Psychological Foundations of the Curriculum

by Willard C. Olson

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As part of Unesco's continuing programme for the extension and improvement of school education, the Director-General was authorized by the General Conference of Unesco at its eighth session (Montevideo 1954) to establish an International Advisory Committee on School Curriculum. In preparation for the first meeting of the Committee, Unesco commissioned a number of studies by outside experts to provide background information on matters within the Committee's terms of reference. One important aspect of curriculum study is the relation of the curriculum to the psychological needs of children, and in order to provide a basis for discussion of this topic a distinguished United States educator, Professor Willard C. Olson, Professor of Education and Psychology and Dean of the School of Education at the University of Michigan, was asked to write the present paper.

In view of the fundamental interest of Professor Olson's subject, especially for those Member States of Unesco which are in the process of constructing or reconstructing their national school systems, the Secretariat thought it worth while that this study, originally duplicated in a very limited number of copies, should be made available to a wider audience by publication in the present form.

AUTHOR'S FOREWORD

The writer has enjoyed the opportunity of organizing and writing the following report on the psychological foundations of the curriculum. It was possible in brief space to give only token consideration to some important areas. A few relevant topics were omitted entirely. The emphasis of the report is on the primary (elementary) school period. Secondary school materials have been included where they helped to clarify problems of research and theory.

The writer has included a substantial amount of new material from the child development laboratories of the University School of the School of Education of the University of Michigan. He is indebted to his colleagues who are involved in the research programme, and wishes to thank particularly Dr. Byron O. Hughes, Professor of Child Development, under whose supervision many of the growth charts in the report were prepared. The writer is indebted also to Mr. John Walden, College Editor of D.C. Heath and Company, for permission to draw on materials in preparation for the revision of the book *Child Development*.

Willard C. Olson

Ann Arbor, Michigan

1 March 1956
I. INTRODUCTION

THE CHILD AND THE CURRICULUM

A comprehensive view of the curriculum requires a consideration of the nature and needs of the individual, the aspirations and requirements of society, and the process by which the individual incorporates experience.

The object of this report is to describe the foundations of the curriculum as represented by changes in the individual with age and maturity, by individual differences in the learner, by facts and principles of learning, by the influence of groups, and by the organization of experiences in schools.

THE BROAD DESIGN OF CURRICULUM FOUNDATIONS

We can add to the precision of our thinking about the curriculum by placing in an appropriate perspective a few of the major concepts.

First, let us consider the following simple equation:

\[(1) \text{Maturation} \times \text{Nurture} = \text{Development}\]

Although the equation is an oversimplification we may think of it as being a general one and applicable to all the types of development that occur in the human being. Maturation is used in the equation to represent innate sequences and patterns in which the design for change is assured by internal factors. Accomplished through maturation.

Nurture is intended to include not only food but all of the types of experience that nurture the maturing design. Development is the end product of a complex interaction between maturation and nurture.

When we consider the special rôle of the curriculum in nurture we are at the same time specifying that the development in which we have a special interest for the moment is school achievement. We may then substitute in the equation as follows:

\[(2) \text{Maturation} \times \text{Experience} = \text{Achievement}\]

Actually in this case we would wish to consider only that part of the experience which becomes incorporated in the learner so as to produce achievement. For this purpose we might wish to substitute 'responses' for experiences. This would be a more definite term since we learn our responses, not necessarily the gross experiences to which we are exposed.

At any particular point in time, of course, we are not dealing with sheer maturation as we plan experiences to produce achievement in the learner. He is already a complex of maturation and learning.

The above equations give us a few simple ' pegs' on which to hang what we know about the person, the experience, and achievement.

As an example, let us consider achievement in ability to read. If under deprived conditions, the experience is not supplied, we would write zero in the equation for large numbers of children. It then becomes:

\[(3) \text{Maturation} \times \text{Zero Reading Experience} = \text{Zero Achievement in Reading}\]

The goal in curriculum planning is somehow to take into account the needs of the individual and of society so as to provide the experiences appropriate to the maturing individual so as to secure achievement.

The curriculum is commonly concerned with those experiences which all children should have in common plus a consideration of those experiences which are designed to produce differences. The process of teaching involves the understanding and management of the factors in the equations. Let us turn first to a brief consideration of the nurture of the equation as a basis for curriculum planning.

DEPRIVATION AND THE CURRICULUM

Deprivation is now commonly recognized as the greatest hazard to the growth process whether it be of food, of experience, or of affection. The easiest things to discover and to appraise in the study of the curriculum are the areas of experience where presence or absence can be guaranteed. Thus one can easily establish the broad contrasts between literate and non-literate groups. Similarly, one can commonly find differences between the people who have or have not had a foreign language. One can usually discern at least the immediate effects of a unit of study or of a particular course for children with and without the experience. It is much more difficult to determine the subtleties of differences within a broad group of curriculum experiences provided for all. Thus it becomes extremely difficult to discern that one way of teaching is a better way than another since children themselves tend to
individual potentials. Premature conclusions about to leave little room for the idea that any are really being deprived of an opportunity to fulfil their individual potentials. Premature conclusions about trainability have probably resulted in some children, such as the mentally retarded, being deprived in addition to their initial handicap.

The experiences that should be provided are the major concern in curriculum planning. In order to have a perspective on the experiences that children are to have in schools there must be some consideration of the objectives.

THE OBJECTIVES OF CURRICULUM EXPERIENCES

It is important that persons charged with nurturing the early learning of a child should agree on the kinds of things that should be learned. Otherwise, the child may be subjected to opposing objectives and methods. Most persons will agree that sooner or later children should learn reading, writing, and arithmetic in the school. They may disagree, however, as to how soon it is wise to bring this learning about.

The teacher today thinks of learning situations as including social and emotional adjustment and physical performance, as well as intellectual acquisitions. Here it is sometimes more difficult to get agreement. Concepts of rigid old-fashioned discipline in the home and in the school conflict with such objectives as the development of leadership, initiative, and independence rather than submission and dependence on authority and external control. The idea that a child should be seen and not heard conflicts with the development of creative expression in art, music, literature, science, industry, and business. If children are inhibited and restrained by adults, they are likely to suffer from a lack of self-confidence and from an inability to express themselves in conversation, public speaking, and writing.

According to learning theory we learn to do what we practice. We make ourselves as we go. The decision on the direction in which a child is to go is an important one, and one which places much responsibility upon the parent, the teacher, and others concerned with the child. Leaders in every field are concerned with the decisions made.

The objectives of curriculum experiences are commonly found by a study of the learner and society. In actual practice these must commonly be translated by the specialists who are acquainted with the various fields of organized knowledge. For example, it is relatively easy to determine that one of the greatest health needs is the prevention of the common cold. One does not get far, however, in translating this individual and social need into a practical programme since secure knowledge on prevention is not available. Thus one must frequently rely on specialists to determine what is or is not possible in terms of the present state of our knowledge. Most curriculum experts will agree that one fundamental purpose of education is to assist in the learning of the cultural heritage. History, literature, science, mathematics, and government constitute vast reservoirs of potential experiences for understanding man and his institutions. How to select, organize, and relate these and similar materials to the needs of the learner becomes one of the interesting and important tasks of the curriculum expert and the teacher.

The use of specialists for the statement of objectives is illustrated in the comprehensive effort of the Mid-Century Committee on Outcomes in Elementary Education(25). Authorities attempted to describe in terms of behaviour the outcomes that should be secured at different ages in subject matter and in intellectual abilities, in personal development, and in social maturation. There has been an increasing effort to formulate objectives in terms of changes in behaviour rather than in terms of knowledge to be acquired. This tendency has been promoted not only by the increased emphasis on functionalism in the curriculum but also by the needs of evaluators who find in behavioural descriptions greater opportunities for determining the efficacy of one programme or another. In order that there will be a guide for a teacher in the development of an instructional programme it is insufficient to describe the objectives in terms of behaviour since it is also necessary to describe the content of experience with which the behaviour is concerned or which produced the behaviour.

When groups engage in curriculum planning they are likely either to state the objectives in very general terms or may go to the opposite extreme of stating them in highly specific terms. For example, one might say in general terms that the objective of elementary education at the end of the primary period is to have the child understand his immediate environment. In very specific terms, however, one might have such an objective as: 'To recognize and name the common animals and plants'. Frequently the statement in general terms is so broad and inclusive as to seem almost axiomatic and hardly to require a statement, while the attempt to enumerate specific objectives results in such a bewildering number and variety as to confront the teacher with burdensome details.

The contemporary approach to the curriculum argues that we should start with a broadly trained teacher, working under some general guides as to purpose and direction, with substantial latitude

* Numbers in the text refer to the bibliography at the end of the study (pp. 65-67).
for the attainment of the countless details. Practice currently varies all the way from a narrowly prescribed body of content which the teacher is expected to teach, to a highly professional teacher who plans with children and uses the human and natural resources of the community, and the prepared books and curriculum materials, to achieve both the broad design and the details of curriculum experience.

The development of the emergent pattern in a curriculum in a school is often assisted by study committees composed of teachers, parents and experts which help clarify both the problem of direction and process.

THE ORGANIZATION OF CURRICULUM EXPERIENCES

Even after objectives have been agreed upon and the pertinent content decided upon there remains an interesting problem of how experiences are to be organized. Many innovations have been tried in an attempt to add meaning and transfer to school learnings. Organization of subjects determined by content is one of the simpler answers. Some type of fusion as in the combination of reading, spelling, and writing in a broad field such as language arts or communication arts has been another. Fusion and integration have been widely accepted at elementary levels both on a basis of broad fields and with unification about a particular unit or activity, e.g. transportation. The interest in a 'core' curriculum at secondary levels reflects a search for the same values.

THE COMMUNITY SCHOOL

The idea that a school should have a strong orientation toward community needs has been advanced both by sociologists and anthropologists from the point of view of social needs, and by psychologists from studies of the motivation of individuals. Administrators of tax-supported schools also see the value and necessity of having strong roots in a community in order to have public understanding and adequate support. There are many levels of involvement of schools in the community. A simple level would be to allow the school house to be generally available for group meetings. A more extensive involvement would be to use the physical and human resources of the community for a laboratory, and for supplementary instructional staff. Curriculum experiences might then be provided in the school through a study of the basic social issues, and of the economic and physical needs of the community. The community school orientation has been used as a basis in some places for increasing the standard of living by attention to the soil, to health, to conservation, to improvement of agriculture and animal husbandry, and to adult education for citizenship. Such objectives have at times been included in the programmes and demonstration centres of the United States of America as well as in many regional demonstrations of various countries.

With increased emphasis on education for all the children of all of the people there has occurred a re-examination of objectives and of curriculum experiences. An example is the recent emphasis on life adjustment education in the United States motivated by a concern about the numbers of children who leave school before completing secondary school programmes.

Surveys of school systems in the United States reveal that secondary schools differ substantially in their ability to hold pupils in school until graduation. One probable or possible explanation is that the high school programme is not meaningful for all of the students. A Commission on Life Adjustment Education for Youth (58) was appointed by the United States Commissioner of Education to stimulate the development of programmes of education more in harmony with the needs of all youth, to locate effective instructional materials already prepared to meet needs which have been revealed in actual situations, and to develop additional materials, to identify schools already serving in a comprehensive way the great majority of youth in their communities and to study their practices. This movement met with resistance from a number of quarters and the term 'life adjustment education' has fallen somewhat into disuse. The weight of tradition is on the side of teaching specialized subjects, logically organized, with historical prestige, with existing syllabuses and content organized, and with school patrons familiar with the older ways of conducting the schools. It requires a substantial investment of time, knowledge, and skill to organize instructional materials and experiences in new ways.

Although not the intent, it often develops that life adjustment education consists in planning for children whose parents are engaged in the lower range of occupations, who have lower incomes, less cultural opportunity, are retarded in school, and have not done as well in mental and achievement tests. Such children at times lack interest in school work as commonly organized. When one analyses the needs of these children it is found that they need experiences in all of the areas that are good for other children but they need them in a form in which the goals are more immediate, the tasks are simpler, and the relationships to what they are to do next more obvious. In spite of opposition and argument, adjustments dictated by the needs of children and of society seem to be made in a slow but persistent manner.

THE GROWTH PHILOSOPHY AND THE CURRICULUM

As evidence has accumulated on the lawful character of individual growth and on the inevitability of individual variations in achievement there has
emerged among people who are well informed about growth and development something which may be described as a 'philosophy of growth'. The essence of the point of view is that the teacher should begin with the child where he is and provide experiences on which he can grow in a direction and by a process which is both socially desirable and individually satisfying. Needless to say such a philosophy does not satisfy those persons who believe that the school should be essentially an instrument for selecting the most capable from the less capable or those persons who have a stubborn belief that all things are possible for all children if only the teacher and the child will work hard enough.

Whether a particular State or nation should implement a philosophy of growth for a substantial period of a child's life is in the arena of public policy. The progress and problems in the establishment of comprehensive high schools in Great Britain have been described by Judges (24).

Improvement in the educational treatment of the slowly growing child has gone hand in hand with a more comprehensive understanding of the nature of the many sided growth of children. It is true that developmental defects and injuries or damage are often irreversible so that predictions about the future cannot always be optimistic and a realistic approach demands more or less permanent custodial care.

Even in such instances, however, there is capacity for growth. In many more instances there is good integration of growth, behaviour, and intellect with a capacity for slow but regular and steady growth. Unfortunately, a lack of responsiveness in comparison with other children has led at times to deprivation. By deprivation we simply mean that the means for growth, particularly intellectual growth, have been withheld since the time and effort spent has seemed to be unrewarding.

The conclusion has sometimes been erroneously drawn that the children were incapable of learning since they could not learn at their age level. As a result of unequal early competition and comparisons, the mentally retarded child often lacks in motivation. He has learned the futility of his efforts on a comparative basis. When one, however, begins to think of learning at the level of the child, new possibilities emerge. These possibilities are being used more fully or consciously in homes, institutions, and schools. The retarded child often responds positively and enthusiastically (Bijou 3). It is true that much of the educational planning is the type which is good for all children. In extreme cases, however, what might be really only a difference in degree represents so much deviation that it becomes almost a difference in kind. This is particularly true for persons not fully acquainted with growth theory and practice. There is also a great need to translate sophisticated developmental theory into practices that can be followed at simpler levels. Guides have been prepared for this purpose.

The growth philosophy also supplies a very hopeful orientation in the education of the gifted. Under such a philosophy no gifted child would be expected to confine his efforts to the routine average expectations of a particular grade or course. It would be assumed automatically that he should have experiences of greater difficulty and of greater breadth and variety. Since he is more mature than his chronological age he should have experiences on which to grow at his own level. It is probably immaterial whether these deeper and broader experiences are developed within heterogeneous groups or in homogeneous groups as long as they are provided. Many prefer that the gifted child work out his achievements within the broad range of the social group of which he is a part since they perceive undesirable types of learning in segregated groups. It is interesting that the schools that are most advanced in the sense of a philosophy of growth for all and who have the richest learning opportunities for all are inclined to prefer the method of enrichment within a group. Those schools that tend to be more barren, which are operating at an economically lower level, and which do not provide all children with opportunities for enrichment, are more likely to argue that it requires segregation in order to meet the needs of the gifted. In terms of curriculum theory it all comes down to presence or absence of the opportunity for response to an experience. If the experiences are there the mode of organization is immaterial so far as present evidence is concerned. Regardless of philosophy all education and all curriculum experiences are profoundly influenced by the age and growth of the learner. There is a consideration of these foundations in the next section.

II. GROWTH AND THE CURRICULUM

Growth and education are closely related. The chief measure of growth for purposes of the organization of schools is chronological age. Thus schools, from the nursery to the college, use the individual's age as a basic concept for classification when schools are built, classes organized, teachers employed, and curricula planned. Frequently such educational programmes are not outlined in detail, age by age, but are organized rather in terms of broad periods of development. Such planning recognizes the limitations of a strict age division, the approximate character of such classifications, and the need for consideration of characteristics of children over a broader band of time.

The development of knowledge concerning growth now demonstrates the crudity of the age criterion since the variation among children at a particular chronological age is far greater than the differences to be found between successive chronological ages. Age changes, correlated with maturity changes, have much significance
for the content of experience, for methods of teaching, for inter-personal relationships, and for the social and emotional life of the child.

The chief object of the present section is to outline some of the major concepts of growth and to indicate some of the broad developmental periods with their correlated educational planning. There will thus be provided an overview of the broad sweep of growth to be followed in later sections by more specific attention to individual differences and the learning process.

We turn first to a brief discussion of what we mean by such terms as growth, development, and maturity.

CONCEPTS OF GROWTH AND DEVELOPMENT

The definitions for such words as growth, development, and maturation are not completely standardized, particularly when one moves from one field of specialization to another. Growth as increase in size or amount is fairly standard and we can apply this indiscriminately to growth in inches or pounds or abilities in school subjects. Growth is an appraisal of the process of change, and is often used to include the concept of increased complexity as well as size change. Some have preferred to use the term development to describe changes in complexity, using it with a meaning similar to differentiation in biology. Maturation is frequently confined to sequences and patterns which are innate and over which no external influence has any power. Maturation includes the fact that frequently the nervous system anticipates a new function, i.e., the environment does not create the function. The progression is assured by internal factors and the environment supports the changes but does not generate them. The racial inheritance is accomplished through maturation. If one wishes to specify social inheritance as environment, the child comes into it through a process of acculturation.

The maturation process describes the potential capacities of the individual but experience determines the expression in development. We do not usually see the full significance of this interaction in the commonly nurtured and much practiced areas, e.g., motor development, size increase, etc., but regularly do so in those areas in which there is presence or absence or highly variable amounts, e.g., reading, music, swimming, etc. Maturation is thus the internally determined aspect of development. Time in and of itself increases many powers but experience, practice, and learning are needed for effective use of the maturational power. It is this 'hen and egg' circular character which frequently confuses educational practice. If you emphasize maturation, practice says, 'Wait, it will be more economical and effective'. If you emphasize experience, practice says, 'Start at once, you must produce the readiness'. The best judgement of the moment says, 'Pace, maturation and learning go best hand in hand'.

In the field of education we have ample justification for using the term development as an end product under the combined influence of nature and nurture, in which nature defines the maturational pattern and in which nurture insures changes in size in the sense of growth and complexity. It is in this sense that one speaks of child development and the curriculum with the curriculum as something through which nurture is provided for the development of the child. In this sense it is proper to speak of developing abilities to read, to compute, to run. Maturation, growth, and development involve time as an important dimension. Sequences tend to be quite constant from child to child but rate varies greatly.

THE CONCEPT OF SEQUENCE IN CURRICULUM DEVELOPMENT

The age grading of experiences is closely linked to the idea that experiences should be sequential in character in order to be in conformity both with the nature of the child and the nature of the learning process. Often the reasoning is by analogy and supported by direct observation without crucial experimental tests of all of the issues involved. For example, it is common practice to have children start their drawing or their handwriting with large paper and large crayons or pencils or brushes. In handwriting, for example, the expectation is that subsequently, year by year, the handwriting will be reduced in size, the pencil may be smaller, the forms may have additional detail, and there may be a shift from manuscript to cursive forms as a wave of development from body to arm to fingers is differentiated. Similarly, language sequences are very important in understanding readiness for a school task such as reading.

GROWTH PERIODS AND CURRICULUM PLANNING

One of the most obvious guides for curriculum planning is to have the experiences that are provided appropriate to the age of the child. To take an absurd illustration - we do not expect the year-old child to learn from the printed page. Although the opportunity might be placed in his environment, he would not respond to the print and he would not in reality be having an experience. As we shall see later, individual differences are so great that it is difficult to plan experiences very precisely in terms of the characteristics of an age period of children. However, such adjustments are the first broad guide to curriculum planning. Astute observers, scientists, and teachers have made better and better approximations to the needs of an age period as time has passed. One of the most systematic of recent approaches in the organization
of curriculum experiences in terms of an age period has been by Havighurst (18) and his associates. They have tried to identify the developmental tasks which must be accomplished by a child within a broad period of time if he is to grow and have a successful subsequent experience.

The following is a fairly widely used and acceptable broad division of the period of growth.

<table>
<thead>
<tr>
<th>Name of Period</th>
<th>Approximate Ages</th>
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<tbody>
<tr>
<td>Prenatal</td>
<td>From 0 to 250 or 300 days</td>
</tr>
<tr>
<td>Ovum</td>
<td>From 0 to 2 weeks</td>
</tr>
<tr>
<td>Embryo</td>
<td>From 2 weeks to 10 weeks</td>
</tr>
<tr>
<td>Fetus</td>
<td>From 10 weeks to birth</td>
</tr>
<tr>
<td>Birth</td>
<td>Average at 280 days</td>
</tr>
<tr>
<td>Neonate</td>
<td>First two weeks of postnatal life</td>
</tr>
<tr>
<td>Infancy</td>
<td>First year</td>
</tr>
<tr>
<td>Early childhood</td>
<td>From 1 to 6 years</td>
</tr>
<tr>
<td>Middle childhood</td>
<td>From 6 to 10 years</td>
</tr>
<tr>
<td>Later childhood</td>
<td>From 10 to 13 years</td>
</tr>
<tr>
<td>Puberty</td>
<td>Average for girls: 12 years</td>
</tr>
<tr>
<td></td>
<td>Average for boys: 14 years</td>
</tr>
<tr>
<td>Early adolescence</td>
<td>From 13 to 15 years</td>
</tr>
<tr>
<td>Later adolescence</td>
<td>From 15 to 20 years</td>
</tr>
</tbody>
</table>

The above classification leans heavily on physical characteristics of growth as a basis for the division. The reader will note, however, that the classifications have a rough relationship to the way in which schools often are organized for purposes of instruction in different parts of the world. Because of individual differences none of the ages shown are really precise and the distinctive needs of a period are not so great but that organization may have substantial latitude.

Psychologists with a psycho-analytic orientation have emphasized the physical and social events concerned with feeding, excretion and reproduction. These are areas in which there is much emphasis in child rearing on the socialization of the child in order to secure development in conformity with the social requirements. A division on this basis would be approximately as follows:

<table>
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<tr>
<td>Prenatal</td>
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<td>First weeks of postnatal life</td>
</tr>
<tr>
<td>Oral</td>
<td>First year</td>
</tr>
<tr>
<td>Anal</td>
<td>From 1 to 3 years</td>
</tr>
<tr>
<td>Phallic</td>
<td>From 3 to 5 years</td>
</tr>
<tr>
<td>Latency Period</td>
<td>From 5 to prepuberty</td>
</tr>
<tr>
<td>Prepubertal</td>
<td>From 10 to 13 years</td>
</tr>
<tr>
<td>Adolescence</td>
<td>From 13 to 20 years</td>
</tr>
<tr>
<td>Adult</td>
<td>From 20 upward</td>
</tr>
</tbody>
</table>

The psycho-analytic classifications have been used most in attempts to describe the development of personality, to understand the reasons for disturbance or trauma, and to analyse adult character as a dominance of the aspects of one period over the others.

Some rough parallels between a characteristic of each period in the first classification and the curriculum planning which is commonly done are described in the following paragraphs. Within each period the child has certain developmental tasks to accomplish.

**THE PRENATAL PERIOD (0 - 280 DAYS)**

At the moment of conception a child is very old. Racially he is older than his parents, and he becomes the possessor of thousands of years of human biology. The egg and the sperm unite to produce an individual with a high degree of uniqueness, although the individual will have a substantial similarity to his race, parents, and brothers and sisters. Self-regulatory mechanisms are at work to ensure his orderly development in the prenatal period and to some extent in the postnatal period. The child is well protected in prenatal life. He is relatively immune from damage through inadequacies of diet but can unbalance the nutritional status of the mother.

A few children are born prematurely for known or unknown reasons. Those who are considered to be born at full term may have a post-conceptual age of between 250 and 300 days with an average value at about 280 days. In certain types of study it has seemed important to calculate age from conception rather than birth. If a child is born at seven months rather than at nine months, it is not surprising if he is delayed two months in terms of his post-natal age in such early traits as sitting, standing, talking, and walking. As one goes further and further from birth, a few months of age becomes a less significant fraction of the total life span.

On the whole, the physical care of the mother is stressed during the prenatal period. A few mothers (and fathers) will have had preparental education. For the most part, they become actively interested in child care during the period of pregnancy. Where health services are the most adequate, the obstetrician assists the mother in learning more about the hygiene of pregnancy and the care of the prospective child.

**INFANCY (0 - 1 YEAR)**

The average baby at birth weighs about seven and one-half pounds, with boys commonly about one-half pound heavier than girls. The slight loss of weight immediately after birth is usually regained in the following one to two weeks. Growth is then rapid with weight doubling by five months and trebling by one year.

The baby's length at birth averages about twenty inches, and he gains about ten inches in his first year.

The first tooth usually appears between the ages of six and seven months, but the variability
Learning becomes important in infancy and early childhood. A child soon after birth can be conditioned to make sucking movements of the mouth upon the sounding of the bell just as Pavlov conditioned his dogs to salivate when the bell was sounded just prior to, or simultaneously with, the presentation of meat.

The concern of specialists in child care is more with the mother in the prenatal period, but the concern extends to the child in infancy. After the child and its mother return from the hospital (most children are still born outside of hospitals), there is accelerated learning in response to the stimulation received from the social and physical attention of adults and children in the household. Much important learning is occurring at this time. While the child is a self-sufficient organism in one sense, he is also highly dependent upon his environment for nurture. A disequilibrium in his bodily processes results in a cry which makes for the reaction of others toward him. If he is handled only when he is crying, he may also cry in order to get attention. However, if he is handled when he is cooing, gurgling, and happy, cooing and gurgling may also become a learned method for securing social attention.

Infant education is undergoing scrutiny and re-evaluation. Pediatricians are questioning average standards and over-regimentation. The individuality which later impresses the educator also impresses the pediatrician. His respect for individuality has led to a greater emphasis on what might be called naturalistic conditions, with the child's own rhythms governing the time of feeding, excretion, and sleeping. Individuality is recognized in the amount of food needed, and appetite is taken as a guide. Psychological as well as physiological considerations have tended to reinstate some of the more primitive conditions for caring for and nursing the infant. Hospitals are being built so as to permit a less ruthless time-serving regimen. It is the same type of wisdom which is modifying the traditional standard prescription type of education in later periods.

EARLY CHILDHOOD (1 - 6 YEARS)

Although many schools start their programmes for children in the nursery schools and kindergarten, it is far from being a universal practice even in the countries who have done most in this respect.

Usually the nursery school and kindergarten has been thought of as an adjunct for parent education and sometimes as a laboratory for secondary school students interested in home and family life. At times provisions for young children have been thought of as a means of permitting the mothers to be employed. Frequently the provision for the young children is a co-operative matter in which trained teachers and parents combine in their services. A few nursery schools have been organized for the treatment of disturbed, disabled, or deprived children.

Modern studies of child rearing practices demonstrate that early childhood is extremely important for later development. When a child is sent to school in this period it is not done to shorten the total period of his school attendance. There is no good evidence, for example, that attendance at a nursery school or kindergarten is going to make a child read sooner or better. Time rather than early teaching is needed for most school achievements.

Early childhood is a period of extremely rapid growth in all of the physical and intellectual dimensions. Consider for a moment all of the developmental tasks set for a child in this period. In this period he learns to walk, he learns to take solid foods, he is weaned, he learns to talk, he socializes the elimination process, he develops modesty, he develops concepts of the social and physical world, he relates emotionally to his associates, and he begins to distinguish between right and wrong.

The period of early childhood has been a favourite one for study clubs and has led to the production of a substantial number of books on child care and education. Parents are commonly concerned with feeding, nervousness, fears, development of speech, relations to playmates, tantrums, and sleeping. They are also interested in help on problems involving toilet habits, fatigue, handling the genitals, and improper language. Usually the problems are discrepancies between what the parents expect and what the child is ready to give. Sometimes books and specialists unwittingly contribute to the anxiety of parents by stressing the average figures for such matters as bowel control, bladder control, and length of sleep. Individuality is the rule, and averages conceal the wide variability that occurs in normal growth.

The teacher in the nursery school and the kindergarten properly recognizes parent education as an important function and the understanding of the child as a major part of professional preparation.

MIDDLE CHILDHOOD (6 - 10 YEARS)

All parts of the body continue to grow in middle childhood, but the increment of change per unit of time is smaller than in the early period and the reflection in progress toward maturity is not striking. The child starts losing his baby or milk teeth at about this time, and acquires the first two teeth in the permanent set which are commonly called the 'six year molars'. Much of the bulk of the brain and the spinal cord has been attained in the preceding period but it would be hasty to assume that mental growth is on a plateau or slowing down. Many of the most
important language and motor skills have been achieved by the time the child enters the first grade of school at the age of approximately six in many countries.

In this period the developmental tasks include learning the physical skills necessary for ordinary games, building wholesome attitudes towards oneself as a growing organism, learning to get along with age mates, learning an appropriate masculine or feminine social rôle, developing the fundamental skills in reading, writing and calculating; developing concepts necessary for everyday living; developing conscience, morality, and a scale of values; achieving personal independence and developing attitudes towards social groups and institutions.

LATER CHILDHOOD (10 - 13 YEARS)

Between ten and thirteen years of age the child is usually in the fifth or sixth grade of the elementary school or preparing to enter the seventh grade. In both modern and traditional schools there is greater emphasis than in the preceding period on the acquisition of skills, information, and attitudes. The contemporary school stresses meaning and motive as the educational method, and the more traditional school prescribed content, rote memorization, and drill. Since the period is marked by very rapid growth and by the appearance of secondary sex characteristics, the mores tend to define and alter the social relationships between boys and girls.

ADOLESCENCE

The period of adolescence is sometimes subdivided so as to include early adolescence (13 - 15 years) and later adolescence (15 - 20 years).

With much individual variation the child in the early part of this period is showing many of the physical characteristics indicating a maturing of the sex functions. There are rapid changes in the testes and in the ovaries and important changes in balance between male and female hormones. The beginning of the adolescent period is often diagnosed by a sequence of changes in the hair of the pubic region. In the first stage non pigmented, downy hair increases in density and length. In the second stage the hair is pigmented and in the third stage the hair is pigmented and curly. The hair in the armpits commonly appears later than that of the pubic region.

The first observable secondary sex change in the girl occurs with the rounding of the hips through pelvic enlargements and the deposition of fat. This is followed by a 'bud' stage of the breasts which commonly precedes the first appearance of pubic hair. The primary stage of the breast next follows and finally the mature stage. The first menstruation usually occurs in the primary stage and in the later stages of the development of pubic hair. The age of first menstruation varies widely in girls on an individual and family basis and also as between races and regions. The menses of girls have been found to vary between nine and sixteen years in the United States of America.

Although individual exceptions are so numerous as almost to disprove the rule, there is a slight tendency for the child who is maturing late in physiological functions to lag somewhat in achievement in school. Mothers who themselves matured late usually have sons and daughters who mature somewhat late and it is common for 'late starters', 'slow matures' or 'late bloomers' to appear with greater frequency from families with delay in this respect. Teachers and counsellors may well be patient and not make premature decisions about the future of such children. In more than chance numbers some of them will surprise both investigators and their associates by their later and maturer accomplishments. (See Section III.)

Curriculum planning in the adolescent period often reflects the needs of growth. Among the developmental tasks of the adolescent period are achieving new and more mature social relations with age mates of both sexes, achieving a masculine or feminine social rôle, accepting one's physique and using the body effectively, achieving emotional independence of parents and other adults, achieving assurance of economic independence, selecting and preparing for an occupation, preparing for marriage and family life, developing intellectual skills and concepts necessary for civic competence, desiring and achieving socially responsible behaviour, acquiring a set of values, and developing an ethical system as a guide to behaviour.

The nature of a desirable educational experience for this period and the subsequent one is currently the subject of lively discussion and experimentation. Explanations are to be found in the changing composition of the secondary school population, in the purposes of education, and in an expanding technology of human relations, which suggests new and better ways of attaining objectives. Fundamental conflicts in philosophies of values and the interpretations of scientific evidence are involved.

Typical practice is to have the youth take 'subjects' of increased difficulty and variety. The number and variety of contacts with classmates is extended. The boy and girl make the acquaintance of more teachers, since the high school curriculum is usually broken up into specialized areas. This period was formerly regarded as 'terminal education' for many, since children are approaching the legal age when they may leave school. Exploratory and prevocational courses come to the fore in such planning. Guidance, both educational and vocational, becomes a more acute need.

In the past, education in later adolescence shifted for large numbers of children from the school to farm, office, store, and factory. With the increase in the average age of effective employment, education in this period for children of all types of interest and ability has become essential.
Children in high school are commonly enrolled in special subjects such as mathematics, languages, English, social studies, and science. The typical offering in small high schools is frequently determined by college entrance requirements. Many schools also add home making, shop, agriculture, and commercial subjects. Vocational courses may be offered in connexion with the usual high school organization or in separate technical high schools. Part-time and continuation school plans assist the child in the transition between the school and community employment. Public schools in the United States accept the co-education of boys and girls as the mode. In private education girls and boys are often taught in separate schools. European education has tended to give greater importance to the male and to separate the sexes.

In the later part of the period some of the students are in junior colleges. These are coming to be looked upon as a continuation of the secondary school and a terminal point for an additional large percentage of students.

There is much questioning among authorities about the nature of a suitable education for the adolescent period. Interviews with adolescent youth reveal a wide gap between existing curricula and what youth desires. According to one such inquiry (62) the chief problem of the adolescent is adjustment to his changing body and changing self and the effects of these changes on his personal feelings and social rôle. Shifting relationships with his parents, with his peers, and with his teachers are involved. He is becoming interested in problems of marriage and vocational choice.

Large numbers of adolescent youth see little relationship between what they are doing and what the cultural and vocational world demands. Desirable conditions for the motivation of work and study are thus missing, and many students whose vocational goals demand no additional preparation tend to leave school.

Secondary schools in many countries are attempting to meet the contemporary need for further education for all of appropriate age regardless of ability. This involves the acceptance of large individual differences and requires substantial modifications in curriculum experiences. There is also the historic demand that the secondary school should select the most able, eliminate the less scholarly, and prepare students specifically for future academic and professional careers. The evidence demonstrates that it is possible to implement a philosophy of growth in the period of later adolescence without loss to those who contemplate further formal education.

MATURITY AND OLD AGE

Since adults are so influential in the rearing of the young it has been suggested that the improvement of a people through education should in part start with the mature members of society. In a world which is changing very rapidly it seems necessary to consider the whole range of the population in planning curriculum experiences. In most regions of the world length of life is increasing and attention to the needs of the later period becomes more and more of a necessity. To be an intelligent and informed citizen and to participate in the making of policy through the ballot means continuous informal or formal opportunities for learning more. One of the major tasks in early maturity is, of course, to know better how to rear a family.

A brief enumeration of some of the developmental tasks of adulthood and old age may serve as a broad design for adult education activities. The developmental tasks of early adulthood include selecting a mate, learning to live with a marriage partner, starting a family, rearing children, managing a home, getting started in an occupation, and taking on civic responsibility.

The developmental tasks of middle age include achieving adult civic and social responsibility, establishing and maintaining an economic standard of living, assisting teenage children to become responsible and happy adults, developing adult leisure time activities, relating oneself to one's spouse as a person, accepting and adjusting to the physiological changes of middle age, and adjusting to aging parents.

The developmental tasks of later maturity include adjusting to decreasing physical strength and health, to retirement, and reduced income, and death of spouse. There is a need to establish an explicit affiliation with one's age group, to meet social and civic obligations, and to establish satisfactory living arrangements.

While broad age groupings of the life cycle are useful in curriculum planning it is clear that individual differences are so great as to deserve much attention.

III. INDIVIDUAL DIFFERENCES IN THE LEARNER AND THE CURRICULUM

While the division of curriculum experiences by age and by broad periods is of substantial help in curriculum planning, it is inadequate from the point of view of the individual differences among individuals. In the development of children it is commonly found that sequences, i.e., the order of events is fairly constant from child to child. Thus a child holds up his head before he sits, he sits before he stands, he stands before he walks, he walks before he runs. Although sequences are very stable from child to child, rate presents an entirely different story. The tempo or timing or age incidence of the events in a sequence varies greatly in children. Thus, while twelve months of age may be an average time for walking in many groups of children, there are always some who will do it at nine or ten months of age and others who will delay to fourteen and fifteen months and even later. This is also true of everything we can measure whether it is the achievement of...
height, weight, the teeth, vocabulary, drawing ability, or reading. We know that these rates are a very fundamental possession of the child and that for many of them little can be done to change the rate. A variety of familial and nurtural factors combine to make individual differences in children ever present and very real for the teacher and for the persons who plan the curriculum.

At times the distribution is not symmetrical but the fact of large differences is always found with a tendency for a large number of cases to be at some central point described as the mode, the median, or the mean. Before much was known about longitudinal studies in which children are followed over a period of their lives, it was mistakenly assumed that an average could be taken as a norm or standard. It will be seen presently that this was a naive assumption.

INTELLIGENCE

Differences in intellectual capacity have been studied most in relationship to the ability of children to profit by experiences in school.

Instruments for the measurement of the general quality called intelligence commonly combine a variety of specific tasks so as to sample an individual's capacities. A test is sought which will, as far as possible, measure native capacity rather than the effects of learning. Whatever may be the organic basis of intelligence in the brain and the nervous system, every approach suggests that persons differ widely in their ability to learn new things, to remember and profit by past experience, and to make adjustments to new situations.

In order to eliminate as far as possible the effects of differences in experience or education, persons who construct intelligence tests have tried to employ two principles. A good test item will be one, highly related to the total, in which the problem is so novel that it is unlikely that it will ever have been encountered before. Thus all persons start even in solving it and the quality of the solution is a measure of intelligence. Since it is difficult to find items of this first class, a second principle has been to find items for which the experience is so universal that it can be fairly conceded that all have had it. Thus the quality and quantity of learning and retention is a measure of intelligence.

Needless to say, the assumptions are not always correct. Group tests, in particular, are based usually on the assumption of universal opportunity for education so that the learned behaviour reflects the status of native intellect. They often involve tests of information, vocabulary, reading skills, and arithmetic. Tests of this type commonly show a substantial relationship to the extent and recency of schooling.

Although there are many arguments about the relative contributions of nature and nurture to the expression of intelligence, the various batteries that have been composed for its measurement have proved to be valuable practical and theoretical tools. As in every field of knowledge, perspective has grown with time and research.

The results of the application of intelligence tests in the growing period are usually described in terms of mental ages. Thus a mental age of ten years means that the child performs like an average child with a chronological age of ten. The intelligence quotient (I. Q.) is the ratio of mental age (M. A.) and chronological age (C. A.).

If mental and chronological age are the same, the ratio is 1.00 and this is commonly multiplied by 100 so that the I. Q. is 100. A child with an M. A. of 12 and a C. A. of 10 would have an I. Q. of 120, whereas a child with an M. A. of 8 and a C. A. of 10 would have an I. Q. of 80.

VARIABILITY IN INTELLIGENCE

When intelligence tests are applied to large numbers of unselected children, a wide range is regularly found. The 2,970 children (see tables) tested in the revision of the Stanford-Binet Scale had I. Q.'s ranging from 35 to 170. The mean of 104 was a little above the theoretical 100 because of the slightly superior sample studied. The standard deviation of 17 indicates that approximately 68.26 per cent of children test between 87 and 121 I. Q. A number of attempts were once made to give a qualitative meaning to the differences on the continuous quantitative scale. Such attempts often seem to confuse more than they help, since appraisal in practical programmes usually involves multiple types of consideration. The gifted by most criteria are at the upper end of the scale, and the retarded are at the lower end of the scale. A child with a high I. Q. tends to profit rapidly and readily by school experience, whereas one with a low I. Q. tends to respond slowly and with difficulty. The figure on page 15 illustrates the continuity and variability found in the mental age growth curves for 100 boys. It will be noted that the children become more unlike with age. The fallacy of a single learning experience for a chronological age group with such variability in capacity for learning is obvious.

Table 1. Variability in Intelligence Quotients on the Stanford-Binet Scale

<table>
<thead>
<tr>
<th>Range of I. Q.</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>35 - 170</td>
<td>104</td>
<td>17</td>
</tr>
</tbody>
</table>

(1) In the revision of the Stanford-Binet Scale the entire chronological age is counted up to 13-0. The C. A. of a subject between thirteen and sixteen is counted as 13 plus two-thirds of the additional months that he has lived. Ages beyond sixteen are not counted, since mental growth is commonly assumed to cease on the average at about this time.

(2) Adapted from Table 1, p. 21 of Quinn McNemar, The revision of the Stanford-Binet Scale. Boston, Houghton Mifflin, 1942, 195 p.
THE LONGITUDINAL RECORD OF INDIVIDUAL DIFFERENCES IN THE GROWTH AGES OF 100 BOYS

Published by Child Development Laboratories, University School, University of Michigan, Ann Arbor, Michigan.
Gifted children. The gifted children selected by Terman in 1921 and later have now been studied after a lapse of 25 years (54). The I.Q. of the elementary school children selected initially varied between 135 and 200 with a mean of 151. While the original designation of 'genius' for these children was too optimistic, it is clear that they are already a distinguished group. They have attained occupational status, education, and income and have made outstanding contributions in publications, patents, and other achievements far beyond expectancy for persons in general.

Mental deficiency. The term mental deficiency is commonly applied to extreme intellectual retardation due either to hereditary or constitutional defects or to the accidents of disease. The endogenous type is commonly attributed to hereditary factors, while the exogenous type occurs as the result of accident or disease. While children with both types of mental deficiency may show improvement with maturity and training, the condition is usually considered incurable. The complex of physical, social, and intellectual characteristics is usually sufficient to distinguish the foregoing types from those that simply reflect some of the effects of deprivation in nurture.

The constancy of intelligence quotients. When mental tests attained popularity, a literature on the constancy of the intelligence quotient rapidly emerged. It was discovered that children who were retested after a short period, or even after a period of one, two and three years, obtained substantially the same intelligence quotient as before, with such variations as might be attributable to the unreliability of the tests rather than to shifts of intelligence. Coefficients of correlation of between .80 and .90 were obtained for varying intervals between tests. However, later studies with longer intervals at times produced coefficients in the range of .40 to .70 depending on the time of first testing and the lapse of time between tests.

Thus, the earlier emphasis on the constancy of the intelligence quotient with only the variability permitted by accuracy of measurements has given way to better insights contributed by the repeated measurement of children over a substantial period of their life span. While all studies show some persistence of individual differences, the changes are somewhat greater than at first estimated, and the individual growth curves indicate systematic changes as if the expression of intelligence were under the influence of an unfolding design.

FAMILIAL RESEMBLANCE IN INTELLIGENCE

Much ingenuity has been exercised in investigating the problem of the effects of nature and nurture on individual differences in intelligence. Family resemblances between parents and their own children have been compared with the resemblance between parents and their adopted children. In a comprehensive study Leahy (31) found that coefficients of correlation between intellectual and educational factors in parents and adopted children were in the neighbourhood of .20, whereas similar coefficients for own children were in the neighbourhood of .50. There is always a question of the extent to which the positive correlations for adopted children are environmental and the extent to which they have been induced by a tendency on the part of agencies to appraise the infant and his mother or parents and to assign available infants so as to secure a rough correspondence to opportunities in the home. Findings on similarities between children in the same family are discussed later in this section.

EFFECTS OF DEPRIVATION AND STIMULATION

Experimental studies in which some experience supplied to one person or group is withheld from another are pertinent to the general subject of deprivation. The conditions of living have set up natural experiments, which have attracted the attention of investigators from time to time. Such studies often lack the clear-cut controls and conclusions of experimental investigations, but they represent a more intensive and lasting application of the experimental factor than the experimenter would dare to apply. Thus Shotwell (49) reports a deprived migrant boy who learned to read in six weeks at age 13 and large average gains in groups similarly deprived.

Environmental correlates. There appears to be little disposition to argue the claim that achievements, such as reading, which require a specific experience will lag in an environment which does not provide the experience. Illiteracy figures correlated with educational opportunities provide ample demonstrations. The argument is more likely to hinge on whether differences in physique and intelligence are clearly attributable to environmental factors, or whether selective migration has placed less able people in more limited and deprived circumstances. Since there is evidence that both types of influence may operate, there is much reasoning in circles. Education and welfare attempt to interrupt the circle by supplying additional nurture to help realize the potential that exists.

The trend of the studies may be epitomized by saying that the raw, unanalysed data commonly show inferior growth and tested ability in rural as compared to city children, in children of low rather than high-income families, in children from poor land instead of good, in orphanages rather than homes, and in children who live isolated from modern educational opportunities as in mountains, hollows, and canal boats.

When children are classified according to the occupation of their parents, the upper socio-economic groups regularly received higher average intelligence quotients. Overlapping between socio-economic groups is substantial
and the high school students, regardless of socio-economic background, tend to test higher than those in grade school because of a tendency for those of lesser ability to drop out. The same selective trend has been shown in other studies for those who go on into the college period.

Since intelligence tests employ some items which are included on the assumption of universality of experience, it is clear that the assumption is not always met. Since deprived children often test like others in the early years, the subsequent deterioration in test status appears to support the hypothesis that nurture has been lacking. In skills practised by all and in tests selected so as to be non-verbal or to provide novel experiences the differences are not so striking. Current research is concerned with the cultural loading of test items and an attempt to secure 'culture-free' or 'culture-fair' tests. However, large differences, larger than the cultural differences, still exist after culturally loaded items are excluded.

It appears probable that individual differences in intelligence have an innate basis which must, however, be fully nurtured if a particular expression of it is to be used as a sample of its presence. Thus a test of arithmetical reasoning would be a fair reflection of individual differences in underlying capacities if all children had an equal opportunity for familiarity with number concepts. Such a test would be an inadequate measure, however, for a child who is isolated from opportunities or one in a primitive culture.

GROWTH OF VOCABULARY

It is a difficult and technical task to enumerate the vocabularies for large numbers of children at various ages. There have been a few attempts at this in individual biographies and in the study of groups. It has usually been necessary to resort to some process of sampling.

From early published studies it appeared probable that vocabulary increased rapidly through the preschool period and then slowed down. One of the difficulties throughout as noted previously is to define when a word is known. Is a word known when it is understood upon being heard, when a child can repeat it, when he is able to use approximately or specifically, or when he is able to tell what it means?

Practically any measurement of vocabulary suffices to reflect individual differences among persons and to show growth under the conditions of the test. However, the actual number of different words in a person's vocabulary has been found to vary widely according to the criteria set up for understanding and according to the type of measurement used. Thus, Madorah Smith (50) devised a vocabulary test for young children based upon 263 words selected by a systematic sampling of a list of 10,000 words prepared by Thorndike. Estimations of total vocabulary were then made by use of a suitable multiplier. Various methods were listed to determine whether a child understood a word. In her study children progressed from about three words at one year of age to 272 at two years of age to 896 at three, 1,540 at four, 2,072 at five, and 2,562 at six. The last figure has been widely mentioned as the approximate size of a child's vocabulary when he enters the first grade. Other tests based upon systematic samplings of abridged dictionaries tended to give roughly comparable answers.

However, Mary Smith, by sampling an unabridged dictionary and permitting a variety of techniques (including multiple-choice recognition) for demonstration of understanding, found startlingly different results as given in Table 2. Thus the average vocabulary of basic words became 16,900 for the first-grade child, with a range from 5,500 to 32,800. In addition a substantial number of derived words are known at each grade level.

While a child may have a few words at twelve months, it is approximately eighteen months before he begins to use words to communicate ideas, and by the age of five he is using language in complex ways to satisfy individual needs and social relationships and may have a vocabulary of several thousand words.

Table 2. The Growth of Vocabulary

<table>
<thead>
<tr>
<th>Grade</th>
<th>Basic</th>
<th>Derived</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>16,900</td>
<td>7,100</td>
<td>24,000</td>
</tr>
<tr>
<td>2</td>
<td>22,000</td>
<td>12,000</td>
<td>34,000</td>
</tr>
<tr>
<td>3</td>
<td>26,000</td>
<td>18,000</td>
<td>44,000</td>
</tr>
<tr>
<td>4</td>
<td>26,200</td>
<td>18,800</td>
<td>45,000</td>
</tr>
<tr>
<td>5</td>
<td>28,500</td>
<td>22,500</td>
<td>51,000</td>
</tr>
<tr>
<td>6</td>
<td>31,500</td>
<td>18,000</td>
<td>49,500</td>
</tr>
<tr>
<td>7</td>
<td>35,000</td>
<td>20,000</td>
<td>55,000</td>
</tr>
<tr>
<td>8</td>
<td>36,000</td>
<td>20,000</td>
<td>56,000</td>
</tr>
<tr>
<td>9</td>
<td>38,500</td>
<td>24,000</td>
<td>62,500</td>
</tr>
<tr>
<td>10</td>
<td>40,200</td>
<td>37,300</td>
<td>67,500</td>
</tr>
<tr>
<td>11</td>
<td>43,500</td>
<td>29,500</td>
<td>73,000</td>
</tr>
<tr>
<td>12</td>
<td>46,500</td>
<td>33,500</td>
<td>80,000</td>
</tr>
</tbody>
</table>

The first words of a child are in reality often complete sentences in themselves to which meanings are added by a variation in inflection or by accompanying gestures. With maturity the sentences increased in length from slightly over one word at eighteen months to about five at the time of kindergarten entrance. Individual differences are great, and some children will enter school using very short and simple sentences.

SOCIAL CLASS DIFFERENCES

Almost any classification of children by the occupational, social, or economic status of the parent

(1) From Mary K. Smith, 'Measurement of the size of general English vocabulary through the elementary grades and high school'. Genetic Psychology Monographs (Provincetown, Mass.), Vol. 24, 1941, pp. 311-345.
will give a hierarchy of groupings with important differences in the central tendency of a measure of the children in each group, but with much overlapping between categories. For example, the distribution of intelligence quotients among children of various occupational groups usually reveals averages with the professional groups at the top, followed by business, by clerical groups, by skilled labour, and finally, by unskilled labour. According to the purposes to be served or the particular philosophy of the investigator, one makes much or little of these differences depending on whether he is more impressed by the average difference between groups or more impressed by the extensive overlapping that exists among them.

A narrowly prescribed curriculum of a highly verbal sort favours, on the average, the kinds of experiences and motivations possessed by the children in the upper socio-economic levels. If the curriculum is rigid in the sense of expecting a particular standard of achievement in a particular grade, the children in the lower socio-economic groups tend to become retarded in school and to leave school early. On the other hand, if the school system attempts to meet the needs of all, retention is favoured. Thus in some American high schools as many as 80 per cent of children of the community of appropriate ages may be in attendance in school in a particular system. To have 65 per cent of youth of secondary school age in high school is a fairly average achievement. This may be contrasted to some regions of the world, where the expectation is that there will be a process of elimination, and that the survival in the secondary period may be as low as 10 per cent.

The pressures for school leaving, of course, are not all from within the school. The goals of children in the lower socio-economic groups are often more immediate. They are interested in early establishment of economic independence and of a family, and are quite satisfied with the promising economic rewards of farming, business, and industry at the levels to which they aspire. Even though the way through college in the United States of America is theoretically open to all with the requisite ability, for example, the road is actually traversed more frequently by those in the upper socio-economic groups. This is not entirely a financial matter. It relates also in part to whether or not the parents and the family perceive higher education as a goal to which they should aspire.

INDIVIDUAL DIFFERENCES IN PHYSICAL GROWTH

Differences in mental functions have been most emphasized traditionally in the planning of educational programmes. The discovery that maturity in physical factors has an important relationship to achievement has led to a more thoughtful consideration of the need for the nurture of the 'whole child'. The extent of these differences can be appreciated by the seriati growth measurements for 100 boys in height age, weight age, carpal age, and dental age (in months) in the accompanying figures (pp. 19-23).

INDIVIDUAL DIFFERENCES IN ACHIEVEMENT

When children are exposed to the learning opportunities provided by school large and increasing differences are found in achievement.

The extent of these are graphically portrayed in the reading careers of 100 boys between the ages of six and twelve years. By the time 144 months of age is reached the range is from a reading age of seven years to a reading age of seventeen years! What becomes of the idea that a 'grade is a grade is a grade' and that there are suitable curriculum experiences for a child of a given age? Under a selective theory of education a large number of these children might be diverted into special programmes or destined for early school leaving at ages eleven or twelve. The wisdom of this is discussed at various points in this report.

The implications of these differences are enormous for the person who engages in curriculum construction. For example, let us assume that a particular school is organized so that all children of a particular age are in the same grade. We can then compute the difficulty of reading materials which should be represented in each grade if each child is to have a successful experience at the level at which he is reading. Thus in Table 3 (page 24) we assume that the children in Grade 1 will be, on the average, seven years of age on 1 March. Only 50 per cent are really ideally suited if a standard first grade book is supplied. Twenty-three per cent are still at the kindergarten level and two per cent are at the nursery school level, whereas 23 per cent are ready for a second grade experience and two per cent are ready for a third grade experience.

As the years go on these differences become larger and larger. While it is true that there is a progression in the sense of sequence and in the sense of having experiences appropriate to an age or grade level, the overlapping between grades is striking and very confusing to any person who believes that a curriculum consists in required learning experience for each grade.

Until recent times, even well informed investigators believed that these variations were somehow accidental or they somehow reflected poor teaching or special disabilities on the part of a child. Under this conception there was much work attempted to 'bring the child up to grade'. At other times and places a solution was sought by holding back children in the lower grades. Thus the 34 per cent in Grade 2 who are not yet at that level might be kept back in Grade 1. This treatment produced many problems. Still another approach has been to encourage the early school leaving of the children who are acquiring the school experiences very slowly.
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Carpal Age

Chronological Age

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IN THE GROWTH AGES OF 100 BOYS

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University of Michigan, Ann Arbor, Michigan.
Table 3. The Percentage of Children in Each Grade Ready for Each Book Level:

<table>
<thead>
<tr>
<th>Book Level</th>
<th>Grade Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grade Age</td>
</tr>
<tr>
<td>N. S.</td>
<td>5</td>
</tr>
<tr>
<td>Kg.</td>
<td>6</td>
</tr>
<tr>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>10</td>
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<tr>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>6</td>
<td>12</td>
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<tr>
<td>7</td>
<td>13</td>
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<tr>
<td>8</td>
<td>14</td>
</tr>
<tr>
<td>9</td>
<td>15</td>
</tr>
<tr>
<td>10</td>
<td>16</td>
</tr>
</tbody>
</table>

THE CHILD AS A WHOLE

The longitudinal, multi-disciplinary studies of children make it abundantly clear that the differences represented in the illustrative figures are very real, that they represent very important differences in the way children are developing, and that they are not easily or quickly changed. The point may be illustrated by the Figures 1, 2, 3, and 4 on p. 25. Each of the figures represents the growth of one child in which age is given along the base line and the growth age is given along the vertical axis. Each square represents twelve months. The straight diagonal line across the page represents one year of growing for one year of living. By measuring year after year and expressing the measurements in terms of age units the growth of each child is described. The various curves include the familiar reading age (RA), and mental age (MA). They also include carpal age (CaA), weight age (WA), height age (HA), dental age (DA), and grip age (GA). Hundreds of growth graphs for children such as those described indicate that growth is continuous, that it is stable, that achievement is commonly a part of the total pattern, and that the teacher and curriculum maker must accept adjustment to individual differences as a part of the task of education.

The relationships between general maturity and behaviour and achievement illustrated in the preceding figures often may be low when expressed in terms of a coefficient of correlation. However, when low coefficients exist the extremes are likely to present profound contrasts. It is often at the extremes of the gifted, the retarded, the well adjusted and the disturbed that one encounters the most concern. For example, one cannot find a high coefficient of correlation between skeletal x-rays and most other measurements. However, they usually are positive and support in some degree the 'holistic' view of growth and development. Jones and Bailey (23) determined the physical ages of ninety boys by means of skeletal x-rays. They then compared sixteen boys at the extremes. The early maturing group was rated as physically more attractive, neater, less animated, less 'affected', less inhibited and more relaxed. Their contemporaries tended to classify the early maturing boys as less attention getting, less restless, more assured, less talkative, more 'grown-up', and more likely to have older friends. Thus there are striking parallels between the rate of physical maturing and many psychological characteristics.

TRENDS IN GROWTH DIFFERENCES IN CHILDREN OF THE SAME INTELLIGENCE QUOTIENT

Although trends are accentuated at the extremes the significance of general growth differences can be teased out of any comparisons one desires to make.

For example, Table 4 compares 27 boys who got an early start in reading with 27 boys of the same I.Q. who got a late start. The differences in favour of the early starters tend to be very consistent on all items. To get the full impact one should really cumulate the differences in some fashion for the various variables. Thus the cumulative differences by addition of the part differences become 25.4 months of growth at age seven and 36.6 months of growth at age twelve. Among other interesting differences are: the early readers cut their first baby tooth earlier, they weighed more at birth, and their mothers had earlier menarcheal ages. Five of the late readers were described as premature while none of the early readers were so described. Age of walking and talking did not differentiate the groups in these samples.

From studies by Willard C. Olson and Byron O. Hughes, Child Development Laboratories, University of Michigan.
Table 4. (1) Average Growth Ages of Early and Late Readers among Boys with the same I. Q. in the First Grade

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Reading Classification</th>
<th>Average Growth Age (in Months) at:</th>
<th>Chronological Age</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>72</td>
<td>84</td>
</tr>
<tr>
<td>Height Age</td>
<td>Early</td>
<td>74.3</td>
<td>87.4</td>
</tr>
<tr>
<td></td>
<td>Late</td>
<td>73.6</td>
<td>85.2</td>
</tr>
<tr>
<td>Weight Age</td>
<td>Early</td>
<td>81.2</td>
<td>92.9</td>
</tr>
<tr>
<td></td>
<td>Late</td>
<td>75.1</td>
<td>87.2</td>
</tr>
<tr>
<td>Dental Age</td>
<td>Early</td>
<td>72.6</td>
<td>86.7</td>
</tr>
<tr>
<td></td>
<td>Late</td>
<td>70.5</td>
<td>83.0</td>
</tr>
<tr>
<td>Carpal Age</td>
<td>Early</td>
<td>73.9</td>
<td>85.7</td>
</tr>
<tr>
<td></td>
<td>Late</td>
<td>64.9</td>
<td>78.5</td>
</tr>
<tr>
<td>Grip Age</td>
<td>Early</td>
<td>81.7</td>
<td>95.3</td>
</tr>
<tr>
<td></td>
<td>Late</td>
<td>75.5</td>
<td>88.7</td>
</tr>
</tbody>
</table>

Differences

<table>
<thead>
<tr>
<th>Measurement</th>
<th></th>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height Age</td>
<td></td>
<td>0.7</td>
</tr>
<tr>
<td>Weight Age</td>
<td></td>
<td>6.1</td>
</tr>
<tr>
<td>Dental Age</td>
<td></td>
<td>2.1</td>
</tr>
<tr>
<td>Carpal Age</td>
<td></td>
<td>9.0(2)</td>
</tr>
<tr>
<td>Grip Age</td>
<td></td>
<td>6.2</td>
</tr>
</tbody>
</table>

RELATIONSHIP BETWEEN GROWTH IN ORGANISMIC AGE AND IN READING AGE

For purposes of theory and analysis the various ages for a child may be averaged from longitudinal record at a point in time to yield an 'organismic' age (OA).

The figure on page 27 (Beck, 2) describes the growth of three groups of boys who were selected at age eleven as fast readers (RA-4 years 6 months or more above CA), as intermediate readers (RA clustered at CA), and slow readers (RA-2 years, or more below CA). The solid line represents the growth in OA, and the broken line gives the reading age which is used as a sample of achievement. The assumption of strong maturational factors is supported by family studies and by components of organismic age that are resistant to planned change.

SIBLING RESEMBLANCE IN GROWTH

A part of the basis for individual differences seems to be found regularly in membership in a family. Resemblances among children of the same parents appear early, are ubiquitous in every comparison, and give more predictive power than can commonly be found in teachers, common curriculum experiences, or details of method.

Longitudinal records now make it possible to compare children of the family at the same chronological age despite different birth dates. The differences between related pairs can then be compared with pairs of children drawn at random. Quite extensive data indicate that differences in physical traits between members of a family will only be about 50 per cent of the differences between unrelated pairs of the same sex drawn at random.

Table 5 is a summary of findings of a study by Schoonover showing in the first columns the coefficients of correlation between measures of siblings, stabilized by a computation of differences in a period of overlap in longitudinal records. The coefficients vary between .39 for a knowledge of science to .71 for mental age. The average difference between siblings in months varies between 9.9 for mental age to 20.7 for language age. The reduction of difference by membership in a family is from 22 per cent for science age to 46 per cent for mental age.


(2) Fisher's t-test of significance, P = .05 -
A COMPARISON OF THE THREE GROUPS OF BOYS IN ORGANISMIC AGE AND READING AGE AT SUCCESSIVE CHRONOLOGICAL AGES
Table 5. Sibling Resemblances in Intelligence and Achievement(1)

<table>
<thead>
<tr>
<th>Measure</th>
<th>Coefficient of Correlation (r) for Pairs of Siblings</th>
<th>Average Difference Between Siblings</th>
<th>Average Difference for Unrelated Pairs</th>
<th>Percentage Reduction for Siblings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental Age</td>
<td>.71</td>
<td>9.9</td>
<td>18.3</td>
<td>46</td>
</tr>
<tr>
<td>Arithmetic Age</td>
<td>.49</td>
<td>10.7</td>
<td>15.1</td>
<td>29</td>
</tr>
<tr>
<td>Educational Age</td>
<td>.59</td>
<td>12.6</td>
<td>19.3</td>
<td>35</td>
</tr>
<tr>
<td>Language Age</td>
<td>.40</td>
<td>20.7</td>
<td>30.1</td>
<td>31</td>
</tr>
<tr>
<td>Literature Age</td>
<td>.41</td>
<td>14.3</td>
<td>20.7</td>
<td>31</td>
</tr>
<tr>
<td>Reading Age</td>
<td>.51</td>
<td>16.4</td>
<td>25.9</td>
<td>37</td>
</tr>
<tr>
<td>Science Age</td>
<td>.39</td>
<td>16.0</td>
<td>20.5</td>
<td>22</td>
</tr>
<tr>
<td>Social Studies Age</td>
<td>.64</td>
<td>13.6</td>
<td>19.7</td>
<td>31</td>
</tr>
<tr>
<td>Spelling Age</td>
<td>.53</td>
<td>14.7</td>
<td>21.5</td>
<td>35</td>
</tr>
</tbody>
</table>

The interesting and important relationships can be illustrated in the figure on page 29 for three children of the same family growing at high levels. One is more struck by the similarities in level and flexion in such cases than by the differences. From sibling comparisons we find that if one member of a family is delayed in reading the next one will also be delayed in some degree. One can quickly get into an argument about what these differences mean, i.e. a genetic basis or a basis in common experiences in a family. Without argument, however, sibling differences and resemblances add to an understanding of curriculum experiences, of children, and of how existing differences are to be interpreted to parents in the endless argument of the rôle of the child and of the experience in the development registered in achievement.

THE CHILDREN WHO SURPRISE US

While we can secure some firm generalizations about the growth of children on the average, i.e., laws of the universe of children, we find that individuals may not fit the generalizations. There appears to exist additionally 'laws of the family', and 'laws of the case' in which we are dealing with more detailed factors influencing patterns of growth. In the longitudinal, multi-discipline records of the University School of the University of Michigan there are now available the early records of children who subsequently attained distinction.

We can only illustrate the problem by the records of one child (Sam M) who graduated with honours from a leading university. A very thick file containing much case material is available for him. The growth curves on page 30 show delay in reading (RA) to almost age ten, an unusual 'splitting' or divergence of the various curves and a steady rise in intelligence (MA) and achievement (RA) toward the close of the period covered by the graph (five to sixteen years). The associated data indicate delayed secondary sex characteristics, late maturation as a family trend, and an academic record which placed him near the bottom of his high school graduating class. Under the usual criteria for a selective philosophy of education he would have been considered unpromising material for secondary school or college. His 'second chance' came through a delay of several years while serving in the armed forces and, under the combined influence of added maturation and experience, he attained later distinction.

This is not an isolated case. Periodically someone describes a 'late bloomer'. Even children described earlier as mentally retarded may surprise. We cannot claim to have firm generalizations about 'late starters' or 'slow maturers'. We can usually find in the records of each such child some 'over-riding' characteristics which seem to affect, contravene, or dominate generalizations for children in general. Slight trends for a group of 'late starters' can be found for symptoms of immaturity in birth weight, in size, and in appearance of secondary sex characteristics. Delayed maturity in secondary sex characteristics in the mother appears as an average trend. Those who surprise us seem to take a longer time to travel a given road, but the road has been kept open by parents and teachers who felt it to be worth while.

SUMMARY

In Section II of this report appeared a broad outline of the relation of curriculum planning to the age and growth of children. In this section there has been an emphasis on the wide differences that exist among children of a given age. These differences are to be found in single attributes such as mental age, reading age, and various physical ages, and also in the patterns of aggregates of the separate strands. The evidence from growth studies challenges the idea that there can be an 'average', a 'norm', or a 'standard' to be sought for every child.

(1) Adapted from Sarah M. Schoonover, *Sibling resemblances in achievement*. Ann Arbor, University Microfilms, 1953. (Publication 5726)
CHILDREN WHO SURPRISED US
SAM M.

Published by Child Development Laboratories, University of Michigan,
University Elementary School, Ann Arbor, Michigan 1954.
In terms of the equations of Section I the equation with which we deal in curriculum construction is:

Individual Differences in Maturation \times Individual Differences in Experience = Individual Differences in Achievement.

All of the possible combinations of interaction may occur. It is evidence of the above and related types that has supported the idea that the curriculum and the schools must somehow be concerned with understanding the whole child. As we shall see later the conception of the whole child in the social group or field goes beyond the measured aspects illustrated in the figures. The differences shown have implications for social relations, the child's feelings, and his behaviour.

The demonstrable differences among children show how difficult it is to have a prescribed curriculum which all should master at a given age. The development of the child again emerges as an interaction between his characteristics and his experiences and points to the importance of 'process' in the curriculum. The process can be facilitated by an understanding of how an individual learns.

IV. THE LEARNING PROCESS AND THE CURRICULUM

EXPERIMENTATION AND THEORY

The first fifty years of the present century has been characterized by a rapid spread of experimental ideas. The successes attained in the physical sciences have led to concepts of scientific experimentation in all areas of knowledge. Thus there has been a concerted effort to test practically every idea or every practice that can be proposed in connexion with the curriculum experiences of children. Such experimentation has had a wholesome effect on unchecked speculation. Often the effect has been to demonstrate that what some people knew for certainty was really in the area of chance and that they had been misled by some uncontrolled factor in the situation such as an unrepresentative sample of the population. In many ways research connected with the curriculum has done more to clear away the brush of misconceptions than it has contributed to new or startling discoveries. Such clarification, however, has often given a surer and more precise knowledge on which to build.

The detailed experiments often have a limited range of applicability. As these small experiments multiply certain regularities come to be perceived among them. At mid-century we have a new interest in theory construction. The goal of such construction of theory is the ability to predict what will happen in new situations as well as to understand the regularities that exist among the experiments thus far performed. Learning theory has substantially coloured the general philosophy, attitude and approach to curriculum study on the part of experts and professionals and the basic psychology taught to prospective teachers. At the turn of the century the analysis of 'consciousness' was much in vogue and problems of learning tended to be defined in 'mentalistic' terms.

Psychology as the study of behaviour was, however, advancing rapidly on the scene and received a comprehensive statement by Watson (59) with an emphasis on the stimulus side of the equation and the response, and a neglect of what happened in between as in the following:

\[ S \rightarrow R \]

In actual practice and in experiments it was discovered that S did not always necessarily directly produce R.

Pavlov (44) experimented with the general concept and quickly discovered that other stimulating elements in the situation might produce 'R'. Thus while the physiologically adequate stimulus for salivation might be food placed directly in the mouth, Pavlov discovered that the sight of food or any other stimulus such as the ringing of a bell which regularly preceded or accompanied the introduction of food would also elicit the salivary reflex. The process of associating new stimuli with the biological response came to be called conditioning. The fact that almost any stimulus could be associated with the response led to a rapid extension of learning theory in child rearing and instruction.

In a somewhat different stream of development Thorndike (55) continued the study of habit as begun by James and emphasized in his work the importance of repetition of a connexion and proposed his law of exercise.

'When a modifiable connexion is made between a situation and a response that connexion's strength is, other things being equal, increased.'

It will be recognized that in the Thorndike approach the idea of contiguity in time and space is very closely related to the idea of conditioning. He also added his law of effect:

'When a modifiable connexion between a situation and a response is made and is accompanied or followed by a satisfying state of affairs, that connexion strength is increased: when made and accompanied or followed by an annoying state of affairs, its strength is decreased.'

Hull (21) and his students made a concerted attack on problems of learning to develop postulates that would account for more phenomena than those of Pavlov. His step was to relate the stimulus to drive reduction in the organism which will result in a greater tendency for that stimulus on subsequent occasions to evoke a reaction. The foregoing analyses have stressed the stimulus side of the equation most largely. However, it is also clear that the organism is able to make a whole variety of responses and that many things happen between S and R which may be described as 'intervening variables'. Thus there becomes an internal aspect to the equation. The overt
stimulation leads to internal responses which lead to further internal stimulation which in turn evoke various types of observable overt responses.

The intervening variable may, of course, be such a thing as fear, previous experience, drive, etc. The idea that associated factors may reinforce the stimulating situation allows more room for the higher mental processes as in reasoning and thinking and to such ideas as transfer based upon the total situational context.

Psychological theory has tended to embrace wider areas of significance as it has attempted to account for observation and experiment. Thus the association theory of Thorndike emphasized stimulus - response, drill, trial and error, reward and punishment and extrinsic motivation. Behaviourism as exemplified by Watson has many similarities to associationism but spelled out the detailed conditions and emphasized the external rather than the internal aspect of the problem. The various field theories such as Gestalt psychology of Wertheimer and others such as Koffka and as Kohler broadened the process to include the importance of insight, thinking, meaning, and understanding. The offshoot of topological psychology as exemplified by Lewin emphasized the organization of forces in an individual's life space, the involvement of the learner in the goals, and the relation of these goals to the possibilities of successful achievement. Emphasis on the group atmosphere or climate, on problem solving, and the individual's perception of his role became important to this school of thought. Psychoanalytic theory as represented by Freud and others tends to emphasize the struggle between the urges (ID), the 'I' feelings and the super-ego which had to do with the socialization of behaviour and the development of conscience. As contrasted to other schools of thought psycho-analysis places much emphasis on the internal and the unconscious.

Thus several aspects of both classical and contemporary learning theory are important guides for the provision of curriculum experiences. To be effective experiences should be so contrived that they are associated in time and space. This is the principle of contiguity - the likelihood of associations so formed to be reliable or enhanced if they are frequent, recent, intense, and in a context of meaning. If the associations or responses have been followed by a satisfying state of affairs or as perceived as being related to the attainment of a goal the probabilities of recall and of retaining of learning are enhanced.

We turn to some of the specific problems with which experimentation and theory have been concerned.

TRANSFER OF TRAINING

Throughout the history of knowledge learning has been frequently defended as a means of training or sharpening the mind. Under this theory of the curriculum what is learned is not as important as the by-product which might come about in the form of a general discipline of the mind or the faculties.

The evidence used to support or to study transfer is usually to measure the success of a person or a group of persons on an initial task, to give them training on a related task, and finally to retest and compare the success on the second test with that of the first. Since other kinds of changes may have been producing effects in the interval of training, a rigorous research design also requires a control group which is given the initial and final test without the intervening training. Such tests have been performed for memorizing material with various types of controls. It is also possible to study the value of formal training in one school subject as compared to another.

One of the most prominent theories is that there is a transfer of identical elements in various situations. Others have argued that there is also such a thing as a generalization of a principle which thereafter is of assistance in a new setting. In animal experimentation there is some indication that a chimpanzee, for example, will 'learn how to learn' and thus after a period of time will show some economy in attacking new problems. One might think of this as cumulative transfer. The large and complex body of information on transfer cannot be summarized quickly or easily. The following generalizations are serviceable in curriculum planning:

1. Some measurable transfer usually occurs.
2. The amount is commonly small compared to the expectations of most people.
3. The transfer which does occur appears to be attributable to similarities in the tests or tasks which are compared.

We may summarize the existing information on transfer by saying, 'We learn our responses'.

In the economical planning of learning one should provide experiences related as directly as possible to the goal.

The abandonment of general acceptance of transfer of high amounts between unrelated activities has commonly led the person in curriculum work to what is described as more functional experience, i.e., experiences closely related to the child's life, his professional and vocational goals, his obligations as a citizen, and satisfying use of leisure time. This need not be any narrowly conceived utilitarianism but can be a helpful principle against which to test proposals.

PERCEPTION

A learner cannot ordinarily isolate a single stimulus from a complex situation and respond to it alone. Perception has to do with the fact that the arrangements and organization of stimuli may result in an experience of wholes rather than in an awareness of all of the separate elements. Past experience has much to do with the way a
new situation is perceived. For example, an individual's perception may vary with his internal condition. A hungry person is more apt to have food associations with a stimulus picture than a person who is satiated (McClelland and Atkinson, 35). One tends to perceive objects at a distance in terms of knowledge of the size of the object rather than in terms of the absolute size as determined by the image on the retina. The differences that people have in their perception of a given situation are a frequent cause of conflict. Each may be very certain that he is correct but since different elements of experience have gone into the present perception of the situation there is little agreement. Thus curriculum improvement and change is confronted continuously by the very real fact that the persons who wish to innovate or control or implement have different perceptions of the task and of the goals. It helps to remove as many of these as possible out of the area of differences of perception and emotional controversy by having all persons look together at the factors which are known with the greatest objectivity. Varying perceptions often contribute to a broader and improved interpretation of the same set of data since a given person's perceptions may be excluding other kinds of consideration. It is for this reason that it has often been productive to have inter-disciplinary approaches to some complicated problems.

WHOLE VERSUS PART LEARNING

The problem of whole versus part learning is related to the distribution of practice. Is the learning of parts of the total material more or less effective than attempts to master the entire task from the beginning? It is still difficult to give a single definite answer. The experiments in this area are often contradictory. In general, distributed practice has an advantage over massed practice but the differences tend to diminish as the complexity of the learning materials increases. The length of time must be long enough to take full advantage of the time required to 'warm up' for a task and yet must be sufficiently short to avoid feelings of fatigue and boredom. There is a tendency for the more mature learners to be ready for the more complex units. Meaning is important regardless of whether the approach is through a part or a whole. Detailed studies of the learning process continue to support the idea that meaning or context helps facilitate acquisition. Thus related words are more easily learned than unrelated words which are in turn more easily learned than nonsense material.

RETENTION AND FORGETTING

Retention has to do with the amount of learning that is retained after an interval. Recognition and recall are used most commonly in school situations to test retention (see Section VII on evaluation).

In laboratory experiments a relearning method may be used. A measure of retention is obtained by the savings between the original and relearning session. The studies of retention indicate that meaning is an important variable in retention just as it was in the original learning. Thus nonsense materials are forgotten more rapidly than meaningful materials. The dependability of a given response in general increases with its repetition and its automaticity becomes greater. Cue reduction means that with practice less of a stimulus is needed and the time between stimulus and response is reduced. This is part of the problem in learning to read rapidly and with understanding.

Forgetting occurs in part as a result of interference. Thus the interposition of material between an initial learning and a final test of a learning may result in retroactive inhibition of the previous learning. The actual amount of forgetting in school learning is enormous. This is probably one of the reasons why the presence of an experience in the curriculum does not at all guarantee the regular presence of the behaviour of knowledge in the child. The frequent complaint that 'he should have been taught that long ago' is fallacious in the sense that he probably was taught it but in the absence of need and continuous practice forgetting has occurred at a terrific rate. This is probably one of the reasons why many of the factors in a school setting such as the emphasis on a subject, the amount of time devoted to it, the scope and sequence of it, leave so few differential and measurable traces. The organism will retain a certain amount, and what is retained cannot be related with any certainty to the emphasis on the subject.

MOTIVATION

What keeps a child growing, active, seeking, achieving? 'I've gotta learn', cries a four-year-old interrupted in an activity. Drives may be somewhat artificially divided according to their origin into visceral, activity, and sensory drives. For example, the need for food with its attendant changes in blood chemistry and hunger pangs is a visceral drive which leads to restless, active, seeking behaviour. Other needs for activity and change arise more in the muscles and the joints with a need for change and the relief of strain. These may be called the activity drives. In school we deal much with the sensory drives. The child is stimulated to hear, to see, and to react. In emotional drives, there is a complex involvement of all aspects of the organism mobilizing the child to meet some type of emergency situation. The mobilization can be discovered in heart rate, circulation of the blood, release of blood sugar, and motor action involving running, attacking, or solving the problem. Motivation is often something that must be inferred since it is an internal condition of the...
organism although it may be described and sub-
stantiated by the external behaviour. Motivation
is different from incentive which has to do with
the external aspect or goal. Among the basic
biological drives are the necessity for food, water,
and air, the need for elimination, protection from
extremes of temperature and the need for rest to
restore conditions of fatigue. The organism
makes a constant attempt to maintain an equili-


mum between the external and the internal forces.
This self-regulation and maintenance of a balance
is called momoestasis. Closely related to the
biological drives are the drives of appetite such
as sex, the need for visual stimulation, and for
the exercise of preferences of taste.

The school commonly builds on the primary
needs or drives of the child in various ways and
becomes more interested in the so-called acquired
social and psychological drives. These are often
quite far removed from their original origin
although the need for affection, and approval may
somehow be related to the early experiences of
feeding and care in the home. Recently extensive
attention has been given to the concept of self
which has to do with the way an individual views
himself and his goals and the ways of reaching
these goals.

Praise and reproof. The study of the relative
effectiveness of praise and reproof or reward
and punishment has had a long and interesting
history in the field of learning. In general, praise
is more effective than reproof. Although any
reinforcement is likely to make for greater gains
than complete absence, reinforcement of responses
comes quite regularly when the person has a know-
ledge of results. The 'psychological feedback' as
it is now often called by analogy to physical systems
seems regularly to have a positive influence both
on individual learning and the performance of groups.

LEARNING THEORY AND GROWTH THEORY

When less was known about growth and individual
differences in children the psychologist and the
curriculum maker were inclined to give greater
weight to the planned control of the learning pro-
cess in the production of changes. Much import-
ance still inheres in the learning process since
growth occurs only with nurture. The earlier
conception was as if we had a standard human
being or learner who could then be subjected to
experiences contrived in terms of laws of learning
and for whom then achievement could be expected
and predicted. The variable learner is now an
important part of the equation and at any point in
time he is a composite of his growth potential
and the great number and variety of experiences
that he is having continuously. Our knowledge of
the cumulative effects of small bits of learning
over long periods of time is still insufficient.
Thus the laws of learning as stated earlier in a
very simple form come to have less utility than
they might otherwise have in really giving a
teacher control over the achievement of children.
The scientific study of psychology has been moving
from principles of association, of frequency, of
reward and punishment, to the more complex
theory involved in motivation. How one manages
the motivation of individuals and groups has come
to be one of the important differentials in effective
and non-effective teaching. The motivation of the
child becomes one of the important variables in
whether he is productive or non-productive.

Before describing some direct applications of
learning studies to the curriculum and teaching,
它 may be well to review some of the characteris-
tics of learning at different levels of complexity.

A famous psychologist (61) once arranged a
narrow pathway of glass in the form of a T with
the source of light at the base. He found that an
earthworm placed at the base of the T would
crawl up the tube away from the light. Having
reached the top, it might turn either to the right
or to the left, but repeated trials indicated that
the earthworm had no particular preference.
If, however, some irritating substance was placed
in the left arm of the T and a comfortable artificial
burrow at the right, the earthworm, after repeated
trials, was found to turn regularly to the right.
Even after a vacation from the maze the earth-
worm still remembered its experiences.

Experiments of this general type have been
made with many kinds of animals and illustrate
some of the basic features of simple learning.
The avoidance of unfavourable situations, the
fixation of a habit which results in a satisfying
outcome, the formation of a habit by repetition,
and memory for past experiences are all charac-
teristic of the learning process. A child, of
course, differs enormously from the earthworm
in his capacity for complex learning, in his power
of responding to language, and in his ability to
respond to a stimulus not apparent in a situation.

Learning is the process by which the experiences
we have lived through modify our present and
future behaviour. The results of learning are
represented in terms of habits, attitudes, skills,
isights, knowledge, and memories. Learning is
so much a part of our daily living that we often
take it more or less for granted and make few
plans to direct it. Some persons even think of
learning as a thing that can be delegated entirely
to schools and teachers. In a broad sense, how-
ever, learning is as much a part of daily life as
eating, sleeping, and breathing.

By what signs can we observe the progress of
learning? A few illustrations will bring out some
of the major features. If you place a toy in front
of a few months'old infant lying in his crib, he
will bounce up and down, kick his feet, wave his
hands, and make many useless movements in
trying to grasp the toy. If the toy is offered re-
peatedly to a child sufficiently mature, the super-
fluous movements of the hands and feet disappear,
and the child grasps it directly. The elimination
of unnecessary movements under the combined
influence of maturation and practice is one of the signs of learning.

If a child is put to work at a puzzle that offers no obvious pattern for solution, so-called trial-and-error movements are made, which gradually disappear. In later attempts the child may learn to put the puzzle together very rapidly, until finally his speed of reaction and his interest are the chief limiting factors. The time needed to perform a task is thus one of the signs of learning.

If a young child is presented with a rabbit, he reaches for it, grasps it, strokes it, and plays with it. If a loud noise is made, it often makes him cry. Now if the rabbit and the loud sound are repeatedly presented together, the child cries when only the rabbit is presented. The making of associations between experiences not previously associated is thus one of the signs of learning.

If a series of school tasks are arranged in order of difficulty, a child can go farther and farther in the series under the combined influence of maturity and practice. Ability to handle more difficult tasks is an evidence of learning.

Anything which may affect a child's sense organs may, if properly presented, affect his learning. Whenever a teacher or parent confronts a child with an object, a person, or an event, a learning situation has been set. One presentation of an experience seldom results in permanent learning, unless it is fraught with relationship and meaning or involves very intense stimulation. Repetition is usually necessary for the perfection of a skilled performance or for the recall of the details of a complex process. An experience that has a desirable conclusion is more likely to be repeated and fixed.

If a child is presented with a new task, he may be able to solve it on the basis of past learning. A difficulty often encountered in instruction in arithmetic is that children learn to compute but have trouble with so-called reasoning problems. The precise nature of the ability to solve new problems or make new applications of old habits is in dispute, but it is prized very highly and its manifestation is regarded as one of the most important signs of learning.

A clear-cut distinction between learning and reasoning has been made by Maier (36) for experimental purposes. Reasoning may be thought of as the ability to combine the essentials of two isolated experiences in such a manner as to reach a goal, while learning may be the ability to combine two experiences contiguous in time or space. In some of Maier's experiments the percentage of subjects who could combine isolated experiences increased from about 20 per cent at four years of age to 71 per cent at six years of age and 100 per cent at age eight.

Modern education attempts to give increased practice in reasoning and not to be content with the sheer associative learning characteristic of the schools that emphasize memorization.

The trend of the evidence is that the maturity of a child is an important factor in his learning. All children do not mature at the same rate, nor do they progress to the same final level. One of the important tasks of the teacher is to arrange the learning situation so that it is within the capacities of the child. Sometimes less teaching is necessary if experiences are postponed for a while. With added maturity and general breadth of experience the child learns a specific item with less practice. This is one reason why educators frown on attempts to force a child to read prematurely.

The general principle that instruction and learning should proceed from experience to the symbol of the experience is verified by studies of the development of ideas of number. Brownell found that those pupils who had developed mature methods of dealing with concrete numbers made the transition to abstract numbers and combinations with relative ease. Difficulties are encountered with pupils who are immature in their handling of concrete numbers and thus find difficulty when they try to handle the abstract.

LEARNING CONCEPTS APPLIED TO METHOD

Motivation and level of aspiration. The entire process by which persons attain goals is commonly named motivation. It thus has an internal aspect in which growth, psychological state, and past experience are influential, and it also has an external aspect in which the total situation and specific incentive are observable. The teaching process has often emphasized the external or incentive aspect of the problem to the neglect of internal factors of readiness based upon growth and history. If a person with prestige sets goals or incentives for an individual, the latter usually strives to attain them, unless the goals are clearly recognized as unattainable. Similarly, persons continually set goals for themselves.

A satisfactory condition of motivation does not mean that a given child must excel as compared with other children. The real test consists in whether or not the child accomplishes successfully what he is trying to do. Under the concepts of level of aspiration, success and failure are relative to the goals that a learner sets for himself.

The concepts have been subjected to certain experimental tests. For example, Sears (48) studied three groups of children selected from the fourth, fifth, and sixth grades. A 'success' group had a history of satisfactory work, a 'failure' group had a history of unsuccessful work, and an intermediate group had experienced both success and failure about equally. The object was to determine the effects of past experiences on the goals set for tasks in arithmetic and reading. The children with the record of success set realistic goals involving an ambition to make a reasonable improvement. The failure group did not set realistic goals. Some set their goals
very low. They seemed to have a habit of failure. Others set their goals very high as if they expected luck to be with them. In other studies it has been discovered that children try to escape tasks that they perceive to be clearly beyond their ability and tend to persist in working upon those in which they hope to succeed.

The idea that the expectancy of teachers and parents should be in accord with the abilities of children in order to sustain motivation thus receives support from studies of level of aspiration.

PRACTICE, PACING, FORCING

While readiness for a new stage of activity is often described as an emergent based upon a stage of maturation of the child, it should be noted that the emergence is accompanied by literally hundreds of hours of practice of the preliminary pattern and components of the co-ordinated act. Thus the infant in preparing to crawl spends much of his waking time in the exercise of arms and legs, in the tentative assumption of various postures, and in experimentation with different methods of producing forward motion. While forcing is unsuccessful in hastening the co-ordinated process, it should be noted that self-instigated practice is almost continuous and that a child readily co-operates with an adult in extending the range of his repertoire of experimental movement. This co-operation is most evident during the nascent stage of emergence, and the adult is simply disappointed if he attempts to enter into the rôle of assistant before a child is ready.

The concept of pacing as used in connexion with the education of children in school is similar to the acquisition of motor control. The healthy child, full of energy and seeking behaviour, is continuously observing and rehearsing. His control of the environment is confined to the things that he finds in it and is extended by the provision of new opportunities. One of the teacher's rôles is to provide new experiences. Under the combined influence of inner design and practice, the child becomes ready for more and more complex integrations. The observant teacher finds an eager learner if during this period of readiness he suggests or points out a relationship. He suffers disappointment if he attempts it before. To assist these broader integrations is another of the important tasks of the teacher. A child tends to engage in any socially approved behaviour within his capacity for response. The teacher gives direction to learning by approving comments to indicate what types of behaviour are socially approved. This is another important rôle of the teacher.

The smoothly operating picture described above becomes garbled and confused if a parent or a teacher continually stimulates a child to activities for which he is unready, at which he fails, and for which he receives disapproval. Under a forcing plan the teacher or parent, by urging, scolding, and setting up extrinsic awards, attempts to bring the child up to some preconceived standard of excellence. Such methods commonly fail and bring about bad social and emotional repercussions.

The only protection from such insult open to a child is to avoid the situation (escape), to fight back (aggress), or to develop a shell (encyst), so as to remove the discomfort (tension) of an impossible situation.

SELF-SELECTION IN READING

Seeking behaviour and self-selection are important attributes of method when the pacing concept is accepted.

A brief summary of a classroom experiment in a second grade will illustrate the plan. The teacher, the school librarian, and the children co-operated in developing a room library which contained 115 titles of readers and stories from pre-primer to fourth-grade level and represented a variety of interests.

No assignments were made by the teacher, but she remained an encouraging guide and often was a part of an appreciative audience. Experience reading continued as a part of the programme. The adjustment to individual differences was made by allowing the children to browse and sample in the room library and select the books they wished to read.

The results can be indicated briefly by the illustration on page 37. Bill read 21 books and gained 19 months in reading age during the seven months of the study as indicated by the solid lines. John read 13 books and gained 12 months in reading age during the period of the experiment. This was the average result for the group. James read 4 books and made no measurable gain during the study on the test used.

James' slow growth in reading was not a consequence of the small number of books read. His behaviour toward reading was rather a symptom of his general immaturity. Teachers before, during, and after the experiment brought their best skill to bear on the improvement of his reading. Time and maturation were necessary to bring about a spurt. The reader will be interested in knowing that James at ages thirteen and fourteen finally achieved a status in reading somewhat above his chronological age. This type of late spurt for children who start slowly happens often enough to be reassuring to those who are inclined to worry too much about the child who does not stand out in the early grades.

With the power gained in the second grade the children in the illustration went on into the third grade where Bill read 110 books, John 123, and James 12.

One cannot, of course, understand completely what is behind the relative rates of growth shown in the growth curves for reading without also studying the same children from the point of view of the child as a whole. This more comprehensive study - including measures of height and
weight, strength, intelligence, ossification of wrist bones, eruption of the teeth, and much social and emotional data - has been made. John and Bill were advanced in these measures, while James was slow. Modern technical studies of children, as well as applications in professional practice, take into account how the total child is growing.

THE LEARNING PROCESS AND THE TEACHER

While the complexities of learning are great a teacher may pursue the day by day programme with some general guides from learning theory and learning experimentation. A few such general guides may be as follows:

1. Children grow
2. Time to grow is needed
3. Children learn
4. Children differ
5. Children associate a variety of situational factors with a variety of possible responses
6. Approval helps identify the correct response
7. Successful responses avoid frustration and maintain motivation
8. Learning is reinforced by environmental factors which facilitate e.g. physical condition, social relations, group atmosphere
9. Participation of the learner as in joint planning and self-selection is a useful method.

V. CURRICULUM MATERIALS AND METHODS

The purpose of the present section is to secure an overview of some of the more technical approaches to securing curriculum content and to consider some of the related problems of method. Curriculum experiences can be derived from many sources and organized in many different ways. It will be possible only to illustrate some of the trends in a few areas.

TRENDS IN ELEMENTARY SCHOOL EXPERIENCES

When programmes of elementary schools are analysed it is obvious that much time and attention is given to such basic things as reading, writing, spelling, arithmetic, and the study of the native language. However, most studies reveal a substantial shift over the years in the actual weekly time allotments. Thus in one study by Gray (8) which compares time allocations in 1900 as contrasted to 1950 there was an actual decrease in the amount of time devoted to language arts, arithmetic, and remedial work. During this time other curriculum experiences entered in very heavily. The biggest changes were in the introduction of music and art in larger amounts, increases in science and in health, and in the social studies. Thus the curriculum has probably been responding to new needs and opportunities. Psychologically, however, one must remember that there has been no successful relationship of the amount of time spent on such things as reading, arithmetic, and spelling and the success of children in these tasks. It is probable that earlier practices put time on these content areas to the point of diminishing returns since the same learnings at the proper point in the maturing child could be accomplished in much less time. The recognition that all that a child can really accomplish in a given area of skill can be done in less time has given support to the idea of more flexibility and enrichment and a retreat from a detailed prescribed content in a course of study.

Two major trends confront the curriculum expert. One is to study and procure materials that are effective and economical in the learning of children and the other is to adapt the experiences provided to the range of individual differences present in any group.

A curriculum based on an acceptance of ideas of extensive transfer of training often used instructional materials such as arithmetic problems and spelling words that were difficult and intended to train the mind even though they had no frequent use in daily living. In a revolt against this approach there is currently a heavy emphasis on functional experiences in the curriculum. From this point of view materials for children are drawn from the life that they are to live. The
MENTAL AND PHYSICAL HEALTH IN THE CURRICULUM

The 64 nations who signed the constitution of the World Health Organization developed a definition of health which makes it a part of the total responsibility of all who work with children. The definition is as follows: 'Health is defined as a state of complete physical, mental, and social well-being, not merely the absence of disease or infirmity'.

A special consideration for children is voiced in the constitution in the following quotation: 'Healthy development of the child is of basic importance. The ability to live harmoniously in a changing total environment is essential to such development'.

It is important for international objectives as well as for personal objectives and those of families and neighbourhoods to have children reared under conditions that promote healthy security. It is the insecure persons who strike out in damaging directions.

When one views health as an international problem it becomes apparent that good health, length of life, and happy and productive people are associated with the extent of education in a population. This might be thought of solely as increased use of medical measures in the area of immunization and sanitation. However, it also seems apparent that health measures will be used only to the extent that an informed public is willing to have them used, that they will not be used in the presence of ignorance and superstition, and that, on the positive side, persons learn to avoid some of the hazards to life and health.

ACCIDENTS IN CHILDHOOD

Many schools now include instruction in safe behaviour. Accidents constitute the main source of death in children in the pre-school period and continue at high levels in later periods. In the ages two to four children escape from supervision, they wander around the roads and streets in the neighbourhood, and they are not sufficiently mature as yet to appreciate the dangers. Boys regularly have more accidents than girls with representative figures often running three times as many boys as girls. These differences are most easily ascribed to the early maturity of girls but it is probable that there is a sex difference associated with being a boy in our culture in addition to the maturity difference.

Accidental deaths in this early period provide a good illustration of how environment interacts and influences the population. For example, where lakes and streams abound, as in the Scandinavian countries, drownings become relatively high. Where traffic is dense, as in the United States of America, traffic accidents account for a high percentage. New attention has been focused on suffocation in recent times because of the high number of discarded ice boxes. The incidence of burns changes as there is an increased use of central heating and improved cooking arrangements.

The incidence of accidents is larger in low income groups and in large families. There is evidence for the existence of what may be called 'accident proneness'. Accident prone children are those who repeat accidents and seem more active and thoughtless than others.

A purely environmental approach to accident prevention would consist in improved supervision and the removal of potential hazards based upon situational analysis. Supervision in the early years is important but children must also have experiences through which they take responsibility as they grow. Perhaps most important is to change the behaviour of children. Improvement of the instruction in safety and instruction in swimming are illustrations. Driver education in high schools has been an important response to the urgency of the need.

PHYSICAL FITNESS

Rigorous programmes of training have been adopted in many countries during times of war to prepare youth for strenuous activity. Some have argued that fitness is achieved only if exercise is at a level which strains capacity and grows more severe as physiological adaptations are made. Speed, skill, strength, power, and endurance have been the objectives of the war programmes. While one may grant the value of such objectives for a war emergency, there is as yet no crucial demonstration that forcing in the physical realm can be of any long-range value to children. The insurance statistics on the longevity of persons who have engaged in strenuous athletics are not reassuring.

The writer believes from the evidence examined by him that the amount of activity which is best
for a child is that which he seeks and enjoys and that the major elements in fitness are not modified by strenuous programmes of training. This point of view envisions long range organic soundness as well as immediate values. Curriculum planners disagree on the extent to which vigorous exercise and rigorous training should be required of children.

As a part of a desirable environment for children, extensive opportunity should be available for every suitable type of physical activity and sport, and for the development of skills which can be pursued into later life.

**PLAY AND GROWTH**

A large fraction of a child's day is spent in a round of activity commonly called 'play'. Spontaneous and self-initiated activity apparently pursued for its own sake is often contrasted with the activity which is channelled, perhaps under the direction of others, to the accomplishment of specific purposes. Various interesting hypotheses have been advanced on the function of play in the classical theories concerning it.

**Theories of play.** The recapitulation theory held that each child tended to repeat in his individual history certain activities which were typical in the evolution of the race. The recapitulation in the individual was not usually thought of as some obscure type of racial inheritance but rather as a parallelism between the child's stage of motor development and the complexities of activities in which he could engage as a consequence. In some of the writings the idea of a racial memory (a highly controversial topic) seems also to be prominent. The application of the theory on playgrounds and in classrooms often resulted in somewhat arbitrary division of the ages and of the experiences appropriate to them, but such arbitrary uses of a developmental theory could not withstand the test of direct investigation. It has been found that children of a given age differ widely in the development of their play interests with much overlapping between age groups. The expression of activity in play has also been found to be subject to wide variations in terms of what is customary or expected by the adult world.

Another classic theory is that play is the expression of an accumulation of surplus energy. Children have high metabolic rates and not all of the energy they produce is needed for growth. The surplus energy impels towards activity. It is well known, for example, that when children are deprived of proper food they tend to become apathetic and, while they may maintain their growth if the deprivation is not too severe, they have very little energy left over for exuberant smiling, laughing, running, and jumping. It seems obvious that the surplus energy theory accounts in part for play but is probably not wholly descriptive of its function. For example, the use of the surplus energy for the production of goods and services is not as satisfying to the child or as conducive to total development as is play. Hence child labour laws protect the child against exploitation while permitting some direction of the energy into work.

Another prominent theory is that play is primarily an escape from the drudgery of labour and that through it a person can recreate his stores of energy and his joy in living. The recreation theory is akin to modern ideas about expressive therapy. The tensions built up by the sensory bombardment received in the day's work may be released and relaxed through activities pursued spontaneously for their own sake.

Each of the classical theories of play deals with a facet of truth concerning this universal and important activity. The application of the various theories of play is often obscured by moral judgments concerning values. For example, some persons appear to be disturbed if children achieve the objectives of education without painful and unsatisfying drudgery. They look askance at modern schools where children learn to read and get along together and to solve problems in a joyous manner. They have not recognized the psychological truth that the difference between work and play lies more largely in the motivations of the persons than in the classification of the activity that is performed.

It is clear that activity and growth are inextricably intertwined. The level of maturation determines in part the nature and direction of activity, and the exercise in turn stimulates and perfects growth and the integration of behaviour. Through play a child perfects the neuromuscular and hand-and-eye co-ordinations necessary for successful daily living. Play activities foster social growth through practice in sharing and cooperation. Personality is given an opportunity for expression and development. The affective colouring of play makes it important for mental hygiene.

**Play interests.** Play interests change markedly with age. Interests may be taken as a rough index of whether a given child is maturing rapidly or slowly. Play is commonly studied by direct observation, by questionnaires, by check lists of play activities, or by experimental and clinical methods. The observational method lends itself economically to restricted aspects of play in school and community settings. The most comprehensive studies have been made by Lehmann and Witty (32). They utilized a list of two hundred play activities in which children were asked to check in columns the activities engaged in during the previous week, those which gave the most fun, those to which the most time was devoted, and those in which they participated alone. They found that younger children engaged in a larger number of activities than older ones, and that most activities reached their peak at the age of about ten and one half. The girls in their survey spent more time in sedentary play, while the boys chose games involving much activity and dexterity.
In the nursery school, children spend much time in solitary play or in play which parallels the activity of other children. When co-operative or interactive play occurs, it is at a low level of organization. Children in the home and in the nursery school and kindergarten prefer raw material to specialized toys. Blocks, boards, paper, paint, containers, sand, etc., lend themselves to a variety of uses. Vehicles are popular at all ages from childhood to maturity and are adaptable to diversified imaginative play as well as pleasurable exercise. Children show much ingenuity in exploiting whatever is available to them. If slides, sand toys, vehicles, kegs, sawhorses, boards and blocks are removed from a nursery school playground, the children play with the sand and dirt and engage in more games and social interaction. More social conflict develops, and thus a greater need for teacher control arises.

The height of play activities occurs in middle childhood and the elementary school period. The ages from about six to eleven are unequalled by any others in variety of play and amount of participation. The child has much mobility in the neighbourhood and is not as specialized in his interests as he becomes in later childhood and adolescence. It is not surprising that curriculum planners have attempted to enlist this exuberance in activity programmes in elementary schools. Learning, which enables children to do better the things which they wish to do anyway, is acquired easily and with zest.

It is not too profitable for the general worker with children to attempt to memorize the age-by-age details of change of interests. Overlapping is the rule; some children are still doing at eleven what others do at seven. There are broad trends, however, which indicate the march toward adulthood. Thus play with dolls by girls changes from dramatic household play to an interest in clothing and sewing. Studies indicate that girls tend to give up play with dolls as they become pubescent. The change of interest and activity from the tricycle to the bicycle is a complex of size, motor control, social competence, and economics. Fads also sweep the country and alter the age incidence. For example, roller-skating becomes very popular at the age of eight, but at times substantial numbers of persons of practically all ages are doing it. With all the variability and overlapping, however, the trends with maturity are sufficient to permit the construction of scales of interest of demonstrated validity and reliability. If a child responds to a sufficiently large sampling of questions on play interests and makes choices, significant data on his maturity are obtained.

**PLAY AND GAMES IN THE CURRICULUM**

A general approach to physical education has been described in a publication of the Ministry of Educa-

tion in Great Britain (17). A major principle for the planning of experiences is that techniques should emerge as an outcome of play rather than precede it. Recess and recreation periods are best used for games rather than for what might be called the grammar of physical training. At times games may be facilitated by concentrating on the grammar such as throwing, hitting, dribbling, running and leaping, and agility on apparatus. Such skills are best associated with an activity but concentration may be needed when the function as a whole is lacking.

There is a hunger for sheer activity in children. Where a classroom programme is more satisfying and less sedentary, children will tend to run and leap and shout on release, but are less explosive than the 'desk bound' children with restricted movement.

The development of play activity in children is one of the first concerns of the teacher. As in the general curriculum, the task is often to provide an instructive environment rather than direct instruction.

**READING IN THE CURRICULUM**

Reading is one of the most universal aspects of curriculums in all regions of the world which provide schools. It is also the subject of the greatest amount of investigation. The student of growth and development sees reading as an emergent out of the early experience and language of the child. It thus becomes a part of a sequence in which many aspects have started at birth and which gradually moves toward the recognition of symbols after there has been appropriate experience and mastery of oral language.

Rivalries in methods. Those who have not studied child development often think of some particular method as being all important in the acquisition of reading. No method now known can produce changes which compare in amount with the differences that exist among children because of variability in rate of growing.

A recognition and acceptance of the reality of individual differences in readiness will assist curriculum planners and teachers greatly in interpreting the controversies and storms that can arise out of a particular way of doing it.

Children who are growing at a rapid rate and who are in an environment at home and school which values reading come into it so naturally that it is hard to discern the process. Others require more attention to method and still others do not make much progress in the early years irrespective of the method used.

The simplest method is sometimes called the 'look and say' method. The word is shown to the child and it is pronounced for him. Thus the word and the sound come to be associated under the usual laws of associative learning including contiguity in time and space and repetition of the connexion. When meaning is present in the
past experience of the child and the child is
going to be used, little or no repetition may be needed.
Unless this meaning is present it is questionable
whether the child has really learned if he has
simply been told him the sight and sound of the
word. He may be only a 'word caller'.

Another common practice in teaching reading
is the use of the sight method. In this method
a picture representing a word such as a cat is
seen simultaneously with the letters c a t. Thus
the child who has already been shown the picture
of a dog based upon experience with the real
object can associate the more abstract symbol
with it.

Frequently the look and say and sight methods
are combined so that the child sees the picture
of a dog, sees the word dog and hears the pronun-
ciation of dog.

Phonics. In some parts of the world the phonic
method is the most widely used and much contro-
versy can be found on its effectiveness as com-
pared to other methods.

The broad contrast is that the phonic method
consists in having children master first the
smallest components of the language and then
having them proceed toward larger units. More
eclectic methods emphasize the thought, the whole
word, the sentence, and subsequently use sounds
and such word analysis as may be needed. With
the meaningful method the theory is that the
children also will obtain mastery over new words.
Children frequently start their reading experiences
by acquiring 'sight' words. This is a process
that often happens in the home before a child comes
to school as words are associated with pictures
and objects. The teacher commonly uses sight
words as a basis for experience stories. The
characteristics of a modern programme are well
described in a recent publication of the National
Education Association of the United States of
America (39).

It is unlikely that any sweeping explanation of
quality of reading can be found in differences in
method. Researches in intelligence testing and in
the measurement of achievement have established
firmly that individual differences exist among
children, that these are not easily or quickly
altered and that they have something to do with
school success. These variations among children
are of an order of magnitude far greater than the
amounts of change that can be achieved by using
one method as compared to another. The explana-
tion of a particular child's slow progress in reading
thus is more likely to be found in the characteris-
tics of his growth pattern than in the method which
is employed.

It has been established that good readers have
good command of phonic skills. The coefficient
of correlation between the ability to read and the
score on a test of phonics will be about .55 to .70
(57).

Psychologists have found repeatedly coefficients
of correlation of approximately .50 between results
of an intelligence test and achievement in reading.
Children who are low in intelligence regularly read
later in life and less well than those who are grow-
ing more rapidly. Indeed, some few children of
very low intelligence will not learn to read at all,
irrespective of instruction. Children with very
high I.Q.'s regularly achieve some competence in
reading without much experience in schools since
they pick it up by themselves. The ability to read
also runs in families and a division into high
reading families and low reading families on the
basis of the first child in a series will make a
greater difference than can be teased out of any
subtleties of method.

To underline the importance of individual differ-
ences as a factor in learning to read, the writer
took 75 boys at age seven and divided them into
two groups - high mental age and low mental age.
The mean reading age of the upper group was 94
months and of the lower 80 months with a differ-
ence of 14 months! To make the case doubly
secure for those who argue that reading ability
affects I.Q., the writer took the 44 boys for whom
mental ages were available at 60 months before
organized reading opportunity, and found that two
years later the upper and lower mean reading ages
were 97 months and 80 months with a difference
of 17 months. Differences such as these cannot,
of course, be found by differences in method.

To illustrate the problem of general maturity
the writer next divided the 75 boys at age seven
into 'heavy weights' and 'light weights' on the
basis of measurements. The 'heavy weights' had
a mean reading age of 89 months and the 'light
weights' 85 months. The difference of 4 months
equals or exceeds most reported comparisons of
method and can be reproduced with greater regu-
larity.

Reading ability varies according to sex, intelli-
gence, parental occupation, family characteristics
and many other factors. Without careful controls,
casual observations and standardized measure-
ments can give no true answer.

Additional studies of the efficacy of methods
with improved designs are needed. The question
of the durability of changes and the comparability
of samples plague interpretations at present.

A small but well designed experiment has
recently come to the writers' attention. Naeslund
(38) at the Institute of Education at the University
of Stockholm has contrasted the phonetic method
and the sentence method by using a co-twin
control experiment. One member of each pair
received the phonetic instruction. The children
were tested for oral reading as recorded on a
tape, by the reading of word lists, and by time
and errors in paragraph reading. Exposure time
for word recognition was tested. Tests of com-
prehension were given. A method of paired
comparisons was used to determine the enjoyment
of reading. Projective tests were used to secure
preferences among school subjects and there were
tests of associated learnings and of spelling.
Equivalence of results seems to predominate in the many detailed analyses with a slight edge in the satisfaction of the children for the sentence method. Naeslund promised a 'follow-up' test for durability.

Individualization and enrichment. Dunklin (13) set up experimental and control groups among children who scored in the lowest third on a learning-to-read test in the first grade of three schools. The groups were matched for scores, age, sex, and previous school experience. Unfortunately, certain other statistical data are not reported in detail.

The essence of the plan was to have the teachers of the experimental group consider the children as individuals and to have a supply of reading materials which would afford each child a successful experience. The work in the experimental group was individualized so as to make much use of independent reading.

At the conclusion of the trial period of seven months, the experimental group was almost half a grade ahead of the control group. The study is gratifying from the point of view of the theory of individualization and avoidance of deprivation. The permanence of the differential gains was not reported, and the study should be repeated with a follow-up after a lapse of time.

In one of the most recent additions to the experimental literature on individualization, Jones (22) concluded that children taught on their individual levels regardless of grade placement achieved a greater amount of growth than comparable pupils taught as a group with a prescribed curriculum for a grade with only minor and incidental adjustments. The generalization was found to be true for reading, arithmetic, spelling, and total achievement.

Oral versus non-oral reading. Claims have been made for the superiority of a non-oral method of beginning reading in which there is a direct association between the visual symbol and the meaning without the intervention of oral pronunciation or subvocal speech.

Buswell (6) has reported an appraisal of a programme in which non-oral reading in the first two years was compared with the oral method. At Grade 3 those trained by the oral method had a reading rate of 150 words a minute and those trained by the non-oral method had a rate of 150.3 words per minute. In a search for long-time effects the children were compared at the sixth-grade level, and the oral group obtained a comprehensive score of 34, as compared with 36 for the non-oral group. The non-oral group had skipped more grades and had repeated fewer than the oral group. There was also more evidence for lip movements in the oral than in the non-oral group. The groups were carefully paired and the differences, although small, favoured the non-oral approach.

The experiment failed to appraise the extent to which the oral and non-oral group were effective as oral readers. It has been known for a long time, of course, that most reading is done silently and that speed is much greater under these conditions. It should be noted that the differences found were very small as compared to the wide range of individual differences found among the children in both groups. Buswell himself does not appear to be too satisfied with the question of whether or not all of the influential selective factors that might occur over a period have been controlled. The writer of this text would expect substantial equivalence in total competence in reading as a result of the two approaches. Since there are still controversial aspects, it is too early to conclude.

Comparison of methods. Burt and Lewis (5) applied modern techniques for the analysis of variance in small samples to test the relative efficacy of the following methods for remedial reading: (a) the alphabetic; (b) the kinesthetic; (c) the phonic; (d) the visual; and (e) a mixed method. The first investigation used 32 boys and girls of ages nine to twelve and one half, with a mean I.Q. of 78, who were all retarded at least three years in reading. Cycles of exposure to the various methods were set up. Increased gains over average classroom expectancy were found. The visual method accounted for the greatest gains. The superiority of the visual was confirmed in a subsequent experiment with 46 boys.

An important observation was that the effectiveness of a given remedial method varied according to whether or not it had been used previously with the same child in school. Change in itself appeared to be beneficial. This appears to be an important cue for classroom practices, since there is the likelihood of renewed interest as well as the possibility that a method will be discovered which is more congruent with the unique needs of a given child.

Multi-discipline approach. With the assistance of specialists from the University of Chicago, Robinson (47) made a study of children who were retarded in reading. Thirty children whose intelligence quotients ranged from 85 to 137 were selected for intensive study. There were 25 boys and 5 girls in the group, indicating again the preponderance of boys among clinical cases of reading disabilities. Each child was examined by a social worker, a psychiatrist, a pediatrician, a neurologist, three ophthalmologists, a speech correction specialist, an otolaryngologist, an endocrinologist, a reading specialist, and the investigator, who was a psychologist and reading technician. Group conferences on the data led to treatment recommendations which were carried out successively after priorities had been determined.

The study contributes more to an understanding of the problem of the child as a whole than it does to the responsiveness of children to remedial treatment. It was found that children who are seriously retarded in reading also present many physical, mental, social, and emotional
deficiencies or disturbances and that retardation in reading usually tends to increase in seriousness in proportion as the number of anomalies increases. There was little conclusive evidence that any given anomaly as such had a specific and remedial relationship to reading retardation.

There is a strong suggestion that the various anomalies are related to slow maturation. Thus 29 per cent of the boys showed an absence of descent of the testicles which is an unusually high incidence of delayed maturation. In the absence of a control group apart from published averages, Robinson wisely refrained from making generalizations about the responsiveness of the children to remediation and the special therapies employed. An independent check by the present writer suggests that bright young children in the study were responsive and dull older children were not. This, of course, is likely to be the case with or without special remediation.

The mental hygiene of reading. The mental hygiene aspects of reading have received much attention, since the social and emotional reverberations become so important for children who are slow in learning to read.

Preston (45) studied 100 children with intelligence quotients ranging from 90 to 140 from the reading failures in Grades 2 to 10 in two city school systems and 67 control children with similar qualifications from the good readers in the same school. Parents were interviewed in the home, and each child was given an individual interview in school. As usual there were more boys than girls in the reading-failure group. Preston's study demonstrates that failure in reading may threaten the child's security in the home, in the school, and in the neighbourhood. Insecurity was expressed by discouragement, loss of interest and self-confidence, and a desire to stay away from school. Excuses for remaining away were sought, and some children pretended to be sick. The members of the control group were appreciably higher in their feelings of security. Ridiculing and spanking may occur in the home, and taunting may occur in neighbourhood groups. The account amply demonstrates the prevailing ignorance about the real nature of slow learning in reading.

Axline (1) reports the experience of a teacher with 37 (8 girls and 29 boys) poor readers or nonreaders in a second grade. The group had an average intelligence quotient of 103. A procedure based upon non-directive therapy was adopted. There were many opportunities for release of feelings in art work, puppets, rhythms, and free play. The teacher's rôle was that of an accepting guide. The participation in reading instructions was on a volunteer basis. There was a library of two hundred books of easy material. No remedial instruction as such was given. Records of conversations and spontaneous verbalizations indicated that this group had many disturbing social and emotional factors in their lives. Gains on the Gates tests in the three and one half months of the experiment averaged about five months.

It should not be assumed from the above study that emotional factors are the only explanatory ones. Regression effects and systematic age changes have not been controlled. The study should be repeated with a control group. As it stands, it indicates improvement through a mental hygiene approach comparable to other studies in which reading itself has been the direct focus of attack.

It is difficult indeed to unscramble cause and effect in analysing the behaviour associated with reading retardation. One point of view which can be pressed with considerable cogency in terms of known mechanisms of frustration and aggression is that children become anxious, nervous, shy, erratic, or aggressive when they cannot engage in behaviour which is adaptive to the expectancy. The desire of so many retarded children to withdraw from the reading situation, to cease trying, and to have a defeatist attitude is consistent with principles of motivation. The lack of a sympathetic attitude on the part of parents and others who tend to be ashamed, over solicitous, or severe is an additional complication. Such associations are substantially underlined by the studies of Preston and Axline referred to previously.

Attempts to individualize and to give emotional facilitation to children are usually accompanied by reports of improved attitudes, work habits, and independence of approach. There appears to be more seeking behaviour than avoiding behaviour, and the children become more expressive and fluent. These differences often seem to be more substantial than the change in achievement in reading scores.

From a strictly scientific point of view, additional studies need to be made. Is it possible that the disturbed behaviour is, to some extent, a reflection of the same condition which is reflected in a slow start in reading? Is the third factor some basic immaturity or inadequacy? Beck (2) has examined records of children in the nursery school and kindergarten who subsequently made rapid or slow starts in the reading process. She found that immaturity of behaviour precedes lack of success in reading. Easy generalization cannot be made on the basis of what we know now. It is entirely in accord with theory to have an exacerbation of symptoms when slow-growing children with immature behaviour are faced with the additional problems of adjustment involved in reading.

Deprivation and stimulation in reading. It is probably fair to say that no one method of teaching reading has established its supremacy over other methods. When a child is ready he apparently can learn by any method. For this reason contemporary reading instruction in some countries may be described as 'eclectic', i.e., the teacher uses whatever element of any method seems useful at a particular point, establishes a meeting
ground with a particular child, or seems to correct or strengthen some phase in which errors are being made.

There is a substantial literature in the area of remedial reading in which methods are described, individual cases are given, and in which the progress of groups of children are compared with the average gains. Unfortunately, it is difficult to interpret the real effect of remedial reading programmes. Experimenters have usually been content with describing cases or groups with comparisons with average achievement. Seldom has there been any study of wide scope involving the treatment of alternate cases or involving the setting up of a control group comparable to the treated group with beginning tests, end tests, and tests of durability over a period after the experiment is finished. In all attempts to stimulate growth, whether physical or mental, there is a tendency for the immediate effects to disappear after a lapse of time. In the same manner deprivation works in the opposite direction during vacation periods, leaves of absence, prolonged illness, etc.

Thus far it appears that remedial reading gets the best results when there has been actual deprivation due to poor educational opportunities or through methods or attitudes which prevent the opportunity from being effective. The person broadly trained as a specialist in reading and child development is also helpful in interpreting children and problems to parents and teachers.

Word lists. Persons who prepare printed materials for children or who edit such materials regularly find useful these extensive compilations of the vocabularies of children. Thorndike (55) pioneered in this field and Rinsland (46) has followed with one of the most extensive collections. The general assumption is that it is useful to begin the teaching of spelling or the introduction of words into reading with those words which are the most common in the language. There are, of course, other principles that apply, but on the whole, the idea is a useful one.

Readability involves a great number of factors including the length and complexity of sentences. It is probable that the emphasis on word counts is an over-simplification of the problem of bringing reading within the comprehension of the child. More important is the simplification of the language structure and the reduction of the difficulty of the concepts involved. A number of children's classics have been edited so that they will be simpler for the child who has not progressed rapidly in reading and yet may have interests characteristic of his age.

The word lists have served as source materials for other studies. For example, Osburn (41) tabulated the words in the Rinsland vocabulary for the frequency of occurrence of syllables in initial, medial and final positions. Such a method of analysis reduces the problem of instruction substantially since the syllables differ greatly in frequency. Thus the syllable 'ing' occurred 881 times in the final syllable as in going. Such a syllable would then transfer to 880 words. This is a substantial fraction of the polysyllabic words in the Rinsland list. It is suggested that it is reasonable to give some emphasis to the common factors in teaching spelling. That it actually makes a difference has not been demonstrated.

Comic books. Comic books in and out of school have come in for a substantial amount of attention from people who are concerned about the curriculum experiences of childhood and youth. Many extreme claims exist among those who contend that comic books promote many undesirable outcomes such as illiteracy, unwholesome states of mind, and delinquent behaviour. Surveys in the upper school grades frequently reveal that children do a large fraction of their voluntary reading in the comic books. Comic books frequently appeal because of the ease with which they can be read and understood. Often looking at the pictures and reading a word here and there are enough to get the story. Little is left to the imagination and the appeal to the senses is direct. The content of the comic magazine is often very compatible with the nature of children in pre-adolescence or early adolescence when comics tend to be at the peak of popularity. Action, suspense, mystery, and adventure are often to be found in the pages of the comic. The 'goods' and the 'bads' are readily distinguishable by physical appearance, dress, and behaviour. On the liability side it may be pointed out that the comic books may over stress love and money, and disparage respected groups in the population. It has been suggested that highly frustrated children delight in this defiance of authority. Low cost and availability add to the popularity of the comics.

A number of constructive attempts now exist to use the appeal of the comic books and the techniques but with a better selection of content. Such books may deal with famous characters and events in history, for example, in a very dramatic way. Many people are not too worried about the appeal of comic books since they observe that as children become more mature many of them shift to more wholesome reading experiences. As far as actual danger is concerned there is a substantial point of view, without consensus among experts, that the selection of poor quality comic books is more of a symptom than a cause in cases of delinquency.

MECHANICAL ASPECTS OF READING

An extensive literature places an emphasis on reading as a process dependent upon the receptor or sense organs such as the eye. In the case of the blind, of course, the sense of touch as in reading Braille would be primary. The idea that important explanations of individual differences and progress in reading would be found in the eye or in the movements of the eye has been attractive to many investigators.
The evidence on growth seems to make reading more of a central than a peripheral sense organ problem. Fundamentally the eyes are the servants or tools of the brain. For the sake of completeness and perspective, however, it is necessary to review some of the evidence on ocular factors.

Ocular factors in reading. There have been many diligent efforts to relate proficiency in reading to various factors in the construction and use of the visual mechanisms. It has been found that the individual can compensate for a wide range of visual defects. Persons with hyperopia (far-sightedness) must adjust more to the close work involved in reading than persons with myopia (near-sightedness) or with average vision. Some studies have found a small differential in progress in the contrasted groups. The child with muscular imbalance (poor binocular vision) has difficulty with depth perception and with efficient eye movements.

The literature on visual factors in reading is a welter of conflicting findings and claims. The problems are so complex that it is difficult to have adequate controls. It is clear, however, that the wide individual differences that exist among children in initial learning in reading and in subsequent progress cannot be explained by an analysis of visual factors. Even the most optimistic studies are dealing with slight differences in averages rather than with the wide range in ability prevalent among children. After summarizing 58 studies, Dearborn and Leverett (12) conclude: No data appeared to provide a reasonable report on the general importance of visual defects as disturbing factors in reading. No agreement can be found in the literature on the subject.

Visual maturity. A very useful service would be performed if someone were to take all of the factors in the eye and its functions that change with age and would develop a scoring method which in turn could be related to age so as to yield a visual age. There is a strong suggestion in the literature that many visual anomalies are not specific in the sense of abnormalities but are rather samples of visual maturity.

Park and Burri (43) have published data on the incidence of various visual factors from the pre-reading period through the eighth grade. While the numbers in each grade group are small, the percentage of children with vision below 20-20 declines from slightly over 50 per cent in the pre-reading and primary period to 20 to 35 per cent in the early elementary and junior high school period. Good fusion increases in percentage from 54 in the pre-reading period to 80 per cent in the eighth grade. Good stereopsis increases from 18 per cent in prereaders to 75 and 80 per cent in late elementary and junior high school. Poor duction for both distant and near vision tend similarly to show a rapid decline during the period under discussion. It is probable that in studies of this type we can begin to see an explanation of some extra incidence of visual anomalies in cases of reading retardation - both may have their roots in a third factor related to the general tempo of maturation of the individual.

The importance of a maturational factor is underlined in a study of premature children by Eames (14). One hundred and fifty-five children who were born prematurely or who weighed 5.5 pounds or less at birth and a small group born later or during the tenth calendar month were compared with 439 children born at full term. At every subsequent age studied there was a greater incidence of low vision among the 'prematures'. Differences in incidence of low vision and median visual acuity persisted through the ninth year.

The best advice that can be gleaned from the present data would be to maintain good hygienic conditions, make such corrections as are possible in the treatment of the eye or through glasses, and attempt to reduce the discomfort and strain involved in compensating for visual handicaps. It is probable that strain and fatigue may tend to lead a child away from the activity and to prevent him from getting full enjoyment of it.

Eye movements in reading. The movements made by an individual's eyes in reading have been investigated extensively by rough observational methods, by motion picture photography, and by methods based upon the changes in electrical potential generated by action of the eye. The various approaches agree in their description of the nature of the movement of the eye during the reading process.

As the eyes move across the page, fixations or pauses are made. During normal reading the eyes show a regular movement from left to right. However, regressions, movements in reverse, may occur. At the end of the line a return sweep is made to the beginning of the next line. The efficient reader is commonly described as one who makes few fixations or pauses per line and few regressions, who makes accurate return sweeps, and who embraces a wide span of words or letters during a short average fixation. The various measures of efficiency in eye movements show relationships to other tests of speed and comprehension of reading.

At one time it was confidently expected that the training of eye movements as such could be expected to make better readers. The alternative point of view was that eye movements were the symptoms and not the causes of inefficient reading and that little could be expected by methods proposed for increasing rate or span and decreasing the number of fixations per line. From this point of view, eye movements were similar to such matters as the breathing and pulse rates - people vary widely, but it is not believed that anything should be done about it. Since the movement of the eyes in reading is patterned by the requirements of the situation, it seems clear that eye movements are perfected by some combination of maturation and learning. Is there, however,
a best method for all, or does each tend to work out for himself a process that is comfortable and effective for his rate of comprehension? If these individual adaptations are made, can a teacher bring to bear a greater wisdom by interfering with them? Dixon (37) has demonstrated that eye movements are more a characteristic of the person than they are a property of the difficulty of the material. The field is distinctly controversial and the published literature is not reassuring on general benefits to be obtained by attention to eye movements. Some writers have stressed the motivational value of the instruments used in training and measuring. They feel reassured that they have seen advantages in individual cases, even though no general superiority can be claimed in comparison to other methods. In many respects this controversy in the area of perceptual process and understanding is much like that of self-regulation versus coercion and standardization in child care.

Periodic records of the same children over a substantial period of their life span would constitute an important addition to the literature on growth as related to eye movements. The individuality of growth and change and the relationship of maturation of eye movements to other indices of maturity should produce additional understanding. It is now known that eye movements have a familial basis.

A study by Cason (7) may be cited as the type of evidence often found in experimental studies aimed at the improvement of the mechanical aspects of reading. She arranged an experimental and control group in the third grade in each of two schools, A and B. In school A the experimental group used materials prepared to emphasize phrasing in reading by means of underlining, vertical marks, or spaces. The control group in the same school spent an equal amount of time in free library reading. In school B an exposure apparatus was used which permitted phrases to be exposed at various rates. The equated group in the same school again spent an equal amount of time in free library reading. The two experimental groups were similar in that there was much emphasis on phrasing and speed of eye movements. The general conclusion was that you might as well send the children to the library for a free reading period as to have them spend their time with the mechanical methods. Differential results for children at varying levels of reading ability were inconclusive.

Physical conditions for reading. Much effort has gone into the study of the best arrangement of a printed page so as to promote the optimum learning conditions. There are many factors to take into account simultaneously. The most obvious ones are the size of type, the type face (light, medium, bold), the length of the line, and the amount of distance (leading) between lines. Research has not been of a longitudinal character (age by age) but on particular cross sections of the population. The most intensive work has been done with adults. However, Buckingham (4) studied speed and comprehension for variation in typography for 2,000 second grade children. Comprehension, a central nervous process, is not a good measure of efficiency since it is little affected by the external conditions. Speed is a better indicator of whether differences exist. He concluded that 12 point type on a short (61.5 mm) or medium (89 mm) length of line was superior to the larger 14 and 18 point type and to the long line (101.5 mm). Most publishers have adopted either a short or medium length line (supported also by eye-movement studies) but favour a larger type size than the research indicates on the deduction from general theory that a young child should have a larger size of print. Eighteen point has been a favourite. Type sizes for older children and adults may appropriately be smaller. Thus in one study with adults 10 point was found to be superior to either a larger or a smaller type. Short lines and double columns of print have increased in popularity in college textbooks in recent times.

Learning can occur under a wide range of intensity of illumination. Comfort and freedom from blinking, strain and fatigue become the important considerations. The classical work on the dependency of acuity on intensity of illumination was done long ago by König (29). His work showed that visual acuity varied with the logarithm of the illumination. Acuity does not change much after particular levels have been reached. Somewhat different values for this level in foot-candles have been obtained by various investigators. Practice in appraising the visual environment in recent times has shifted from measurement in terms of foot-candles to the use of a unit called the foot-lambert. A task becomes visible because of reflected brightness. This brightness is measured by the foot-candle intensity multiplied by the reflection factor of the task. In actual practice this usually means a lighting system that provides from 20 to 40 foot-candles on the poorest lighted task. Most classrooms deserve a substantial amount of attention from the point of view of visual comfort and efficiency.

RESEARCH AND TRENDS IN SELECTED SUBJECT FIELDS

Arithmetic. In accord with the nature of the developing child experiences in arithmetic commonly proceed from the simple to the complex skills. In the early period children are acquiring much experience with number and number concepts. They soon learn to count and to write numbers, to add and to subtract when the operations are appropriate. This goes to multiplication and division including common fractions and decimals. Those who would give arithmetic a functional approach would go to life of the community for the selection of materials and problems.
Thus Eddy (15) and his sixth grade class went to adults in a community to determine what measures were being used. These then offered a source for instructional materials.

General theory tends to favor meaning in most approaches to the curriculum. However, experimental studies which contrast an emphasis on teaching of arithmetic in Grades 3 and 4. While the number of children involved was small, the method was suggestive. Workbooks constituted the experimental material for self-selection. Children were allowed to sample and inspect workbooks of different levels of difficulty. They then went to work on the one they preferred. On the whole, the children were sound in the judgement of their abilities. Children often started with quite simple materials and progressed through several levels during the school year. A flexible assigned period was available for arithmetic, but there was much freedom. Children who were growing rapidly often chose to do arithmetic at other times also. The gains under a considered self-selection plan seemed somewhat better than under a more laissez-faire procedure maintained in the third and fourth grades in previous years.

Foreign languages. The psychologist as such has had relatively little to say in a systematic way about the rôle of the learning of a foreign language in the life of a child. The field has often been left to the linguist. Where such a language has a social utility it has been included in the curriculum without much question except as to which language should have priority. When the analysis of a child's world or a citizen's world reveals important needs for communicating in a language other than the native one such an experience is quickly and commonly included. This is particularly true when schools are planned for the mobile professional, social, and economic groups. In the United States of America it is relatively uncommon for children to be introduced to a foreign language during the elementary school years. The social demand has been small in volume, the utility for most children has not been obvious, and the daily life of the citizen of the community will not support the language at a functional level of speaking or reading. As the world has decreased in size through developments in communication and transportation and as the interrelated character of world problems becomes more and more manifest there has been a resurgence of interest in language in the United States. The goals have been both to acquire skills in communication and also to acquire an understanding of other peoples and their cultures. Thus there is currently a small but very vigorous movement to include more foreign languages in the elementary school curriculum. Such inclusion usually meets with some enthusiasm on the part of those for whom it is likely to be functional. The natural method advocated by psychologists for over a quarter of a century is commonly followed. The child proceeds from experience through an oral phase to an increasingly symbolic and integrated phase. The introduction of language into the elementary curriculum in the United States presents a number of difficulties. For example, the dominant pattern of organization is a self-contained classroom for which a single teacher is responsible. Such a teacher is broadly trained for competencies in most areas commonly included in the curriculum experiences of a child. Such breadth has often been difficult of attainment and becomes still more difficult if the specification of skill in a foreign language is added. Various plans for semi-departmentalization or for the assistance of a language expert and for the production of an increased number of teachers with language competencies have assisted in the work that has been done thus far. When children are allowed to volunteer for foreign language study those who have most readiness for it as judged by competence in their native language are most likely to choose it. Social pressures and organizational arrangements may, however, interfere with the child's perception of his readiness.

Science. The large and increasing rôle of science and technology in society has resulted in most places in a social demand for more emphasis and for more trained people in these areas. If one turns to children and to elementary teachers for the content of experience one usually finds that topics associated with animals, plants, and the weather are of greatest frequency and interest. Some argue that in order to have a science content there must be some emphasis on general principles. Science content is gradually expanding to include more content derived from astronomy, geology, electricity, and chemistry.

Social studies. The trend in curriculum content in the social studies has often been parallel to the findings of psychologists on the developing social age of a child. Thus the early emphasis is on the child's immediate environment in the
home, the school, and the neighbourhood. This advances to a study of the community and of the nation in upper grade levels. There is then increased emphasis on helping children gain an understanding of other peoples of the world, of the importance and nature of international cooperation, and of the requirements of citizenship at all levels. The trend in the organization of materials in the social studies has been toward broad fields rather than specific subjects. Experts in particular subject areas have often been uneasy about this trend.

Spelling. Spelling is a field in which there seems to be little systematic relationship between growth and the amount of time spent in teaching. It appears probable that growth in ability to spell is related to extensive reading, maturational factors, and to need for use in communication. A successively larger number of children spell a given word correctly in each grade. However, the progress does not appear to be much related to the presence or absence of the word in the formal curriculum. In one study a spurt in the year of introduction was followed by a decline to normal rate. Apparently substantial gains made in special drives as in spelling contests prove ephemeral. Perhaps the results can hardly be expected to be otherwise because of the importance of total maturation in individual differences in spelling when all children have adequate opportunity for learning.

Handwriting. Handwriting is a complex skill in which readiness and proficiency are strongly under the influence of the child's stage of maturation. Speed and quality increase rapidly between the ages of eight and eleven. To allow for the principle of developmental direction in the motor area it is customary to provide the child first with large pencils and crayons and with large sheets of paper so that he can express himself in large relatively unco-ordinated activity in scribbling and later in the more precise co-ordination involved in the formation of letters. The standard lesson materials in the various systems for instruction in handwriting start with large models and widely spaced lines and proceed toward smaller letters and narrower lines until conventional adult sizes are reached.

There are two rival plans for introducing children to handwriting: one method advocates separate letters in manuscript style; the other advocates connected letters in cursive style. About four out of five schools have swung over to the introduction of handwriting through the manuscript forms in the first and second grades. However, only about one out of five continues to teach manuscript writing in the third grade. In later grades only two or three per cent of schools continue to teach manuscript writing. The chief arguments for introducing children to manuscript as a first step are that it is easier to learn and that the letter forms also assist in reading and spelling. Some have argued that it is unwise to begin with manuscript forms because it is difficult to change to cursive forms. However, most regard this argument as unimportant. Some experimental schools have questioned the need or desirability for changing to cursive forms, since many of the advantages of manuscript writing in terms of legibility are important in later years. It is also possible to develop good speeds with manuscript writing. Individuals at times maintain both types, using the one when great legibility is desired as in labels or instructions and the other when rapidity is desired.

There is not much published literature on the extent to which handwriting tends to be under the domination of total growth. Many have assumed that practice was all that was needed to produce good handwriting in children. This is probably as erroneous in the case of handwriting as in the case of other skills. The general level of growth in the child is somewhat influential.

Art. Drawing appears as one of the first methods of communication in the child. The spontaneous drawing of children have been much studied from the point of view of content. In recent years particular attention has been given to art as a form of projection in which children turn into action various internal pressures such as anger, fear, jealousy, and love. Modern approaches to instruction avoid forcing technique on the child but encourages the teacher to strengthen technique as the child becomes ready for it. There is much emphasis on creativity. One can find adherents both for expressionism and realism and for harmonization of the two in current approaches.

Music. Music is basic in a well-rounded curriculum. The first emphasis is commonly on singing, rhythms, dramatization, and listening. These experiences are based on the child's enthusiasm for and pleasure in music. Children enjoy making music with simple instruments and in creating original songs and dances. Musical skills follow later in the sequence and for a few may attain a high level of specialization. Writers in a recent bulletin of the Association for Childhood Education have prepared an excellent summary of the field for the classroom teacher.

TELEVISION, RADIO AND OTHER AIDS

Relatively little intense psychological study has been given to the impact of radio and television on the curriculum experiences of boys and girls. The scrutiny once given to radio is now being applied to television (60). In the United States the possession of television sets in the home increased from 43 per cent in 1950 to 97 per cent in 1955. Elementary pupils frequently spend an average of about 20 hours a week in television viewing and high school students approximately 14 hours. Teachers themselves have lagged in ownership of sets in the home with an increase from 25 per cent in 1950 to 86 per cent in 1955.

Much of the literature on television seems to be
concerned with whether or not viewing is harmful or beneficial. Extreme claims in this connexion seem to be supported more by personal feelings than by evidence. When one keeps the occupational status of parents and the intelligence of pupils constant in comparisons it is difficult to make any definite relationship to scholarship. This is not surprising since individual differences in children are so much greater than the variations that could be expected due to the use of time. However, there are very real problems that worry parents and teachers such as neglect of homework, disturbances at meal time, evidences of fatigue, the values of viewing as compared to out-door play, and possible reduction in the amount of reading. An actual survey of pupils does not support the idea that they read less on the average. There has been substantial progress in the production of better programmes for children. There is some current interest in trying out the extent to which both open and closed circuit television may be used to bring instruction directly to children and to adults, to extend the range of influence of the master teacher, or to bring curriculum resources to the classroom that did not exist before. Much television content is now being recorded on film under studio conditions. The 'kinescopes' produced become an addition to audio-visual resources such as motion pictures, slides and recordings. Although many claims are made it is difficult to secure evidence of clear cut educational values from audio-visual methods that exceed those of competing methods. It is clear, however, that motion pictures, tapes, slides, and other recordings add interest and flexibility to the instructional materials available to the classroom teacher.

SUMMARY

This section has given a brief perspective on the studies that have been made to have important areas of experience included in the curriculum with methods which are effective from the point of view of the child and of society. In the section that follows there will be a consideration of learning experiences highly dependent on membership in a group.

VI. SOCIAL LEARNINGS: THE ROLE OF THE GROUP

SOCIAL LEARNINGS

One objective of education is to take children from the dependent state of infancy to the more independent state of adulthood. In schools the teacher exercises controls but relaxes them as individual children or groups can assume self-control. It is not surprising that most new and even some experienced teachers find many of the most pressing problems in the development of a desirable social situation and relationship to children. Schools properly hold that the achievement of desirable social attitudes and behaviour is an important objective of the educational process.

The process by which a child is changed from a biological unit at the time of birth to a social unit is often described as socialization. Recent research on the child emphasizes the importance of the processes in the home by which a child is nursed and weaned and by which his customs of eating and elimination become acceptable to those about him. Emphasis in the early period has shifted from specific techniques, i.e. breast feeding versus non-breast feeding, to the more general problem of climate or tone. Similarly, recent studies of the classroom emphasize the group climate as the most important factor in the child's socialization at school, the teacher as a principal agent in establishing this climate, and the inter-personal relationships as the method for establishing the process.

THE MEASUREMENT OF SOCIAL FORCES

The measurement of social forces, or sociometry, contributes to an understanding of relationships among members of a group.

Sociometric analysis attempts to find answers to questions such as these: To what extent are there children who are unhappy and withdrawn or fighting back because they are ignored or rejected by their classmates in play, work, and other associations? To what extent does their behaviour lead to their neglect and rejection? Are there warm, mutually reciprocated choices for various activities? What are the relations between boys and girls? Is there evidence of change or growth in social indexes. What steps might be taken to develop group solidarity and desirable personal feelings? Answers to such questions are sought at times through the use of a sociometric test. Such a test usually consists simply in having children indicate choices of associates for various activities.

For example, in one study, the children in the class were asked to supply three names of children from their classroom in response to each of the three following statements:

I would like best to work with these children:
I would like best to play with these children:
I would like best to have these children sit near me:

A 'social status score' can be obtained by counting the number of choices received by a child. In a class of 30 children, making 90 choices, it is usually found that some children receive no choices while others receive as many as 30. The 'isolates' and 'stars', the mutual choices, and the barriers to choice constitute some of the raw data for an understanding of the social forces of the classroom.
What can be said about the characteristics of children who are isolated and neglected or who are highly approved by their associates on the sociometric test? The factors are complex and yet sufficiently orderly to describe trends which are significant for the understanding and improvement of human relations. Detailed individual study would be necessary to understand isolates and stars as persons rather than in terms of particular factors in their behaviour.

Children categorized as chronically ill, sulky, conduct problems, bossy, new to the school, and shy, commonly secure fewer choices than the average of all children and supply more than their share of the isolates and 'neglectees'. In ascending order children described as good-natured, quiet, friendly, well adjusted, and dependable secure more choices than the average.

A school is concerned with the social and emotional growth of all and with the future of these children in the community. It is known from studies based upon interviews that the isolated and neglected child is often unhappy. Security resides in the social fabric. It is known that he may be somewhat withdrawn from the social scene or aggressively seeking the attention which is denied him. It can be inferred safely that the socially ostracized groups in our classrooms will supply more than their share of those who will be bitter against society, delinquent, and criminal. Since the process is apparent, it is obvious that corrective measures should be introduced as comprehensively and diligently as possible. These measures can be only partially under the control of schools, since the situations that become apparent in the sociometry of a classroom group are reflections of, and are partly produced by, the social structure of the community with its variations in standards of behaviour and living. It is also known that the social status of an individual in a classroom as in the community does not change rapidly even when deliberate attempts are made.

One cannot proceed to interrupt the vicious circle of 'bad family and community-conditioned behaviour - school rejection - social withdrawal or aggression - bad family and community behaviour' without a philosophy of personality and a plan. Many specific steps can be taken in particular situations for the improvement of social relations. Unpopular children deserve and commonly receive extra attention, counsel, and help in socialization from the teacher. Conferences with the parents and 'talk contacts' with the children can be useful. Classroom and home forces can sometimes be placed in operation to improve the status of isolated and rejected children. The accepted children usually have so many desirable qualities that the teacher does not worry much about them. They are a source of strength and leadership. The task is to direct these assets in desirable directions and to avoid the formation of exclusive sub-groups.

THE SOCIAL CLIMATE OF CHILDREN'S GROUPS

What are the roles that a leader or teacher may occupy and what are the effects of the type of control upon the behaviour of children in groups? Lewin, Lippitt, and White have conducted a series of studies with the general goal of obtaining an understanding of social climates or group atmospheres. In a study which may be taken as illustrative (34) four clubs were arranged with five ten-year-old boys in each. Various experimental precautions were maintained such as rotating the experience and leaders for each group and making equations for known background data. The experimental variables consisted of three types of control: authoritarian, democratic, and laissez-faire.

Under the authoritarian regime the leader determined policies, revealed steps one at a time, and made assignments for work and companions. The leader remained aloof and tended to be personal in his praise and criticism of each member.

In the democratic group, policies were determined by group discussion and decision with encouragement and assistance from the leader. The general objective or goal was revealed, and there was much freedom for choices of companions for work. The divisions of the task were left to group determination. The leader attempted to be objective in his praise and criticism and to identify himself with the group without actually doing the work.

The laissez-faire groups involved a minimum of leader participation. The leader simply supplied materials and gave information when requested. He remained a spectator unless questioned. Observations of the leadership behaviour indicated that the authoritarian person gave more orders, disrupting commands, non-constructive criticism, and personal praise and approval than the other types. The democratic leader tended to give more guiding suggestions, to stimulate self-guidance, and to give matter-of-fact recognition. In the authoritarian group the leader dispensed social recognition in praise and approval; in the democratic organization this was more a function of various members of the group. The democratic group excelled slightly in the ratio of the pronouns 'we' to 'I' in the running records. This is sometimes used as an index of 'we feeling'. More friendly remarks occurred in the democratic group and fewer expressions of discontent.

While the method by which a leader conducts a group does not wipe out individual differences among children, it has become apparent that groups organized on a democratic basis are motivated to engage in self- and group-sustained activities toward individual and group goals. Children in the laissez-faire situation tend to become dissatisfied with their lack of efficiency.
and accomplishments. Children want some clarity in purpose and plan and are dissatisfied with uncertainty and confusion. One of the errors in some interpretations of contemporary education has been to assume that laissez-faire is democracy.

**GROUP AND INDIVIDUAL FRUSTRATION IN THE CLASSROOM**

Much can be learned from the nature of the behavior ensuing from frustration by relatively simple observation of informal situations in the classroom.

In one such study the children in a first grade were seated at three round tables at lunch time with an adult at each table. The custom was to be seated only when each place was completely set. The children then said in unison, 'We are glad for our food', and sat down to eat. An experimental variation consisted in intentionally omitting a fork at one of the places. Such a minor frustration was accepted very graciously on the whole.

In a series of individual experiments an investigator said, 'I would like to have you draw two pictures for me. First you may draw anything you like'. The intent was to have a self-selected and thus highly motivated goal. The experimenter observed the child carefully and in the middle of the drawings placed a psychological barrier between the child and his goal by saying, 'This is all the time we have'. The behaviour of the child was then recorded and the child was allowed to finish.

The same procedures were followed for a second picture except that the experimenter specified, 'You may draw a picture of a house'. The intent was to have an imposed goal.

A sample record follows:

**Examiner:** 'You may draw a picture of a house'.
**Child:** picks up crayon and makes skeleton of house.

**Examiner:** 'This is all the time we have'.
**Child:** 'No! I'm not through'. (He holds tightly to the picture.)

**Examiner returns picture.**
**Child:** 'I get mad when people stop me in the middle of something'.

In summarizing the series of experiments the investigator concluded that when children were blocked the most frequent response was the desire to go forward with the activity that had been interrupted. They took the point of view, 'You can't do this to me; I am not finished yet'. The next most common response was the submissive one with the general attitude, 'Well, I don't like to be stopped, but I guess it's all right'.

The children who were better adjusted were more likely to voice their desires to finish in positive and constructive language, while those with high problem tendencies were likely to engage in a scolding type of response. In general, the more mature children tended to have more of the positive, constructive approaches and fewer of the aggressively negative approaches or the purely submissive reactions. Children rated as introverts were usually more submissive in their reactions. Poor readers had more aggressively negative and more submissive responses, while good readers were more positive in their approach. Children were more submissive when imposed goals were interfered with than when progress to self-selected goals was interrupted. This is in accord with theory, since self-selected goals have higher motivation. Many other features of frustration and aggression sequences also occurred. For example, some of the children attempted to throw the materials away or to escape by crawling under a desk.

Modern curriculum planning places a heavy emphasis on the kinds of experiences which the group supplies in social learning, in attitudes, and in social skills. If we start again with the assumption that we learn our experiences or our responses the task of the teacher is to analyse the kinds of responses that can be made in a classroom. For example, a classroom can be teacher directed or dominated. Children who do not like this pattern may be coerced in various ways into accepting it. While a large amount of individual learning may be going on in such a situation without loss to basic skills and information, it is clear that the pupil or student is learning a limited aspect of the possibilities of the group.

**CO-ACTION AND INTERACTION**

Two patterns that may be found in classroom groups are illustrated in the accompanying figure.
In the 'co-acting group', the members simultaneously responded to a direction from a leader such as the teacher. There may also be interaction between the pupil and the teacher or between two pupils under teacher supervised conditions.

In the interacting group children have an opportunity to learn more types of response since the children are encouraged to participate, to discuss with one another, and to grow in their ability to conduct themselves as effective members of a social group with a common purpose. The interacting pattern is frequently used for committee meetings and may be accompanied by some definite instructions on how to work effectively in such a group.

CHILD AND TEACHER CO-OPERATION IN PLANNING

Democracy, both as a political and economic system and as a way of life, rests on the participation of the individual in the solution of all problems that concern the group. The complexities of group living require more than goodwill for the solution of problems - there must also be experience and technique. Contemporary schools have accepted the value that children should be allowed responsibility and self-control as rapidly as, and to the extent, that they evidence a sufficient maturity for it. Such schools give children opportunities for participation in the determination of plans and in the making of choices. Such experiences are a part of a design intended to give children practice in ways of behaving in a democracy.

Co-operation. The first steps in group planning with young children are tentative and involve varying degrees of teacher domination. As children grow older they are better able to exercise the types of restraint needed in more formal organizations of a group for the co-operative solution of problems. There are numerous attempts to formulate principles of procedure. One procedure calls for the election of a chairman and a recorder, unless it is a situation in which the teacher is to be the chairman. One of the first steps is to define the purpose of the problem to be solved by group participation. Another step is the collection of suggestions. During the period of collection of suggestions it is permissible to question the member of the group who makes the suggestion, but it is inappropriate for individuals to criticize and inject personal points of view. If a number of suggestions are before the group, a preferential vote may be taken on those that should be considered and selected for group discussion. There is then an attempt to reconcile conflicts by discussion and harmonization rather than by arbitrary vote. Plans for minorities are adopted in order that group action may progress without division.

Are these techniques effective in producing changes in children? Heise (19) created five experimental and five control groups in Grades 5 to 12 in various schools. The experimental groups were given experience in the co-operative pattern. Tests were devised to measure changes in attitude toward co-operation and gains in information concerning technique. Observational and stenographic records were made so as to describe differences in children's conduct. The tests were administered at the beginning and end of the twelve weeks' training period to permit the measurement of growth. He found that there was growth on the tests from Grades 5 to 12 irrespective of instruction but that within each grade the experimental group made larger gains than the control group. The children behaved in observably different ways under the two conditions.

At the conclusion of the experiment Heise gave a test of efficiency to both groups and was disappointed to find that the group trained in co-operative techniques took somewhat longer without a higher degree of success in performing the task. The test of efficiency involved supplying omitted words in sentences in the Trabue language scale. The descriptive notes demonstrate that the groups trained in co-operation filled in the blanks with admirable self-restraint and with deference to the wishes of the various members of the group. All had an opportunity to participate in an orderly manner. However, this took time. In the control groups there was a tendency to allow some able or dominant member to proceed rapidly through the material without too much regard for the wishes of the others. The failure of this test suggests that when efficiency is the goal a democratic group should learn to delegate action to its most efficient member or members.

The unique role of co-operative technique is the determination of policy and the growth of the participants.

Perhaps nowhere is there a greater need for precise thinking than in studies of co-operation. The details of the method of conducting investigations figure heavily in limiting the generality of the conclusions that can be adopted. For example, Klugman (27) performed an experiment in which pairs of children working together on problems in arithmetic were compared with children working individually. He found that the pairs did better but took more time, since discussion, rejection, and acceptance were involved.

Competition. Man lives in a high state of dependency on his fellows. He has thus developed co-operation in government, industry, and education. Matters of common importance are agreed upon by ballot and supported through general taxation. In the great majority of cases, relationships among persons may be described as friendly and sympathetic, understanding and tolerant. The attainment of such a state requires an advanced degree of civilization and much maturity in the individual person. It is not surprising in children, therefore, that conflicts are expressed in rivalry, quarrelling, and fighting.
An important rôle of the school is to assist the child in finding better ways.

In a larger society the co-operative solution of common problems may break down, even when there is a recognition of conditional interdependence and identity of interests. At other times there seem to be irreconcilable differences in values. Thus war has been a recurring relationship among nations, and strife has been a common result of settling disputes by force, coercion, and compromise. The United Nations charter provides mechanisms for the promotion of understanding and peace.

Teachers in school recognize that children have much fun in certain types of competition - particularly if the child can choose his field and is not degraded or scolded for failure to do as well as someone else. The child who is always left to the last in a public choosing of sides for an athletic contest is not being helped in his social relations or his internal personal adjustment. Many persons who conduct games now rely on other methods of securing sides. The old-fashioned spelling match was of interest to spectators as well as to the participants who engaged in it as a self-selected activity. However, to line up and spell down children as a compulsory school exercise means that the best spellers in the class regularly receive the most practice, while those who need it are eliminated. Nor can it be claimed that the incentives provided by the contest result in general improvement. An interesting variation of the spelling contest was observed by the writer. Each child was asked to spell words taken from his own spelling list adjusted to his ability.

At various places in this report mention is made of the determination of some curriculum experiences through participation by pupils. Perhaps summary of one survey will illustrate the process and suggest others to the teacher or administration interested in trying the idea.

STUDENT PARTICIPATION IN PROVIDING CURRICULUM EXPERIENCES

When high schools in Indiana (20) have students participate in curriculum planning the most frequent area is extra-class activities. This is followed in descending order by such areas as pupil needs and interests, school policies, common needs, evaluation, community needs, plant management, using resources, school values, and work experiences. The techniques employed in descending order of frequency were: student councils, school assemblies, school publications, school committees, conferences, interviews, discussions, parent meetings, questionnaires, panels, writing for classes, suggestion boxes, community surveys, work experiences, school surveys, rating scales, check lists, study groups, records, workshops, and experiments.

DISCIPLINE AND THE CHILD-TEACHER RELATIONSHIP

As long as schools had a very narrow definition of the objectives of curriculum experiences for children any interruption or interference with these narrow goals was regarded as an infraction of discipline. Thus unquestioning obedience was the highest virtue and evidences of rebellion the greatest sin. As psychologists probed more deeply into the nature of the child, his growth, and the consequences of successful and unsuccessful experience, it was perceived that the behaviour of the child in school had a profound relationship to his motivation. Frequently his unruly behaviour was evidence of the fact that the school was not providing an opportunity for successful experience. Practice does not always take full cognizance of the fact that a constructive attack on the problem of better human relations in a group would pay positive results in the behaviour of individual children.

In some schools the custom prevails of sending children to a school officer such as the principal whenever there is an infraction of rules or a deviation from the expected conduct according to standards set up by the school or the teacher. It is interesting that one of the first effects of the introduction of a programme of child study on an in-service basis for teachers is a rapid decrease in the number of children who must be handled outside of the classroom group. When the pupils are involved in the setting of standards of behaviour, when they make agreements as a group, and when variations are regarded as an opportunity for learning, a constructive educational approach has been substituted for a punitive one.

Particularly baffling to the teacher is classroom behaviour that does not seem to be obviously related to anything in the total situation. It is disturbing to have a child fly into a temper tantrum, become naughty, kick, be tearful, reject food, and refuse to participate. These states are related in some degree to insecurity, can be understood only in the light of the child's previous experience, and can be assisted only by trying to determine what the child is seeking. New experiences may then lead toward improved behaviour rather than toward increasing maladjustment. In extreme cases specialized help may be needed from the psychologist or psychiatrist.

THE BALANCE BETWEEN INDIVIDUAL AND GROUP NEEDS

It is entirely possible for an occasional teacher with responsibility for a group to become so sensitive to the need for individual understanding as to lose sight of other current needs. There is regularly need for some reasonable leadership in the class, and there are responsibilities to others. An individual child must make some of his important adjustments by understanding the
limits that membership in a group places upon him and accepting the requirements that are set up by group living. Wisdom in teaching involves an assessment of the total needs as a basis for action.

VII. EVALUATION OF CURRICULUM EXPERIENCES

PURPOSES OF EVALUATION

Some method of appraisal, measurement, or evaluation must be used to determine whether children are growing in the directions accepted by society, curriculum planners, by the children, or by the teacher.

In experimental curriculum work an ideal design would include initial measurement followed by the curriculum experience and by another measurement to determine growth. This in turn should be followed after the lapse of a period of time by another measurement to determine the persistence of the effects. To be certain that the results were produced by the experimental curriculum materials introduced, it would also be necessary to carry a control group to determine whether ordinary living and learning would supply all of the experience that the child could utilize.

In an experimental approach to the curriculum one first determines what objectives are sought, then provides experiences reasonably related to these objectives, and then secures evidence as to whether the objectives have been accomplished.

Evaluations may be made at various levels of informality and objectivity. Observation, testimony, and a subjective appraisal often suffice. In other instances teacher-made tests, tests by outside examiners, or standardized tests are used. Experts contribute to the field of measurement by devices for quantification, by studies of the validity and reliability of the instruments, and by the construction of norms based on large and representative samples of the population.

A test made by a teacher has the virtue or potential virtue of being intimately related to the kinds of experiences that he has provided for the pupil and to the objectives that he is attempting to secure. Such tests have the limitation that there exists no way of appraising a particular teacher's goals and accomplishments against the more general goals of a larger professional or social body. The tests made by a teacher may be adequate for describing a child's position in a class, but will not tell how a particular child is growing with respect to other children in other groups.

Standardized achievement testing to be fair and useful must rest on some core of common learnings on a school-wide or nation-wide basis. To the extent that a particular school system adapts itself to the community that it serves there may be defensible variations in the achievement pattern.

One of the first mistakes made in the standardized testing movement was to assume that the average of a group of children constituted a norm or standard and that a school or teacher that did not compare favourably with this norm was not doing a good job of teaching. This point of view turned out to be a major blunder since a more complete understanding of individual differences now makes it very clear that variation is a characteristic of mankind and that deviation in many measurements, in the absence of deprivation, was not something that one cured. The problem is illustrated by the growth curves for children in an earlier section of this report.

In schools deliberately designed to be selective, of course, standardized tests may be used to determine various 'cutting edges' which are determined by the prevalent philosophy of education, the ability or willingness of society to support further education, or some ideas about the extent to which a society can absorb educated people. Needless to say in this complex world it has been increasingly difficult for selective philosophies to survive since the maximizing for each individual's potential or aspiration comes closer to democratic goals and ideals.

CLASSROOM TESTS

A number of books and manuals are now available to assist a teacher in producing improved tests. They commonly give suggestions on how to secure appropriate questions based upon the experiences provided in the classroom. The creation of a cumulative card file is a frequent device. Emphasis in recent times has often been on objective test methods, i.e. true-false, multiple choice, matching types, etc. Tests employ several levels of complexity in measuring a child's information. The first and simplest is to simply recognize the correctness of an item. It is a psychological fact that one can recognize as correct or familiar many more things than he can actually recall. Thus recall becomes another level that can be used in testing. Such tests place an obligation on memory. Still another level requires the interpretation and evaluation of information and material. In order to test the ability to apply and organize the pupil may be required to respond to essay questions of either a long- or short-answer type. Various devices can be used to improve the scoring of the various type of tests.

Two technical questions are commonly asked of every test. Is it valid? Validity has to do with whether or not an item or the total measurement is related to what it is supposed to test. The second question that standardized tests in particular must answer is 'Is it reliable?' Reliability has to do with the extent to which the same or similar test would secure the same
answer on subsequent applications without a change in conditions such as additional experiences, normal growth, etc. Other things being equal, the longer the test the more reliable it is likely to be since a broader sample of the child's knowledge is obtained. There are diminishing returns, however, and practical limitations on the amount of time that can be used.

EVALUATIVE DEVICES

A complete evaluative process is concerned with the study, interpretation, and guidance of the behaviour of children. Among the common devices employed are:

1. Behaviour scales and check lists,
2. Journal records,
3. Projective techniques,
4. Interest inventories,
5. Sociometric tests.

The foregoing devices are often plans for broadening the basis of evaluation and for carrying it beyond the types of content that can be included in either standardized or teacher constructed tests.

Behaviour scales. When persons have observed children over a period of time, they tend to form some distinct impressions, even though they have neither recorded their observations nor arranged controlled situations. Students of childhood have utilized these general impressions by the construction of rating scales for standardized reporting. It has been demonstrated that such impressions can be reliably reported under proper conditions and have a valid basis in terms of other criteria. The rating scales appear to work best when the behaviour is easily observable and requires little from the rater in terms of interpretation.

The rapidity with which data may be secured, the ease of statistical treatment, the systematic character of the record, and the substantial predictive value compensate for the limitations of ratings. As compared to journal records they have a non-flexible and preconceived frame of reference. There is a tendency to rate details in terms of overall 'halo' effect, and different observers may be easy or harsh in their standards of judgement.

Many studies of the validity and reliability of ratings have been made. Thus the ratings of teachers on the following sample from the Haggerty-Olson-Wickman Behaviour Rating Schedules give a coefficient of correlation of fifty when comparisons are made with intelligence quotients on an individual mental test:

1. How intelligent is he?
   Feeble-minded Dull Equal of Bright Brilliant
   average child on street

Journal records. To serve as a basis of thoughtful evaluation and guidance and for conference with parents, teachers are sometimes encouraged to keep a record of significant events in the life of a child as in the following example:

<table>
<thead>
<tr>
<th>INCIDENT</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Outward characteristics and accomplishments.</td>
</tr>
<tr>
<td></td>
<td>Personal and social behaviour problems.</td>
</tr>
<tr>
<td></td>
<td>Interviews with the child, parents, or others.</td>
</tr>
<tr>
<td>Explanations of incident, results of fact finding and treatment interviews, decisions, recommendations, actions, and notes on progress.</td>
<td></td>
</tr>
</tbody>
</table>

Projective tests. Most of the projective test procedures are based upon the simple observation that when persons are confronted with situations or materials capable of ambiguous or diverse interpretations, they will project on to them some of their unique personality characteristics. One of the earliest methods involved free associations with stimulus words. The unique individual associations given in response were capable of interpretation in terms of past experience. The speed or delay of response was affected by the emotional colouring. Similarly dream interpretations have projected aspects. The play of children with dolls and household equipment reveals much of the experience and attitudes of the child in the home. The concepts of projection involve the externalization of feelings, perceptions, and reactions. They are used both in informal situations and in situations which are standardized or structured to some extent. Thus the child who stated, 'When my mother gets mad at my father, she hits me', is recognizing the projection of the feeling state and the displacement of the aggression. Children in the course of their play and work activity often make up poems, write stories, and interpret pictures in terms that are obviously related to a preceding experience. Materials in seemingly endless variety have been lending themselves to use under the guiding concepts of projection. These include the writing of themes, the completion of sentences or stories, clay modelling, drawing, and finger painting. Children have been seen to project their feelings on puppets which they control and in dramatic performances which they produce.

Projective techniques thus are designed to tap the inner feelings by requiring the child to respond to some ambiguous stimulus figure, picture, or words. For example, Naeslund (38) used this method when he wished to secure some idea of the satisfaction of children with the phonetic approach to reading versus a more eclectic and meaning approach. Direct inquiry often fails to reveal the spontaneous affective colouring of responses. The exteriorization of tensions in projective techniques has served also as a basis for sophisticated therapeutic theory.

Interest inventories. Inventories of interests have been used often as a basis for deciding on the nature of the experiences that children should have in school. Thus the studies on the play interests and activities of children by Lehman and
Witty (32) established the kinds of play activities that children engaged in each age period. Such inventories have been used to appraise the developmental age of a child as in the scales developed by Fursey (16) and Sullivan (53). Thus the possession of more mature as compared to less mature interests are significant for the development of a child. The Strong interest inventory is widely used in vocational counselling.

Sociometry. As the social learnings in a group become viewed as of increasing importance, the evaluation of the status of children and of changes in their status becomes of interest. Degree of acceptance by a group seems regularly to be related to feelings of belongingness and to general trust or security. The sociometric test commonly involves some questions designed to elicit preferences for various types of activity. The choices that children make for companions thus points out the child who is popular and the one who is isolated and gives some evidences of the barriers to free communication within the social network of the group. (See Section VI for further discussion.)

STANDARDIZED ACHIEVEMENT TESTS

Standardized tests are based upon a careful study of curriculum experiences, the formulation of exercises to sample the attainment of objectives, the application of the items to large groups of children, and the description of the results in terms of averages, percentile scores, ages, and other scores. The person constructing a standard test will commonly try out many items and discard those that are not applicable or do not differentiate between abilities. A standard test is administered under conditions in which the directions and amount of time available are constant and in which there are admonitions against added instructions which might impair the comparability of results. A standard test attempts to measure the common elements in instruction under widely varying conditions in a roughly comparable culture and opportunity for schooling. At times it is difficult to reach this goal even with a common language and a similar school organization. The task becomes extremely difficult if it is desired to make comparisons across language and cultural differences.

A standard test is usually examined for both its validity (does it measure what it purports to measure), and its reliability (how accurately does it do it), before publication and distribution.

Standardized tests have now been produced in large numbers and are widely used for describing the progress of individual children, a grade, or a school system. The individual growth curves in reading as given in an earlier section of this document were prepared by testing children twice a year in the early period on the Gates Reading Tests and in the later period by the Stanford Achievement Tests.

The results of standard tests can be used to plan the curriculum materials for a class. For example, the writer once witnessed a teacher attempting to use a fifth grade book on a fifth grade class made up of children who tested at fourth grade level. A simple adjustment to the level of the class increased the prospects of success and growth. However, within each class, the extremes are so great that thought must be given to the needs of both the gifted and the slow.

Some tests are diagnostic in the sense that they yield several scores instead of one. Thus a reading score may have elements of speed, vocabulary, and comprehension. Arithmetic may be broken down into computation and problem solving. A diagnostic test may give a teacher a clue as to where to start with the instruction of a child or group.

In the absence of actual deprivation of experiences, standardized tests results are less responsive to remediation, extra time, special methods, etc. than was once believed. The averages cannot be accepted as goals of attainment for all children and under all conditions. They cannot properly be used to evaluate the efficiency of a teacher.

In the light of our present knowledge of development the standard tests give descriptions of level and growth which can be helpful in understanding children and the educational process. Then results will be affected by individual differences in maturation in children, by sex, by socio-economic background, by motivation, and other factors. Since the standard tests emphasize common factors other instruments are needed to describe those which are unique to a given time and place.

SCHOOL MARKS

School marks are a common way of registering a judgement concerning a child's achievement for reporting to the pupil or parents. With the increase of knowledge of the development of children and of the importance of interpersonal relationships there has been a tendency to lessen emphasis on the use of comparative marks. This is particularly true in the period of compulsory or customary school attendance. There is no evidence that 'marking' growth serves to change it.

Objectives of marking systems. The general purpose of reporting is to convey information concerning the status and progress of a child to those who have responsibility for him. In the course of time this responsibility shifts in some measure to the child himself. Reports are usually made on the objectives which a school is expected to attain. At times the marking system itself is used, probably improperly, to serve as an incentive toward the attainment of objectives. Under most plans for marking, some competitive elements creep in and at times teachers deliberately use them on the theory that they stimulate study. This extrinsic type of motivation is frowned upon as ineffective by most investigators of learning and
growth. Marks tend to remain the same with monotonous regularity through the years, except for idiosyncrasies of particular teachers and for variations in the pattern of relative strength and weakness in a given pupil. Since marks tend to be relative to the group, they are not capable of registering growth and therefore do not constitute a desirable motivating influence.

Marks are also commonly used as guidance information as a part of a system of records in the administrative office and, as such, may at times furnish a basis for the classification of pupils, promotion, honours, and reporting in case of a transfer to other schools. To the extent that the contemporary school emphasizes co-operation as a pattern for democratic living, competitive marks are out of place. When groups of children are working together to achieve common purposes in accord with their capacity, a discordant element is injected by marks awarded on a competitive basis. The purely mechanical phases of marking and of informing parents about minimum accomplishments are more important if one believes that children are to fail of promotion, to be held back, and to be discouraged from further attempts.

Traditional plans for marking. Teacher judgement based upon a synthesis of observations and other evidence of performance and products is the common basis for marking plans in most subjects in elementary schools. Informal tests and standardized tests may also be used as evidence and add to the objectivity of the process.

Under most plans of marking, the highest performance is awarded a high numerical or letter grade and the poorest performance is awarded a low numerical mark or letter grade. The marks a child achieves are thus relative to the distribution of abilities in the group of which he is a part. Sometimes a school system recommends the percentage frequency for each mark in order to standardize subjective factors in teachers.

Some have argued that there should be absolute standards based upon the attainment of specific goals. In examinations and exercises that can be marked on a percentage basis, some plans have set up percentage values. One difficulty with this method is that the percentage of success depends pretty largely on whether the examination is an easy or a difficult one.

It has been proposed that a child's progress relative to the status at which he started should be the basis for marking. Under this system the least able individual in a class might thus secure a high grade or be marked satisfactory. The difficulty with this point of view is that no one can be too certain about the factors that have produced the growth. It is probably beyond the technical competence of any teacher or research worker at the present time to describe accurately 'capacity for achievement'. It is clear that life age and mental age are not an adequate description of capacity. Reference has been made to this problem in earlier sections.

The extent to which the quality called 'effort' is subject to alterations in motivation and habituation and the extent to which it is a problem of energy production or some other attribute of the organism is not at all clear. It would appear that solutions calling for marking in relation to capacity are difficult of attainment in practical situations, even if they are wise. The plan also adds to the confusion concerning the meaning of a mark.

The meaning of a mark is further confused, on either a relative or an absolute basis, by the fact that a given child classified in a third grade with a given ability will receive a better mark than if he is classified in a fourth grade when more is demanded. The child is the same - the difference is only one of policy in the classification of pupils.

Research based on the traditional conception of the purpose of marks and of the achievement of these purposes through the marking system tends to raise questions concerning the extent to which teacher's marks are reliable and valid. Different papers may be scored by different teachers and the wide variation of marks noted. Research is often done on inadequacies of marks resulting from the subjectivity of teacher's standards or from a tendency to include a variety of things other than the achievement to which the marks supposedly apply.

Competitive marks have been found to promote dishonesty and other undesirable traits in children. When motivation to secure good marks is emphasized, the children exercise the kind of adaptive behaviour needed to achieve the goal. Finding limitations in themselves and their resources, they adapt by deception in their school work. Students in schools having a good classroom atmosphere are more honest in character tests than those in rigid ones. Further evidence of the corrupting influences of marks comes to light in individual instances where pupils erase and insert new marks, forge their parents' signatures, conveniently 'lose' a report, or lie about the marks they have received.

The threats to security in classroom relationships received through the marking system are often augmented by loss of approval and affection in the home. For example, a conflict arises when the parent offers a cash reward for work of a certain quality when it is inevitable that the child will fall below this quality. Bad emotional consequences occur when the parent physically or verbally punishes the child for low achievement. These issues are so real that it is not unknown for a number of children to cry at the time the marks are distributed.

Marks have undesirable effects on children of high achievement as well as those who achieve poorly. There is danger that priggishness and attitudes which operate to the personal disadvantages of the child may result from his being constantly told of his superiority to other children.

It has been argued that marks are analogous to
the rewards of everyday life and that a realistic approach emphasizes and utilizes the competitive character of marks as a means of simulating life conditions. The validity of the parallelism is highly doubtful. True, differentiation into work of varying levels of complexity and economic reward occur in the adjustment of the person to life situations. This, however, is an inevitable consequence of the interplay of person and culture. In the process of that interplay, the person is informed concerning the opportunities of realizing his purposes in accord with his potentialities by the degree of his success. Similarly, in the school situation, a child is constantly being informed by day-to-day experience concerning his abilities. It is not a necessary consequence that a social judgement of inferiority be passed upon him because of the direction and quality of his behaviour. To tie values in living to a set of conventional marks or to economic rewards seems a distortion of reality.

Public relations. If one makes a systematic study of the attitudes of the pupils toward school, one quickly finds poor attitudes on the part of children who have been receiving low marks. It is possible that this attitude persists when these children become adults and the school tries to get their support in the educational programme. Parents sometimes ascribe low marks to the inefficiency of the instructional process in the school and are unwilling, or unable, to appreciate the extent to which the child is a determining factor. To tell a parent year after year that his child is inferior creates an attitude of doubtful value for educational programmes.

Transitional solutions. A number of constructive suggestions are appearing for the maintenance of such guidance values as inhere in marks and for the elimination of the misconceptions and misuses which have crept in because of an over-interpretation or inadequate understanding of the services they can perform. In the first place, it has been pointed out that the administrative function of marks, to the extent that they are valuable and valid, may be preserved without using the marks as a means for reporting to the child and parent. All that is necessary to make this shift is to have marks or similar appraisals filed in the school office for administrative purposes.

Those who believe in the value of formal reports to child and parent at stated intervals in terms of marks have recently been adopting what the writer would term 'transitional' report cards at a rapid rate. The typical 'transitional' report card uses some type of grading or marking for the usual areas, plus evaluation of new objectives in citizenship and health, or qualities such as cooperation, punctuality, courtesy, and other traits. Often the general qualities are made more specific by accompanying them with trait descriptions representing various levels of attainment. Many of the report forms also include space and standardized questions for reports from the parents to the school.

Dissatisfaction with formal reports has led a number of schools to employ a narrative letter which offers a flexible opportunity for comments on growth and for suggestions for improvement. The problems requiring really extended discussion for mutual understanding on part of parent and teacher are then covered by conferences rather than by routine reports.

Conference method of reporting. The advantages of the conference method may be enumerated as follows: (1) The growth of the individual child may be stressed rather than a comparison with other children. The incongruity between the modern knowledge of growth and the traditional competitive and comparative systems resting on a philosophy of selection is thus avoided. (2) The teacher and school maintain a systematic contact and an educational process with the parent instead of attempting to solve problems on an individual, incidental, or complaint basis. (3) A series of interviews supplies the teacher with the corrective of parent values, enables him to adjust the treatment of both the group and individual children in terms of these values, and lets him introduce other objectives for consideration. (4) The method has a maximum of flexibility and individuality. (5) Teachers are relieved of the 'busy work' involved in much marking, posting of marks, and reporting. (6) The teacher receives the tonic of contact with parents who are highly pleased, to offset those who are disgruntled and who, through their greater initiative, may distort the picture.

Under conference plans, the child is informed about his progress largely by the realities of the activities in which he is engaged. He may also be involved in some self-appraisal.

When conference methods are employed the teacher may keep a record on some type of journal form which becomes a part of a cumulative file for a child. This file offers excellent material for case study.

THE CASE STUDY

The factors involved in the progress and problems of a particular child are usually complex. To understand the impact of experiences on a particular child one needs to make an individual study. The case method, common among specialists, is also a useful device for the teacher, or for the teacher in co-operation with other persons in contact with a given child. Case study is an instructive method for staff meetings with different persons reporting aspects of the data, engaging in discussion, and arriving at conclusions. Cases may be analysed and treated at many levels of sophistication. The following simple outline has provided a helpful beginning for many:

I. Introductory Statement
   A. Why and how the child was selected for study
   B. Identifying data - name, sex, age, date
C. The setting in which the child was studied - group, classroom, home

II. Developmental Background
A. Physical growth and health history
B. Mental growth and educational achievement
C. Behaviour data
   1. Observations and ratings
   2. Journal records
D. Emotional or affective data
   1. Observation
   2. Interview
   3. 'Projective' data

III. Environmental Factors
1. Home, family, and neighbourhood
2. School and classroom

IV. Hypotheses and Recommendations for Treatment, Education, or Future Plans

V. Treatment
A. Environmental
B. Personal

VI. Results and Follow-up

VIII. SCHOOL ORGANIZATION AND THE CURRICULUM

PURPOSES SERVED BY ORGANIZATION

Some structure is needed in a school in order to relate opportunities for curriculum experiences to the children to be educated. In the present section there will be a brief characterization of the light thrown on some problems of organization by psychological studies.

Some of the recurring problems are: When should school begin? How should children be inducted? How should children be classified? What is the optimum size for a class? What counselling is needed to relate children to the available opportunities?

EFFECTS OF AGE OF ENTRANCE TO SCHOOL

Maturation appears to be a dominant factor in the rate of growth of children and it is very difficult to secure special effects by bringing training to bear unless children are actually deprived of opportunity to gain the necessary nurture or experience.

Both parents and professional people at times have hoped or assumed that attendance at nursery school or kindergarten would somehow be influential either in altering a child's general ability or in assisting him to achieve greater success in subsequent years of school. The evidence is fairly clear that there are no special intellectual or growth effects attributable to attendance at nursery school and kindergarten for children who have adequate nurture in homes. Investigators have occasionally and general observers have often been misled by the tendency of nursery school and kindergarten children to be a somewhat select group as compared to random samples of children of their age. They bring more to the nursery school and kindergarten, and their superiority is maintained in the subsequent years. Some changes in IQ. have been found when children are tested immediately before and after admission to school. These are thought to be adjustment rather than growth gains because of the rapidity with which they occur.

At times there is a substantial pressure to admit children very early to the first grade of the school system. If such children are a random sample rather than one for whom entrance is being pushed because of some type of superiority the question arises whether six years of schooling will offset the initial deficit they have by being younger and less mature on the average. Such systematic studies as have been made demonstrate that, other things being equal, the young child cannot make up his deficit of months or years by entering early and attending for a standard period. His achievements will be less than those of an older group with equal capacity. In one such comparison it was found (King, 26) that a younger group as compared with an older group with a nine months difference in start in the first grade was unable to make up the deficit in six years. The younger group was characterized by lower achievement, more retention in grades, poorer attendance, and more frequent difficulties in personal and social adjustment. This was the finding in spite of the fact that the study was made in a school system and under conditions which emphasized adjustment to individual differences.

Evidence of the preceding type is mounting. A number of studies of acceleration indicate that superior children do very well when admitted early or when extra promoted. Unfortunately rigid experimental designs are impossible since a child cannot be his own control and the separation of identical twins for experimental studies represents a social impossibility.

The case for nursery schools, kindergartens, and early school entrance should be based on the satisfying experiences that can be provided rather than any intention of forcing the maturation and developmental process.

INTRODUCING THE CHILD TO SCHOOL

The shift from home to school is at times a severe test for the less mature or more socially inexperienced members of a group. The observational and clinical data on symptoms of difficulties of adjustment have led to a number of beneficial practices. Many schools now have handbooks to acquaint the parent with what to expect and to suggest some preparatory experiences for the child. An exploratory visit may be arranged
for orientation and there may be a conference between mother and teacher to ease the transition. Schools have found it advantageous to distribute the arrival of new children over a few days.

CLASSIFICATION FOR INSTRUCTION

It is significant that no one has been able to give a single clear cut answer on the ideal method of grouping children for purposes of instruction. Chronological age and length of school attendance continues to be the most common basis. Practice has swung in the direction of providing continuous opportunities for experiences adjusted to individual rates of development without failure and repetition of grades. Probably no large scale statistic can be supplied that in and of itself would argue for acceleration, retention, or automatic promotion. The absence of such a statistic in itself clears the way for practices based on judgement involving what is best for an individual child. In mass education it would be helpful to have some whole-sale policy which could be supported, but such is not the case. It is entirely proper, therefore, for educational administrators to allow experimentation with different practices and to allow variations in terms of an individual child's need.

Bases for grouping. In order to operate a school with some division of labour among the teaching staff it is usually found desirable to divide the child population into groups of convenient size. Most curriculum planning has been based on some vague idea of a 'grade', and this has had a rough counterpart in the age and development of the children. The surveys of achievement demonstrate that no matter how children are grouped they still learn in accordance with their individual abilities. Teachers should not expect results markedly different in areas of common experience if all six grades are in one room as in rural schools, if there is a double grade in a room, one grade in a room, or half a grade in a room. A new unit often opens up experiences which are qualitatively different as in the consolidation of rural schools. To date research has centred more on progress in common experiences than on differential results from contrasted opportunities such as would be provided by shops, home making laboratories, and enrichment in art and music.

Knight (28) studied double grades in the New Haven schools. He found that differences were small and inconstant in direction between the fourth grade taught separately or combined with the grades above or below. Double grades appeared to promote acceleration and reduce retardation. Only 1 per cent of the children reported a dislike for the double grades. Principals did not like them, and teachers felt that they worked harder with double grades and preferred single ones.

Experience suggests that one of the difficulties with double grades is interpretation to parents. The idea of a fixed content by grades is so widespread that there is always the question of how the teacher can teach two grades as well as one. Even when the economic or administrative necessity is understood, parents may still wonder whether their children are in some degree deprived. When classes are split so as to combine one half with a lower grade and another half with an upper grade, one may expect substantial dissatisfaction among the parents of the children combined with the lower group. In such a case the school is dealing with factors of prestige and association among parents as well as ties that have been formed and may now be severed between children.

One of the simple administrative adjustments once proposed to increase flexibility and reduce failure was that children should be grouped by half years with semi-annual promotions. Attempts to demonstrate the effectiveness of semi-annual promotion in terms of producing greater homogeneity of children, greater learning, or more satisfactory values for teachers have regularly failed. It could hardly be otherwise in terms of the known facts concerning the wide variation in human capacity, the individuality of growth, and the ineffectiveness of special methods of classification. While semi-annual programmes appear to be unrelated to the progress of children, they are somewhat of a nuisance to teachers and administrators in that extra reports and unprofitable book-keeping of various kinds may be required. These handicaps have caused a number of cities to revert to annual promotion plans. Such a change has been simple if the natural reluctance of parents to see their child demoted by even a half grade is taken into account. A smooth adjustment usually occurs if the mid-year entrance or promotion is first dropped in the kindergarten and first grade, and the practice is then continued as these and succeeding groups move through the school.

There appears to be a very persistent belief that many instructional problems would be solved if one could only put together the children who are alike with respect to the subject of instruction. It seems probable that this type of thinking persists because schools historically have been dominated by the data of curriculum construction and teaching methods rather than the evidence on growth. It will not be profitable to review here many reports of the generally unsuccessful attempts to stimulate the growth of children in school subjects by various schemes for grouping. Special classes for exceptional children can be defended at times on the basis of convenience and enrichment.

There is a strong present trend in the United States of America (33) for a child to remain with a group in which he is a good physical and social fit and to adjust the work within the grade to his needs.

The claim is heard sometimes that the assurance
that every child will pass makes for a lower quality of work. Otto and Melby (42) put this claim to a test by arranging for experimental and control groups at the second- and fifth-grade levels. The children in the experimental group were told at the beginning of the semester that all would go to the following grade the next term. The children in the control group were reminded throughout the semester that they must do good work or suffer non-promotion. The gain in educational age actually favoured the experimental group somewhat, although the differences were too small to be of statistical significance. Reports from the teachers suggested that they could not note much difference in the application of the children under the two systems.

The claim that regular promotions increase the variability of classes, lower average achievement, and reduce incentive is not supported by the evidence. Cook (9) contrasted nine systems that approached automatic promotions with nine that maintained rigorous standards. There was a matching for size, general socioeconomic status, and professional qualifications of teachers. Naturally the one who failed many children had high proportions of over-age and slow pupils. No significant difference was found in the achievement of pupils of the same chronological and mental ages in the two groups. Retardation was not successful in making groups more homogeneous. Contrary to some initial expectancy the groups with a high degree of retardation were below average in mental ages and achievement ages. If, instead of studying practices of different systems, one were to simply remove the poorest achievers in a given school and place them in lower grades, the net effect should be a slightly higher achievement in the various grades. This would be an arbitrary difference, however, for it could not be demonstrated that the achievement of the children had been changed or would improve.

Under a liberal promotion policy, children of relatively low ability enter secondary schools which may not always be prepared to accept and make provisions for them. The slow-growing child may appear a nuisance to persons dominated by the content and selective point of view. The claim that the students who come poorly prepared to high school are so because of inferior teaching in the lower grades is untenable. Major curriculum adjustments are needed at secondary levels to meet the needs of children under a philosophy of education for all who can profit. The long-time careers of late maturing children reveal a thought provoking fact. By and large, and on the average, they took a somewhat longer time to complete their educational programmes. This often happened by a clinical adjustment within the elementary period and sometimes by taking a somewhat longer time to meet the requirements of the secondary and college period. For his own comfort a slowly growing child should at times probably take a year longer to finish an elementary school and a child who is generally accelerated in his social, emotional, physical, and intellectual growth can make a gain of modest amount without jeopardy to his status in the group or to his total growth. The evidence does not justify broad generalizations or a particular plan, but leaves the way open for individual adjustments.

**DESIRABLE SIZE OF CLASS**

Is there a desirable size for a class of young children? As a general rule teachers prefer relatively small classes to large classes. No doubt the small class makes fewer demands for administrative skill and is less tiring for the teacher. Administrators have tended to point to an earlier literature which demonstrated rather conclusively that, for areas common to all programmes and in the formal subjects, achievement test results were about the same irrespective of class size. Since it is cheaper to have large classes, the burden of proof was placed on those who advocated the small classes. If the same things are done in both large and small classes, or if the evaluation of results is restricted to the things they have in common, equivalence would be all that could be expected. The claims for smaller classes have often been in terms of subjective values for which simple appraisal instruments have not been devised.

**Class size and interpersonal relationships.** If a classroom is being handled as a simple coacting group, the addition of one person adds but one unit of relationship, i.e., that with the leader or the teacher. If, however, the classroom is an interacting group in which flexibility and social learning are being emphasized, the addition of one person counts for the addition of a series of relationships as numerous as the members who already make up the group.

The general formula for the number of the possible paired relationships is:

\[ x = \frac{y^2 - y}{2} \]

- \( x \) = number of paired relationships
- \( y \) = number of persons in the group

For example, if ten has been set as a good number for a nursery school group there will be 45 combinations of interpersonal relationships among pairs. If one child is added, the number of such relationships will jump to 55. If 25 has been set as the size for a kindergarten group, there will be a possibility of 300 paired relationships. An addition of five children to make a class of 30 produces 135 additional possibilities of pairs for a total of 435. There are also other possibilities of relationships by three's, four's, etc. The geometric character of increase in interpersonal relationships with class size thus becomes even more impressive.

**Class size, information, and participation.** It is clear that each child in a small group has a
better chance to participate than in large group. Dawe (10), in a study of kindergarten children, attempted to go beyond the relationship of the acquisition of information and the size of class to an evaluation of amount of participation. The eighteen groups varied in size from 15 to 46 children. A story was read to the children on one day, and they were tested for recall on the next day. Size of class had no regular or important relationship to the amount of recall. On the other hand, it had an important relationship to the amount of individual participation. The average number of remarks per child of seven in a class of 14 dropped to about one in a class of 46. What are the long-range effects of such a contrast in participation on satisfaction, confidence, and facility in discussion? Although research is silent, experience in participation seems an important objective.

Class size and adaptability. Newell (40) has reported that a small size of class is associated with a group of factors that make for educational invention, the early introduction of innovations of promise, and the diffusion of accepted modern practices. He pointed out that a lapse of from 25 to 50 years is not unusual between the recognition of a need and the experimental introduction of an answer. A lapse of another 50 years is not uncommon from the time of first introduction to complete diffusion of an idea.

Newell applied a check list of practices and searched for innovations in schools and communities contrasted in terms of average size of elementary classes. He concluded that there was a significant relationship between invention, or the early versus the late introduction of a practice, and class size. Since small classes appeared to be highly useful in accelerating a diffusion process, he recommended that there should be some at least in every school system with a plan for sharing results. He points out that the relationships are less marked than they would otherwise be, since the teacher is such an important factor in invention. Variability among teachers is so great that class size itself can never be a complete explanation. Other things being equal, however, the teacher has more time and energy for creative work in the small than in the large class.

Class size and the teacher. Teacher opinion on a desirable size of class in the elementary grades frequently centres about the figure 25 to 30. Smaller groups may be subject to domination by individuals and cliques. Larger groups often run into difficulties of size of room and ability to carry on particular programmes with the available facilities. Differences among the children are so much more important than the size of the class that achievement in the more academic areas seems to go on irrespective of size.

Although there is much unanimity among members of the profession that small classes are highly important for the best education, there is an extreme paucity of data about the advantages that are expected to accrue. Spitzer (52) has recently summarized the claims for small classes as follows:

1. The teacher's ability to give more time to individual pupils results in superior achievement by the pupils.
2. The fact that the task of teaching is less difficult makes for higher morale of teachers, which again contributes to a better instructional situation for pupils.
3. The routine teaching activities do not take an undue proportion of time.
4. A less formal instructional programme is possible when classes are small.

Surveys of the achievement of pupils in small and large classes find little regularity between the size of classes and the accomplishment of the pupils. Rather regularly the same finding is discovered that the pupils in small classes have no advantage over those in large classes in acquiring the kinds of achievement tested by standardized tests. There is a great need at the present time for research on the unique outcomes that can be attributed to membership in a small class.

There are probably a number of devices that can be used to enable a teacher to live comfortably with a large class. Among the suggestions proposed by Spitzer are:

1. A wealth of instructional material should be supplied teachers.
2. The number of preparations required of teachers should be lowered.
3. Time off from instruction during the day should be given to enable teachers to prepare for the instruction of large classes, especially the preparation of specific materials for the gifted pupils and the slow pupils.
4. Adequate secretarial assistance should be provided for teachers.

Current research in the United States of America is attempting to study the effects on educational outcomes of providing a teacher aide in a large class and of making greater use of closed circuit television, audio-visual materials, recordings, and other adjuncts to instruction.

COUNSELLING AND GUIDANCE AND THE CURRICULUM

As schools have become aware of the range of individual and social needs specialized staff members have often been employed to work with pupils, parents, and teachers. They bear various names such as school psychologist, counsellor, director of pupil personnel, etc. depending on the function that is stressed.

The contemporary comprehensive secondary school frequently offers to adolescent youth a bewildering variety of opportunities. These have been created out of the needs of society and in an attempt to meet the varied capacities and
interests of students. To assist the student in knowing the whole range of opportunities and in relating these to his specific interests and capacities there has been increased emphasis on counselling and guidance services. These may be of a group character as in a course on occupations or may be highly individualized as in a study of a person's assets and the relation of these to the requirements of various vocations. However, the distribution of children into occupations and into future educational activities concerned with future vocational goals is but one aspect of the problem of guidance. Pervasive in all operations of schools is the adjustment of the child to himself, to his family, and to his peers. The counsellor in increasing measure individualizes many areas of experience by the kinds of materials he has available to supply further insights into the problems of home and family living, into the needs of occupations, and in the area of human relations. In the United States of America extensive materials of this type have been prepared in pamphlet form for ready use.

In a school with well organized counselling and guidance services one frequently finds also an active interest in following up the graduates of the institution to determine the degree of their subsequent success, and their opinions of the values and limitations of the experiences that they have had. Thus there is both evaluation and a survey of needs which may affect the curriculum plan.

School counsellors frequently give much attention to the reasons why children drop out of school. School leaving is often associated with low classroom performance, with the repetition of grades and with the membership in a social group that does not value continued education. When Kuhlen and Collister (30) followed up a group of children who had had sociometric tests at the sixth and ninth grade levels they found that the children who had dropped out before graduation were shy, withdrawing, unhappy, socially inept, and somewhat maladjusted. In states with compulsory education the problems of school leaving are often complicated by problems of truancy (illegal absence) or by delinquency. Work with 'drop-outs' or potential drop-outs often requires a consideration of co-operative programmes with business and trades. Problems of counselling and guidance are multiplied as the schools attempt more nearly to meet all of the needs of all of the children of all of the people. Most persons agree that these efforts are warranted.
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