PLANNING NEIGHBORHOODS AND SCHOOLS FOR BOWIE-BELAIR COMMUNITY, MARYLAND, U.S.A.

by

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B. Arch., M. S. University of Baroda, India, 1965

A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF ARCHITECTURE

College of Architecture and Design

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1968

Approved by:

Major Professor

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INTRODUCTION

School planning has become an important part in community development. The citizens in many communities have accepted the invitation to participate in planning the school program and especially that phase of school administration which deals with the physical facilities. As a result of this increased demand for services several state departments of education are adding school building specialists to their staffs and other expanding of such services are taking place.

The building needs of new schools in the United States are the following:

1. A rapidly increasing enrollment caused by the rapidly increasing school age population.[1]
2. Revision of the school curriculum to meet the needs and demands of changing society.[2]
3. Rapid change in construction processes and in the equally rapid development of new construction materials.

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[1]In 1959 the nation's school and college enrollment reached 46,480,000--an average annual increase of 4%. In other words, one out of every four persons was attending school, from kindergarten to college. 99.2% of the 6-13 year age group were in elementary schools; 89.2% of the 14-17 year age group were in secondary schools. (source: Building Bulletin No. 18, Schools in the U.S.A. Report Ministry of Education. July 1961, p. 19).

[2]When Sputnik streaked into the sky in 1957, Americans felt a new and urgent need for education. Advancing technology, the dropout problem, and a growing labor market--all spurred the nation to change and improve American education. (source: The First Work of this Times: A Report. U.S. Dept. of Health, Education and Welfare, June 1966. p. 17).

4. A population movement from rural to urban areas and from central cities of the metropolis to the suburbs.

Education in the United States

Education in the United States of America is based on two fundamental principles:[3]

1. Every person has an equal right to educational opportunities.
2. An educated citizenry is essential in freedom and human welfare.

Following these principles and working through their federal, state and local governments, the people of the United States moved closer to achieving their educational goal. In any dynamic society, the role of education is of necessity a most important one. And in our highly mechanized and automated society, the importance of education has increased to such proportions as to involve some fifty million persons (one quarter of the total population of the U.S.) in the business of going to school.[4] Several million others such as administrators, teachers school librarians, publishers, are also directly involved in education in America.

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[3] Progress of Public Education in the United States of America, U.S. Dept. of Health, Education, and Welfare (1959) p. 1.

[4] Klein Bernard, Guide to American Educational Directories, McGraw-Hill Book Company, New York, (1965) p. 5.

Throughout the year there is evidence that parents and other citizens in all sections of the country are increasingly taking an interest in their schools and are making a conceted effort to improve them. As individuals and through statewide and local committees of citizens, through parent-teacher associations, and various other organizations they worked with teachers and administrators to obtain a higher quality in education. In their efforts to improve education, state and local agencies and the professional associations have had the support of the Federal Government, for the Government has a vital interest in education.

The U.S. Educational Aims and Objectives

The following are the educational aims and objectives. These are drawn from various texts on continuing education as well as from the Taxonomy of Educational Objectives and Classification of Educational Goals.[5]

1. Receiving (Attending): This is the first and crucial step if the learner is to be properly oriented to learn what the teacher intends that he should. The category of Receiving has been divided into three subcategories to indicate three different aspects of the phenomenon.

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[5]Krathwohl, D. R., Bloom, B. S. and Masia, B. B. Taxonomy of Educational Objectives The Classification of Educational Goals. David McKay Company, Inc. (New York) 1964. p. 176.

a. Awareness

(i) Develops awareness of aesthetic factors in dress, furnishings, architecture, city design, good art, and the like.

(ii) Develops some consciousness of color, form, arrangement, and design in the objects and structures around him.

b. Willingness to receive

(i) Attends carefully when others speak--in direct conversation, on the telephone, in audiences.

(ii) Appreciation of cultural patterns exhibited by individuals from other groups--religious, social, political, economic, national etc.

(iii) Increase in sensitivity to human need and pressing social problems.

c. Controlled or selected attention

(i) Listens to music with some discrimination as to its mood and meaning and with some recognition of the contributions of various musical elements and instruments to the total effect.

(ii) Alterness toward human values and judgements on life as they are recorded in literature.

2. Responding: This category is used to indicate the desire that a child becomes sufficiently involved in or committed to a subject, phenomenon, or activity that he will

seek it out and gain satisfaction from working with it or engaging in it.

a. Acquiescence in responding

(i) Willingness to comply with health regulations.

(ii) Obeys the playground regulations.

b. Willingness to respond

(i) Acquaints himself with significant current issues in international, political, social and economic affairs through voluntary reading and discussion.

(ii) Acceptance of responsibility for his own health and for the protection of the health of others.

c. Satisfaction in response

(i) Enjoyment of self-expression in music and in arts and crafts as another means of personal enrichment.

(ii) Finds pleasure in reading for recreation.

(iii) Takes pleasure in conversing with many different kinds of people.

3. Valuing: This category is employed in the usual sense that an object, phenomenon, or behavior has worth. This concept of worth is in part a result of the individual's own valuing or assessment, but it is much more a social product that has been slowly internalized and has come to be used by the student as his own criterion of worth.

a. Acceptance of a value

(i) Continuing desire to develop the ability to speak and write effectively.

(ii) Grows in his sense of kinship with human beings of all nations.

b. Preference for a value

(i) Assumes responsibility for drawing reticent members of a group into conversation.

(ii) Deliberately examines a variety of viewpoints on controversial issues with a view to forming opinions about them.

(iii) Actively participates in arranging for the showing of contemporary artistic efforts.

c. Commitment

(i) Devotion to those ideas and ideals which are the foundations of democracy.

(ii) Faith in the power of reason and in methods of experiment and discussion.

4. Organization:

a. Conceptualization of a value

(i) Attempts to identify the characteristics of an art object which he admires.

(ii) Forms judgements as to the responsibility of society for conserving human and material resources.

b. Organization of a value system

(i) Develops a plan for regulating his rest in accordance with the demands of his activities.

5. Characterization:

(i) Readiness to revise judgments and to change behavior in the light of evidence.

(ii) Judges problems and issues in terms of situations, issues, purposes and consequences involved.

6. Knowledge: Knowledge involves the recalls of specifics and universals, the recalls of methods and processes, or the recalls of a pattern, structure and setting. The recall situation involves little more than bringing to mind the appropriate material for measurement pruposes. It emphasizes most the psychological processes of remembering.

a. Knowledge of terminology

(i) Defines technical terms by giving their attributes, properties, or relations.

(ii) Familiarity with a large number of words in their common range of meanings.

b. Knowledge of specific facts

(i) The recall of major facts about particular cultures.

(ii) The possession of a minimum knowledge about the organisms studied in the laboratory.

c. Knowledge of conventions

(i) Familiarity with the forms and conventions of the major types of works; e.g.,,plays, scientific papers, etc.

(ii) Makes pupils conscious of correct form and usage in speech and writing.

d. Knowledge of trends and sequences

(i) Understanding of the continuity and development of American culture as exemplified in American life.

(ii) Knowledge of the basic trends underlying the development of public assistance programs.

e. Knowledge of principles and generalizations

(i) Knowledge of the important principles by which our experience with biological phenonena is summarized.

(ii) Knowledge of major theories about particular cultures.

7. Intellectual Abilities and Skills: Abilities and skills refer to organized modes of operation and generalized techniques for dealing with materials and problems. Their objectives emphasize the mental processes of organizing and reorganizing material to achieve a particular purpose. The materials may be given or remembered.

a. Comprehension

This represents the lowest level of understanding. It refers to a type of understanding such that the individual knows what is being communicated and can make use of the material or idea being communicated without necessarily relating it to other material or seeing its fullest implications.

b. Translation

The ability to understand non-literal statements.

c. Interpretation

(i) The ability to grasp the thought of the work as a whole at any desired level of generality.

(ii) The ability to interpret various types of social data.

8. Application: The general ideas, rules of procedures, or generalized methods, technical principles and theories which must be remembered and applied.

(i) Application to the phenomena discussed in one paper of the scientific terms or conepts used in other papers.

(ii) The ability to predict the probable effect of a change in a factor on a biological situation.

9. Analysis: Analysis are intended to clarify the communication, to indicate how the communication is organized,

and the way in which it manages to convey its effects, as well as its basis and arrangement.

a. Analysis of elements

(i) The ability to recognize unstated assumptions.

(ii) Skill in distinguishing facts from hypotheses.

b. Analysis of relationships

(i) Skill in comprehending the interrelationships among the ideas in a passage.

CHAPTER I

STUDYING THE COMMUNITY

Introduction

Communities grow and decline as do other living organisms. During their lives, changes are constantly occuring. The educational system can meet the changing needs of adults and children and keep step with community development. The study of a community and its school facilities, as a basis for determining future plans, has proved to be of great value. Such studies have become accepted practice in the school building planning.

The school system is one of the most important aspects of the community. If the school is to serve its community most effectively, it must be built with the needs and resources of that particular community in mind. In order to determine what those needs are, the community which is going to use the school must be studied.

Ralph Waldo Emerson once said, "To make a good boy you must begin with his grandfather." "To build a good school you must begin with the community."[1]

Every community has characteristics which differentiate it from the others. This is logical because communities are made up of individuals who differ from each other. Each

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[1]Sumption, Merle R. and Jack L. Landes, Planning Functional School Buildings, Harper & Brothers publishers, New York, (1957). p. XV.

community like each individual also possesses characteristics that are common to many others.

The characteristics of the community are the important subject matter for study as the first step in the development of the educational program. The community in all its varied aspects is the foundation upon which a functional educational program must be built.

If the school is to serve its community most effectively, it must be built with the needs and resources of that particular community in mind. The effective school does not operate in isolation. In fact, no school can confine itself. completely within its walls. The school must identify itself with the community it serves and to serve effectively it must respond to the needs and utilize the resources of that community. This response will be reflected in the nature, content, and scope of the educational program which in turn should determine the kind of school building that is desirable. It must be designed to meet community needs. It is important that the needs of the community be closely studied before the school building is planned.

Since the school plant may well serve forty to fifty years,, the study must include future as well as present needs. That means that a knowledge of trends and future possibilities in community development is required. What changes have taken place in the past? What do they portend for the future? Is the economic basis shifting? These and hundreds of other

questions can be answered in a reasonably satisfactory manner only after careful study of the history, general nature and future possibilities of the community.

The Educational Program on the Basis of Community Needs

The study of the human and natural resources of the community provides a basis for developing educational goals which will determine the nature and scope of the educational program. It must be recognized that each community exists in a broad context which includes the state, nation and more recently recognized, the world itself. The program of the school must, therefore, serve the community as a part of this broader context and recognize that there are significant educational implications in this enlarged concept of community relationship. To treat the community as an isolated unit would be a great error. But this situation in no way minimizes the importance of the study of local community educational needs, because it is in this area that the greatest variation exists. Communities not only differ widely, but the varied elements of community life have many implications for the educational program.

The most realistic approaches to the curriculum development should be based on the community concept. The curriculum which disregards the changes in community living and educational needs is failing in its mission.

The purpose here is to indicate in a general way the need for the development of an adequate educational program which will have important implications for the physical facilities of the school. The school can serve the community most effectively when it is fully aware of the existing educational needs. It is, therefore, the responsibility of the school to find appropriate means of serving the community educational needs.

What are the Areas of Community Study?

History of the community[2]: Many communities in the United States trace their history back over one hundred-fifty years. Some have grown from population clusters of fifty or a hundred people to bustling cities of fifty or a hundred thousand. Others have experienced a period of growth followed by a general stability which may have extended over the last half century.

The important phase of the history of the community is the story of its educational background. What was its begining? How well has it been supported by the people of the community? Another important phase of the history of the community is its economic development. Has the economic basis of the community changed over the years? If so, how?

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[2] Ibid., p. 33.

The following list represents the useful information to determine about the community.[3]

1. The story of the founding and political development of the community.
2. The historical background of the population.
3. The development of the educational system.
4. The growth and development of other social agencies in the community.
5. The economic history of the community.
6. Cultural achievement over the years.
7. Establishment and development of civic organizations.

Geographical Setting of the Community: The physical setting of the community has many direct and indirect influences on the lives of people. The nature and the type of natural resources determine to a great extent the vocational opportunities available in the community.

The following geographical information is valuable in appraising the community.[4]

1. Area and boundaries of the community.
2. Topography of the area.
3. Nature and type of soil.
4. Water resources.

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[3]Ibid., p. 33.

[4]Ibid., p. 34.

5. Mineral resources.
6. Forest and woodland resources.
7. Animal resources.

The Population: The nature and number of people is important to those who would plan the educational program and the plant to hous it.

Good planning requires certain information about the general population as follows:[5]

1. Number:
   a. Present, past and probable future trends.
   b. Estimate of future population.
2. Distribution:
   a. Density area.
   b. Population cluster, cross sections of growth, stability, and decline.
3. Direction:
   Directional pattern of population change.
4. Description:
   a. Proportion of population at different age levels.
   b. Sex composition.
   c. Percentage of foreign born.
   d. National extraction.
   e. Number of adults handicapped and nature of disability.

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[5] Ibid., p. 34.

f. Mobility factors.

g. Educational status.

h. Occupational status.

i. Birth rate.

j. Mortality rate.

5. Minor population:

a. Number and location of preschool age children.

b. Number and location of school age children.

c. Number and location of exceptional children.

Economic Basis: The economic basis of the community may be determined to the extent necessary in educational planning by securing the following type of information.[6]

1. Products (number, nature, and value).
2. Manufactures (Illustrations: steelmaking, book publishing, furniture making).
3. Distributive enterprises (Illustrations: stores, gas stations, restaurants).
4. Public utilities (Illustrations: telephone, water and gas).
5. Agriculture (Illustrations: stock farms, grain farms, forestry farms).
6. Extractive industries (Illustrations: mining of coal, gypsum rock, building stone, phosphate, iron ore, petroleum exploration and drilling and refining

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[6] Ibid., p. 35.

and fisheries).

7. Professional services.

Basic Social Services: Every community possesses certain basic social services. Without them a community cannot exist as a community. The school itself is one of the most important service institutions. It is helpful to see the school in this setting along with the other social institutions which serve the community. An illustrative list of the social services found to a greater or less degree in typical, medium-sized American community appears below:[7]

1. Public health:
   a. Hospitals, clinics.
   b. Redcross centers.
   c. Sanitoriums.
   d. County or city health service.
   e. X-ray clinics for tubercular testing.
   f. Sanitation services.
   g. Cancer clinics.
2. Public safety and welfare:
   a. Police force.
   b. Fire department.
   c. Crime commissions.
   d. Governmental and judicial bodies of various kinds.

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[7]Ibid., pp. 35-36.

e. Community planning commissions.

3. Education:

a. Public and private schools.

b. Apprentice programs.

c. In-service training programs.

d. Adult education programs.

e. Libraries.

4. Religion:

a. Churches

b. Religious instruction centers.

c. Other religious agencies.

5. Cultural facilities:

a. Museums.

b. Art collections.

c. Arboretums, planetariums.

d. Lectures and musical programs.

e. Stage presentations, dramatic productions.

Communication Facilities: Communication is an important aspect of the community life and may be classified as a basic social service.

These community communications are very important in developing the school program. It is through these media that the general public may become acquainted with the problems and plan of the school.

Community Organizations: Most of the community organizations affect the school either directly or indirectly.

They often provide educational resources in the community. Some idea of the many different types of the organizations can be gained from the following.[8]

1. Civic organizations:
    a. Community council.
    b. Citizen advisory committees.
    c. Women's clubs.
2. Economic organizations:
    a. Business associations.
    b. Labor unions.
    c. Manufacturer's associations.
    d. Chamber of commerce.
3. Professional organizations:
    a. Lawyers.
    b. Doctors.
    c. Teachers.
    d. Architects and engineers.
4. Service clubs:
    a. Rotary.
    b. Lions.
5. Charitable organizations:
    a. Salvation Army.
    b. Community Chest.
6. Youth organizations:

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[8] Ibid., pp. 36-37.

a. Y.M.C.A. and Y.W.C.A.

b. Boy and Girl Scouts and clubs.

c. 4-H clubs.

7. Educational organizations:

a. Parent-teacher associations.

b. Citizen commissions for schools.

8. Miscellaneous organizations:

a. Historical societies.

b. Patriotic organizations.

c. Musical societies.

d. Religious organizations.

e. Farm and home bureaus.

Recreational Facilities: Some communities provide many and varied recreational facilities, but in others these facilities are meager. Coordinated planning can enable the school to meet the need of the community and also can prevent the duplication of facilities.

Some of the common recreational facilities which are present in the various communities of the country are listed below:[9]

1. Public parks, zoos, and planetariums.
2. Stadiums, and athletic fields.
3. Water recreational facilities such as rivers, lakes, and swimming pools.

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[9]Ibid., p. 37.

4. Roller skating, bowling and basketball.
5. Libraries, auditoriums, and exhibit halls.
6. Theaters.
7. Miscellaneous facilities such as tennis courts, and golf courses.

Transportation Facilities: Transportation of people and goods plays an important role in the community life. The number and nature of transportation agencies and facilities will have a decided effect on the nature and number of vocational opportunities in the community, the possibilities of population growth and industrial development, and the financial ability of the community to support education.

The common transportation facilities and agencies are the following:[10]

1. Highways and bridges.
2. Railroads, depots, and freight terminals.
3. Air lines and airports.
4. Trucking agencies.
5. Long-distance bus lines.
6. Waterways, ports, and docks.
7. Local transportation facilities such as streetcars, buses, and taxicabs.

The first six types listed in general connect the community with the rest of the world. The seventh, local

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[10] Ibid., pp. 37-38.

transportation, has an influence upon the selection of school sites and subsequent location of schools.

Schools and the Community

The role of the school in the American community is vital and challenging. If it is to exercise intellectual leadership, if it is to recognize and provide for educational needs, it must develop and maintain a close relationship with the community. This relationship must not be a superficial one, but rather a deep and meaningful one. It must not be occasional or temporary, but continuous and lasting.

In order to develop and maintain a desirable and adequate relationship between school and community, four essential principles must be operative.[11]

1. Recognition of the school as a public enterprise.
2. The public school in the United States has the unique function and moral responsibility to seek out truth, whatever it is or whereever it may be, and teach people to live by it.
3. There must be a structured, systematic, and active participation on the part of the people of the community in the educational planning, policy making, problem solving, and evaluation of the school.

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[11]Sumption, Merle R. & Yvonne Engstrom, School-Community Relations, A New approach, McGraw-Hill Book Company, New York, (1966). pp. x, xi.

4. A clear and effective two-way system of communication between school and community.

When the school is fully recognized as a public enterprise, and when it continuously seeks for truth, enjoys widespread community participation, and maintains clear two-way communication with the people it serves, it will inevitably be sensitive to change. This sensitivity is the essential element of the school which enables to effectively meet the challenge presented to a social institution in an age of controversy.

The reason for the existence of schools and their continued operation depends on their social environment. This point of view and its implication for depressed urban neighborhoods require more attention than they have received in the past.

In order for the school to achieve its aims in the depressed neighborhood, the following principles should be considered:

The School Program and Activities: The school should provide services and programs which work toward the elimination of the pupil's physical, mental, and emotional handicaps. These schools should assume an equally urgent commitment to compensate for the pupil's impoverished socio-economic background. Because proposition of such school efforts is made to provide activities that compensate for the cultural deprivation of pupil's parents.

The presence of culturally deprived residents in our neighborhood, therefore, should stimulate school staffs to work to develop programs and services designed to work toward the elimination of deprivation of both the pupils and their parents. From a study of literature, interviews with specialists in education, visits in the field, and letters written by teachers, a list of some of the activities and equipment and supplies needed has been obtained and tabulated.[12]

1. Working with materials: Children like to study specimens (mounted picture) by collecting and exhibiting them. They find much satisfaction and emotional release in translating their ideas and feelings into constructive action.
2. Holding group discussions: The children meet in large and small groups for discussion. Class room may be arranged so that they face each other.
3. Painting and drawing: Experiences in graphic arts provide the children with many opportunities for creative expression.
4. Reading: They read for information concerning many different problems and subjects.
5. Making charts and maps: They express social studies concepts and information through the making of maps and charts.

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[12]U.S. Dept. of Health, Education and Welfare--Office of Education, Designing Elementary Classrooms, special publication No. 1. (1953) pp. 9-10.

6. Engaging in physical education and play: Many play-activities take place in the class room. Other games and sports are carried on outdoors in good weather.
7. Dramatizing stories and creating plays: Acting a story gives it life and interest. School becomes more satisfying when children become the characters found in books or in stories they have created.
8. Making booklets: Through making booklets children learn to locate information, organize ideas, and present them through writing and illustrations. Skills are acquired in written expression, including handwriting and spelling.
9. Making tape recordings: Hearing their own voices on a recording may help improve speech.
10. Participating in music activities: Most children enjoy taking part in music activities. These include singing, playing instruments, listening, responding rhythmically, creating songs and melodies, and other experiences with music.
11. Using audio-visual aids: Movies, filmstrips, radio, television and other audio-visual media may be used.
12. Gardening: Children learn about plant life and plant cultivation by planting seeds and watching plants grow.

13. Experimenting: Pupils gain understanding of science through carrying out simple experiments.
14. Writing reports, letters, stories, poems, notices, articles: Today's program requires the writing of reports, letters, and other practical forms of writing to an even greater extent than the traditional curriculum.
15. Practicing good health habits: Practicing good health habits is important. Children learn by doing.

School-Home Interaction: The culturally deprived parents tend to lack the understanding and social skills required to bring about desirable changes in school, home, and neighborhood. These parents are unwilling to visit the schools, too shy to meet their personnel and are not easily involved in school activities. In the face of parents unwillingness to take a part in bringing about desirable changes, the school staff needs to create an atmosphere in which parents are assisted to accept their responsibilities in improving school-home relationships in order to reduce the gap between the school and home. If the school will not take the initiative in developing an action program to generate school-home interaction, it is probable that such action will not be assumed by the parents.

In this connection, Harold Taylor[13] refers to education as a "total process, in which the condition of society deeply affects the child's mind, the level of his achievement, and the range of his possibilities." He further suggests, "It is no longer permissible to say that the social environment of the child is not the problem of the educator, that it belongs to city planners, social workers, economists, housing experts, or society. It belongs to everyone." Taylor insists "but most of all to the educator."

It is the school's duty in relation to the culturally deprived low-income citizen, to consider ways of adapting its programs to deal with multiple needs of the parents. The staff development of appropriate practice needs to be based on information concerning home and neighborhood conditions.

The School's Responsibilities: To accomplish school-home-neighborhood improvement, the school should take the lead, but the school cannot assume the role unless it has a staff which provides creative and dynamic leadership. This staff should be encouraged to attempt new and untried approaches.

The school should develop conditions conducive to releasing the creative energies of both staff and laymen in working out methods to solve school-home-neighborhood problems.

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[13]U.S. Dept. of Health, Education and Welfare, Office of Education. School-Home Partnership in Depressed Urban Neighborhood. Bulletin No. 20 (1964) pp. 58-59.

The school is a community agent which is equipped to communicate with parents and to influence their attitudes in a positive way.

It is important for teachers serving deprived people to maintain a high estimate of parent potential. Inappropriate teacher attitudes may widen the social gap between school and home.

Summer workshops and seminars in which problems are discussed by sociologists, anthropologists, psychologists, and others can help teachers and other staff members to deepen and broaden their knowledge about working with culturally deprived pupils and their parents.

CHAPTER II

CHILDREN AND THE SCHOOL PLANT

The school plant is for the child. It has no meaning except in terms of the value given it by children and teachers, parents and citizens. Here children can aquire essential skills, develop as worthy members of their communities, build sound bodies, solve problems of living, learn about the world, express themselves, broaden interests and be guided into a constructive citizenship in community, state and nation.

The schools are something more than the educational plants. Their functioning, their location and their cost are the concern of the entire community. The public schools belong to the public and most serve the interests of the communities to which they belong.

An essential function of the school is to serve the pupil. It is an environment created to help him learn. The good school is more than a sheltered space and equipment. It is a second home for the children where they spend a good part of their time.

The school design approach should begin with the basic need of the children first and then consider the educational needs. These basic needs of the school children may be divided into physical needs and emotional needs. The physical needs are those which are administered by safe structure, proper sanitation, good acoustics, good lighting, proper ventilation, and adequate space for work and play. The emotional needs

are those which are accomplished by pleasent surroundings, inspiring environment, friendly, restful and secure atmosphere, and colorful spaces. For an architect to produce a good school design, therefore, the pupil himself must be known.[1] Plate I illustrates what the pupil needs.

The Pupil as an Organism

If we are planning schools which will help the pupil, and if we are considering the pupil as our standard of measurement, we must think of him as a living body. When we do so we will stop building places to store children and will start building healthful, comfortable school buildings designed to be lived in.

The human organism, to some extent, acts upon its environments. The organism, however, to a certain degree allows for environmental changes. For example, the eye is a sensitive light regulator. The ear has a certain amount of control over sound and the skin also has a certain amount of control over heat. But eye, ear, and skin can work only within certain limits. The function of the eye, the ear and the skin cannot always provide an equilibrium among the forces of environment and the counteracting forces of a human being's system of seeing, hearing, cooling, and heating. Within a

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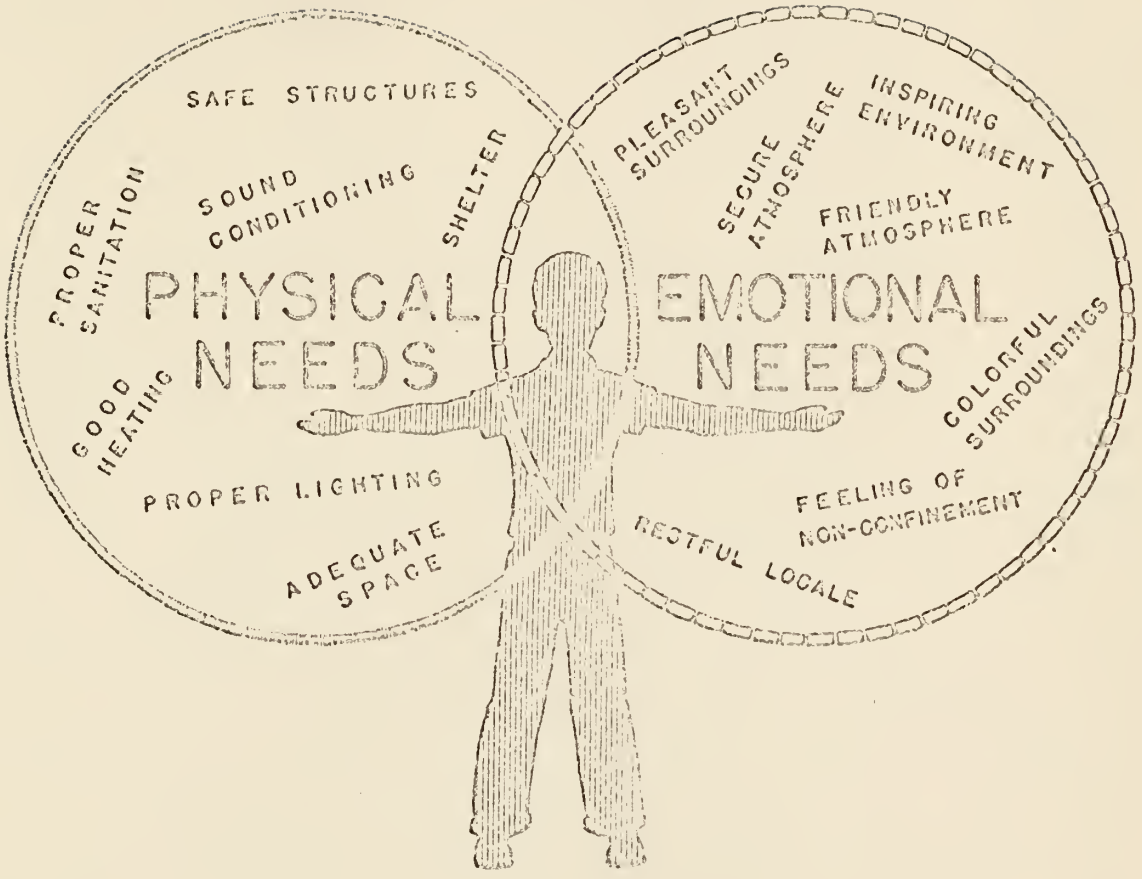
[1]William W. Caudill. Toward Better School Design, F. W. Dodge Corporation, New York (1954) p. 3.

PLATE I



This figure* illustrates the basic needs of the pupil. These needs of the school child are divided into physical needs and emotional needs.

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*Source: Caudill, William W. Toward Better School Design, F. W. Dodge Corporation, N. Y. (1954) p. 2.

certain range of environmental changes, these systems can operate effectively, but when they are overloaded, a strain is exerted on the human being. For this reason the shelters will take the load of the natural environment off the organism and leave all his energies to be free for learning. The school planner, therefore, should find ways of modifying the forces of nature so that they are within the ranges of the human body's regulators. It is, therefore, the responsibility of the school planner to find out what will constitute comfort for the children and then to plan teaching space accordingly.[2]

Light and the Pupil

How much light is needed for the pupil and what kind? Those requirements depend on the task--reading, sewing, games. No one knows exactly, because of the variables involved. The pupil himself is a variable. Some think the pupil can work in comfort with 15-candles of illumination. Others recommend 60 foot-candles. The National Council of Schoolhouse Construction recommends a minimum of from 20 to 40 foot-candles and the American Standards Association, with the approval of the Illuminating Engineering Society and the American Institute of Architects, recommends 30 foot--candles, as the minimum for ordinary classrooms.[3]

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[2] Ibid., p. 4.

[3] Ibid., p. 5.

No one really seems to know how much light is needes, this subject needs much more research.

Some study was made on the quality of lighting. Charles D. Gibson and Foster K. Samption of California gave an excellent account of quantity versus quality argument. They say that the unit brightness of any surface viewed from any normal position in the classroom should (1) not exceed ten times the brightness of the most poorly lighted task in the room; (2) be not less than one-third the brightness of the most poorly lighted task in the room, with the provision that (3) the brightness of any surface immediately adjacent to any task should not exceed three times the brightness of the task. These recommendations are considered satisfactory.[4]

The visual comfort in classrooms is related to (1) intensity, (2) brightness and (3) distribution. The best situation is one in which every part of the classroom receives the same amount of light, but most of the experts agree that an intensity drop across the class not greater than 2 to 1 is satisfactory.[5]

In Plate II, the chart is adapted from a report by Ferree and Round. The chart shows the effect of interaction of five sized and varying illumination of test objects upon speed of discrimination. This quality of lighting should be

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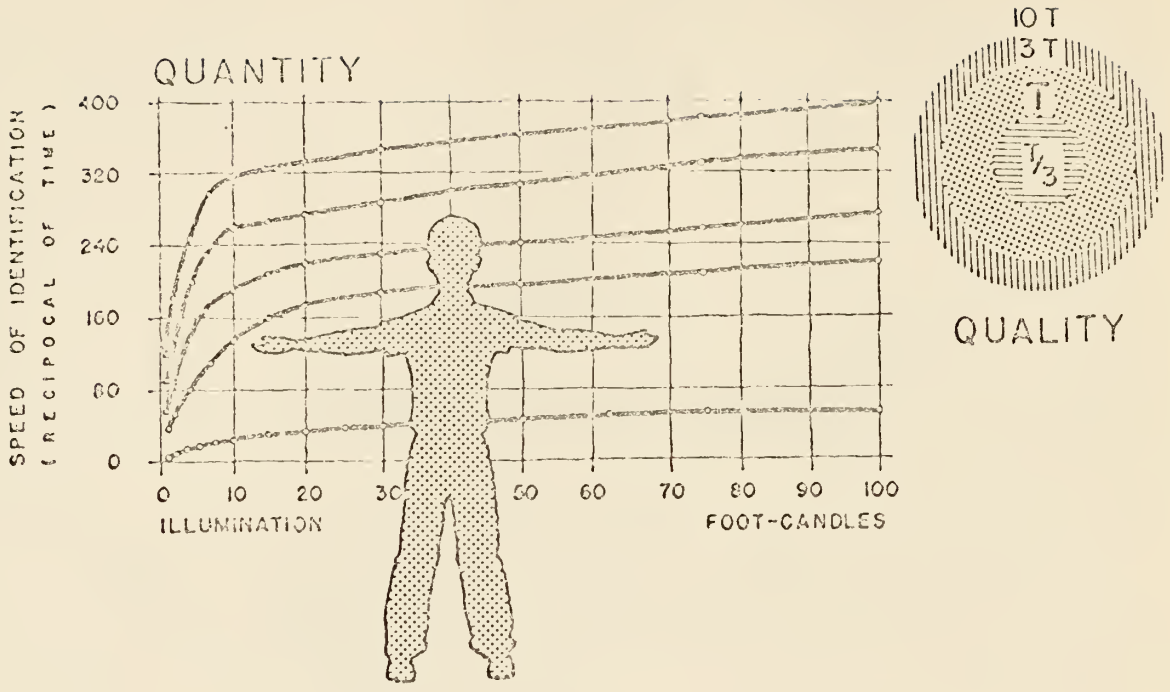
[4] Ibid., p. 5.

[5] Ibid., p. 6.

PLATE II



This figure* illustrates the quality and the quantity of light needed for the pupil. The chart shows the effect of the interaction of five sizes and varying illumination of test objects upon speed of discrimination.

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*Source: Caudill, William W. Toward Better School Design, F. W. Dodge Corporation, N. Y. (1954) p. 5.

such that the brightness of any surface viewed from the pupil's position in the classroom should (1) not exceed ten times the brightness of the most poorly lighted task (designated as T) and (2) be not less than one-thrid the brightness of any surface immediately adjacent to the task (T) should not exceed three times the task brightness.

Air and the Pupil

The recirculating of and re-using of the indoor air with the addition of only 8 to 10 cubic feet per pupil per minute of fresh air, which can infiltrate through closed windows, is the amount of needed fresh air. The problem of air largely depends on the temperature, humidity, radiation, and air movement. The pupil must operate within his own body temperature of 98.6°F. or suffer the consequences. If the temperature, humidity, radiation, and movement were just right there would be no stresses. If all other conditions of light and sound were right then this human being would be comfortable and learn efficiently.

Cooling the school is a real problem during the hot school months. Complete air conditioning is getting rather close to the school these days, however, by the aid of wind children are comfortable in most climates. If the wind is properly used, it may provide comfort through providing a movement of air in the classrooms. In cases where both the temperature and humidity are high, the air coolers will

increase humidity and provide comfort.[6]

Heating the schools is another problem during the winter time. Henry Wright, outstanding consultant on heating and ventilation problems, figures that a classroom full of children, who act like so many stoves, produce as much as 8500 BTU's per hour, a quantity of heat which cannot be ignored by the heating engineer.[7] Whether the problem is cooling or heating, it cannot be neglected. If the pupil is too cold or too hot he cannot work efficiently. Since the perception of warmth and coolness depends on air temperature, humidity, radiation, and movement, these four factors of environmental control must be considered in the design of classrooms. The importance of each will depend on the local climate.

Plate III, shows how these four forces (temperature, humidity, radiation and air movement) act on the pupil. For example, curve 3 represents what most people think constitutes thermal comfort. In this case comfort is obtained when the air temperature is 70 degrees, and relative humidity is 50 per cent, with comparatively no air movement or radiation effects. In curve 4 the air temperature is 90 degrees and the humidity is high. Under such conditions comforts may be provided by considerable air movement, plus any negative radiation effect which might tend to cool the body. In curve 2 the air

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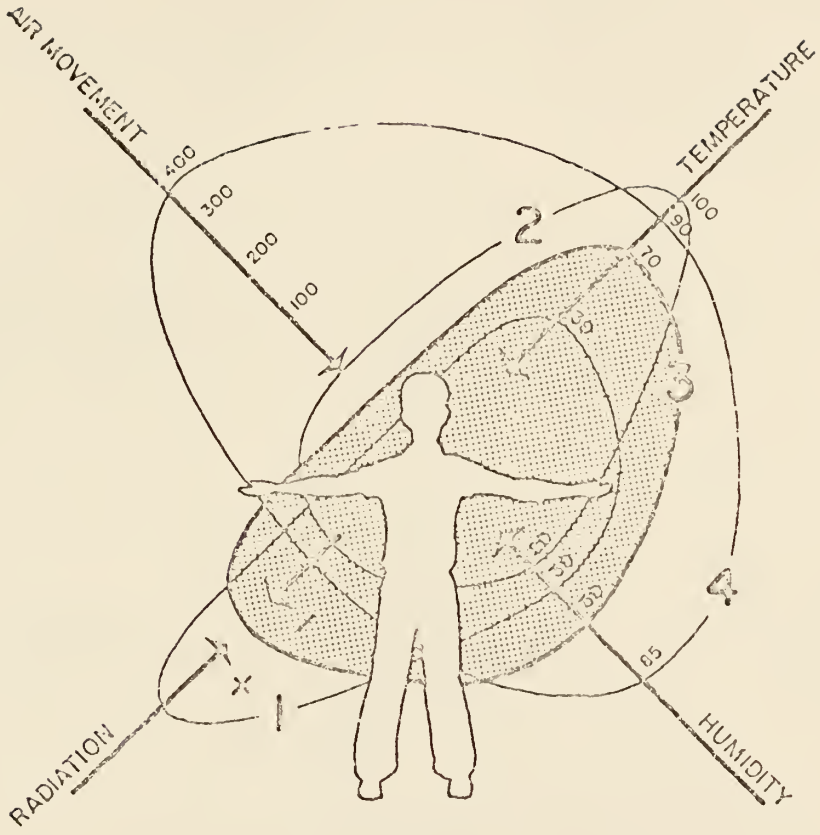
[6] Ibid., p. 7.

[7] Ibid., p. 7.

PLATE III



This figure* illustrates how the temperature, humidity, radiations and air movement act on the pupil.

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*Source: Caudill, William W. Toward Better School Design, F. W. Dodge Corporation, N. Y. (1954) p. 6.

temperature is high; but the humidity is low. Comfort may be provided in this case by cutting down the air movement. In curve 1 the air temperature is low. No air movement or increase in humidity is wanted, but in this case a positive radiation effect, such as from a warm porch or the sun, is needed to provide a sensation of warmth.

Sound and the Pupil

Disturbing noises affect the pupil's nervous system and slow his learning processes. If the pupil must strain every effort to hear the teacher, he is missing much energy which he could be using for learning. The same bad sound conditions can put stress on the teacher too as a human being. If we can control the sound in a classroom, we can help both the teacher and the pupil.

According to Richard H. Bolt and Robert B. Newman,[8] consultants in acoustics, this is what is needed to hear well: (1) The background noise should be low enough not to interfere with the desired sounds of speech or noise. (2) The desired sounds must be loud enough to be heard without effort. (3) The reverberation time must be short enough to avoid echo and long enough to provide some blending. (4) The sounds must be distributed properly through the room. Very few teaching situations and not even all of the newer

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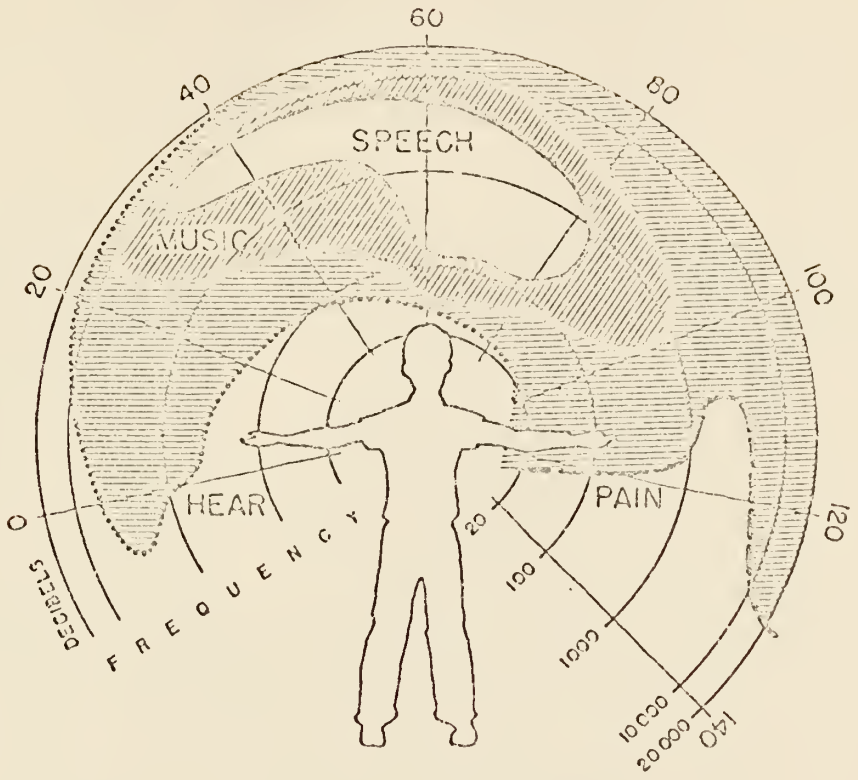
[8] Ibid., p. 8.

PLATE IV



This figure* shows the minimum audible threshold (HEAR) is related to frequency in cycles per second and the sound-pressure level in decibels. The range of orchestral music (MUSIC) is also shown, and conversation speech (SPEECH).

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*Source: Caudill, William W. Toward Better School Design, F. W. Dodge Corporation, N. Y. (1954) p. 7.

classrooms can meet these requirements.

In order that sound waves may be heard, they must have a certain minimum pressure. Plate IV, developed by Knudsen and Harris,[9] shows the minimum audible threshold (HEAR) and the threshold of feeling (PAIN) as related to the frequency in cycles per second and the sound-pressure level in decibels. The range of orchestral music (MUSIC) is also shown, as well as the range of conversational speech (SPEECH). Since good hearing conditions are very important to the mental development of the pupil, it is unfortunate that schools are quite often among those buildings where hearing is very difficult. If we are to free the pupil of nervous strain, we should provide him with acoustically correct school building spaces. It must always be remembered that good hearing is very essential to good learning.

Time and the Pupil

Dr. P. Lecomte Du Navy, the famous French scientist, has proved in a study[10] concerning the relative value of time as a function of age, that a year actually is longer for a child than for an adult, both physiologically and psychologically. He concludes that time flows for an adult of fifty about ten times as fast as it does for a child of five, or

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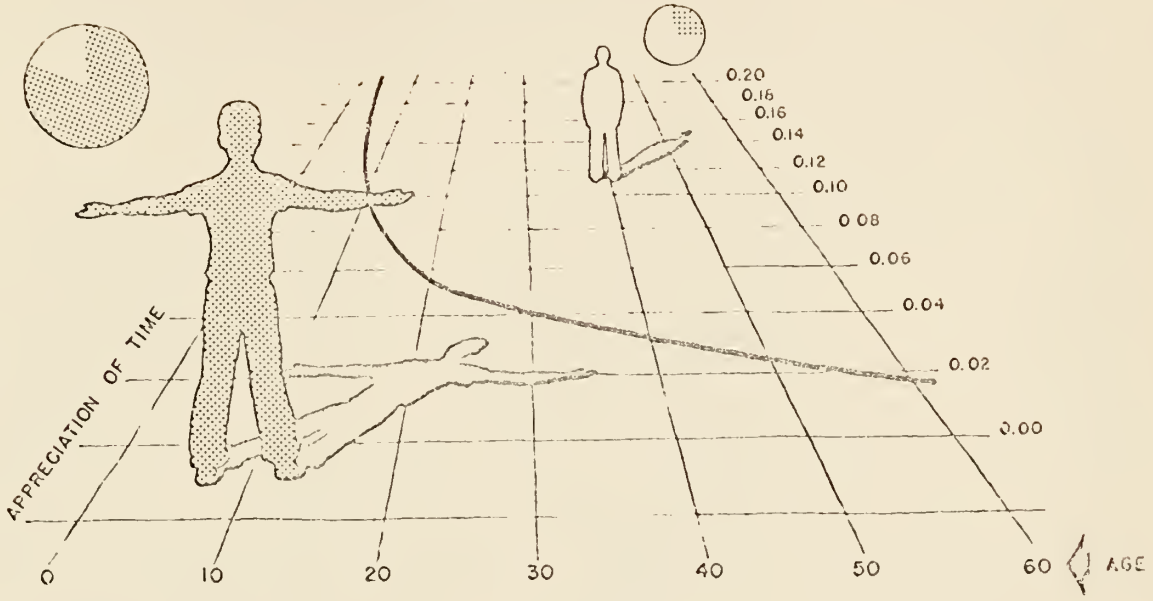
[9] Ibid., p. 7.

[10] Ibid., p. 8.

PLATE V



This figure* shows the relative value of time as a function of age. The curve illustrates the application of time for a child of 10 years old and for an adult of 40 years old.

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*Source: Caudill, William W. Toward Better School Design, F. W. Dodge Corporation, N. Y. (1954) p. 9.

about four times as fast for an adult of twenty as for a child of five. This situation will mean to the school planner that the time that the pupil stays in his school is a long period of hours. It is important, therefore, that the school planner remembers that the school which he builds for the children is to be used for very long hours.

In order to illustrate the principles of Dr. P. Lecomte Du Navy,[11] using a child of ten years of age and his father of forty years of age. The curve in Plate V determines by simple reasoning that to a man forty years old, one year represents one-fortieth of his age while to his ten year old son, a year would represent one-tenth of his life. This means that the pupil spends much time in his classroom. For this reason considerable care should be taken in connection with air, light and sound.

The Pupil as a Social Being

The pupil as a human being needs both physical and emotional comfort to function at his best. If the school planners recognize the child as a social being, it is easy then to realize that all children, and particularly those of high school age, are going to gather in small groups about as often as they can and where they can. Some will gather in their homes, but most of them will seek less desirable places.

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[11] Ibid., pp. 8-9.

It does not cost much money to make the school another place to keep the children off the streets. Education starts at home and the school planner should carry this social living from home into the elementary school, into the secondary school, into colleges, and then into democratic adult life. Therefore, the planner's responsibility is not only to solve the physical problem of schools, but he should broaden their concepts to include the emotional aspects also.

Atmosphere and the Pupil

Children in the primary grades know very little about the world outside their homes. They have grown up with the love and security of their families. They are very close to the warm protection of home. Suddenly they are confronted by the monumental school buildings and their formalness.

They can learn better in schools that are not so much different from the environment of their homes. They need intimate, cozy schools with welcoming entrances and cheerful, friendly classrooms.

In some ways the emotional needs for the older children are greater; their needs become more exaggerated. Life for a teen-ager is both complex and turbulent. He does not have the same emotional needs the youngster has, but he does need a cheerful, clean, and wholesome atmosphere in the school just as much as he needs it in the home.

Scale and the Pupil

Scale is the imaginary measurement used to bring the architectural elements into a harmonious relationship with those of the human being. In some ways the scale is related to the dimensions of the human body and in another way to the mind. For example even though a room is large enough for certain physical needs, it may sometimes feel too small. If so, then it is too small because it is out of scale with human feelings.

The scale is important in the school buildings and for their effect on the pupil. It is not agreed yet as to how the pupil is affected by scale. "Some architects think that the ceiling heights are of no importance in determining how the classroom feels to the child. To some of the architects it seems apparent the ceilings can help to produce a sense of relationship to the environment for the children. When the discussion gets to a consideration of the anatomy of the pupil, there is not much variance of opinions."[12] The pupil will move with more ease and more peace of mind when the spaces of the school, the equipment and furniture are all scaled to his size. He will feel that the space was made for him and for his comfort and finally he will work more efficiently.

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[12] Ibid., p. 10.

Color and Texture

The pupil as an organism needs his surroundings to be warm and friendly. The pupil likes to sit in a lighted classroom with right air temperature, but will reject an unfriendly, colorless and textureless atmosphere. A child likes colors, and he is accustomed to colors. The child responds to color psychology even more than the adult. A child likes to play with a bright red and yellow toy in preference to dark toys of the same kind. He also likes the colored cartoons and pays closer attention to cartoons and features in color than in black and white.

The color has a great effect on the psychological reactions of humans. All adults now recognize that greens, aquamarines and blues tend to be easy on the spirit and the eyes and that harsh bright colors are stimulating and sometimes distracting. Adults use colors widely and generally well, for themselves, in machine shops, assembly rooms, automobiles, theatres, departmental stores, and homes.

Adults would not like their home kitchens or their office reception rooms done in drab tans, dull grays or shabby gray-whites. If color is worth something to adults, it is also valuable to children. If we know that color can help our children to like their schools and to learn better in them, there is no valid reason colors should not be used for that purpose.

Creative architects have been bringing outside materials to the inside of the buildings with considerable success in producing colorful and highly textured spaces. Brick and natural siding with their own built-in colors have been particularly successful.

Because the pupils are sensitive to color and texture, the design of walls, ceilings, and floors should show consideration for their emotional and mental needs.

Comfort and Security

The object of the school planning is to house the pupil with a great consideration concerning his physical and emotional needs. The good school is that one which is designed and equipped to satisfy all the needs of the pupils. They will then work with a sense of security, and be helped to learn and to study efficiently.

The schools cannot function properly if the spaces are too small for individuals or groups of pupils to work in, or if the shelves are too high to reach and seats are too small to sit in with comfort. Plate VI shows characteristics of the anatomy of the pupil, based on statistics prepared by the United States Department of Agriculture. The pupil is a measurement tool, which varies from one group to the other. Plate VI is based on "H" the average height in inches indicated in circles for each age or corresponding grade.[13]

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[13] Ibid., p. 11.

PLATE VI

This plate* illustrates the characteristics of the anatomy of the pupil. The pupil is a measurement tool, which varies from one grade to another. This plate is based on "H" the average height in inches indicated in circles for each age and corresponding grade.

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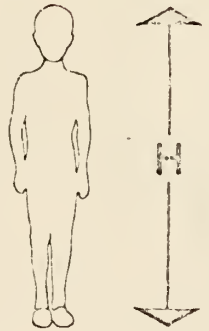
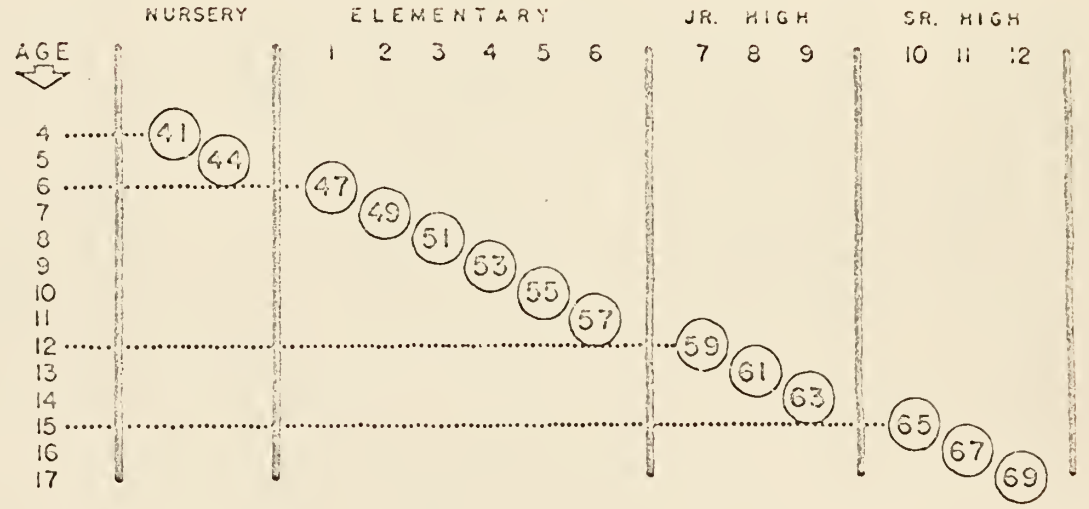
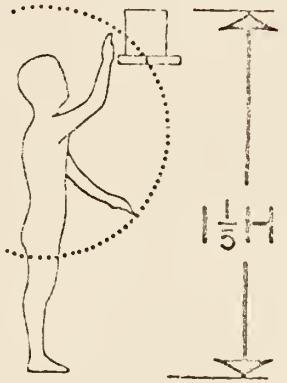
*Source: Caudill, William W. Toward Better School Design, F. W. Dodge Corporation, N. Y. (1954) p. 11.

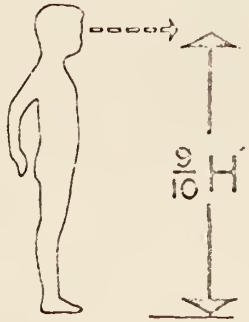
PLATE VI

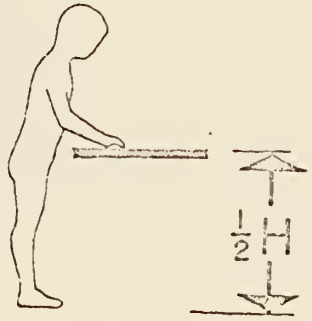
The Physical Size of the Client

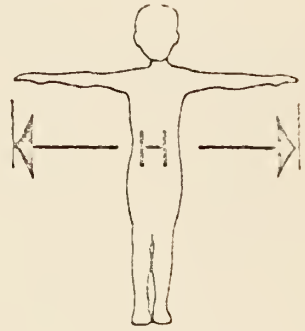


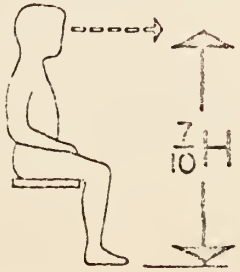


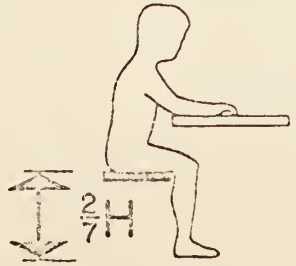


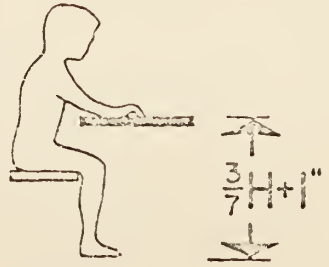


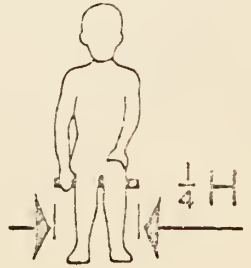












The Humanistic Approach

A quick look at the history of American Architecture as a whole will help us to appreciate the background of the humanistic approach and its ultimate influence on the design of school buildings. This approach has developed gradually over three hundred years of American history.

"The difference between style and function, between the desire to impress and the need to create practical shelter, has existed since Colonial days. While Renaissance, Georgian, and Classic Revival buildings were being erected in the Colonial capitals, the common people were working out their own practical theories of building, using the materials they found at hand."[14] Jefferson was probably the first to understand these trends. He acknowledged the political importance of style in the public buildings of a young nation. He gave first consideration to function in his school and university buildings. His architectural concept of a system for education designates him as the true father of the "comfort approach" to school planning.[15]

In Jefferson's letter of May 6, 1810, to the Trustees of East Tennessee College,[16] he suggested that

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[14] Ibid., p. 11.

[15] Ibid., p. 12.

[16] Ibid., p. 12.

> It is best to erect a small and separate lodge for each separate professorship, with a hall below for his class and two chambers above for himself; joining these lodges by a covered passageway to give a dry communication between all the school. The whole of these, arranged around an open square of trees and grass, would make it what it should be in fact, an academical village. . . .(such a plan) would afford that quiet retirement so friendly to study and to avoid the danger of fire.

Jefferson's plan could be the origin of the decentralized school plant with its connecting covered corridors.

The difference between style and function became the gap between architects and engineers. It became evident in the Northeast, where the late nineteenth century industrialists demanded technical efficiency from the engineers and conservative symbolism from the architects. In the Midwest, however, different social, political, and physical conditions, including the Great Chicago Fire of 1871 provided opportunities to develop a progressive meaningful architecture. The result was the famous "Chicago School" of Richardson, Wright, Sullivan and many others.

These great architects made architecture again a living part of American culture. They produced buildings designed inside to house whatever they were supposed to house efficiently, and to look like what they were. They made use of the vast improvement in equipment and materials.

The result was a remarkable improvement in the technological level of the entire building field. The period witnessed an important advance in city planning, parks, and housing. And this advance led to another element of the

comfort or humanistic approach; the realization that the special relationships inside a building are also related to external relationships between buildings and between buildings and grounds.

American architecture improved during this period, but since then buildings have fallen into a state of crises involving every phase of the building field. There are still some builders who cannot meet the needs of their society. There are some builders who are concerned with science only and cannot recognize the importance of aesthetics. There are designers who emphasize function, structure, plan, or aesthetics at some cost to the other aspects; and hence are content with these situations even though their own development is out of balance. There are also planners who want to understand the necessary fusion of function, form, and beauty and who work sincerely toward this goal. This later group follow the humanistic approach.

1950--A Turning Point in School Architecture

In 1950, a new movement based on the needs of the pupil was brought to the attention of architects concerned with education. For the first time a large majority of architects and educators throughout the entire nation began to work closely to try to solve their common problems. Cities began to revise their codes. By 1950 the battle between contemporary and traditional was won. The new movement which grew

out of the Chicago School of Architects drew new educators as well as architects. Because of the leadership of some outstanding architects and educators the present situation of school planning looks promissing. The future looks even better, because within the new crop of young architects and educators there are many who have caught the pupil theme idea, and they plan to perfect it.

The humanistic approach recognizes that a school must be safe, strong, and economical. It holds too that logically "form follows function" and also that form should express function. The school should be beautiful; however, a concept of beauty which conflicts with function and logical expressive form is a dishonest beauty.

The humanistic approach is truly aware of the importance of beauty to the pupil as well as to the passerby. Futhermore, it is fully aware of the ideological import of architectural aesthetics. It stands firm in the belief that the beauty which developes from good composition from the most suitable building materials is an honest expression of the function. True beauty is to be obtained from honest expression of the people's culture and their ideology.

CHAPTER III

SCHOOL DESIGN

At a school-building problems meeting held in one of the major universities of the United States, a noted architect observed that it was neither the ingenuity of engineers, the vision of architects, nor the dreams of school administrators that have created the character of school plants. Rather, the character and the design of the school buildings have been dictated by the educational program.[1] Undoubtedly, there is a great deal of truth in what they say, for school buildings have a long life. In many instances they are used forty or fifty years or longer. During such a span of time, even in the least progressive school systems, remarkable changes are made in the educational program; however, with the best planning, the school buildings tend to be less flexible than both curriculum and instructional methods are.

Education--A Changing Process

There is a great difference between methods of teaching children today and those of a few years ago. Basically this difference lies in the lines of communication within a classroom. The old time belief was that learning took place mostly in a one-way line of communication--from the teacher to the pupil--except that afterward the pupil was expected at times

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[1] Planning American School Building. Report of the American Association of School Administration, School Building Commission, 1960. p. 3.

to recite back the things that he had learned. Today it is believed that much more learning can be achieved if the lines of cummunication within the classroom are extended not only between the teacher and the pupil, but also between pupil and pupil. In short, the children learn from each other. They learn from each other's experiences. They learn through discussing their problems with each other. The procedure indicates that if a classroom is designed to facilitate the learning process, it must be so arranged and so equipped that pupils can work in groups and communicate freely with each other.

All old and newly established parts of the curriculum require newer types of facilities as new content is added to the courses of study and as research gives further insight into intricate processes of teaching and learning. Not long ago the pupil was considered as a charge and the function of the elementary school was to help him to become an adult as soon as possible. The secondary school prepared him for college work through the academic study of the liberal arts. Teaching and learning were formal.

The formal teaching concept was reflected by the school architecture. Because of the fact that the human rights and children's needs were not given the required consideration, the schools were almost uniformly, uncomfortable and depressing. In plan they were as formal as the education process. The classrooms were arranged so that the pupils were seated

in stiff rows facing the teacher's raised platform which represented the source of knowledge.

Since the early 1900's forces have been at work to change this method of acquiring education. The attitude now is changed and the pupil is considered to be a real person with human rights and needs which must be respected. The purpose of elementary education is to help the child to become socially adjusted and to make him literate and provide him with basic knowledge. Secondary education is designed to help pupils to be prepared for what kind of work they are going to do and to make them responsible citizens as well as to prepare them for possible college work. Teaching has become relatively informal and democratic.

School architecture today tries to reflect this new educational concept. Since the pupil is now being considered a real person with his own rights and needs, schools are being made more comfortable and cheerful. In play they are flexible and informal. In appearance they tend to adjust to the pupil's emotional needs.

Elementary Education--Its Aims and Process

A community's goals for its youth and for its own future are expressed through its school programs. The course of study for elementary school districts is designed to achieve two fundamental objectives:[2]

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[2] Basic Course of Study for Elementary Grades, office of County Superintendent of School, Sacramento, California (1966) p. 1.

1. Maximum development of the resources and abilities of every individual.
2. Training that will produce a competent citizenry committed to maintaining and improving our free society.

To achieve these goals, both the content and the methods of instruction are selected which will produce these outcomes:[3]

1. Skills in communication and computation;
2. Basic knowledge and understanding of the natural sciences, the social sciences, mathematics, language, health, music, and art;
3. A dynamic spirit of inquiry, to acquire competence in critical thinking and problem solving;
4. Aesthetic appreciation, expressive ability, and creativity.
5. Development of wide interests and motivation to assure a lifelong learning ability;
6. Self direction and ability to work both independently and with others on common tasks;
7. Effective human relationships;
8. Appreciation of and identification of the goals of democracy in our country, together with acquiring the ability to participate in world affairs;

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[3] Ibid., p. 1.

9. Physical and mental health and vigor;
10. Skills, attitudes and interests to ensure worthy use of leisure time.

There are certain historical developments which have determined the general character of the present public school system in the United States.[4] (1) The education of today endeavers to develop the child and to make him a responsible and self-reliant social being. (2) The second development is that of shifting from autocratic, sit-and-learn methods to a variety of less formal methods in which the children learn by doing in a number of different group relationships in which their activities are directly related toward home and family life. (3) The third development is the recognition of close relationship between the school and the community. In reality the school is an extension of the community. This relationship between the community and the school has brought the various community activities into the school building.

These historical developments have caused changes in curricula and methods of teaching. The most influential force in bringing about the change in school architecture is the movement toward a fundamentally different type of curriculum which is based upon the idea of learning by doing. The new type of curriculum requires great changes in design

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[4]Caudill, William W., Toward Better School Design, F. W. Dodge Corporation, New York, (1954), pp. 24-25.

and layout as well as in space and equipment requirements.

Classroom--Shape and Size

The new ideal classroom, will be a large, open work area, part of which is roofed, enclosed, and heated for protection against the elements. This area, part indoors and part outdoors, will be suitably serviced with the materials necessary to use in the educational process, will be provided with ample storage space, and will care for the personal hygiene of the students.

The classroom will be composed of a series of centers or elements, depending upon the program that is anticipated for the school. The major elements to be commonly included are:[5]

1. General work area.
2. Electric clock.
3. Reversible chalkboard-tackboard.
4. Teacher's file and storage cabinet.
5. Teacher's wardrobe.
6. Movable bookcases.
7. Louvers for natural light reflection.
8. Pupils' wardrobes.
9. Individual pupil storage unite.

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[5] Designing Elementary Classrooms, U.S. Dept. of Health, Education and Welfare--Office of Education, special publication No. 1. (1953) p. 36.

10. Display space and storage.

11. Storage for playground equipment.

12. Linoleum wallboard for art activities.

13. Toilets.

14. Drinking fountain.

Some architects prefer the square type of classroom. Other architects believe that the conventional rectangular classroom will serve the formal program as well as the informal activity program. But there are also strong arguments for the circle, the pentagon, the octagon, the hexagon and the parallelogram classrooms.

The recommendations concerning the size of the classroom, run from 600 sq. ft. to 1200 sq. ft.[6] The only way that the planner can tell what the size and shape of a classroom should be is to know (1) what kind of activities will take place within the room and (2) what number of pupils that this room is to house. Having secured adequate information the planner will then be able to formulate a functional shape and size for the classrroom.

The architect would rather have a statement concerning the activities which will take place in the classroom than to be limited by a certain shape and size. When the architect is limited by specific shape and size, he will lose part of

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[6]Caudill, William W. Toward Better School Design, F. W. Dodge Corporation, New York, (1954) p. 28.

his control of the design for the structure and of the all over construction cost. In order to reach a reasonable solution, the educators should take the lead in specifiying the functions of the classroom and the architect should take the lead in specifying the architectural shape to fit that function. Architects and educators should work together, since their responsibilities will overlap and because form should follow function.

A Classroom Arrangements[7]

Plate VII, Fig. 1, shows the conventional formal seating arrangement. Even though this type of seating arrangement is related to the old teaching method, there are still some occasions for which this arrangement is the most suitable. It is good to use during tests and for writing drills. It takes little space, that is 20 ft. by 15 ft. or 10 sq. ft. per pupil.

Plate VII, Fig. 2, shows that the pupils are working in groups of six, and the furniture has been arranged to serve this purpose. This kind of arrangement is used quite often. Some of the groups may be reading and others may be given some writing to do. This arrangement takes more space than the arrangement in Plate VII, Fig. 1.

Plate VIII, Fig. 1, shows another pupil group arrangement,

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[7] Ibid., pp. 29-35.

the teacher is seated at a small reference table with two students. The large group is having a committee meeting to determine how the class could build a model of a home as a part of a current unit study. The other group is considering what will go into the home.

Plate VIII, Fig. 2, shows that all the pupils with their teacher are gathered in an informal arrangement to discuss a special subject. In this arrangement each pupil has the opportunity to talk and to discuss as well as being near to every other member of the group. This arrangement shows democracy in action as the pupils sit together with their teacher.

Plate IX, Fig. 1, shows that the class area is cleared of the furniture and the pupils are participating in folk dancing. The space thus used is rather small.

Plate IX, Fig. 2, shows that the pupils are looking at a movie as a visual aid. The space used is rather small, less than 7 sq. ft. per pupil.

Plate X, Fig. 1, shows that the pupils are producing a little play. Two of the youngsters are seen performing on the stage. Educators believe that dramatization like this one is a wonderful learning medium as well as being excellent opportunity for self-expression.

Plate X, Fig. 2, shows that pupils are working on different projects in art and the class has been arranged for these activities.

Plate XI, Fig. 1, shows that the class is engaged in building a model for a house. One group of boys is building the roof and a group of girls is making the curtains. The other groups are participating in different types of work related to the project. This kind of activity requires a lot of space as the groupings indicate.

Plate XI, Fig. 2, shows that a large table was used for group study and activity. One of the pupils is giving a demonstration at a chalkboard. The use of tables in this manner provides facilities for innumerable learning activities.

Plate XII, shows that if the diagrams of all the classroom activities were superimposed the composite picture of all these activities will come within an area of 26 ft. by 28 ft. This area is very close to a square or circle. Probably this situation is the reason why some planners and architects believe that the square classroom is the best. However, if for structural reasons, one side has to be squeezed down a little, the change would not harm the educational process very much. A classroom space approaching a square seems to be adequate. But this comment does not mean that all the classrooms should take this exact shape. There will be some space needed in which to place the desks and chairs to make room for some of the varying pupils' acitvities. If adequate space is added to accommodate the other activities, the classroom probably could take any shape--square, L-shaped, circular, hexagonal, and so on. It is the furniture and

EXPLANATION OF PLATES VII-XI

The following series of photographs, posed by an actual elementary class, demonstrates the space requirements of typical classroom activity.*

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*Source: William M. Caudill, Toward Better School Design, F. W. Dodge Corporation, New York, 1954, pp. 30-34.

PLATE VII

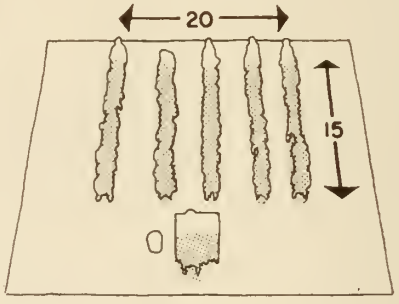
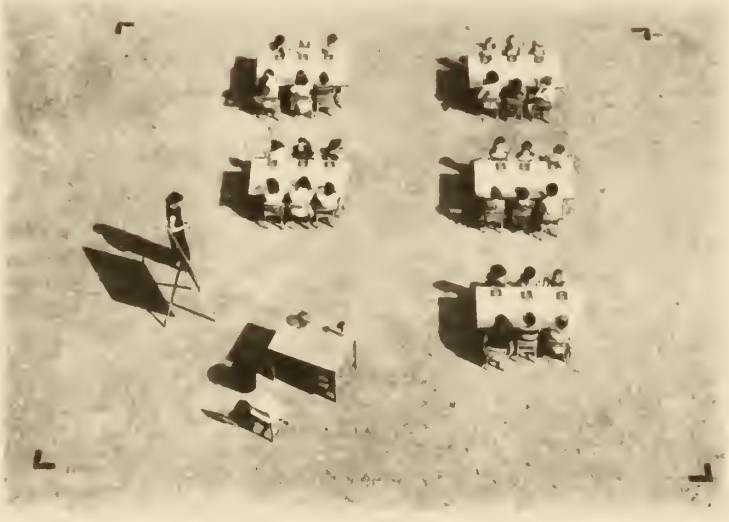


Fig. 1



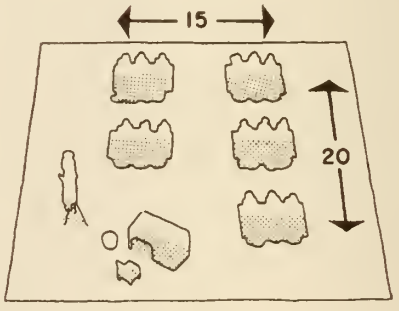


Fig. 2

PLATE VIII

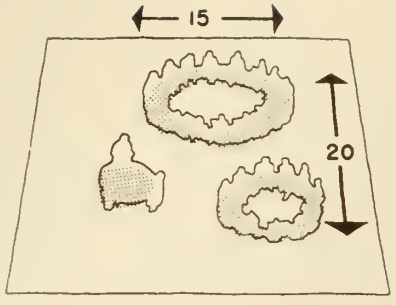


Fig. 1

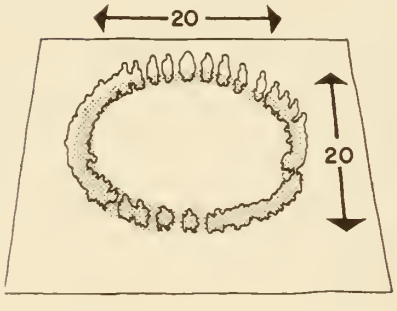


Fig. 2

PLATE IX

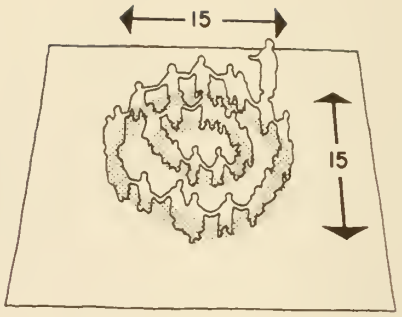


Fig. 1

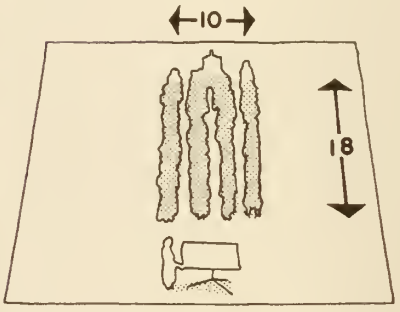
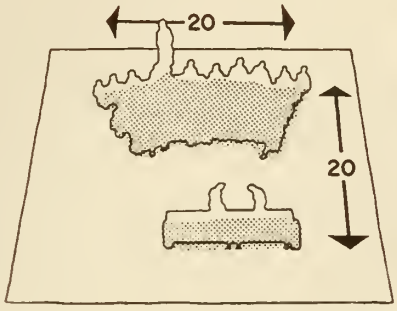


Fig. 2

PLATE X



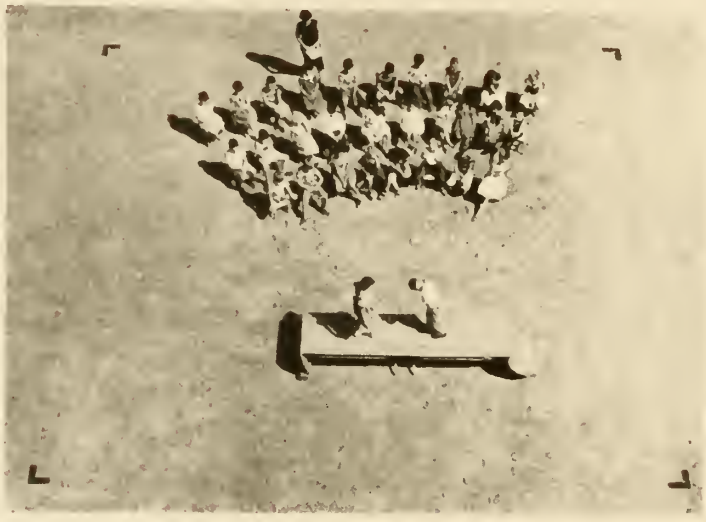
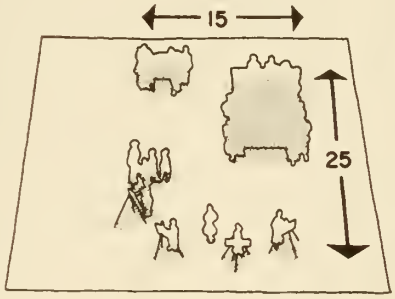


Fig. 1



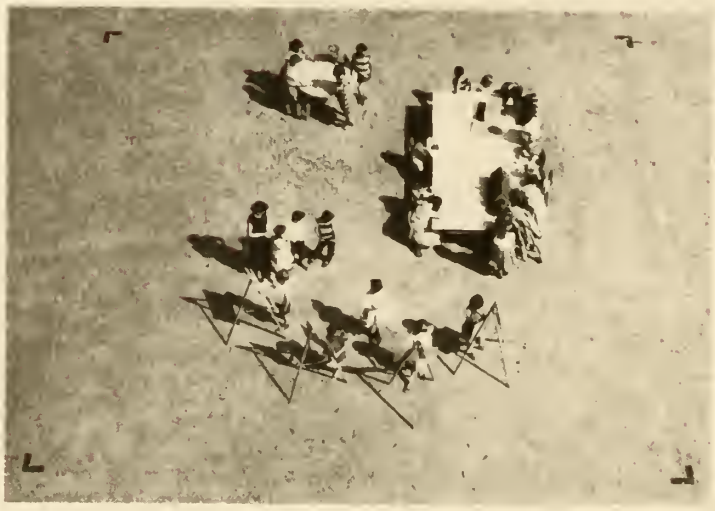
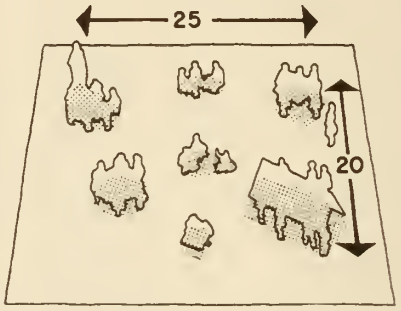


Fig. 2

PLATE XI

Fig. 1



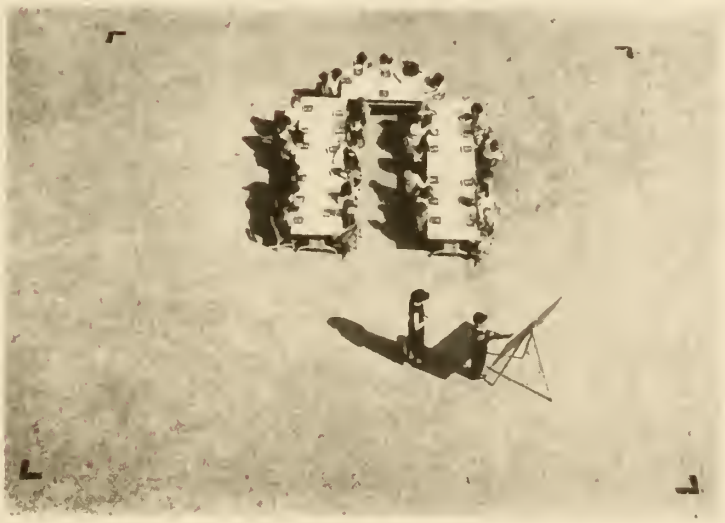


Fig. 2

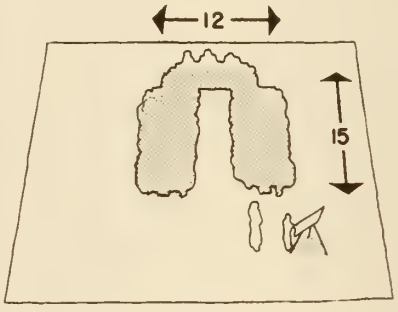
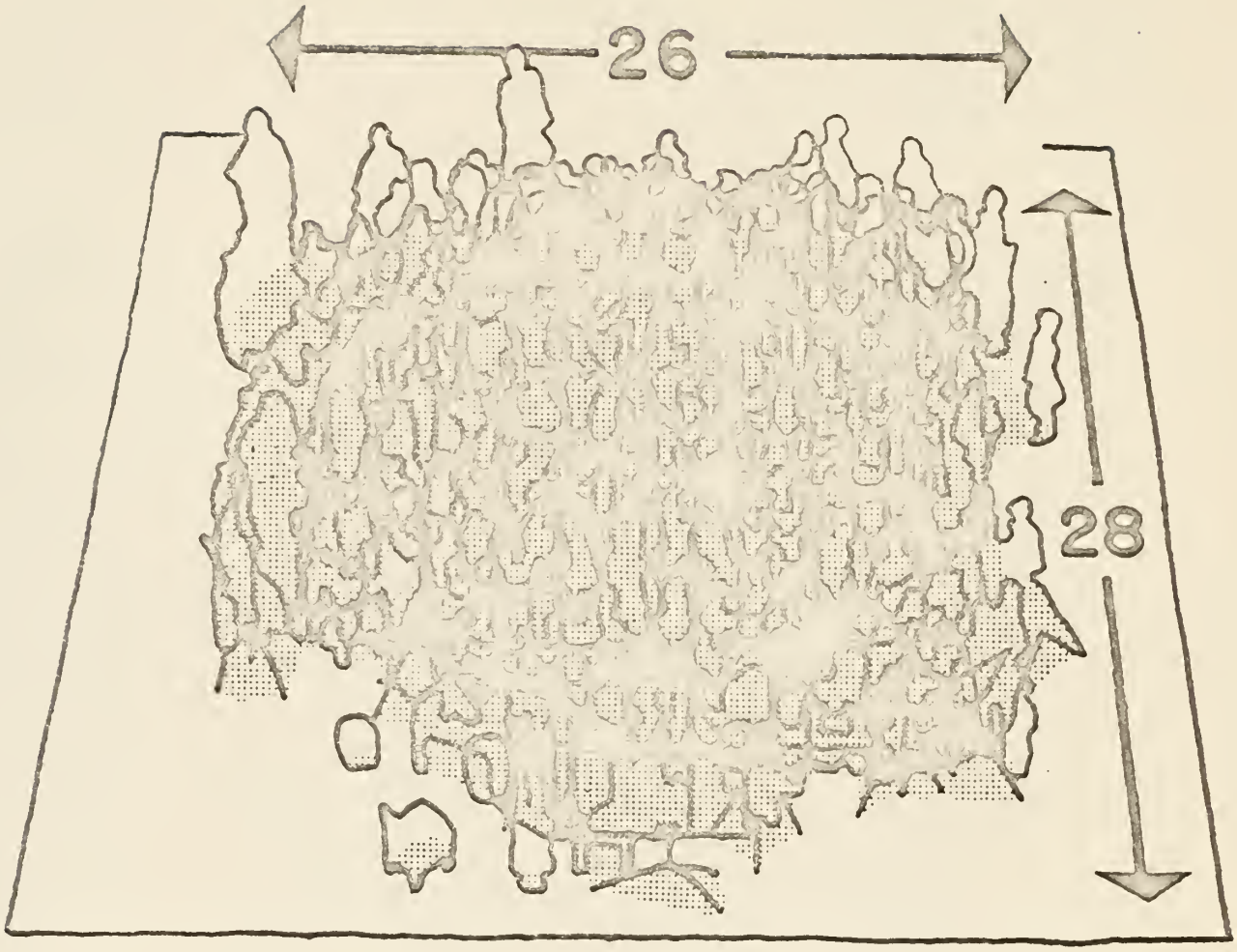


PLATE XII



This plate illustrates the composite result of the photographic studies concerning classroom shapes and sizes. All of the classroom arrangements come within an area of 26 ft. by 28 ft., which allows about 25 sq. ft. per pupil. After space for storage of equipment, wardrobes, and furniture has been added, the activity type classroom will take as much as 35 sq. ft. per pupil.

Source: William M. Caudill, Toward Better School Design, F. W. Dodge Corporation, New York, 1954, p. 35.

equipment that makes the difference. Arrangement of the furniture and equipment definitely helps to determine the shape of an ideal classroom.

The teaching activities take up a space of 26 ft. by 28 ft., or about 25 square feet per pupil. But if the space required to store the equipment and furniture is added these figures will go up. The recommended space of 35 sq. ft. per pupil proposed by W. W. Caudill in 1941 probably still is considered as satisfactory as any figures to use for an activity type classroom.[8] The conclusions based on this study of classroom size and shapes are as follows:

The classroom should have at least 35 sq. ft. per pupil to meet his activity program, but the shape is to be determined by the furniture and equipment arrangements and by storage facilities.

The study indicated that the width of the main teaching space should be standard. It seems that 26 ft. is a reasonable figure and possibly it could be as low as 24 ft., but it should not be lower than that. These studies and measurements used were made for a first grade class. A higher grade group would take more space for the reason that the children are larger and they need more space in which to move and larger furniture and equipment to use. For these older children the 35 sq. ft. per pupil should be considered a minimum. The

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[8] Ibid., p. 30.

space study should be used for other spaces. A similar study should be done for eating spaces and for assembly and recreational areas.

Secondary Education--Its Aims and Process

The educators realize that one student out of five or six goes to college,[9] and they feel great responsibility toward the large majority of the students who do not. The secondary school now tries to prepare students to live and to work. The responsibility of the secondary school is to meet the educational needs for the students and to make them active members in their communities. In a booklet called Planning for American Youth, the National Association of Secondary School Principals[10] lists these needs:

1. Society needs to be organized and governed so all people live in peace and are politically stable.
2. Society needs a free economic system which provides the basic needs.
3. Society needs to be cooperative to reach agreements for planning.
4. Society needs to organize business and labor to share the benefit of their production.

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[9] Ibid., p. 32.

[10] Ibid., p. 33.

5. Society needs to provide opportunities and security for each individual.
6. Society needs to develop the principle of democracy and to protect individual freedom.
7. Society needs to provide equal opportunities and education.
8. Society needs to protect its welfare from illegal practices.
9. Society needs to protect its natural resources so that they may not be wasted.
10. Society needs to protect its social, moral, and spiritual values.

It is the school's responsibility to see that each boy and girl should be aware of his responsibility to understand and to work effectively with these needs. It is also the school's responsibility to meet the individual needs of youths to make them capable to deal with the common problems of the society. These needs of youth are listed in planning for American Youth as:[11]

1. All youth need to develop skills and understandings and attitudes to make intelligent and protective workers.
2. All youth need to develop and maintain good health.

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[11] Ibid., p. 35.

3. All youth need to understand their rights and duties.
4. All youth need to understand the significance of the family to the individual and society and how the family life can be successful.
5. All youth need to know how to purchase and use goods and services intelligently.
6. All youth need to understand the methods of science and its influence on the human life.
7. All youth need to develop their abilities to understand and to appreciate beauty, literature, art, music and nature.
8. All youth need to develop respect to other people and be able to live with them cooperatively.
9. All youth need to learn to use their leisure well and useful.
10. All youth need to be able to think and understand.

The document listing these ten imperative needs of youth is an instrument that can be used in planning the building as well as planning the curriculum. In the planning of secondary schools, these needs of youth represent a base line upon which to work. Curriculums will change and will make inflexible school buildings out of date, but the needs of youth will remain for some time.

Architectural Considerations

The youth needs to be shown that boys and girls of

secondary school age must learn to work and play together. The list of needs suggest that in order to make good citizens, the secondary school students must learn how to solve their problems intelligently. In other words, the secondary school plant should be a social and cultural as well as a recreational center. This means that the school building should be so attractive and equipped and arranged so that the students would like to spend most of their time in it.

The school planner should set down a statement containing the prominent considerations for the design of the school, a statement offering a real basis for his work. These considerations are:

1. The high school population will continue to grow and the courses of study will continue to change; therefore, the school design should be flexible and expandable.
2. For each individual subject, there will be a continuous change in teaching techniques; therefore, each classroom or laboratory should be designed so that efficient adaptations to these changes can be made.
3. The students will spend more than an hour a day in the halls; therefore, all circulation areas and halls should be designed to achieve the aim of the educational program.
4. The best educational program emphasizes communication

among students as well as communication between a teacher and his students. Class areas, therefore, should be flexible in seating arrangement.

5. The school building will be used for community education and recreation; therefore, the school building should be designed to facilitate community use.
6. The school should be a social center for its students, The school should, therefore, be designed and equipped in such a way as to attract the student. It should also offer the most desirable opportunities in the community to learn and to play.

CHAPTER IV

BOWIE-BELAIR COMMUNITY

Introduction

If present trends continue, the Washington Metropolitan Area population will have increased from the present two and one-half million to nearly six million persons by the turn of the Century.[1] Many of these people will locate their residences in Prince George's County, and a substantial portion of these will select the Bowie-Belair area for their homes. The trend in county growth is toward developing the outlying area as prime single-family lots, since the cost of purchased land has become more expensive in recent years. The farm residents of the County are aware of pressures for development, and because it is becoming more difficultto realize a comparable profit from agricultural production, are following the trend of selling. During the past seven years, twenty to twenty-five percent of the total area has become more easily available for non-agricultural development through subdivision activity, zoning, extension of sewer service, or a combination of all three.[2]

Planning Goals: No scheme for development is reasonable if it is undertaken without reference overall set of goals.

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[1] Bowie-Collington and Vicinity, The Maryland-National Capital Park and Planning Commission, Sept. 1967, p. 3.

[2] Ibid., p. 3.

In the case of this study, the following goals have been accepted by County and municipal planning officials:[3]

1. Sufficient employment space for theoretical self-sufficiency in jobs should be designated and furthermore the opportunity should be created for every area resident to work in the area.
2. The studied area should be developed at densities which avoid "urban sprawl."
3. A system of public and private open space, as well as low-density residential uses, should be developed to shape and define the urbanized protions of the planning area.
4. The residential uses in the area should be developed to attract a diverse population in terms of household size, income, and personal preference.
5. The ultimate population of the area should not be significantly in excess of that now allowable under existing zoning.
6. A coherent policy of coordination between the timing of utilities and transportation construction with land use growth should be developed.
7. To the extent that commercial facilities offer a wide range of goods and services at competitive prices and qualities, as well as employment

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[3] Ibid., p. 5.

opportunities for area residents, this form of development is to be encouraged.

Location and the Region: Belair is located twenty-three miles east of Washington D. C. and about fifty miles south of Baltimore. A key factor in the future urban geography of this area is the closeness of these two neighboring metropolitan cities. Baltimore is providing a variety of manufactured goods plus major ocean shipping facilities for the national and the regional market, and Washington D. C. is providing the seat of national government. Now that the two urban areas are spreading out toward each other, the land between them provides sites for facilities that can serve both of them together. The future "super metropolitan area" will draw from a far wider range of resources, from steel mills to national research centers, than either city now does on its own.[4]

The climate of this region is widely known for hot and humid summers. The nearest shores of Chesapeake Bay, one of the great boating areas of the nation, lie within a half-hour's drive, and the shoreline stretches for many miles with peaceful coves and islands. A three hour drive will bring one to the Atlantic Ocean beaches.

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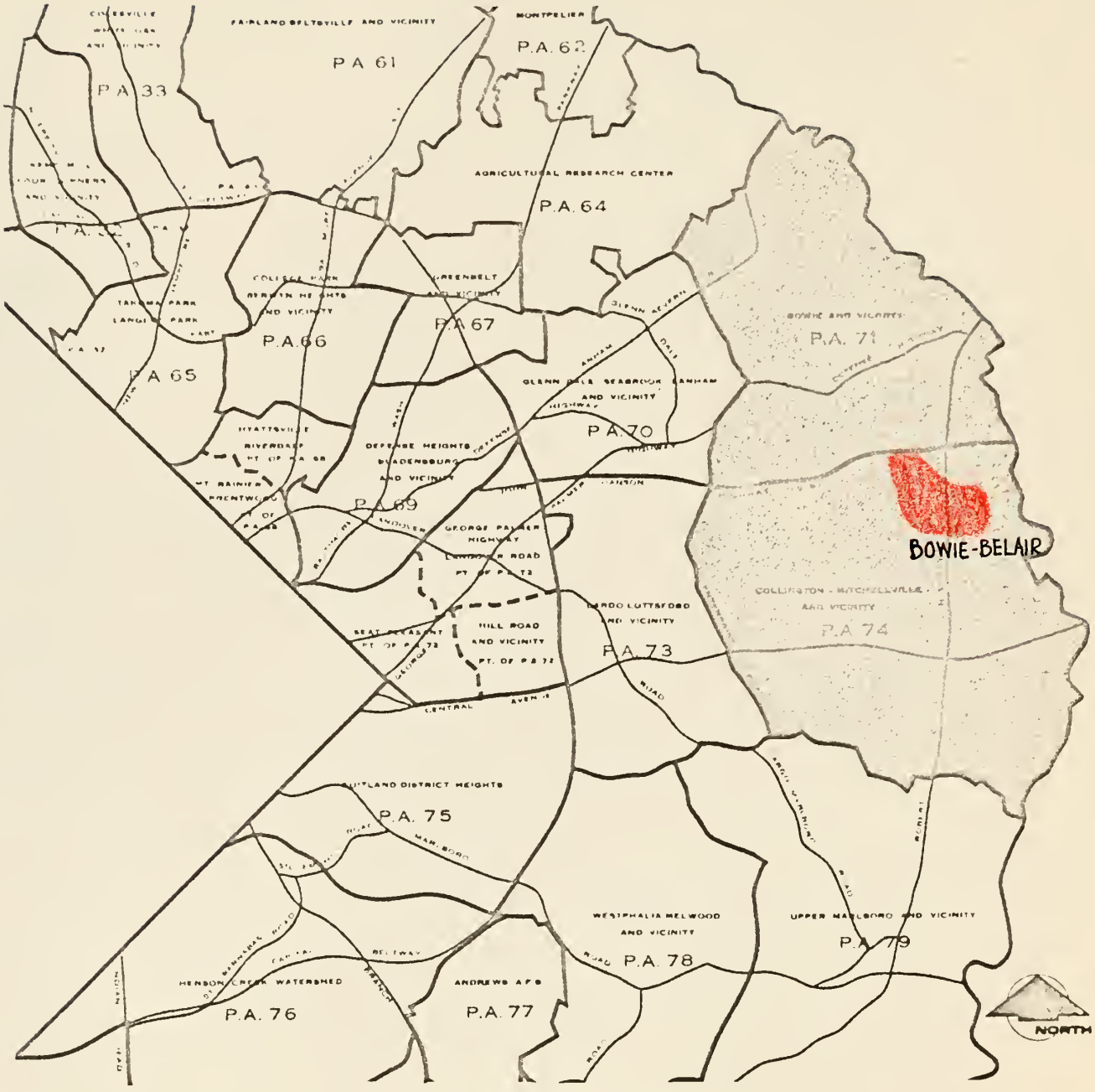
[4]A Plan for the Year 2000--The Nation's Capital, prepared by National Capital Planning Commission, Washington, D. C. (1961), p. 12.

PLATE XIII



LOCATION MAP

PLATE XIV


Harrisburg
Philadelphia
PENNSYLVANIA
MARYLAND
Baltimore
MARYLAND
DELAWARE
Dover
DELAWARE
BAY
DOWIE-BELAIR
District of Columbia
Annapolis
Charlottesville
MARYLAND
VIRGINIA
Richmond
Norfolk
N

Planning the Neighborhood

The neighborhood unit as a physical environment comprises "that area which embraces all the public facilities and conditions required by the average family for its comfort and proper development within the vicinity of the dwelling."[5] A neighborhood is furthermore the housing environment of the smallest geographic unit which includes these basic facilities and conditions; and a unit will permit organization of physical surroundings to eliminate inconveniences and hazards and which will provide a physical form suitable for the full development of community life.

Several types of elements comprise the housing environment. These may be grouped in the following principal categories:[6]

1. Residential facilities which include houses and immediate spaces around them.
2. A neighborhood community center which provides educational, health, social, cultural, recreational, and shopping facilities, used by the normal family.
3. Utilities and services including water supply, light, gas, telephone, storm drains, and sewage disposal,

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[5]Clarence Arthur Perry. Housing for the Machine Age, Russell Sage Foundation, New York, (1939) p. 50.

[6]Planning the Neighborhood. The American Public Health Association Committee on the Hygiene of Housing, Public Administration Service (1960) p. 2.

fire protection and police service.

4. Circulation of persons and goods made convenient by walks in general because of possible limitation of private cars, and also because of streets limited to service and emergency use only.

Walter Gropius stressed in his book Rebuilding our Communities that building the neighborhood community center is more urgent than building the housing itself. Those centers will form "a cultural breeding ground" which will enable people of the neighborhood to attain status within their community.[7]

Limits of Neighborhood Size; Area and Population:[8]

The size of a neighborhood is governed by the area required for all its land use components; by the population required to support necessary community facilities and services; by the accessibility of such facilities and by the existence of suitable physical boundaries. Because the neighborhood requires the service of an elementary school, and because it seems possible that the other required neighborhood facilities can be supported by a population even

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[7]Walter Gropius, Rebuilding our Communities, (1945) p. 54.

[8]Planning the Neighborhood, The American Public Health Association Committee on the Hygiene of Housing, Public Administration Service (1960) p. 2.

smaller than that for the school, the area and population which can be served by an elementary school is a reasonable basis for determining the size of the neighborhood. Minimum and maximum limits of elementary school size, determined by educational practice, can be ascertained with some accuracy.[9] On this basis the neighborhood population will usually fall between 2,000 and 8,000 persons, with a desirable size of about 5,000 persons.

The geographic extent of the urban neighborhood is limited by accessibility to the school. A school should be within one-half mile walking distance so that a neighborhood with a centrally located school should cover substantially more than 500 acres. Within these limits, an area is determined by space requirements of the proposed types of dwellings and for other facilities.

Assumed Family Size and Composition: Numerous planning decisions depend on population totals and on data concerning family composition. Not only must the types of dwelling be selected to accommodate the different sizes and types of families, but playgrounds, schools and other community facilities serving specific age groups must be planned in relation to a predetermined or assumed age distribution. The average family size and the age distribution of children

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[9]See Table 2 for relation of elementary school size and population.

TABLE 1. ASSUMED FAMILY SIZE AND AGE DISTRIBUTION: SELECTED DATA

1) Average Size of Family[a]		3.6 Persons
2) Age Distribution of Children Served by Neighborhood Schools and Play Areas[b]	Children per 1,000 Persons	Children per Family
Children by School Age Groups		
Nursery School		
2½ through 4 years	37.5	.14
Kindergarten		
5 years	15.0	.05
Six-Grade Elementary School		
6 through 11 years	90.0	.32
Eight-Grade Elementary School		
6 through 13 years	120.0	.43
Children by Play Age Groups		
Playlot		
2½ through 5 years	52.5	.19
Playground		
6 through 13 years	120.0	.43

[a] Assumed family size is equal to the total urban population (1940 U.S. Census) divided by total urban families.

[b] 1940 U.S. Census figures by age group indicate that for the elementary school age group, 6 through 13 years, there are 117.27 children per 1,000 persons of the total urban population. For purposes of this report, 120 such children per 1,000 persons have been assumed, evenly distributed through the 8-year range. This gives 15 children per 1,000 persons per year of age. Other age groupings of children are based on the number of years included times 15.

Note: These figures may be lower than the average family size and school population for many residential neighborhoods. They are based on a full cross section of the population including single person families, many of whom do not live in "residential" areas. For any specific project, population figures must be checked for local age distribution and birth trends, and in relation to expected occupancy of the dwellings.

TABLE 2 ELEMENTARY SCHOOL CAPACITY RELATED TO NEIGHBORHOOD POPULATION

Assumed Maximum Population Served, by Type of School[a]

	Minimum[d] School	Average[d] School	Maximum[d] School
Classrooms[b]	6 or 8	13 or 17	25 or 33
Pupils[c]	180 or 240	390 or 510	750 or 990
Families	550	1,200	2,300
Persons	2,000	4,250	8,250

[a] Assumed: 15 pupils per school year per 1,000 total population; will vary locally.

[b] Number of classrooms and pupils is given for 6- and 8-grade elementary schools. The number of grades in the school affects the number of pupils but not the total population required to provide these pupils. Each grade added will supply a new age group from the total population. For example, according to assumed population characteristics, there are, per 1,000 persons, 90 children aged 6 through 11, and 30 additional children aged 11 through 13 per the same 1,000 persons.

[c] Assumed: maximum of 30 pupils per classroom.

[d] Minimum school—1 classroom per grade.
Average school—1 classroom per semester-grade + 1.
Maximum school—2 classrooms per semester-grade + 1.

are given in Table 1.

Availability of Sanitary and Protective Services

A healthful neighborhood can be developed only on a site with a water supply that is adequate and certain as to amount, that will not be a means of conveying disease and that is reasonably free from chemical and physical impurities. It is also equally important that the collection and ultimate disposal of human waste must be provided for without sanitary hazard.

In the case of Bowie-Belair community, the water and sewer service proposals are embodied in the Five-year Program (1967-1971) of the Washington Suburban Sanitary Commission (WSSC).[10] The WSSC is a bi-county public agency, established as a non-profit organization in 1918 to provide water supply and sewage facilities within the growing areas of Montgomery and Prince George's Counties. The Commission has constructed and maintains about 4,600 miles of water, sewer and storm drainage pipelines.[11]

Power, Fuel and Communication: Electricity is essential in every home. The Potomac Electric Power Company and the

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[10] Bowie-Collington and Vicinity, The Maryland-National Capital Park and Planning Commission, Sept. 1967, p. 12.

[11] Annual Report to the People, Prince George's County, Maryland, September, 1966, p. 32.

Baltimore Gas and Electric Company provide the electric and gas facilities for the county. Washington Gas Light Company has also continued to expand its facilities in Prince George's County.[12]

Telephone service can be extended to most sites upon demand. Since World War II, the Chesapeake and Potomac Telephone Company has been expanding steadily to keep up with increasing demand for telephone service in the county and the entire area.[13]

Fire and Police Protection:[14] The water requirements for fire fighting normally set the peak load demand for a community supply. The Prince George's County Fire Board is serving the fire-fighting demands by providing increased speed, flexibility and reliability.

Access to Community Facilities Outside the Neighborhood: Certain facilities which are needed by the residents will not be available in the neighborhood. These include centers of employment, high school, major shopping centers, specialized health services and similar features to be found in Bowie-Belair community. All residents in the neighborhood development should have access to an improved highway system to

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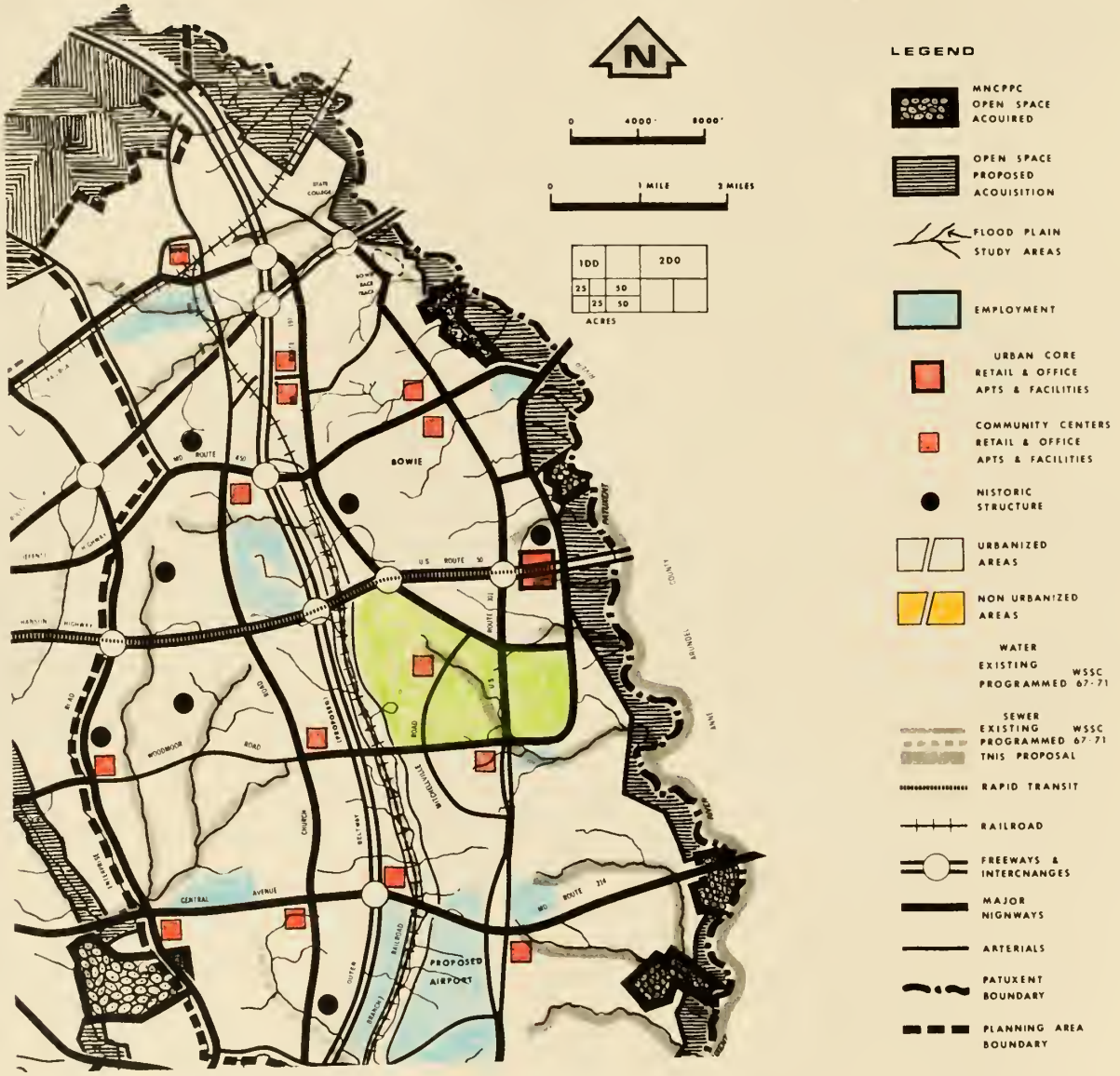
[12] Ibid., pp. 44-45.

[13] Ibid., p. 45.

[14] Ibid., p. 19.

PLATE XV



Proposed Master Plan for Bowie-Collington and Vicinity.* Proposed Area for Bowie-Belair Community Development.

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*The Maryland-National Capital Park and Planning Commission.

outside centers of activity. In order to serve the enormous increase in population in this study area, a greatly changed transportation system will be necessary. As shown on the map, page 88 at least two new highways are planned (The Outer Beltway and the George Palmer Highway to be extended) to complement a major highway network that will upgrade virtually every existing road in the area.[15] A second recommended element of transportation is a rapid transit linkage which would function to connect the planning area with Washington and other protions of the County.

Pedestrian and bicycle ways are to be considered the major way of circulation within the neighborhood. Pedestrians need all-weather walks separated from streets or roads. These should be lighted and should give protection at major traffic crossings.

The Urban Center is located near the major interchange at the northeast quadrant of the intersection of Crain and Hanson Highways. It includes the offices for business, governmental functions, regional shopping, cultural activities, and entertainment facilities.

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[15] Ibid., pp. 9-12.

CHAPTER V

PLANNING FOR RESIDENTIAL FACILITIES

General Considerations

Residential facilities are the structures and immediately adjoining land devoted to residential and directly accessory services.

Governing Factors in Residential Site Planning: The residential facilities are closely related to other elements of the neighborhood plan such as circulation layout and the location of the school and other community facilities. Residential facilities connot therefore, be separated from the general neighborhood plan. The good site planning practice should make adequate provision for:[1]

1. Light and air in the buildings.
2. Outdoor space for daily family needs.
3. Protection against noise.
4. Safety from accidents and fire.

Providing these requirements in site planning practice will vary with the design solutions and densities of the development appropriate to various types of dwellings.

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[1] Planning the Neighborhood, American Public Health Association Committee on the Hygiene of Housing, Public Administration Service, Chicago, (1960), p. 24.

Classification of Principal Dwelling Types for Bowie-Belair Community

The following types of dwelling classification will be used in the Bowie-Belair Community planning.

1. Single-family dwelling unit: It occupies the structure from ground to roof, with independent access, services and use of land.
2. Two-family dwelling units: They occupy the structure one above the other. Independent access and services are widely associated with this type. Land is generally used in common.
3. Multi-family: Three or more units included in one structure, usually with common access, services and use of land.

Relation to Site Analysis

Dwelling types should be selected with regard to topography and subsoil conditions of the site. Apartment houses (townhouses) will ordinarily be built parallel to contours of the site, to avoid costly breaks in floor levels. Since low cost is not of prime importance, apartment houses at right angles to moderately sloping ground will produce pleasing effects.

Ground slope classification is very helpful in determining the use of contours. For Bowie-Belair community the following slope classification will be used.

(1) 0% to 4% slope is suitable for roads, plazas, playfields, parking lots and building sites with a minimum of site preparation.

(2) 5% to 10% slope is suitable for roads and building sites with minor site preparation.

(3) 11% to 20% slope is suitable for building sites and street roads with a moderate amount of site preparation.

(4) 21% to 40% slope is suitable for building sites requiring considerable earth moving.

(5) An above 40% slope is unbuildable. (It may be suitable for residential building sites but it is uneconomical.)

The slope classification is developed from an available U.S.G.S. map, enlarged by the scale of one inch to four hundred feet with five feet contours as the basis for determining the possible use of the land.

Density of Residential Development

The density measurements are important characteristics for site planning. It reveals the crowding of people and the structures on the land and the amount of open space available to the families. Specifically densities should be limited to provide:[2]

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[2] Ibid., p. 36.

1. Adequate daylight, sunlight, air and open space.
2. Adequate space for all community facilities.
3. A general feeling of openness and privacy.

Densities should have a reasonable relationship to land and improvement costs. Two types of density measurement are needed:[3]

1. Density measures for residential areas of the neighborhood to insure adequate open space, light and air for residential facilities.
2. Density measures for the entire neighborhood, taking all land use into account, to insure provision of adequate community facilities in relation to population load.

Measure of Density: The recommended dimensions and areas of lot for the specified types of dwelling for Bowie-Belair Community are as follows:

1. Single-family detached 70' x 130' = 9100 sq. ft.
2. Two-family detached 80' x 130'; 5200 sq. ft. for each family.
3. Multi-family apartment houses; 1300 sq. ft. to 1500 sq. ft. floor area for each family.

Building Coverage: Building coverage is the proportion of net or gross residential land area occupied by buildings.

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[3]Ibid., p. 36.

At the present time, 20 per cent to 30 per cent coverage of land is practical and permits conformity with accepted standards for light, air and open spaces.[4]

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[4] Ibid., p. 40.

CHAPTER VI

PROVISION FOR BOWIE-BELAIR NEIGHBORHOOD COMMUNITY FACILITIES

Factors of Need, Selection and Accessibility

The basic services which cannot be supplied to the individual family in its own dwelling should be included among the neighborhood facilities. Two of these are a direct extension of the dwelling and its yard. Playgrounds, for example, serve those children who are old enough to need more space and equipment for exercise than that obtainable on a small lot.

Bowie-Belair community should include the following neighborhood community facilities:

1. Educational: Elementary school, junior high school and senior high school.
2. Recreational: Playground and park.
3. Social and cultural: Churches and library.
4. Neighborhood shopping: Food and drug stores and miscellaneous services.
5. Health services: Access to medical and dental service.

Standards: In order to insure adequate space for all neighborhood facilities, some standards are necessary. The assumed sizes and population loads of all neighborhood community facilities are given in Table 3. The standards for

TABLE - 3

Proposed Land Area of All Neighborhood Community Facilities,
(Component Uses and Aggregate Area, by Type of Development and Population of Neighborhood)[1]

	Neighborhood Population				
	1,000 Persons 275 Families	2,000 Persons 550 Families	3,000 Persons 825 Families	4,000 Persons 1,100 Families	5,000 Persons 1,375 Families
One- Or Two-Family Development[2]					
Area in Component Uses					
1) Acres in school site	1.20	1.20	1.50	1.80	2.20
2) Acres in playground	2.75	3.25	4.00	5.00	6.00
3) Acres in park	1.50	2.00	2.50	3.00	3.50
4) Acres in shopping center	.80	1.20	2.20	2.60	3.00
5) Acres in general community facilities[3]	.38	.76	1.20	1.50	1.90
Aggregate Area					
6) Acres: total	6.63	8.41	11.40	13.90	16.60
7) Acres per 1,000 persons	6.63	4.20	3.80	3.47	3.32
8) Square feet per family	1,050	670	600	550	530
Multi-Family Development[4]					
Area in Component Uses					
1) Acres in school site	1.20	1.20	1.50	1.80	2.20
2) Acres in playground	2.75	3.25	4.00	5.00	6.00
3) Acres in park	2.00	3.00	4.00	5.00	6.00
4) Acres in shopping center	.80	1.20	2.20	2.60	3.00
5) Acres in general community facilities[3]	.38	.76	1.20	1.50	1.90
Aggregate Area					
6) Acres: total	7.13	9.41	12.90	15.90	19.10
7) Acres per 1,000 persons	7.13	4.70	4.30	3.97	3.82
8) Square feet per family	1,130	745	680	630	610

Source: Planning the Neighborhood (Chicago: Public Administration Service, 1948), Table 11, p. 53.

[1] This table combines the recommended or assumed values of Tables 7-10, in Planning the Neighborhood, pp. 45-52.

[2] With private lot area of less than $\frac{1}{4}$ acre per family (for private lots of $\frac{1}{4}$ acre or more, park area may be omitted).

[3] Allowance for indoor social and cultural facilities discussed in Section 22, in Planning the Neighborhood, pp. 49-50 (church, assembly hall, etc.) or separate health center, nursery school, etc., unallocated above. Need will vary locally.

[4] Or other development predominantly without private yards.

TABLE 4 ACCESS STANDARDS FOR COMMUNITY FACILITIES OUTSIDE THE NEIGHBORHOOD

DISTRICT OR CITY FACILITY	MAXIMUM DESIRABLE DISTANCE OR TIME (ONE WAY) FROM FARTHEST DWELLING	
	A Walking: Total Distance	B Automobile and Public Transit: Total Elapsed Time
Secondary School		
Junior High	¾ to 1 mile,[a] *or*	15 to 25 minutes by public or special transit, without cost to pupils
Senior High	1 to 1½ miles,[a] *or*	20 to 30 minutes with 10¢ maximum daily fare[a]
District Center: Shopping, Culture, Religious Worship, Recreation	1 to 1½ miles, *or*	20 to 30 minutes with 10¢ maximum trip fare
Employment Centers	No standard: B governs	20 to 30 minutes
Urban Center: Commerce, Culture, Government	No standard: B governs	30 to 45 minutes
Outdoor Recreation		
Major Park	No standard: B governs	30 to 60 minutes
Athletic Playfield	1 to 1½ miles	No standard: A governs[b]
Health Services	Should be available in district or urban center	

[a] Based on the assumption that a lunchroom is available, seating at least half the pupils, and serving a hot lunch at nominal cost. In densely populated areas where children lunch at home, a lunchroom may not be necessary, but acceptable distances should be decreased accordingly.

[b] Necessity of public transit over long distances will discourage use by students and team groups intended to be served.

the location and servicing of sites for community facilities are given in Table 4.

Education

The educational facilities to be provided within the neighborhood of Bowie-Belair Community are elementary school and some types of adult educational facilities. Junior and senior high schools are also provided on a district basis, because of the larger population required for their support.

Responsibility for Provision and Operation: The public school system of Maryland is under the general guidance and direction of the State Board of Education. The education program in Prince George's County includes grades 1-12 in the elementary and secondary schools, organized on a 6-3-3 plan: elementary school, 6 years; junior high school, 3 years; and senior high school, 3 years.[1]

Multiple Use of Facilities: Combination of elementary school and playground saves duplication of facilities and saves space. It requires coordination between local recreation and school authorities. The adult education facilities have been considered as a part of public educational systems and are to be sponsored by the State Board of Education.

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[1] Annual Report to the People, Prince George's County, Maryland, September, 1966, p. 12.

Recreation

The recreational facilities to be included in residential developments are neighborhood park and playground. They provide opportunity for exercise and exposure to sunshine, especially necessary for children. They also provide the opportunity for group recreation and fostering of good social relationships. Standards for the size and facilities of active recreation areas have been listed in Table 3 and Table 5. The use of park area as a buffer strip between residence and shopping center or other nonresidential area reduces the total area needed and is quite acceptable as the park function is not impaired because of this use.

Responsibility for Provision and Operation: Responsibility for provision and operation of facilities usually rests with a city department of parks and playgrounds. But it is desirable that neighborhood parks be publicly acquired, equipped and maintained. The maintenance of a park area may, however, remain the responsibility of the management of the special housing project.

Multiple Use of Facilities: If the playground is to be provided by school authorities and operated by the playground department, assurances should be obtained from the school board that the playground will be open and available to all children of the neighborhood at all hours when it can be used.

TABLE - 5

STANDARDS FOR RECREATIONAL ACTIVITIES*

Type of Recreational Activity	Space Requirements for Activity per Population	Ideal Size of Space Required for Activity	Recreational Area Wherein Activity May be Located
Active Recreation			
Children's play area (with equipment)	0.5 acre per 1,000 pop.	1 acre	Playgrounds – neighborhood parks – community parks, school playgrounds
Field play areas for young children	1.5 acres per 1,000 pop.	3 acres	Playgrounds – neighborhood parks – community parks
Older children – adult field sports activities	1.5 acres per 1,000 pop.	15 acres	Playfield – community park – district park
Tennis – outdoor basketball – other court sports	1.0 acres per 5,000 pop.	2 acres	Playfield – community park
Swimming	1 outdoor pool per 25,000 pop.	Competition size plus wading pool 2 acres	Playfield – community park
Golfing	1–18 hole course per 50,000 pop.	120 acres	Community park – district park
Parking at recreational areas	1 acre per 1,000 pop.	varies	Playfields, community, district and regional parks

* *Urban Land*, May 1961, by George Nez, Director, Inter-County Regional Planning Commission, Denver, Colorado.

STANDARDS FOR RECREATION AREAS*

Type of Area	Acres per 1,000 Population	Size of Site (acres)		Radius of Area Served (miles)
		Ideal	Minimum	
Playgrounds	1.5	4	2	0.5
Neighborhood parks	2.0	10	5	0.5
Playfields	1.5	15	10	1.5
Community parks	3.5	100	40	2.0
District parks	2.0	200	100	3.0
Regional parks and reservations	15.0	500–1,000	varies	10.0

* *Urban Land*, May 1961, by George Nez, Director, Inter-County Regional Planning Commission, Denver, Colorado.

Parks can be located so that they will provide a noise buffer between playground and residences.

Neighborhood Playground: It is the center of activity for the elementary school children. Equipment should be provided which permits a wide range of normal play. Adults can enjoy games which require little space. The playground should provide most of the following facilities:[2]

1. Open space for informal play.
2. Surfaced area for softball, tennis, volley ball etc.
3. Water activity area.
4. Area for quiet games and storytelling.

Proper surfacing for playgrounds is important for protection of the children. Surfaces of general play areas should be resilient, dust free and quick drying.

Neighborhood Park: The neighborhood park area will be a pleasant green area. Shade, walks, benches and a pleasant outlook are the chief requirements for such a recreation area. The park may be broken up into separate small units which can be interconnected by pedestrian paths and landscaped strips.

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[2] Planning The Neighborhood, American Public Health Association Committee on the Hygiene of Housing, Public Administration Service, Chicago, (1960), p. 48.

Social and Cultural Facilities

Social and cultural facilities provide opportunities for normal group activity. Services and organizations for which space may be required, includes:

1. Social service: employment guidance, girl scouts, boy scouts, Community Chest organization.
2. Religion: churches may play an important role not only in the religious, but also in the social and cultural life of a community.
3. Literature and the Arts: library, art exhibits and lectures.

Neighborhood Shopping

The shopping facilities include those stores and services which are used by all families and which should be easily accessible to the home shops which are normally operated by private enterprises. The shopping center may be constructed by the developer or by the firms that will operate the stores. The chief planning considerations are the need to include the proper types of facilities and the need for enough control over the physical plants to preserve the architectural and other amenities of the neighborhood.[3]

The following list indicates the basic facilities which may be included in the shopping center:

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[3] Ibid., p. 50.

1. Food market.
2. Drug store (including reading matter and stationery).
3. Barber shop and beauty parlor.
4. Laundry and dry cleaning service.
5. Shoe repair and shoeshining.
6. Auto service station.

The neighborhood shopping center should contain only the types and number of stores which can be well supported by the population.

Health Service Facilities

Availability of a physician within or close to the neighborhood is essential. Medical and dental offices can usually be provided in buildings in the neighborhood shopping center.

The hospital facilities should be located between two neighborhoods. The location should be easily accessable for emergency use in connection with a doctor's office.

Open Space

General: Over the past decade many American families have moved to the suburbs--in Walt Whitman's words--to be "vitalized by regular contact with outdoor light and air and growths, farm scenes, animals, fields, trees, birds, warmth and free skies. . . ."[4] Larger incomes, shorter working

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[4]Cluster Design, a look at Brookhaven, published by Pratt Institute, School of Architecture, (undated) p. 2.

hours, decentralized industry, universal automobile ownership and better roads have made the move to outlying areas feasible for large numbers of middle class families. In current suburban developments the outdoor open space becomes popular partly because of the environment but also because the residents hope to find " a better class of people"[5] which means, to some extent, neighbors who help provide more safety and security. In addition, safety means safer streets for children to walk and play on, and safer play areas, in general. Open space, cluster planning, parks and a good street plan help in the sale of new homes or apartments in the neighborhood.[6] Most developers, who have tried open space and better land planning agree that the community planning and amenities were major sales factors, and in their next developments they have gone even further to provide more open space, and more and better recreational community facilities.

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[5]A joint study research sponsored by the National Association of Home Builders and Urban Land Institute found that the 721 families living in 28 open space communities are well above the average in education. Of the 721 families, 75 per cent of the men had college training and 63 per cent were college graduates. Their wives were also well educated: 61 per cent had some college and 34 per cent were college graduates. (Source: ULI, Technical Bulletin No. 57, p. 4.)

[6]ULI, Technical Bulletin No. 57, p. 4.

The open space includes the following features: trees, parks, recreation areas, lakes, walks and other such amenities. In general, the more features a community has, the more important the environment is as a sales factor.

Ownership and Maintenance: The idea of open space exists for the benefit of the home-buyers. They are paying for it. The cost of the land has already been built into the price of the homes in the community. The people who buy them are the ones who are paying for the open space. There are several methods that may be used in the operation and maintenance of open spaces and which are best, depends on the community. The principal methods of operation are the following:

1. Municipal ownership.
2. Homeowners' associations.
3. Special service districts.
4. Landlord maintenance.

The Federal Housing Association (FHA) urges the formation of a home-owners' association which takes over the responsibilities for open spaces, maintains them and levies assessments for operation. This homeowners' association can be socially beneficial for a neighborhood as well as useful in operating swimming pools, tennis courts and recreation areas.

The open areas might be operated as a special district, as are other community facilities such as street lighting, fire protection, and water, sewer and garbage collection.

Such facilities are empowered to levy assessments on the residents for maintenance and development of the open space.

The Urban Land Institute indicates, homeowners' associations have worked quite well. The key requirements are the following:[7]

1. They must be set up before the houses are sold.
2. Membership must be mandatory for all homeowners.
3. The open space restrictions must be permanent.
4. They must be responsible for liability insurance, local taxes, and the maintenance of recreational and other facilities.
5. Homeowners must pay their pro rata share of the cost and understand that the assessment levied by the associations can become a lien on the property.
6. They must be able to adjust the assessment to meet changed needs.

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[7]Whyte William H. Cluster Development, American Conservation Association, New York, (1964), p. 37.

CHAPTER VII

THE CIRCULATION SYSTEM FOR BOWIE-BELAIR

The Function of Circulation

Auto traffic, as a major source of nuisances and hazards, makes proper design of the circulation system of prime importance to health. Functionally, circulation provides access for residents and for all those who serve the neighborhoods. Physically, the circulation pattern, links residences to each other, residences to neighborhood community facilities and the neighborhood to center of business and employment center in this community.

The elements of the circulation system may be classified as follows:[1]

Types of Uses:

1. For residents: in all daily activities.
2. For deliveries and collections: including fuel, furniture moving, mail and garbage.
3. For protective services: fire, police, ambulance.
4. For maintenance and repair: utilities, grounds and structures (including snow removal).

Circulation Routes:

1. Access from the outsideto the neighborhood.

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[1] Planning the Neighborhood, by the American Public Health Association Committee on the Hygiene of Housing, Public Administration Service, (1960), p. 54.

2. Access to dwellings.

3. Access to neighborhood community facilities.

Means of Circulation:

1. Pedestrian.

2. Automobile, truck and motorcycle.

3. Public transit.

4. Others (bicycle, baby carriage, etc.).

Circulation Ways:

1. Streets.

2. Walks.

3. Driveways (to garages, parking areas and service courts).

4. Parking areas.

Convenient access, especially to stores and public transportation, is necessary to avoid fatigue, and safe access is particularly important for schools and playgrounds.

Organization of the Circulation System

Street Types: Directness of access, increased speed of through travel, reduction of accident and elimination of unnecessary traffic from the neighborhood should be governed by a clearly articulated street pattern. This should be composed of various types of streets, each designed for the character and volume of its traffic. The recommended classification of the streets for Bowie-Belair Community are the following:

Residential Service Street: providing direct access to residential structures; serving a small number of dwellings.

Neighborhood Feeder Street: connecting service streets to each other, to community facilities and to minor traffic arteries.

Minor Traffic Street: connecting feeder streets to major traffic streets and to district centers.

Major Traffic Street: connecting cities and major districts of a single city; serving fast moving traffic (including highways, freeways, etc.).

Parking Requirements: In any development, upto neighborhood size, it is essential to provide adequate parking space for residents, visitors and service vehicles in connection with both community facilities and dwellings. Parking in connection with community facilities should be provided off the street, in separate parking lots. The parking standards considered for Bowie-Belair Community are indicated in Table 6.

Walking and Bicycle Paths: Walks from all dwellings should provide convenient and safe access to elementary schools, shops, playgrounds and other chief pedestrian objectives. Children will use paths that are short cuts from their homes to a nearby school, swimming pool, or favorite store. Such paths are safer than sidewalks along the busy

TABLE - 6a

OFF-STREET PARKING

USE	MINIMUM STANDARD
Residential	
Single family dwellings	2 spaces per dwelling
Multifamily dwellings	
1 bedroom or less per unit	1 space per unit
2 bedrooms per unit	1½ spaces per unit
3 bedrooms or more per unit	2 spaces per unit
Apartment hotels	1 space per unit
Hotels and clubs	1 space per room up to 40 rooms, and 1 space per 2 rooms over 40 rooms
Tourist motels	1 space per sleeping room or living unit
Trailer parks	1½ spaces per trailer
Shopping Centers	
Neighborhood	6 spaces per 1,000 sq. ft. gross floor area
Community and regional	8 spaces per 1,000 sq. ft. gross floor area
Food Markets	10 spaces per 1,000 sq. ft. gross floor area
Retail Stores	
Less than 5,000 sq. ft. gross floor area	1 space per 200 sq. ft.
5,000-20,000 sq. ft. gross floor area	25 spaces plus 1 space per 150 sq. ft. over 5,000 sq. ft.
More than 20,000 sq. ft. gross floor area	25 spaces plus 1 space per 150 sq. ft. over 5,000 sq. ft. plus 1 space per 100 sq. ft. in excess of 20,000 sq. ft.
Restaurants and Bars	1 space per 150 sq. ft. gross floor area
Central Business	1 space per 300 sq. ft. gross floor area when mass transit is available, 2 spaces per 300 sq. ft. gross floor area if not available
Office Buildings	
General business	1 space per 400 sq. ft. gross floor area
Banks, Professional Offices, and Service Shops	1 space per 250 sq. ft. gross floor area
Medical-Dental Offices	1 space per doctor and each employee plus 1 space per examining room or 1 space per each 100 sq. ft. gross floor area
Public Assembly	
Theaters, auditoriums, and stadiums	1 space per 5 fixed seats or 35 sq. ft. of seating area
Churches	1 space per 3 fixed seats
Schools	
Elementary schools	1 space per classroom
High schools and trade schools	1 space per 5 seats
Colleges	1 space per 3 students

TABLE – 7

HIGHWAY AND STREET STANDARDS*

Type of Facility	Function and Design Features	Spacing	Widths		Desirable Maximum Grades	Speed	Other Features
			R.O.W.	Pavement			
Freeways	Provide regional and metropolitan continuity and unity. Limited access; no grade crossings; no traffic stops.	Variable; related to regional pattern of population and industrial centers	200–300 ft.	Varies; 12 ft. per lane; 8–10 ft. shoulders both sides of each roadway; 8–60 ft. median strip.	3%	60 mph	Depressed, at grade, or elevated. Preferably depressed through urban areas. Require intensive landscaping, service roads, or adequate rear lot building set-back lines (75 ft.) where service roads are not provided.
Expressways	Provide metropolitan and city continuity and unity. Limited access; some channelized grade crossings and signals at major intersections. Parking prohibited.	Variable; generally radial or circumferential	200–250 ft.	Varies; 12 ft. per lane; 8–10 ft. shoulders; 8–30 ft. median strip.	4%	50 mph	Generally at grade. Requires landscaping and service roads or adequate rear lot building set-back lines (75 ft.) where service roads are not provided.
Major roads (major arterials)	Provide unity throughout contiguous urban area. Usually form boundaries for neighborhoods. Minor access control; channelized intersections; parking generally prohibited.	1½–2 miles	120–150 ft.	84 ft. maximum for 4 lanes, parking, and median strip.	4%	35–40 mph	Require 5-ft.-wide detached sidewalks in urban areas, planting strips (5–10 ft. wide or more) and adequate building set-back lines (30 ft.) for buildings fronting on street; 60 ft. for buildings backing on street.
Secondary roads (minor arterials)	Main feeder streets. Signals where needed; stop signs on side streets. Occasionally form boundaries for neighborhoods.	¾–1 mile	80 ft.	60 ft.	5%	35–40 mph	Require 5-ft.-wide detached sidewalks, planting strips between sidewalks and curb 5–10 ft. or more, and adequate building set-back lines (30 ft.).
Collector streets	Main interior streets. Stop signs on side streets.	¼–½ mile	64 ft.	44 ft. (2–12 ft. traffic lanes; 2–10 ft. parking lanes)	5%	30 mph	Require at least 4-ft.-wide detached sidewalks; vertical curbs; planting strips are desirable; building set-back lines 30 ft. from right of way.
Local streets	Local service streets. Non-conducive to through traffic.	at blocks	50 ft.	36 ft. where street parking is permitted.	6%	25 mph	Sidewalks at least 4 ft. in width for densities greater than 1 d.u., acre, and curbs and gutters.
Cul-de-sac	Street open at only one end, with provision for a turn-around at the other.	only wherever practical	50 ft. (90 ft. dia. turn-around)	30–36 ft. (75 ft. turn-around)	5%		Should not have a length greater than 500 ft.

* *Urban Land*, May 1961, by George Nez, Director, Inter-County Regional Planning Commission, Denver, Colorado.

streets that have intersections, and many times safer than if children walk or ride bicycles in a street. The width of the walks should generally be four feet, and five feet is the desirable width.

Design of Streets

Streets should provide easy and safe circulation by avoidance of steep grades, sharp curves and needless intersections; and by adequate width in relation to volume of traffic. The major design standards are given in Table 7.

Lighting for Circulation

Streets, parking spaces and walks should be lighted to provide safe travel for all vehicles and to prevent pedestrian accidents. These requirements make lighting necessary throughout the night along all the streets and public walks. Any economy measures which serve to reduce or eliminate the lighting during some part of the night should be considered as substandard procedure; furthermore, lights are needed for an emergency or unusual conditions as well as during normal travel hours.

It has been found that lighting is generally inadequate or wasteful if the spacing of lights exceeds the distance equal to eight times the height of the lights above the street. A minimum height of fifteen feet is recommended for street lights, and twenty feet is suggested as more desirable. This

recommendation implies that street lights should be spaced approximately 120-160 feet apart.[2]

Glare from street lights shining directly into sleeping rooms should be controlled by proper location of lights and provision of adequate shields. Street lights should be provided at all intersections and between intersections spaced more than 350 feet apart.

The designing of streets, walks and street lighting are specialized problems. The Department of Public Works of Prince George's County should be consulted in determining the final solution.

Social and Esthetic Impact of Circulation[3]

People living in a neighborhood community where there is an unusually good street pattern are quick to notice it and praise it. They like cul-ce-sac and three-way intersections when they are told about their contribution to improved safety; they like greenbelts and pedestrian walks for their children to use in walking or riding bicycles.

The path system influences communication between people. It is evident that one prime way to encourage contacts between neighbors is to put them on a common pathway upon which their

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[2] Ibid., p. 62.

[3] Lynch, Kevin, Site Planning, The MIT Press, Cambridge, Mass. (1962) pp. 50-54.

entrances visibly open. Friendships are made along the street rather than across the park. The designer can foster privacy, division, or isolation by providing separate routes or masked routes such as apartment hallways, and doors not intervisible.

The pattern of streets or paths may provide or destroy the sense of focus or center in the plan. It is one of the most powerful means of making clear the underlying topography, whether by running submissively with the contours, or by aggressively opposing them. In sketching the system of roads and paths it must be remembered that they will be seen from the air as sharp objects in perspective, and not as patterns.

CHAPTER VIII

CONCLUSION

The concept of open space is a controlling factor in the proposed development for this community (Plate XXI) It allows considerable freedom in the urban design and functional relationship within major categoris (residential, commercial, recreational and so forth).

Considering education as a basis for the design of a community the access to and from the schools is a prime objective. A walking distance of half a mile from elementary school to the surrounding community is desirable. To encourage secondary school education, the junior high school and senior high school are placed at a desirable walking distance of one mile, and, one and half miles respectively. All community facilities are grouped together in a central location and are connected to the community by direct automobile and pedestrian access. The centrally located shopping center and offices will serve as a focal point of architectural interest.

This comprehensive approach to community development may be a guide to planners in the latter part of this century.

ELEMENTARY SCHOOL

Schematic Layout

1. School site is planned in conjunction with open space, park and sport facilities.

2. School location is to be within walking distance (half mile desirable) of all pupils, and the walkway system is tied into both the school system and neighborhood shopping center.

The elementary school location has been chosen to meet the above requirements and also it should be available for community activities.

The schematic layout for elementary school allows for future expansion with a minimum disturbance to the school function. A number of separate entrances are provided for the convenience of students approaching from different directions and to make outdoors accessible for instruction. The playroom is easily available for the outdoor sports facilities. The cafetorium provides multi-purpose use for lunch and recreational activities. The kitchen adjacent to it is provided. The parking lot near to cafetorium makes easy access to the visitors.

PLATE XVI

LEGEND

- Administration
- Library
- Classrooms
- Cafetorium
- Playroom
- Storage, kitchen and boiler

SCHEMATIC LAYOUT

ELEMENTARY SCHOOL

SITE: 8 acres

ENROLLMENT : 400- 425 pupils

0 50' 100' 200' 300'

N

JUNIOR HIGH SCHOOL

Schematic Layout

Finger plan is adopted in order to allow future extension if needed. A separate block for gymnasium, auditorium and cafeteria provide easy access to outdoor sports and also to the visitors. A parking lot is closely placed to all these recreational activities. The administration block has separate parking.

The library is located near the academic classes and administration which reduces the amount of circulation. The corridor has classrooms on both sides.

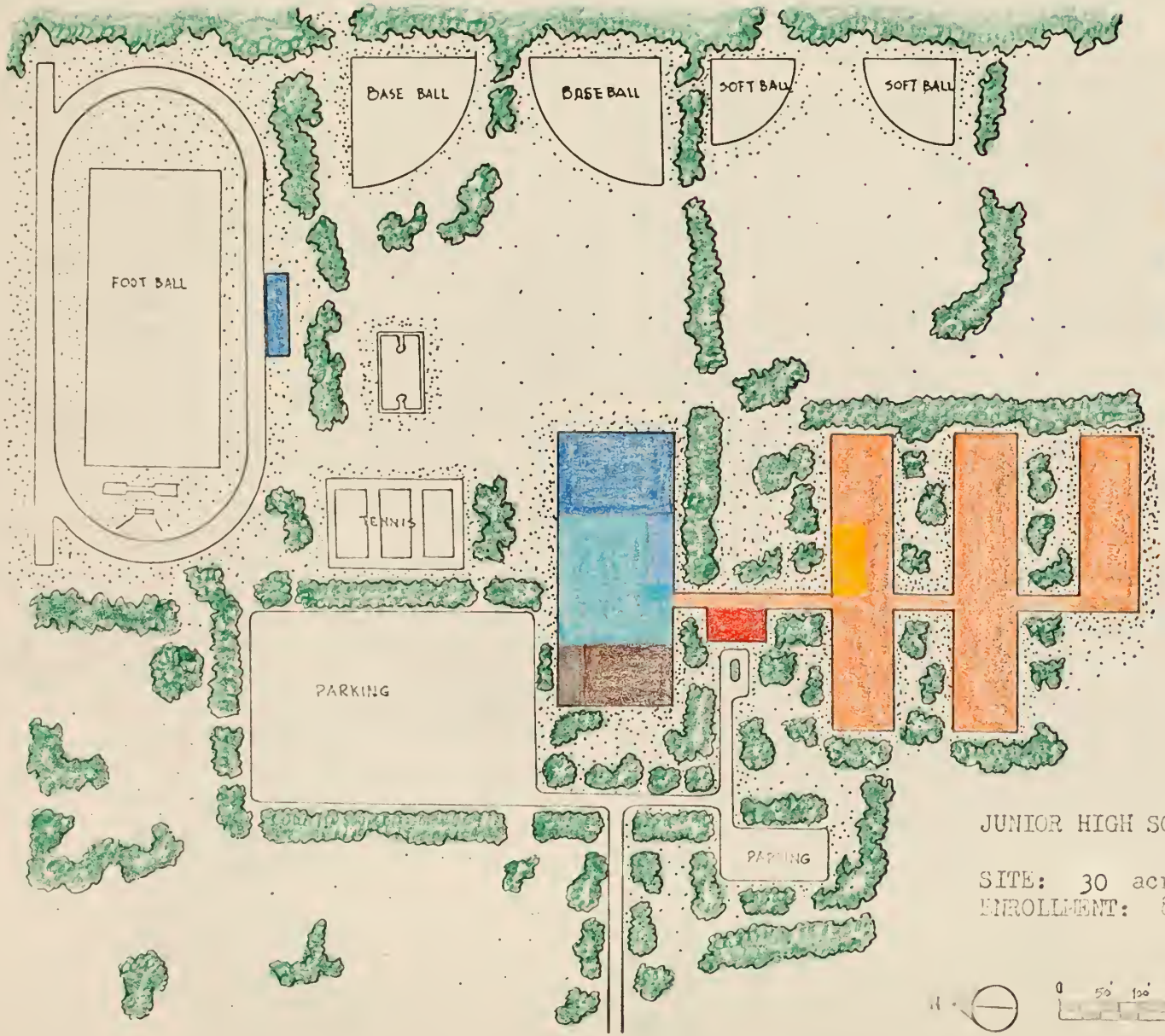


PLATE XVII

L E G E N D

- Administration
- Library
- Gymnasium
- Auditorium
- Cafeteria
- Storage & Kitchen
- Music
- Special Classes

SCHEMATIC LAYOUT

JUNIOR HIGH SCHOOL

SITE: 30 acres
ENROLLMENT: 800-900 pupils

N

0 50' 100' 200' 300'

SENIOR HIGH SCHOOL

Schematic Layout

A wing type plan is used in order to serve the various functions. Part of the building (special class area) is double-storied. Additions can be made to the original structure. The physical education unit is separated from the main school plant by providing a separate building for the gymnasium to reduce noise. A buffer zone is provided between them.

In order to provide easy public access, the football field and playground are placed near the access road. Parking for 800 cars near the entrance will encourage sport facilities.

Music classes are closely located to the auditorium to allow practice and rehearsal. A centrally located library provides easy access for the students and staff. Cafeteria is made accessible by a corridor. A separate service entrance to the kitchen is also provided.

A buffer zone screens the vehicular traffic noise from the highway.

PLATE XVIII

L E G E N D

- Administration
- Library
- Gymnasium
- Auditorium - Music
- Cafeteria
- Special Classes

N

0 100' 200' 400' 800'

SCHEMATIC LAYOUT

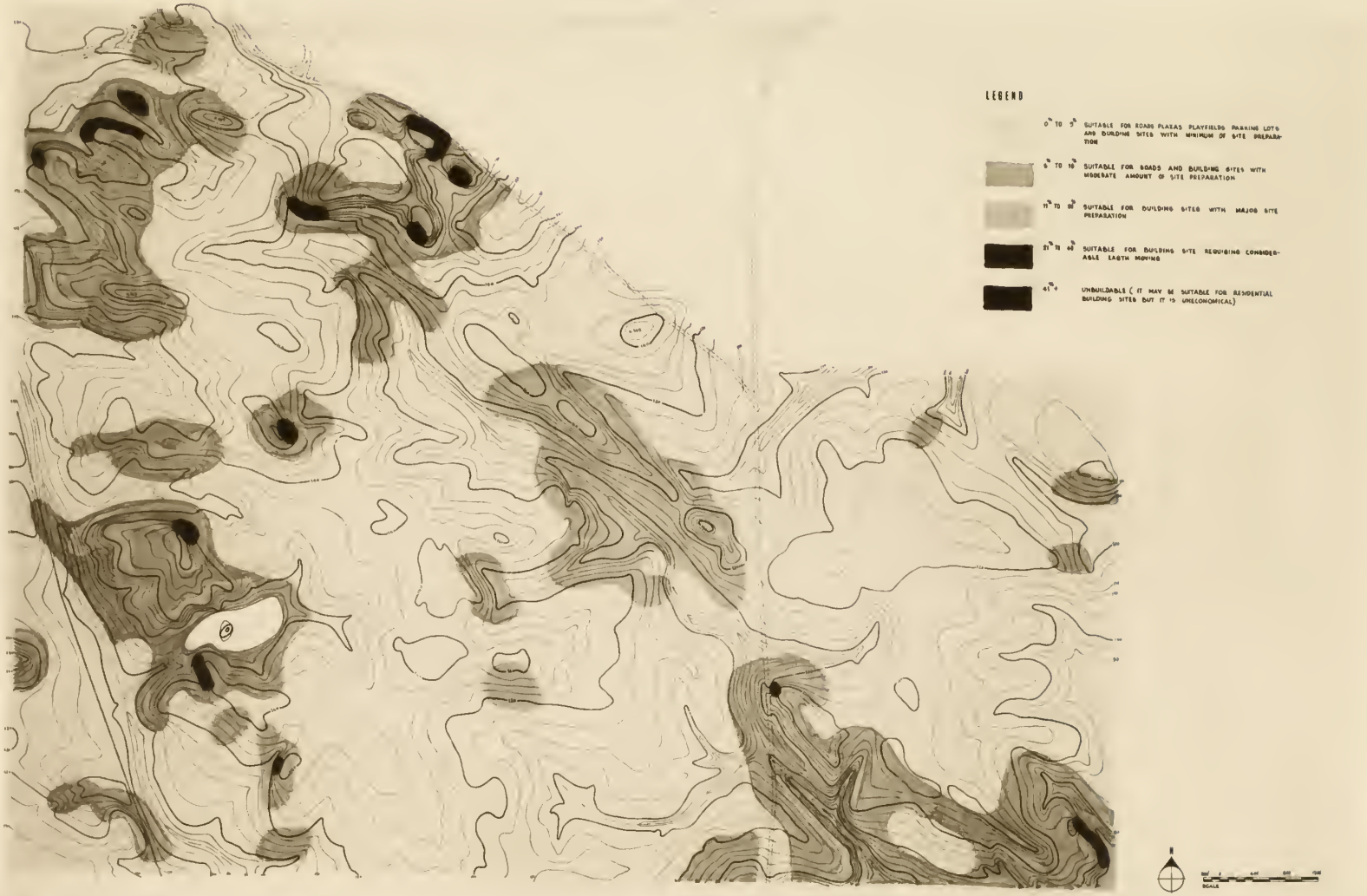
SENIOR HIGH SCHOOL

SITE: 37 acres
ENROLLMENT: 1100 pupils
CAR PARKING: 800 cars

DRAWINGS BOWIE-BELAIR COMMUNITY DEVELOPMENT

The following pages (Plates XIX to XXIII) are the drawing for proposed Bowie-Belair Community Development.

PLATE XIX



MASTER'S THESIS **BOWIE-BELAIR COMMUNITY, MARYLAND** SLOPE MAP P. L. PATEL APRIL-1968

PLATE XX

MONTH	PRECIPITATION		SNOW FALL	PRECIPITATION DAYS			RAIN FALL		TEMPERATURE		SOLAR ANALYSIS					
	MAX	MIN	TOTAL	DAILY DAYS	SNOW	THUNDER STORM	MAX	MIN	MAX	MIN	% OF POSS. SUN HOURS OF SUNSHINE	CLEAR DAYS	CLOUDY PARTLY CLOUDY DAYS	DAYS CLOUDY	WIND DIRECTION & VELOCITY PREVAILING	WIND DIRECTION & VELOCITY AVERAGE
JAN	7.05	0.85	8.6	11	4	1/2	3	0.6	42°	21°	48%	6	8	15	NW 45	NW 9.5
FEB.	9.84	0.62	38.5	10	5	1/2	2	0.6	44°	23°	53%	6	8	11	NW 47	NW 8.7
MARCH	8.66	0.57	18.5	12	2	1	3	0.5	85°	85°	60%	10	10	11	NW 47	NW 8.5
APRIL	5.18	0.86	9.5	11		2	3	0.5	64°	44°	76%	10	10	10	NW 37	NW 8.2
MAY	10.99	0.61		12		5	5.5	0.5	75°	54°	61%	11	13	6	SW 45	NW 8.5
JUNE	10.84	0.84		11		7	4.8	0.5	85°	63°	65%	10	12	8	NW 4-	8.88
JULY	10.85	0.82		12		8	6.6	1.0	87°	68°	63%	11	13	8	NE 53	8.98
AUG	14.41	0.62		11		6	7.5	1.0	84°	88°	4-%	11	15	5	N 46	7.87
SEPT	17.49	0.14		6		6	6.6	0.5	78°	60°	61%	12	10	8	SE 51	8.56
OCT	8.61	0.28	2.2	8		1	4.5	0.5	67°	48°	51%	14	6	9	NW 41	NW 8.2
NOV	7.18	0.55	7.4	9	1	1/2	5.0	0.5	55°	38°	55%	10	9	11	SW 45	NW 7.6
DEC	7.58	0.18	14.5	10	5	1/8	2.8	0.29	46°	25°	48%	10	8	12	NW 38	NW 7.6
YEAR	61.55	15.52		128	12	55			68°	46°	57%	127	120	118	NE 53	NW 7.9

LEGEND

HARD SURFACE HEAVY DUTY ROAD TWO OR THREE LANES

HARD SURFACE MEDIUM DUTY ROAD TWO OR THREE LANES

IMPROVED LIGHT DUTY ROAD

UNIMPROVED DIRT ROAD

BUILDINGS

BARN OR WAREHOUSE

LAKE

WOOD OR BRUSHWOOD

DISAPPEARING STREAM

DRAIN

SCALE

MASTERS THESIS

BOWIE-BELAIR COMMUNITY, MARYLAND

SITE SURVEY MAP

P L PATEL APRIL-1968

PLATE XXI

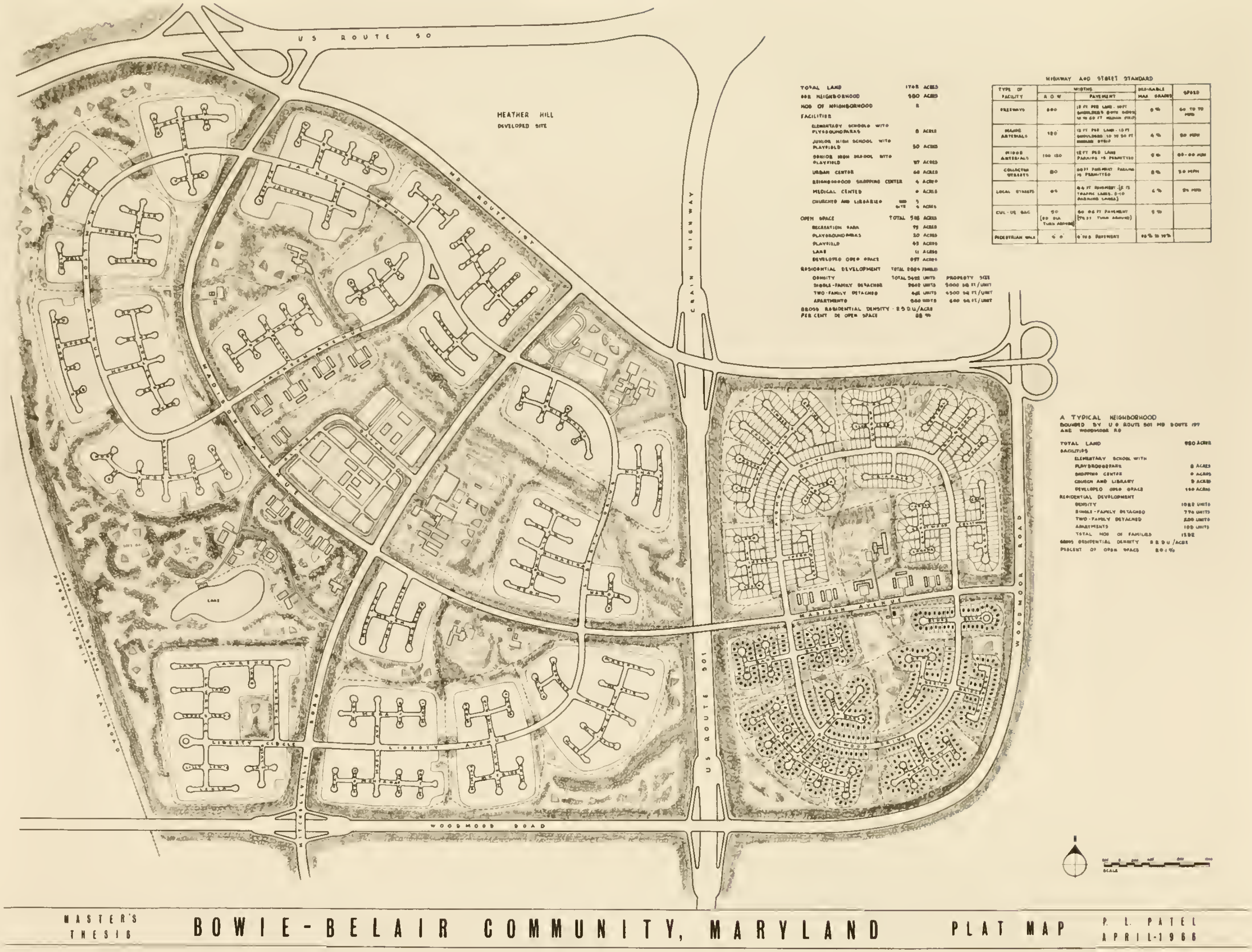

US ROUTE 50
HEATHER HILL
DEVELOPED SITE
CRAIN HIGHWAY
US ROUTE 301
WOODMOOR ROAD
HIGHWAY AND STREET STANDARD
A TYPICAL NEIGHBORHOOD
LAKE
PENNSYLVANIA RAILROAD
MASTER'S THESIS
BOWIE-BELAIR COMMUNITY, MARYLAND
PLAT MAP
P. L. PATEL
APRIL-1966

PLATE XXII

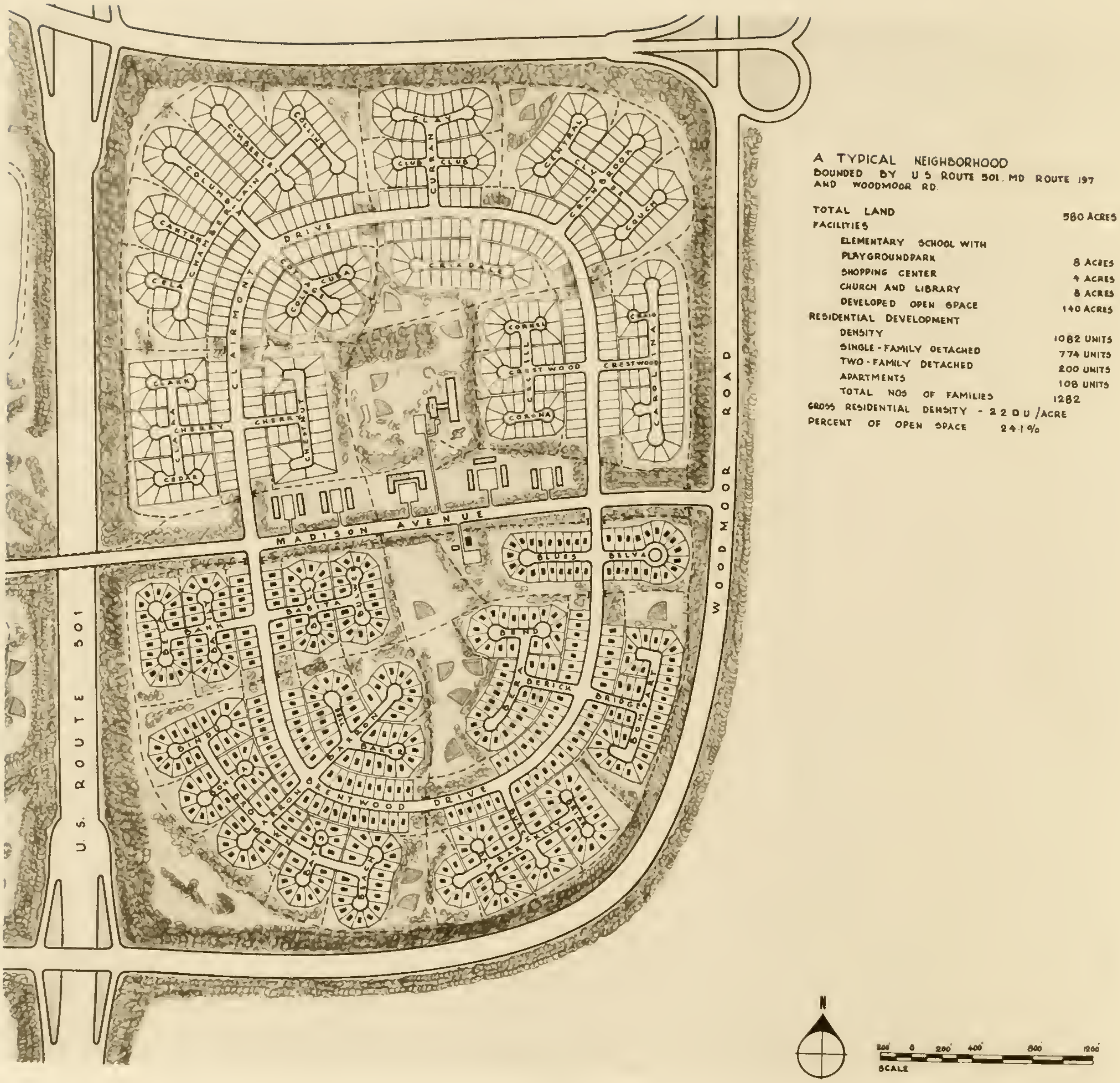

U.S. ROUTE 501
WOODMOOR ROAD
MADISON AVENUE
BRENTWOOD DRIVE
A TYPICAL NEIGHBORHOOD
BOUNDED BY U S ROUTE 501, MD ROUTE 197
AND WOODMOOR RD.
TOTAL LAND 580 ACRES
FACILITIES
ELEMENTARY SCHOOL WITH
PLAYGROUNDPARK 8 ACRES
SHOPPING CENTER 4 ACRES
CHURCH AND LIBRARY 8 ACRES
DEVELOPED OPEN SPACE 140 ACRES
RESIDENTIAL DEVELOPMENT
DENSITY 1082 UNITS
SINGLE-FAMILY DETACHED 774 UNITS
TWO-FAMILY DETACHED 200 UNITS
APARTMENTS 108 UNITS
TOTAL NOS OF FAMILIES 1282
GROSS RESIDENTIAL DENSITY - 2.2 D U /ACRE
PERCENT OF OPEN SPACE 24.1%
N
200' 0 200' 400' 800' 1200'
SCALE

PLATE XXIII


LEGEND
MASTER'S THESIS
BOWIE-BELAIR COMMUNITY, MARYLAND
UTILITIES MAP
P. L. PATEL
APRIL-1980

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ACKNOWLEDGEMENTS

The author wishes to acknowledge the efficient direction, the continued encouragement, the excellent suggestions and valuable aid given by his major adviser, Professor J. C. Heintzelman and the members of his committee, namely Dean Emil C. Fischer, Mr. Ray B. Weisenburger and Professor Robert P. Ealy, all of the College of Architecture and Design.

Throughout the development of this thesis, several organizations, the Maryland-National Capital Park and Planning Commission, The Education Board, Prince George's County, Maryland, The U.S. Department of Health, Education and Welfare and Levitt and Sons, have provided valuable assistance. His sincere gratitude is extended to them.

PLANNING NEIGHBORHOODS AND SCHOOLS FOR BOWIE-BELAIR COMMUNITY, MARYLAND, U.S.A.

by

PARBHUBHAI LALBHAI PATEL

B. Arch., M. S. University of Baroda, India, 1965

AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF ARCHITECTURE

College of Architecture and Design

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1968

Approach: The ideal neighborhood school is a strong factor in American community life and it has many values. To design a neighborhood in relation to a school is a piece of elementary wisdom.

Problem: The building-up of a good neighborhood depends in part on a good school. To consider how large this neighborhood should be, the elementary school enrollment determines the appropriate size of a neighborhood for the Bowie-Belair community. The optimum standard recommended by the school designer is about 400 to 425 pupils for an elementary school with 8.2 acres for the school site which includes school plant and playground. According to the assumed family size and composition for Bowie-Belair community, the required neighborhood population will be about 1200 families or abour 4,250 persons to support the above elementary school enrollment within a one-half mile radius in which a child may comfortably and safely walk to school. Two such neighborhoods (2400 families) will support a junior high school with an enrollment between 800 to 900 pupils. The walking distance will not exceed one mile from the junior high school to the most remote home. Four neighborhoods will require a senior high school, the enrollment in which will be about 1100 pupils within the desirable walking distance of one and one-half miles.

Facilities: Other neighborhood facilities such as shopping center, churches, health service, recreation area and park should be considered. The internal street system of the

neighborhood should provide streets designed proportionally to their probable traffic within the neighborhood. Most residential streets are suggested as cul-de-sac to eliminate through traffic.

Considerations: Before determining the program and facilities, a detailed study of the educational facilities is outlined on the basis of the physical, economic and social characteristics of the American community. Analysis of community educational aims and objectives and educational needs are determined from the information obtained from the community survey. The physical and emotional needs of the child are investigated. A humanistic approach reveals the needs of the child. These needs influence the design as exemplified in the "Chicago School" of architecture.[1]

Having established the requirements for Bowie-Belair community based on family structure, dwelling types and proposed standards for neighborhood facilities, the required services and utilities will be provided as designated.

The design of the urban center includes shopping center, drug stores, medical and dental offices, business offices and a movie theater. All the necessary drawings for a clear presentation of the over all Bowie-Belair community development have been executed.

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[1]Chicago School of Architecture has given us the creative approach in effort to provide the best possible learning environment for the pupil.