay-as-you-go plan	4	3	1
c. Suggested bonding program	5	3	0

Comments or additions

APPENDIX C

Data Required in Study of School Building Needs

	Essential	Desirable But Not Essential	Not Necessary
I. The Nature of the community			
1. Tables			
a. Population of city, county, and state by decades for fifty years	5	2	2
b. Indexes of population for city, county, and state by decades for past fifty years	4	1	3
c. Population of the city by age groups	6	3	1
d. Live births and deaths of residents of city over past twenty years	6	1	2
e. Racial composition of the population of the city	1	7	2
f. Number of years of school completed by persons over 25 years of age in the city and the state	1	6	3
g. Population density of city compared to several cities of similar size in the region	2	4	4
h. Characteristics of city housing by wards at time of last census	5	3	2
2. Figures (Graphs, maps, and diagrams)	1		
a. Population trend of city for past fifty years with estimated trend for next twenty years	7	2	
b. Population trends by wards by decades for the past fifty years	4	4	1
c. Dwellings erected by wards over past fifty years by decades	3	4	2
d. Zoning map of city showing location of schools and school sites	9	1	0
e. Map of city showing main traffic arteries, transportation lines, and school locations	10	0	0

	Essential	Desirable But Not Essential	Not Necessary
f. Spot map showing residential building over past ten years as evidenced by building permits issued	10	0	0
g. Map showing location of all parks, playgrounds, recreational centers and public buildings	8	2	0
h. Contour map of the city	2	8	0
i. Map showing vacant land of the city	6	4	0
Comments or additions			
II. The School population			
1. Tables			
a. Total population and school census figures over past fifty years by decades and projected twenty years into future	6	2	1
b. Twenty year record of school census, public school membership, non-public school membership, and out of school group showing per cent of school census in each classification	6	3	1
c. Twenty year record of non-resident pupil enrollment	5	2	2
d. Relationship of marriages to births over past twenty years	1	4	5
e. Births by years for past ten years and estimated annual births for next five years	10	0	0
f. Ratio between kindergarten enrollment and number of births five years earlier for the past ten years	8	0	2
g. Ratio between enrollment in successive grades for the past ten years	9	0	1
h. Estimated enrollment by grades and school divisions for the next ten years	10	0	0

	Essential	Desirable But Not Essential	Not Necessary
i. Estimated total enrollment for next ten years based on relationship between total population, school census and school membership	8	2	0
2. Figures			
a. Graph showing total population, school census and school membership past and future trends	4	6	0
b. Bar graph showing age distribution of school age population at time of last school census	3	6	1
c. Map showing births by wards, census tracts or elementary school districts	4	5	1
d. Map showing the proportion of children to adults for each census tract	2	3	5
e. Three spot maps showing residential location of elementary, junior and senior high pupils respectively	9	0	0
(1) Circles of half mile radius for elementary schools, 1½ mile radius for junior high schools and two mile radius for senior high schools should be drawn on maps with each school as the center of a circle	4	0	0
f. Spot maps showing residential locations of non-resident pupils	2	4	3

Comments or additions

III. The school program			
1. Tables			
a. Grades housed in each building	8	0	0

	Essential	Desirable But Not Essential	Not Necessary
2. Figures			
a. Chart showing present organization by which children pass through the schools of the system	6	2	2
b. Chart showing proposed organization by which children should pass through the schools of the system	5	3	2
Comments or additions			

IV. The present school plant			
1. Tables			
a. Size of school sites and acreage which would have to be added to meet minimum standards	10	0	0
b. Playground areas by school and minimum standard of area required by schools these sizes	6	4	0
c. Dates of original construction and additions to school buildings	7	2	1
d. Summary of elementary school enrollment, capacity and utilization	10	0	0
e. Number of rooms in temporary frame buildings currently in use	10	0	0
f. Number of elementary school vacant classrooms, their area and capacity	10	0	0
g. Rating of elementary school plant on score card appraisal	2	3	1
(1) Raw scores and per cent scores on site, building, classrooms, general rooms, service systems and total	5	1	1
h. Average annual operating cost of elementary school buildings per 100 square feet of floor space	2	4	3

	Essential	Desirable But Not Essential	Not Necessary
i. Placement of elementary school buildings under their rated categories	5	2	2
j. Rating of secondary school plant on score card appraisal	4	2	1
(1) Raw scores and per cent scores on site, building, academic classrooms, special classrooms, general service rooms, administrative facilities, service system and total	4	0	1
k. Placement of secondary school buildings under their rated categories	5	2	1
l. Summary of data on room and pupil-station utilization in secondary schools	9	1	0
2. Figures			
a. Map showing location of present elementary schools and elementary school attendance district boundaries	10	0	0
(1) Include circles of half mile radius with centers at each elementary school	8	0	0
b. Map showing location of present junior high schools and junior high school attendance district boundaries	10	0	0
(1) Include circles of 1½ mile radius with centers at each junior high school	8	0	0
c. Map showing location of present senior high schools and senior high school attendance boundaries	10	0	0
(1) Include circles of two mile radius with centers at each senior high school	8	0	0

Comments or additions

	Essential	Desirable But Not Essential	Not Necessary
V. The ultimate school plant			
1. Tables			
a. Site recommendations for new buildings	5	0	0
(1) Include data on ultimate pupil capacity, proposed size, and minimum standard size	8	0	0
b. Recommended site expansions	5	0	0
(1) Include data on present and proposed site size and playground area, addition in acres, and standard minimum acreage	8	1	0
c. Disposition of elementary buildings	8	1	0
d. Disposition of secondary school buildings	8	1	0
e. Sequence of replacement of existing buildings	9	0	1
2. Figures			
a. Map showing ideal ultimate school plant and attendance districts if no present buildings needed to be retained	6	1	2
b. Map showing location of proposed new buildings and additions to existing buildings	8	0	1
c. Map showing location and size of recommended sites to be acquired for future use	8	0	1
d. Analysis sheet for each school building giving summary of findings and recommendations including:	3	1	0
(1) Enrollment trend graph showing past and future enrollment	6	3	0
(2) Map showing proposed attendance district boundaries and residential locations of pre-school age children of the elementary school district	5	4	0

Comments or additions

	Essential	Desirable But Not Essential	Not Necessary
VI. Financial means of accomplishment			
1. Tables			
a. Financial ability of school district			
(1) Ten year record of taxable wealth, tax rates in mills value of school property, school debt and expenditures for schools	6	3	0
b. Comparison of city with seven other cities of comparable size indicating ability of city to support good schools	2	5	1
(1) Include data on bank deposits, post office receipts, retail sales, number of automobiles, number of telephones, number of homes with radios, and per pupil expenditure in A.D.A.	1	2	5
c. Assessed value of taxable property and estimated true value of taxable property in city studied and seven cities of comparable size in the region	7	2	1
d. Estimated true value of taxable property for previous year in per capita of total population, per child 5 to 19 years of age, and per pupil in average daily attendance in city studied and seven cities of comparable size in the region	5	4	1
e. Adjusted school tax rates per $1000 of property valuation on 100 per cent basis of assessment for twenty cities of comparable size for previous year	5	4	1
f. Percentage school tax is of total property tax for twenty cities of comparable size for previous year	5	4	1

	Essential	Desirable But Not Essential	Not Necessary
g. Receipts from state (including federal) sources and from local sources for public education for the past ten years	4	2	1
(1) Express receipts in dollars and in per cent of total income	2	3	1

Comments or additions

APPENDIX D

April 7, 1949
N. E. Viles

Federal Security Agency
Office of Education
Division of School Administration
School Housing Section

School Plant Surveys

Many local school officials, interested parents, and others wish to know how to evaluate the existing school plants and how to determine the new school plant facilities needed in their communities.

A major school building program should not be attempted until a study is made of the present and future school plant needs and of the ability to finance plant improvements as they are needed. In many cases the school officials maintain continuing surveys that provide data on anticipated school loads and anticipated needs. In other cases local administrators assemble whatever data may be available to indicate plant improvement needs for a particular project or series of projects.

For many school communities the erection of new school plants is a major undertaking. It is good administrative practice to be assured that the total picture is available. Assumptions of need should be verified and supported by convincing data.

The school survey provides one of the best means of evaluating the school plant needs. When properly organized, the school plant survey report provides an excellent means of informing the public on the local school plant needs.

The following suggested survey steps or procedures are not all-inclusive. It is not anticipated that all of these steps will be needed or applicable for all surveys. In some cases certain steps or factors should be developed in some detail.

A. There are various types and kinds of school plant surveys. They may be developed in various manners.

   1. State
   2. District or area
      a. Part of a comprehensive educational survey
      b. Limited to building evaluations and needs
   3. They may be made or developed by
      a. The State Department of Education
      b. The local staff as a self-survey with the State Department of Education or an outside specialist serving as a consultant
      c. An outside survey staff

B. School population data
   1. Census

a. Enumeration trends over a period of years
b. Pupil census by age levels, birth rate
c. Percentage of adults of child-bearing age

2. Enrollments
a. Trends by years - public, non-public
b. By grade levels, trends
c. Enrollment persistency, for period of years

3. Socio-economic factors affecting enrollment
a. Industrial
b. Housing
c. Trends

4. Transportation as it affects enrollment by buildings
a. Traffic routes, barriers
b. Transportation facilities, school, other

5. Pupil locations
a. Trends
b. Use various measures

6. Predicting future enrollments
a. By areas
b. By grade levels

C. The educational program to be housed

1. The school organization
a. Policy on building sizes, enrollment
b. Grade organization K6-6, 8-4, etc.
c. Community and out-of-school use of school plants

2. The instruction program
a. Subject offerings
b. Class sizes
c. Teaching methods

3. Number of teaching units
4. Classrooms needed
5. Special rooms needed
6. Other spaces and services

D. The existing plant

1. Building locations, with reference to
a. Need, pupil locations
b. Other buildings
c. Accessibility
d. Environment

2. Sites, sizes, availability of recreation areas
3. Building conditions
a. Age
b. Safety
c. Repair and upkeep

4. Building capacities
a. Rooms available
b. Loading

E. A summary of plant needs

1. Total needs less capacities to be retained

2. A recommendation of needs
   a. Set up in a series of steps
   b. Show priorities

F. Financing possibilities

1. Existing obligations
2. Financial capacity
   a. Reserves
   b. Tax levies
   c. Bonding ability
3. Possible funds from outside sources
   a. State
   b. Federal
   c. Other
4. Anticipated tax loads
   a. Assessed valuations, trends
   b. Legal taxing limits, and possibilities

APPENDIX E

Basic School Plant Survey Data[1]

I. Population Data

A. Community Population

1. Birth rates (Village, Township, County, State)
2. Death rates (Village, Township, County, State)
3. Number of marriages, (Village, Township, County)
4. Federal census population figures (Village, Township, County)
5. Age distribution of population
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9. Number of males per 100 females
10. Number of females by age groups
11. Average size of family
12. Occupational classification of adult population
13. Place of work of adult population

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1. School census by age groups
2. Public School membership (including nonresidents)
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4. Non-public school membership
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6. Public school age-grade reports as of Sept., (elem. sec. div.)
7. Non-public school age grade reports
8. Membership and census data for community districts

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1. Postal receipts
2. Bank clearings
3. Industrial index
4. Building permits
5. Proportion of built-up and vacant land
6. Principal industries and number of employees
7. Land use

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1. Michigan State Department of Public Instruction. Planning Together for School Buildings. Bulletin No. 412. Lansing: the Department, 1950. pp. 109-111.

III. Data on Community Services

1. Transportation routes
2. Street pavement
3. Sewerage system
4. Water supply
5. Hospital service
6. Library
7. Organization for recreation
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2. Administrative policies
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3. Freedom from noise and nuisances
4. Safety to life
5. Playground space
6. Landscaping and screening

B. Buildings

1. Safety to life (fire and plan hazards)
2. Age
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6. Sanitation
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4. Location of pre-school children
5. Location of present school buildings
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8. Transportation routes, sewerage, and water systems

APPENDIX F

Survey Report, Battle Creek Public School, Battle Creek, Michigan.

Made by Committee on Field Services, Department of Education, University of Chicago, April, 1945.

Analysis of the Community, Population and Housing

Most surveys begin with the study of the community as a basis for determining its educational needs and hence its building needs. The best source for this information is the reports of the United States Bureau of Census. The University of Chicago in its study of the Battle Creek Schools made in 1945, assigned Dr. Newton Edwards to prepare the chapter entitled "The Battle Creek Community." Dr. Edwards is eminently qualified to make a study of this type and particularly to interpret the census figures and school census statistics. The following outline indicates the salient points of his chapter:

I. The people and their capacity to meet their educational responsibilities.
   1. Growth of the city from 1870 to 1940.
      a. Census figures are reviewed
   2. Reasons for lack of growth during the decade of 1930-1940.
      a. Declining birth rate
      b. Failure of job opportunities in cities during this period to draw people from the farms.
      c. The tendency for people to move from the city to the suburbs.
   3. Comparison of number of children under five years of age per thousand women age twenty to forty-four in the nation and in Battle Creek.
   4. Analysis of school census figures for the past ten years.

a. Ratio of children and youth five to nineteen per thousand adults in the productive age group (twenty to sixty-four).

b. Favorable ratio of children to adults should facilitate support for an educational program.

5. Estimate of population of the city at the time the survey was made.

a. Ration Book registrations used in estimate.

6. The Battle Creek trading area.

a. Population of this larger community is estimated at 70,000.

b. Retail trading zone and newspaper circulation zone includes all of Calhoun county and eighteen townships in adjoining counties.

7. Index of cultural-economic status.

a. Calhoun County scored 128 with the national average 100 and the highest score for any county in Michigan was 132.

b. Index was based on measures of housing conditions, the universality of elementary education, effective buying income and the extensiveness of the distribution of radios.

c. Index figures indicate that the level of living of this area is relatively high and that the resources are adequate to support an advanced educational program.

II. The pattern of occupational life.

1. Industrial establishments

a. Types of manufacturing plants

b. Number of workers employed and total amount of annual wages

c. Value of products manufactured annually

2. Placement records of U.S. employment service

III. Organization of the educational enterprise

1. Analysis of membership decline increase by individual schools.
2. Number votes cast in school board elections in recent years indicates lack of interest in school affairs.
3. School administration in the larger Battle Creek community is highly decentralized.
   a. There are twenty-three school districts in the four townships in which the city of Battle Creek is located.
   b. Analysis of the number of non-resident pupils in Battle Creek Schools indicates some willingness on part of families residing beyond the city limits to use the city schools.

IV. Planning an educational program for the Battle Creek community.
1. The sense of community consciousness in the larger Battle Creek Community does not appear to be very strong.
2. The boundaries of the larger community should be clearly determined, its common problems should be defined, and plans should be developed for solving these problems.
3. A community-wide educational council should be established to point the way to cooperative action in the solution of the educational problems of the greater Battle Creek area.

The School Sites and Buildings

This chapter was written by William C. Reavis of the University of Chicago and Selmer H. Berg, Superintendent of Schools, Rockford, Illinois.

I. Standards for School sites
1. School sites should be located near the geographical center of areas to be served.
2. The environment of the school site should be residential rather than business or manufacturing.
3. No city school should be erected on a site of less than five acres.

Ten acres or more is the recommendation for junior high school sites and fifteen acres is recommended for senior high school sites.

4. Rectangular plots provide the most effective utilization of ground space.

5. The site should have sufficient elevation to insure proper drainage. Sandy loam provides the best soil for the site. Torpedo sand, gravel or limestone screenings provide the best surfacing for playground areas.

6. The building should be placed on the site so as to secure the best allocation of site area to playground space.

II. Size and characteristics of sites

1. Most schools were erected on sites entirely inadequate for the purpose.

2. All sites were rated as to:

   a. Location of site with respect to center of population of district.

   b. Location of site with respect to surrounding area.

   c. Travel hazards to pupils

   d. Distances travelled

   e. Elevation of present site

   f. Drainage

   g. Adequacy

   h. Possibilities of enlarging the present site

   i. Prevailing opinion in community with respect to the present school site.

III. School buildings

1. The school-building program should be developed to accommodate the educational program.

2. The effectiveness of a plan for school building development is determined partly by the plans for city development.

3. A city zoning plan contributes greatly to the stability of a school building program.

4. Classification school buildings of Battle Creek by age and condition.

   a. No score card rating was made but each school was inspected and rated A.B.C. or D.

   b. A paragraph is included describing the condition of the building, the site limitations, the probable future land use of the area, and listing recommendations and needed improvements.

IV. Location of School Buildings

1. The location of school buildings is analyzed in terms of distances pupils must walk to reach school. Circle figures are used.

   a. Standards used are one-half mile for elementary districts, one mile for junior high school districts and two miles for senior high school districts.

V. Classroom seating

1. Recommend movable seat and desk units or tables and chairs.

2. In elementary schools, 58 per cent of the school seating is adjustable and movable and 32 per cent is tables and chairs.

3. One third of the secondary school seating is fastened to the floors, another third is adjustable and movable and only one ninth is of the preferred table and chair type.

VI. Utilization of seating provided

1. Seating facilities of elementary school classrooms are used to capacity except in two of the schools.

2. The average pupil-station utilization of the secondary schools is 53 per cent, indicating that a much larger enrollment could be accommodated.

Financing the Schools

This chapter was prepared by Nelson B. Henry of the University of Chicago, School of Education.

I. Present status of operating funds.

1. School district has been operating by deficit financing. Expenditures should be so planned that this borrowing power is reserved for use only in emergency situations.
2. The obligation to maintain a satisfactory school program is a public obligation and future revenue requirements should be planned for without reliance upon private aid. The Kellogg Foundation has made continuing contributions from 1931 to 1944.
3. Revenues consist of 56 per cent from local taxes and 39 per cent from state aid.
4. Expenses of operation have exceeded the sum of state aid and current tax receipts for each of the four years prior to 1943-44. Since these items represent 95 per cent of the necessary income, future budgets should be planned on the basis of an approximate balance between appropriations and the income to be expected from the two major sources.

II. Local tax for school purposes

1. The critical factor in the problem of financing the schools is related to the fifteen mill tax limitation which includes the city government as well as the county and the schools.
2. An election should be held on the extra millage proposition to

increase the allocated rate by three mills effective in the fiscal year 1945-46, and established for a five year period.

3. The essential obligation of the board of education is to provide the opportunity for an expression of popular opinion and the information the public will need in order to gauge intelligently the requirements that should be met.

III. The local tax burden in Battle Creek

1. Tables taken from the National Municipal Review show the relative rank of Battle Creek's tax rate compared to other cities of its population group and other Michigan cities. The adjusted school tax rates and the percentages the school tax rate is of the total property tax rate are also compared.

2. Battle Creek's total tax rate ranks considerably below the average of the 42 cities of similar size. Its school tax rate is the median rate for the group and the city ranks relatively high among these cities with respect to the percentage of the total tax used for school purposes.

3. Among Michigan cities of more than 30,000 population, Battle Creek ranks tenth in point of the adjusted total tax rate, sixth in order of school tax rates and second in the proportion of the total rate used for the schools.

IV. Financial needs of the Battle Creek Schools

1. An indebtedness of $79,000 was incurred due to the fact that operating expenses exceeded income from tax receipts and state aid for each year from 1939 to 1944.

2. Due to this situation maintenance costs have been reduced to the bone, capital outlay for plant improvement has been deferred, and no new staff appointments have been made.

3. Recommendation is made that the school budget be increased a total of $200,000 to provide for moderate expansions in school services and for overdue plant expenditures. These needs are detailed.

V. The level of school expenditure

1. Battle Creek rates favorably in cost per pupil in average membership when compared with other Michigan cities.

2. Battle Creek's cost per pupil in average daily attendance is only slightly below the median of other cities of its size throughout the country.

VI. School costs and tax burden

1. The factual data relating to school costs and tax burden appear to justify immediate action to make effective recommendations for the improvement of various features of the school system.

2. The board of education may with propriety seek the authorization of revenues necessary for instituting the improvements outlined in the survey report.

Tables

1. Census and average membership Battle Creek Public Schools 1934-35 to 1943-44.

2. Placements by occupational groups, Battle Creek, 1943 and 1944

3. Placements by skill, grade, and class of worker, Battle Creek, 1943 and 1944.

4. Votes cast in elections for members of the board of education, 1940-1944.

5. Number of registered voters and votes cast at special elections since the passing of the fifteen mill tax limitation in 1935.

6. Nonresidents attending city schools, 1943-44.

7. Minimum areas for school sites.

8. Acreage of school sites and acreage which would have to be added to meet minimum standard.
9. Characteristics of school sites in Battle Creek.
10. Dates of original construction and additions and type of building.
11. Per-pupil expenditures in dollars for building maintenance in Battle Creek, in the State of Michigan and for the United States.
12. Utilization of classroom space in junior and senior high schools.
13. Budget recapitulation 1944-45.
14. Estimated income for year 1944-45.
15. Assessed valuation of school district, current tax receipts, state aid funds, and operating expenses by years, 1939-40 to 1943-44.
16. Adjusted total tax rates per $1000 of property valuation on 100 per cent basis of assessment for forty-two cities of 40,000 to 50,000 population, 1944.
17. Adjusted school tax rates per $1000 of property valuation on 100 per cent basis of assessment for thirty-five cities of 40,000 to 50,000 population, 1944.
18. Percentage school tax rate is of total property tax rate in thirty-five cities of 40,000 to 50,000 population, 1944.
19. Comparative total tax rates and school tax rates for 1944 in sixteen Michigan cities of more than 30,000 population.
20. Estimated maintenance work needed for public school buildings.
21. Estimated expenditures needed for capital outlay on public school buildings.
22. Cost per pupil in average membership of twelve Michigan city school systems, 1943-44.

23. Current expense per pupil in average daily attendance in nineteen cities of 40,000 to 50,000 population, 1941-42.

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1. Sites of elementary school buildings in which children of the kindergarten and first six grades are housed. (Circles have radii of one-half mile.)
2. Sites of school buildings in which children above the sixth grade are housed (Radius of circle described around senior high is two miles; all others are one mile.)

APPENDIX G

T. C. Holy, John H. Herrick. A Survey of the School Building Needs of Cincinnati, Ohio.

I. General characteristics and growth of Cincinnati
   1. General characteristics
      a. Size and location
      b. Topography
      c. Economic life
   2. Population
      a. Racial composition
      b. Population growth
      c. Population by age groups
      d. Population changes by area
      e. Probable future population
   3. Summary

II. School organization and pupil personnel
   1. Organization
      a. National trend
      b. Development in Cincinnati
      c. Present policy in Cincinnati
   2. School membership
      a. Membership in recent years
      b. Membership estimates
   3. Implications for school plant
      a. Elementary schools should be planned for six grades and kindergarten and their size should be based on an assumption of 35 pupils per room.

b. Junior high schools should be planned where a size of five hundred pupils can be maintained and where excessive unused space in existing buildings will not result.

c. The needs of the vocational high schools should be conservatively estimated and buildings should be so placed as to be suitable for regional use.

d. Comprehensive high schools and junior high schools should be planned with a city-wide provision for an increase of from 15 to 20 per cent in membership.

4. Summary

III. The present school plant and its utilisation

1. Introduction

a. History, age, and cost of present school plant

2. Scoring of buildings

a. Method of scoring

(1) Holy and Arnold score cards were used

b. Scores of secondary school buildings

c. Scores of elementary school buildings

3. General interpretation of scores

a. Sites

(1) Standards are discussed

b. Buildings

c. Academic classrooms

d. Special classrooms

e. General service rooms

f. Administrative rooms

g. Service systems

h. Comparison with other cities

4. Vocational high schools

a. General evaluation

b. Evaluation by schools

5. School building utilisation

a. Explanation of procedure

(1) Secondary schools were studied in terms of room utilisation and pupil station utilisation

(2) Elementary schools are studied in terms of membership and building capacity

b. Secondary school utilisation

c. Utilisation of elementary buildings

6. Summary

IV. Recommended future school plant

1. Basic considerations

a. Special schools and classes

b. Use of existing buildings

c. Size of elementary buildings

(1) Assumes 35 pupils per classroom above the kindergarten and 30 kindergarten pupils per session

(2) Auditorium, gymnasium, lunchroom, practical-arts room, visual-aids room and kindergarten-primary playroom are provided but are not included in computing capacity

d. Size of secondary school building

(1) Assumes 70 per cent pupil station utilisation

(2) Secondary schools are expected to maintain an enrollment of five hundred or more

e. Placement of schools

(1) All pupils enrolled should live within a radius of three-fourths of a mile of an elementary school, a mile and a half of a junior high school, and two miles

of a senior high school.

(2) Consideration should be given school buildings in adjoining school districts which might possibly be brought into the city by future annexation.

2. Senior high schools

a. Distribution of pupils

(1) Interpretation of spot map

b. Recommended plan in general

(1) Recommendations for each senior high school district for abandonment, retention, or conversion of present buildings. Recommends new buildings where needed.

3. Junior high schools

a. Distribution of pupils

(1) Interpretation of spot map

b. Recommended plan in general

c. Abandonment of schools

d. Continuation of existing junior high schools

e. Junior high schools to be rehoused

f. New junior high centers

4. Elementary schools

a. Distribution of pupils

(1) Interpretation of spot map

b. Recommended plan in general

c. New school centers

d. Changes in district boundaries

e. Details of recommendations by schools

f. Other new elementary school buildings

g. Additions and alterations

5. Vocational schools

a. Recommends a new vocational school located so as to be accessible from all parts of the city

6. Special schools

a. Details of recommendations for school housing plans for schools for gifted children, unadjusted adolescents, crippled children, slow learners, and other handicapped children.

7. Administrative buildings

a. New office building to house the entire central office personnel

b. Warehouse and shop space to be provided by converting two present buildings now used for instructional purposes.

8. Site acquisitions and enlargements

a. Presents a proposal for site enlargement of fourteen existing school plants

9. Unused buildings and sites

a. Lists 25 buildings and 8 vacant sites which are no longer needed and should be sold

10. Summary

V. Implementation of the recommended program of plant improvement

1. Financing the recommendations

a. Estimated cost

(1) Lists projects with estimated cost of each

b. Source of funds

(1) Recommends an additional bond issue or a continuing building levy

2. Sequence of projects

a. Recommends the purchase of needed sites where vacant land is now available as first step

b. Recommends the acquisition of sites where partially vacant land is available.

c. Lists each site and building project in the order in which it should be undertaken

3. Other recommendations

a. Site selection

(1) Recommends establishing a staff site selection agency to set standards for site selection, make tentative site selections after consulting with the City Planning Commission, and finally to recommend sites to the Board of Education for review and final selection

b. Building plans

(1) Recommends a staff schoolhouse planning agency to gather suggestions from employee advisory committees and to set up criteria to be observed in determining the nature of facilities to be provided

c. Personnel for site selection and building planning

(1) Recommends a person experienced in the planning and execution of school building projects and who is competent in both the educational and engineering aspects of the job

d. Review of survey recommendations

(1) Recommends that all proposals be reviewed, before they are finally executed, in the light of the latest information on census, home construction, population movements and the revised city master plan

e. Changes during construction

(1) Recommends full and adequate advance planning rather than ignoring needs developing after construction begins.

f. Public participation in planning

(1) Recommends that representatives of interested groups be given an opportunity to present criticisms of the proposed program within a limited period of time.

(2) Recommends that the Board of Education take criticisms and suggestions under advisement, making no final decisions on them until they can all be considered in the light of the entire recommended program.

g. Summary

VI. Results of the recommended program of plant improvement

1. Quality of buildings

a. Will eliminate all the temporary frame buildings and rented quarters now in use

b. Buildings lacking auditoriums, gymnasiums, and other special facilities are either to be abandoned or these facilities are to be provided

c. Old uneconomical structures will be removed from service reducing the median building age from thirty-seven to twenty-eight years

2. Adequacy of sites

a. Median secondary school site is increased from 1.6 acres to 7.6 acres

b. Median elementary school site is raised from 1.8 to 3.8 acres

3. Plan of organization

a. The junior high school plan of organization will be in use in all but two isolated communities.

b. There will be only one combination elementary and secondary school

4. Size of school units

a. All elementary schools under 300 pupils and all secondary schools under 500 pupils will be eliminated

b. The number of elementary school units will be reduced from 62 to 54

5. Margin of capacity

a. Plan provides elementary school capacity for approximately 14 per cent more than the present membership without exceeding an average of 35 pupils per room

b. The proposed senior high school plant provides for a margin of 24 per cent and the junior high school margin will be 16 per cent over the present membership

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APPENDIX H

The Worcester, Massachusetts Survey of Plant Facilities

This survey was made by the Institute of Field Studies Teachers College, Columbia University and published in 1949. Henry H. Linn was the director of the survey. The survey discusses the operation and maintenance of the physical plant and the management of the custodial staff personnel with special reference to the salary emolument. The report answers the following questions:

1. What is the physical status of the several existing school buildings and grounds?
2. To what extent do they meet criteria calling for buildings that are safe, healthful, comfortable, convenient, attractive, and adaptable?
3. How well do the buildings serve the promotion of a desirable educational program?
4. How conveniently are the schools located with reference to the pupils to be served?
5. How many school plants are needed to care for the anticipated future school enrollment over the next ten to twenty years and where should they be located?
6. What new plants are needed, which existing plants should have additions and what plants might be closed (at least temporarily) or abandoned?

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9. Location of elementary schools - Grade K-8
10. Present locations of junior high schools
11. Location of present senior high school buildings
12. Proposed locations of elementary schools
13. Proposed locations of junior high schools
14. Proposed locations of senior high schools
15. Classical high school - Distribution of pupils grade 10-11-12
16. West central section
17. Southeast central section
18. East central section

Illustrations

1. Some examples of poor classrooms
2. Some examples of poor school buildings
3. Some examples of good school buildings
4. Some examples of mediocre school buildings
5. Hand washing facilities

6. Fire hazards in Worcester Schools

7. Lunchroom dining facilities

An outstanding feature of this report is the school building analysis sheets contained in the index. These present pertinent data on each building in a convenient form and include a list of needed improvements and recommendations.

APPENDIX I

The School Plant Needs of the School District of the City of Port Huron:

Research Study Number Three by Arthur Bernard Moehlman and James A. VanZwoll. Published by the authority of the Board of Education, City of Port Huron, July, 1942.

I. The Port Huron Community

1. Reorganization trends
2. The community district
3. Natural communities in St. Clair county
   a. Thaden - Mumford Study
   b. Van Volkenburgh Study
   c. Chamber of Commerce Study
   d. Check survey: Studied non-resident students
      (1) Distance travelled
      (2) Residence
      (3) Method of travel
      (4) Trading centers
      (5) Newspaper circulation
      (6) Parents place of work
   e. Comparison of surveys previously made of this area
4. The Port Huron natural community
   a. Land use
   b. Population
      (1) Total population
      (2) School population
   c. School organization
   d. School service
   e. Non-resident students

f. Valuation per child

5. Summary

a. The planning for the educational future of Port Huron must include the facilities needed to serve the natural community or trade area of which it is the nucleous.

b. "The school district of the future will be centered in the natural community, a land area with a combination of closely related economic, educational and social interests."

c. The Port Huron community is currently organized in thirty-seven ungraded or primary districts and one third class city school district.

II. The Port Huron school district

1. History

2. Economic conditions

a. Industry

b. Natural resources

c. Retail trade

d. Purchasing index

e. Postal receipts

f. Communication

g. Labor

h. Power

3. Transportation

a. Water

b. Railroads

c. Highways

d. General

4. Government

a. Water

b. Sewage

c. Recreation

d. Library

e. Cemeteries

f. Hospitals

g. Public health

5. Social organization

a. Societies

b. Churches

6. Land use

a. Territorial growth

b. Current land use

c. Transportation

d. Industrial areas

e. Commercial area

f. Parks

g. Cemeteries

h. Built up and vacant property

i. Pavement

j. New construction

k. Zoning

l. Future land use

m. Transportation

n. Industry

o. Commerce

p. Recreation

7. Population

a. Composition

b. Density

c. Population growth

d. Future growth

(1) Stimulating factors

(2) Depressive factors

8. Summary

III. The School Population

1. Total population and school census

2. Location of children of school age

3. School census and school membership

a. Children in school

b. Membership by age groups

4. Acceleration and retardation

5. Growth of school membership

a. Elementary (Public and non-public)

b. Secondary (Public and non-public)

6. Future demands

a. Total population

b. Port Huron school population

c. Community demands

d. Conditioning factors

7. Summary

IV. The organisational history

1. Private effort

2. Ungraded rate schools: 1833-1848

3. Early union schools: 1849-1864

4. Organisation: 1865-1899

5. Organisation: 1900-1917

6. Organisation: 1918

7. Organization: 1919-1922

8. Organization: 1923-1942

9. Probable future organization

   a. Elementary

   b. Secondary

10. Summary

V. The educational policies

1. The purpose of education

2. The extent of education

3. The organization of education

4. Location of buildings

5. Developmental procedures

   a. Board of Education

   b. Superintendent

   c. Architects and engineers

   d. Building contractors

   e. Appraisal

   f. Operation and upkeep

   g. Appraisal

VI. The present school plant

1. Elementary school plant

   a. Location of children

   b. Location of buildings

   c. Adequacy of sites

   d. Playground area

   e. Traffic hazards and noise

   f. Screening of sites

   g. Landscaping

   h. Drainage

1. Unused sites

2. Elementary school physical plant

   a. Capacity and use

   b. Instructional facilities

   c. Building age

   d. Safety to life

   e. Sanitation

   f. Operating efficiency

   g. Maintenance efficiency

3. Disposition of elementary buildings and sites

   a. Buildings

   b. Sites

4. Secondary school plant

   a. Location of students

   b. Adequacy of sites

      (1) Junior high schools

      (2) Senior high schools

      (3) Junior college

   c. Appraisal

   d. Buildings

      (1) Junior high schools

      (2) Senior high schools

      (3) Junior college

5. Use of secondary buildings

   a. The Washington Junior high school

   b. Senior high school

   c. Junior College

6. Summary

VII. The Future School Plant

1. City of Port Huron school district

a. Elementary division

(1) Numbers

(2) Attendance areas (Each elementary school district is analyzed and recommendations are made)

b. Secondary division

(1) Organization

(2) Numbers

(3) Attendance areas (These are defined and recommendations are made for each)

(4) Port Huron Community College

c. Board of Education

(1) Recommends remodeling present junior college building to enable it to be used for administrative offices

2. The Port Huron natural community

a. Recommends creating a Port Huron School Community Planning Committee

b. Recommends expanding the present school district to include the present boundaries of the natural community

VIII. Finance

1. Cost of plant program

2. District financial condition

3. Methods of financing

4. Summary

The Maps

1. Natural Communities in St. Clair County, Thaden and Mumford

2. Proposed community District, St. Clair County, Van Volkinburgh

3. Comparison of Natural Community Surveys

4. Port Huron Community and St. Clair County
5. Land Types in the Port Huron Community
6. Location of Children of School Age in the Port Huron Community
7. School District Organizations in the Port Huron Community
8. Location of Children of School Age (Secondary) in the Port Huron Community, Attending School
9. Railroad and Highway Facilities in St. Clair County
10. Territorial Development of Port Huron
11. Current Land Use in Port Huron 1942
12. Built Up and Vacant Property in Port Huron June, 1942
13. Street Pavement as of 1942
14. Building Permits over $2000, 1940-41 incl.
15. City Planning Commission Zoning Map
16. Future Land Use in Port Huron
17. Location of School Age (5-19) Children School Census 1942
18. Location of Elementary School (K-6) Children 1941-42 and Proposed Attendance Areas
19. Location of Elementary School Buildings 1942
20. Location of Junior High School (7-9) Children, 1941-42
21. Location of High School (10-12) Pupils, 1941-42
22. Proposed Extension of the Port Huron School District into the Community

<u>The Charts</u>

1. U. S. Postal Receipts, Port Huron
2. Telephone Customers, Michigan Bell Telephone Company
3. Electric and Gas Customers in Port Huron, The Detroit Edison Company
4. Population Growth in Port Huron

5. The Relationship of School Census to Total Population
6. Number of Children Attending School by Type of School and by Years 1931-42
7. School Census and School Membership by Instructional Divisions
8. Growth in Public School Membership by Instruction Divisions
9. The Evolution of Instructional Organisation in Port Huron, 1833-1942
10. Theoretical School Plant Spacing for a K-6-4-4 Instructional Organization
11. Summary Appraisal of Elementary Schools
12. Washington Junior High School Use for the Week Ending May 15, 1942
13. High School Use for the Week Ending May 15, 1942
14. Junior College Use for the Week Ending May 15, 1942
15. Summary Appraisal of Secondary Sites and Buildings

The Tables

1. The Port Huron Trading Area
2. Distances of Non-Resident Secondary Students from Port Huron
3. Location of Non-Resident Secondary School Students
4. Method of Transportation Used by Non-Resident Secondary Students
5. Port Huron Community Trading Centers Indicated by Non-Resident Secondary School Students
6. Newspapers Subscribed to by Families of Non-Resident Students
7. Place of Work of Parents of Non-Resident Students
8. Total November Membership, 1941-42 in Port Huron Community
9. Percentage Distribution of School Membership as Related to School Census in Port Huron Community by Townships, School Year 1941-42
10. The Per Capita Valuations in the Port Huron Community
11. Retail Trade in Port Huron 1929 and 1939 (U.S. Census Reports)

12. The Purchasing Power of a Dollar in Three Michigan Cities 1935

13. Employment Status of Persons 14 Years of Age and Over, 1940

14. The Port Huron and Michigan Birth and Death Rates, 1926-1942

15. Territorial Growth and Population Density

16. Port Huron Population Composition

17. Growth of Port Huron Population, 1860-1940

18-19. Relation of School Census to Total Population

20. Acceleration and Retardation in the Port Huron Public Schools, 1942

21. Acceleration and Retardation in the Port Huron Non-Public Schools, 1942

22. Total Elementary November Membership (K-6), 1935-1941

23. Secondary November Membership (Grades 7-14) 1935-1941

24. Estimated Growth in Port Huron and Natural Community, 1942-1950

24A. Appraisal of Location of Elementary Buildings

25. Size of Elementary School Sites

26. Size of Elementary School Playgrounds

27. Appraisal of Sites for Traffic Hazards and Interfering Noise

28. Appraisal of the Screening of Elementary Sites

29. Appraisal of Elementary School Site Landscaping

30. Elementary School Capacities

31. Elementary Instructional Facilities

32. Age of Elementary Buildings

33. Safety to Life: Fire and Plan Hazards

34. Elementary Plant Sanitation

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36. Average Unit (1000 Cubic Feet) Heating Costs, 1938-1942

37. Average Cost of Building Maintenance Based on Membership, 1938-1942

38. Disposition of Elementary Buildings

39. Disposition of Elementary Sites

40. Secondary School Sites

41. Disposition of Secondary School Plant

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I. The Port Huron natural community

II. The Port Huron school district

III. The school population

IV. The organisational history

V. The educational policies

VI. The present school plant

VII. The future school plant

VIII. Finance

The Appendix

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2A The Detroit Edison Company electric and gas customers

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15A Port Huron population by age group classifications 1920-1940

16A Method of estimating population

17A November memberships in ratio to school census by school division

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20A Port Huron public schools age-grade report, January, 1942

21A Port Huron non-public schools age-grade report, June, 1942

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25A Unit heating costs of buildings

26A Distribution of operating costs by schools and by memberships

27A Unit cost of total operation of schools by volume

28A Distribution of maintenance cost by building and memberships

29A Heating costs of schools

30A Ranking of schools in terms of cost of maintenance and of operation

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32A Use of the Port Huron senior high school

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Form used for appraisal of the existing plant

Plot plans of each building and site

APPENDIX J

The Report of a Survey of the Public Schools of Newark, New Jersey.

Made by The Division of Field Studies Institute of Educational Research Teachers College, Columbia University, George D. Strayer, Director, N. L. Engelhardt, Associate Director, Bureau of Publications, Teachers College, Columbia University, New York: 1942

The School Building Program

I. Newark and its Population

1. Reasons contributing to population decline
   a. Poor housing: Statistics from State Housing Authority survey
   b. Migration away from the city due in part to better schools in surrounding areas
   c. Declining birth rate
2. Building saturation
   a. Only 33 vacant blocks out of 1975 blocks in the city
   b. Study of blocks occupied shows 79.8 per cent saturation
   c. Apparently American people are becoming increasingly opposed to dense concentration of people in blocks
   d. More attractive home centers are being found outside the city
3. Large scale housing
   a. Large scale housing should be coordinated with new scale housing, new parks and new recreational areas
4. Increase in Negro population
   a. 1930, 8.8 per cent of total population was Negro

b. More Negroes make it necessary to consider their problems of housing, recreation and education

5. Population changes by sections of the city

a. Indicates wards of the city which gained in population from 1920-30 to 1930-40 and those which declined during the same period

6. Future population of Newark

a. High density of population of 18,767 inhabitants per square mile surpassed only by Jersey City when compared to twelve other northern cities of the same class size

b. Probable that the population will decrease

7. Geographical limitations

a. Considers probable annexation of neighboring communities of Belleville, East Orange and Irvington

8. The role of the school system in the study of population and the suggestion of city improvements

a. Schools should have a group of its teachers, principals and administrative officers, constantly engaged in the study of the city itself, its people, its housing, its problems of juvenile delinquency, infant mortality, mortgage foreclosures and the like.

b. The replanning of Newark is first of all a great educational enterprise

II. The Physical Plant of the School system

1. Number of school buildings in use November, 1941

a. Elementary, Junior high, high schools

2. The age of Newark's school buildings

a. Outmoded buildings have been equipped with fire-resistive

stair towers

b. Newark mustbe willing to tear down some of its old school houses and new buildings must become community centers open day and evening

3. Ratings of Newark's school buildings

a. Strayer-Engelhardt 1000 point score cards

b. 79.7 per cent of Newark's buildings scored less than 500 points out of a possible 1000

4. Elementary school building scores

a. New buildings are preferred to additions to old buildings

5. High school building scores

6. Enrollments housed in various building rating categories

a. Lists per cent of children housed in inferior, inferior and poor, superior, superior and good.

III. Good Features Predominating Among the School Buildings

1. Fire-resistive stairwells

2. Excellent fencing around playgrounds and experimentation with resilient playground surfacing

3. Principals office and health service rooms are attractive and well planned

4. Fire extinguishers are in good condition

5. Experimentation in artificial lighting has led to improvements

6. Most schools are provided with an auditorium, gymnasium and with special shop facilities

IV. Outstanding Faults Found in the School Plant

1. Sites

a. Inadequate in size, not properly planned or selected

2. Auditoriums

a. Some are placed on the top floors rather than ground floors

b. Inadequate provision for ease of exit of audience and inadequate stages

c. Should be located on the outer periphery of the buildings

3. Gymnasiums

a. Basements are not the proper places for gymnasiums

b. Represent the architects concept of what a gymnasium should be rather than the educator's or physical directors concept

4. Lighting

5. Heating

6. Ventilation

7. Acoustical treatment

a. Cafeterias and corridors need acoustical treatment of ceilings

8. Toilet facilities

a. "Unreasonable and even inhuman to expect children to travel from a third or fourth floor classroom to an insanitary toilet located in a dark basement recess."

9. Interior decoration

a. Tends toward deadliness & institutionalisation

10. Partitions and corridors

a. Necessary to pass through classrooms to get from one part of building to another

11. Basements

a. Industrial arts and household arts classes are housed in basement classrooms

12. Weathering of new construction: Extensive leakage indicates need for checking of specifications and supervision in planning

13. Planning for educational use

a. Needs of teachers and pupils have not been considered in the planning of spaces

b. Architect's concept of what was desirable rather than the educator's has prevailed even in the kindergarten rooms

c. Lack of flexibility in classroom equipment, over-installation of blackboards and limited provision for bulletin board space characterize many classrooms

V. Proposed School Organization and the School Plant

1. K-6-3-3 plan recommended

2. The middle schools

a. Description of needs in terms of site, garden space, workshops, homemaking rooms, cafeteria, libraries, and auditorium

3. The upper schools

a. Must be planned for educational, social, and recreational center for the adults as well as for the youth

b. Description of facilities to be included

VI. Population and Ultimate Building Program for Sections of the City

1. City was divided into seven sections and population trends were traced for each section from 1920 through 1940. Estimates were made for 1950

2. Analysis was made of each school in each district. Topics treated were:

a. Grades housed

b. School building rating

c. Playground rating

d. Building capacity (From principals estimates)

e. Live enrollment

f. Average daily attendance for previous year

g. Number of additions to original school building unit

h. Date of latest addition

i. Dateof original unit

j. Cases of truancy per 1000 enrolled previous year (by attendance districts)

k. Index of educational need

l. Number of vacant rooms

m. Percentage of classrooms in basement or on ground floor

n. Percentage of classrooms above second floor

o. Total population, 1940

Per cent of population change 1930-1940

p. Probable future population change

q. Estimated percentage of 1940 population which is:

Native white

Foreign born white

Negro

Other races

5-14 years of age

3. Brief description of the section

a. Population trend

b. Housing situation (residential saturation)

4. Recommendations concerning schools in the section

Financing the Schools

I. How much do the public schools of Newark cost?

1. Total costs have ranged from a low of ten million to a high point of almost fourteen million with cost at the time of the survey just under twelve million

II. What are the major items of school expenditure?

1. Current expenses: $10,504,000 or 88.6 per cent of total
   a. Refers to payments for services and materials currently consumed in running the schools
   b. Includes salaries, books, supplies, cost of census, attendance, health, and medical services; transportation of pupils, expenditures for insurance, pensions and other fixed charges
2. Debt services: $1,225,000 or 10.3 per cent of total
   a. Involves payments of both principal and interest on debt for school purposes
3. Capital outlay: $133,000 or 1.1 per cent of total
   a. Expenditures for new sites, buildings and equipment
4. Details of major item, current expenses
   a. General control: 3.85 per cent
   b. Instruction: 79 per cent
   c. Operation of plant: 8.37 per cent
   d. Maintenance of plant, coordinate activities and auxiliary agencies, and fixed charges account for remaining 8.78 per cent

III. What is the trend of expenditures per pupil?
1. Elementary school costs
   a. Dropped rapidly during the early depression years then increased to a high point of $141.82 at the time of the survey
2. Secondary school costs
   a. Costs stayed below the cost at the beginning of the decade until the final year when a high point of $186.52 was reached
3. Special school costs

a. Costs dropped sharply during the first years of the decade then gradually rose to $297.04 which was still below the high point established the first year of the decade

IV. Is Newark spending more or less for its schools than comparable cities?

1. Cost per pupil is compared with twenty school districts in Essex County

a. Newark with a per pupil cost of $169.46 ranks eighth

2. Per pupil costs compared with seven other cities with a population of more than 300,000 located in the northeastern states

a. Newark ranks third among these eight large cities in population

b. Ranks first in the group in proportion of total population which is in school indicating a heavy educational load

c. Ranks fourth in annual per pupil costs and fifth in daily per pupil costs

3. Comparison is also made with these cities in regard to cost per pupil of major items of current expense

a. Ranks relatively high in terms of administration, instruction and coordinate activities

b. Expenditures for operation of plant are average

c. Maintenance and fixed charges expenditures are below average

4. Newark's school expenditures justifies its citizens in expecting better than average schools

V. Is Newark financially able to pay for good schools?

1. Ratio of assessed value to true value of property in the eight

comparable cities and the estimated true value of taxable property shows Newark to rank sixth

2. Taxable wealth per capita and per child

   a. Comparison with other great cities of this area shows that Newark has less than average ability to pay for its schools

3. Percentage of population making income tax returns

   a. Newark ranks eighth

4. Ability to finance schools as affected by debt

   a. Newark ranks sixth among the eight cities in the ratio of school debt to taxable property

   b. City's ability to finance education is not significantly modified by debt

VI. Is the state of New Jersey adequately aiding in the financing of Newark schools?

1. New Jersey is one of the most laggard states in the nation in providing state aid to local school districts

   a. Provides only six per cent of local school receipts while the average of the United States is thirty per cent

VII. How much can Newark spend for its schools?

1. School support and local fiscal organization

   a. It may spend as much as the Board of School Estimate authorizes

2. Sources of school revenue in Newark

   a. Income from local sources is increasing while income from state sources is decreasing

3. Financing plant needs

   a. Capital outlay may be financed by increasing the property tax for "pay-as-you-go" financing or through borrowing

4. Economic capacity and school support

   a. School expenditures amount to only three per cent of the effective buying income of the people

   b. Newark can spend almost any amount it considers necessary to spend

5. Willingness to finance education

   a. Obstacles to adequate school support are readily overcome when people are clear as to the value of education and its financial needs

   b. With adequate vision and well conceived, effectively administered services Newark will invest substantial sums for schools

VIII. How much should Newark spend for its schools

1. Appraisal of current level of expenditure

   a. The value of the services rendered must be considered along with the costs involved

2. Administration costs

   a. Recent level of expenditure for general control is justified. Good administration does much to maintain and increase the efficiency of a school system

3. Instructional expenditures

   a. Only decreasing school enrollment can make possible reduction in instructional expenditures

4. Operation and maintenance of plant

   a. Emphasis should be along lines of realising better returns for expenditures made

5. Other items of current expense

   a. Auxiliary agencies, coordinate activities and fixed charges

are essential services and the amounts expended for them are generally justified

6. Capital outlay

a. Expenditures for buildings sites and equipment are at a low level. Eventually the city should make substantial expenditures to meet the plant needs pointed out

IX. Analysis of 1942-43 budget

1. Decreases resulting from closer budget estimates

a. Appropriations have tended to exceed expenditures each year by a considerable amount

2. Decreases resulting from decline in school enrollment

a. Reduction in personnel may be accomplished by not filling vacancies which occur. This should result in a budget reduction of $124,800

3. Decrease in operation and maintenance cost

a. Possible reduction of $110,000 is suggested as a temporary, war-time, economy measure

4. Minimum estimate of other reductions

a. Reduction in amount spent for capital outlay and the reduction of the number of small classes should reduce budget by at least $133,000

5. Recapitulations of reductions in 1942-43 budget

a. Possible decreases suggested total $576,775

b. Since the major part of this reduction is taken from the instructional salary item it is emphasised that similar reductions cannot be made in following years without doing harm to the school program

X. Future school costs

1. Factors tending to reduce school costs

a. Declining enrollment trend indicates decreasing educational load carried by the city

b. Gradual reduction of the retirement age should result in increased educational efficiency and permit substantial savings

2. Factors tending to increase school costs

a. Rising prices

3. Needed expansions of educational service

a. Numerous areas of educational services need more adequate provision and will tend to increase costs

4. Youth needs

a. Goal should be to provide adequate educational service for all youth up until the time they enter into permanent and desirable full-time employment

Tables

1. Date of erection of Newark School buildings and additions by decades of erection

2. Placement of individual Newark school buildings under their rating categories, November, 1941

3. Total population by sections of Newark, 1920 to 1940, and estimates for 1950

4-10. School buildings of the different sections of Newark - Facts concerning buildings and population

11. Annual expenditures for operation and maintenance of the Newark public school plant over the five year period, 1936-41

12. Annual expenditures of the Newark public schools for current expenses, debt service and capital outlay for school years 1931-32 to 1940-41

13. Distribution of items composing current expenses for regular full time day schools in Newark for school years 1931-32 to 1940-41

14. Number and cost per pupil in average daily attendance in full time, regular terms elementary and secondary schools and in special schools and classes in Newark public schools for school years 1931-32 to 1940-41

15. Ratio of children 5 to 19 years of age to total population and of number of pupils in average daily attendance in day schools to the number of children 5 to 19 and to the total population in Newark and seven other large cities, 1940

16. Current expenses per capita of total population and per pupil in average daily attendance in full time regular day schools per year and per day in Newark and seven other cities in 1939-40

17. Cost per pupil in average daily attendance of major items of current expense in full time regular day schools in Newark and seven other cities in 1939-40

18. Assessed value of taxable property and estimated true value of taxable property in Newark and seven other cities in 1941

19. Estimated true value of taxable property in 1941 in per capita of total population, per child 5 to 19 years of age, and per pupil in average daily attendance in day schools in Newark and seven other cities

20. Percentage of school receipts from taxation and appropriation from state sources for the four states in which the eight large cities are located for the years 1930, 1934, 1936, 1938 and 1940

21. Receipts from state (including federal) and local sources for

public education in Newark for the school years 1935-36 to 1941-42

Charts

1. Population trends 1860 to 1950, the United States, New Jersey, Essex County and Newark

Map

1. Population change, Newark, N. J. 1930-1940

APPENDIX K

Report of the Cooperative Study of the Lincoln Schools, 1945-46, Board of Education, Lincoln, Nebraska, 1947.

This survey was directed by Clyde M. Hill and S. M. Brownell of Yale University. The section on "The Physical Plant" was written by Calvin Grieder, University of Colorado, and the section on "Finance" was written by Leslie O. Chisholm, University of Nebraska.

I. The Physical Plant

1. Foreword
2. Population forecasts
   a. The city population
   b. School population
      (1) Past school census
      (2) Future school census
      (3) Enrollment by schools
   c. Conclusions
3. Status of the existing school plant
   a. School organization
   b. Evaluation of elementary school sites and buildings
      (1) Elementary school sites
      (2) Elementary school buildings
      (3) Score-card evaluation of elementary school plant
      (4) Operation costs of small units
   c. Junior and senior high school plant
      (1) Junior high school sites
      (2) Senior high school sites
      (3) Junior and senior high school buildings
      (4) Miscellaneous other sites and buildings

4. Utilization of existing school plant

a. Utilization of existing school plant

b. Utilization of secondary school buildings

(1) Separate studies of utilization of each building

(2) Summary of secondary school utilization

5. Future school plant needs

a. Recommendations on site development

b. Recommendations on school buildings

6. Appendix

a. Forecasting Lincoln's future population growth

(1) Past population growth

(2) Estimates of future growth

(3) Economic and social considerations

(4) Project estimate

II. Finance

A. Income

1. Sources of income

a. Local taxes produced ninety-one per cent in each of last two years

b. Income from permanent school funds held in trust by the state produces 2.5 per cent and miscellaneous items, federal and state grants and tuition account for the remainder

c. Lowering of the assessed valuation of real estate during the depression years has resulted in an apparent permanent reduction in these assessment values

2. Assessment of property and the collection of taxes

a. Collection of taxes consistently runs less than the

amount of school tax levied, but delinquent tax payments have made the total school tax collected as much as eight per cent greater than the levy

b. Increased revenue from local property taxation can come only as a result of increasing the present assessed valuation, adding new property to the taxable list, or through legislative action lifting the property tax limit above the present seventeen mill limit

3. State contributions to education

a. Nebraska is one of the states that leaves support of its schools almost entirely to local districts

b. Comparison with other cities and states indicates that the state should contribute seven times as much as at present for support of city schools

4. Ability of Lincoln to support good schools

a. Taxable wealth per pupil in average daily attendance increased from 6,527 in 1940-41 to 7,801 in 1944-45

b. Lincoln's financial ability and school costs

(1) Expenditures per pupil rose from $88.75 in 1940-41 to $128.13 in 1944-45, but Lincoln was $28.19 below the national average for cities of its class

(2) In 1928-29 the Lincoln schools received 56.4 per cent of the tax dollar and received only 46.10 per cent in 1946-47

(3) Evidence indicates that Lincoln could support higher school costs through increased property taxation

5. Income from the sale of bonds

a. Bond issue must be approved by people at either a regular

or a special election before the bonds are issued

b. Total bonded indebtedness of Lincoln school district amounted to $2,559,500 as of June 30, 1946

6. The general management of income

a. All general and special funds are made available or allocated to the purpose for which they are intended

7. Forecasting future income

a. Lincoln has no definitely projected program of income for future years and no long-time income program

b. A forecast of possible future income should be made for at least five years

B. The school budget

1. Content and form

a. The budget is an instrument to facilitate the carrying out of the educational program of the schools. Persons charged with responsibilities for various parts of the educational program must be consulted in its preparation

2. Analysis of budget figures

a. Consideration of the budget is a process of balancing all of the needs against possible resources

b. The objective of the school system is the education of the children and all reasonable expenses that are necessary to provide the kind and amount of education the community desires for its children are justifiable

3. Budget adoption procedures in Lincoln

a. Superintendent sets up a tentative budget estimated for all classifications after considering departmental budget requests

b. Administrative officers of each division then select the

items that are most necessary and endeavor to bring the amount involved in the budget requests within the tentatively estimated receipts

c. The complete budget estimates are then presented to the Board for consideration at an open meeting which any interested citizen may attend

4. Research on school costs

a. Studies showing trends are regularly made in the following areas:

(1) School census, enrollment, average membership and average daily attendance

(2) Membership and per cent of total enrollment in elementary, junior and senior high schools

(3) U.S. census data on per cent of age groups in school

(4) Per cent of pupils in each grade

(5) Index of area and assessed valuation

(6) Index of revenue and attendance

(7) Assessed valuation in relation to bonded debt

(8) School levies since 1934 for twenty-one neighboring cities

(9) Mill levies by the four major budget funds

(10) General property tax

(11) Payment for bond interest and bond retirement

(12) Bonded debt history

(13) Value of school property

(14) Balance at the close of the year and at low month of each year

(15) Comparison of assessments with disbursements from

tax revenue

(16) Tax collections with reference to time of payment

(17) Per cent of current expense allocation to main budget divisions

(18) Current expense per pupil in comparison with cities reported by U.S. Office of Education

(19) Salary distributions

b. The department of pupil accounting and research makes special research studies including

(1) How 135 superintendents reduced school costs

(2) Subject costs in secondary schools

(3) Cost of annexation

(4) Comparative studies of Lincoln and Topeka Schools

(5) Evaluation of typewriters and motion picture projectors

(6) Methods of retiring bond issues

(7) Custodial survey

(8) Transportation of pupils

c. Additional studies suggested by survey staff

(1) Trends in population in Lincoln

(2) Utilisation of school buildings

(3) Changes in property valuation

(4) Life of school buildings

(5) Standardising school supplies

(6) Standardising school equipment

(7) Ways of eliminating waste of various kinds

(8) New sources of money for the support of schools

5. Recommendations

a. Efforts should be made to have the legislature remove its control of the local tax levying power for school districts

b. Efforts should be made to secure state support for the schools comparable to that in other states

c. A projected program of educational need and the possible income of the district should be prepared each year

d. A larger proportion of the budget should be allocated to instructional purposes

e. Research activities should be expanded and greater attention should be given to making their results felt in the actual operation of the schools

f. The budget should include an educational plan. It should be the result of careful planning throughout the year in the light of school needs and community resources. The complete budget should be presented and adopted at one time preferably by the end of May. It should be further simplified and all revolving or self-liquidating fund accounts should be excluded from the budget. The budget should be revised regularly at the end of each quarter. The budget should be circulated to and understood by all members of the school staff. Budget information should be made available to the public with full explanation of the school program

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4. Receipts and disbursements, 1945-46
5. Revenue receipts for state school systems (in per cent)
6. Revenue receipts for city school systems, 1942 (in per cent)
7. Per cent of receipts from taxation and appropriation from state sources for specified years by state
8. Financial ability of Lincoln school district
9. Comparison of Lincoln with other cities indicating relative ability of Lincoln to support good schools
10. General property tax dollar as levied in Lincoln in 1946
11. General revenue dollar, 1944
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14. Lincoln school budget and expenditures, 1940-41 to 1945-46 (in per cent)
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17. School census statistics, Lincoln, Nebraska, 1925-1946
18. Effect of birth rate on school census, 1938-1960
19. Estimate of future school statistics, Lincoln, Nebraska, 1950-1980
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27. Dates of construction of secondary school buildings

28. Rating of secondary school plant on 1000 point scale of Holy-Arnold score card

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31. Number of elementary school vacant classrooms, their area and capacity

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9. Bonds issued and paid since 1918 - Amount outstanding at close of each fiscal year
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11. School census forecast
12. Building enrollments - Elementary schools, 1931-1946
13. Comparison of population growth
14. Estimated future population of Lincoln, Nebraska
15. Past growth trend

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