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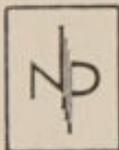
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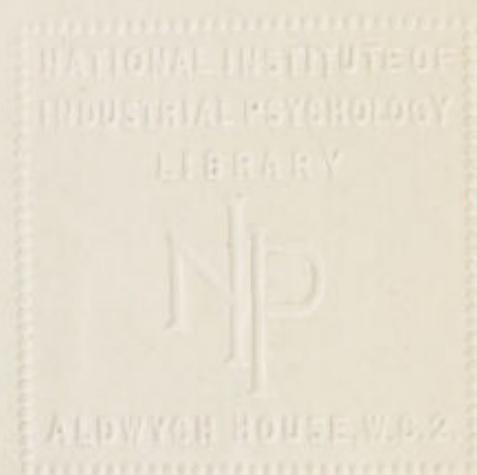
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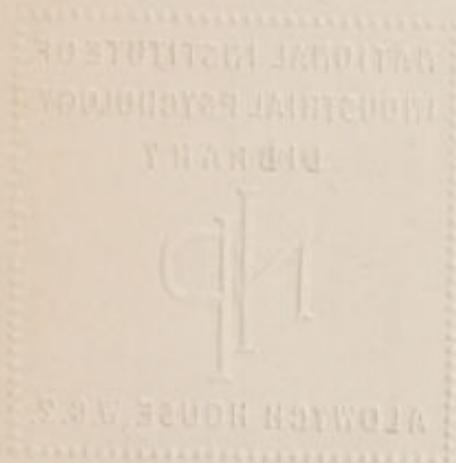
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PSYCHOLOGY AND THE NEW EDUCATION

By S. L. Pressey



PSYCHOLOGY AND THE NEW EDUCATION

BY

S. L. PRESSEY

*Professor of Educational Psychology
The Ohio State University*



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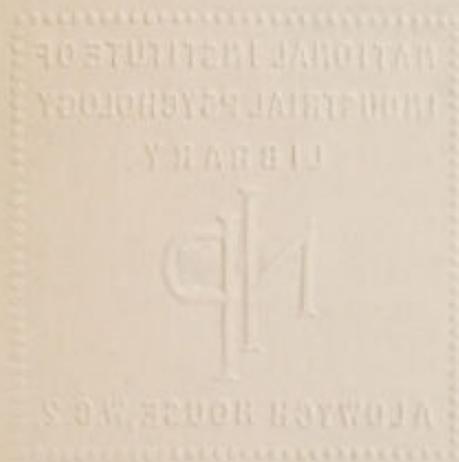
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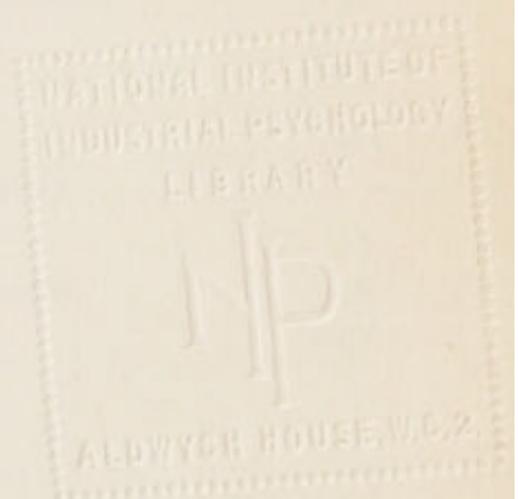
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PREFACE

THIS volume might be called an experiment in subject matter. It is an attempt at a sweeping reorganization of the usual treatment of educational psychology. The aim has been not so much at a systematic presentation of psychological data and theory as at maximal usefulness in contributing to the understanding of educational problems. In consonance with this aim, the usual arrangement of topics has been departed from whenever such a step seemed desirable. Certain topics and much data common to texts in the field have been omitted. Much material not hitherto readily available for use in teacher training has been added.

Entire chapters largely new to this subject have been introduced. Thus a chapter on the social psychology of the school years aims to combine modern work in social psychology and child study so as to bring out the importance of the child's social development throughout the school period. Modern studies of play, of reading and "movie" interests, of motivation and incentive, are brought together to give an interpretation of psychological dynamics which should have multiple educational applications. Physical growth is treated not merely as physiological background; rather there is emphasis upon growing as a psychological experience and upon the manifold ways in which a child's physique and physical maturity affect his place in "child society." Similarly, there is emphasis on the subtle ways in which a youngster's health may affect the development of

his personality and the direction of his interests. A chapter on the study of the individual child tries to bring together all this various material, in such a form that the teacher will see not merely traits but individual, living children. Finally, a chapter on general training attempts to go from the work on transfer to a consideration of the development of methods of work, character traits, attitudes, æsthetic sensitivities, and thinking.

Conventional in name, but hardly so in treatment, is a discussion of emotion in which emotional stress is presented as evidence (like fever in physical disease) of some difficulty of adjustment which the teacher must diagnose and remedy. The discussion of memory stresses modern work on the permanence of school learning over considerable periods of time, and the effects of schooling on attitudes, prejudices, and interests.

Not only is there gross reorganization of the material in order to make the treatment more practical and functional for teacher training, but, throughout, this practical and functional point of view markedly affects the selection of material. The discussion of learning begins not with the escape of cats from a box, but with a "field study" of children cooperating in the solving of a puzzle. The learning curves show progress in school subjects. And the forgetting curves show forgetting not of nonsense syllables, but of arithmetic, history, chemistry. The writer does not question the value of animal experimentation or work in the psychological laboratory. But he feels that educational psychology should deal with children, and the learning of school materials, in school; he feels also that the subject has now progressed far enough that it can develop its topics

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is responsible for what each child becomes. And the school can make a child or break him, bring him happiness or utter misery. Throughout the volume the writer has tried to arouse in the reader an appreciation of the teacher's responsibility, and of her marvelous opportunities.

Much use is made of illustrative incidents and anecdotes. And the reader is frequently asked to recall, from his own experience, illustrations of the point under discussion (the instructor will find written assignments along this line to yield much fascinating material). Such anecdotes and reminiscences should make the material more interesting. They should aid in applicational transfer, so that the student may make some use of his educational psychology when he begins teaching.

But there is a still more important purpose, fundamental to the entire treatment. It is the hope that this concrete material may make the reader see, behind each generalization—children. At least the reader's reminiscences of his or her own childhood will, it is hoped, show that the book aims not to give a cold knowledge about pupils but rather a warm, sympathetic understanding of teachers and children and the things they do together. The writer has much sympathy with his friends in progressive education when they complain that educational psychology tends to mechanize and dehumanize education. By such illustrative devices, by such broadening of the treatment as has already been mentioned, by the general attitude throughout, he has tried to avoid this criticism, and to develop a sensitivity to child problems and an enthusiasm for the teacher's art.

Certain obligations remain to be mentioned. The writer wishes, first of all, to acknowledge his debt to Dr. H. B.

English for the careful reading of the manuscript, and for many valuable suggestions. He is also obligated to the members of some seventeen committees on which he has served in the revision of the curriculum of the College of Education at the Ohio State University, and in particular to Doctors H. B. Alberty, R. D. Bennett, W. W. Charters, H. G. Good, and W. G. Reeder, of the Committee on Required Professional Courses, with whom he has worked on the application of curricular techniques to these courses. He has tried to coordinate the volume with the best thinking in the various fields of teacher training, and in certain respects it is a product of the efforts and tribulations of this committee. Most of all he is indebted to the graduate students who have, during the past ten years, carried on research with him on problems of professional education; the book is primarily the product of this ten-year program aiming at the development of a course in educational psychology which should be founded on educational experimentation and exemplify the principles which it teaches.

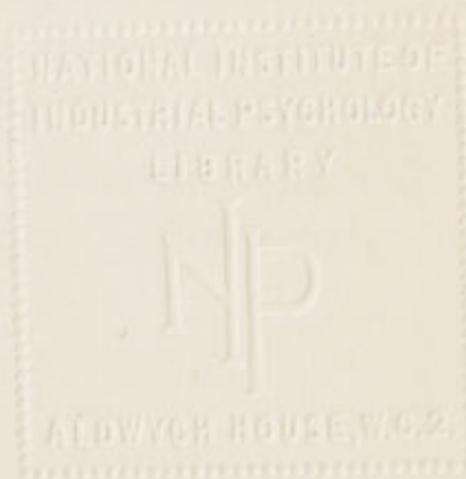
May, 1933

Sidney L. Pressey

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CHAPTER I

PSYCHOLOGY AND THE EDUCATIONAL CRISIS

IT MIGHT well be said that the distinctive development in the field of psychology during the past fifteen years has been this: psychology is being humanized. Instead of busying themselves almost exclusively with the study of mental states or reflexes, psychologists are giving major consideration to problems of human welfare and happiness. A confusing richness of such material has appeared in educational psychology and related fields. It is the purpose of this volume to bring together this matter in a form readily available for service to teachers.

In accordance with this plan, the usual rather close systematic organization of material on the subject has been abandoned in favor of an organization which is more topical with reference to teachers' problems. And the volume has been divided into two parts, the first dealing with development during the school years, and the second with learning. It is important, if the treatment is to be of maximal value to the reader, that the simple and straightforward organization, and the general point of view, should first be got clearly in mind.

DEVELOPMENT DURING THE SCHOOL YEARS

Part I begins with a discussion of problems of physical growth and health as they affect a youngster's intellectual and characterological development. Then follows consid-

eration of children's interests, the very important but decidedly neglected topic of the child's social life, problems of emotional adjustment arising throughout childhood and adolescence, and problems involved in the development of intellectual efficiency. Every bit of the material has been chosen for its possible helpfulness in dealing with common educational problems. The last chapter of this section aims to bring all this material together, so that the reader may obtain some conception of the total richness and infinite variety of development as manifested in individual children.

The limitations as well as the range of the treatment should be made clear. The major treatment deals only with the school years. The very important pre-school period is touched upon only as the origins of various problems of adjustment must be sought in these early years. And there is only an incidental following through of high school problems into college and adult life. The writer would consider this last omission the more serious. But for practical purposes it seems necessary to confine the major discussion to problems of the public school pupil—that is, the development from about six to about eighteen.

Some discussion of development through college and into adult life would be desirable both for completeness and for the possible orientation of the reader with reference to difficulties he may himself then encounter. For many young people the college years present serious problems. If the student goes away to college, this may be the first experience away from home for any length of time; freshmen are often far more miserably homesick than first-grade children on the first day. College society is likely to be more sophisticated and more competitive than the social life at home; serious dif-

difficulties of adjustment may here arise. Ideas are met which disturb religious and moral attitudes, and perhaps even question the present economic and social order. . . . Multitudinous difficult adjustments usually need to be made during the individual's first year of work. And development does not stop with the reaching of adulthood; throughout adult life there are continuing psychological changes and developments of certain sorts, even into the decline of old age. The school should see the sweep of the total process in perspective; it might do much to avert later crises. But, strangely enough, so little is now known about normal adult life that any such treatment is now impossible.¹

In particular, there is needed a psychology of the teacher. For one thing, teachers are such important influences in pupil development that consideration of the psychology of the teacher is a needful complement to the study of the psychology of the pupil. But teachers need such material for their own help. Certainly the young teacher is often a very different person at the end of her first year of teaching from what she was at the beginning. Adjustment to certain other teachers, and to principal and superintendent, may not have been easy. There may be a most unfortunate professional disillusionment. And if she remains in teaching? How the unmarried woman may order her life so that she does not become morbidly lonely and embittered, is an outstanding problem which has not only never been systematically studied; it is not even commonly recognized, although it is surely a major problem of human welfare in the modern world.

¹ Some material exists on problems of the college period, but almost no work seems to have been done on that exceedingly critical time, the first year out of school. "Nervous breakdowns" seem especially common the first year after college; whenever the individual first enters the work world he meets a multitude of problems. Unemployment may affect adult life like a mortal disease. Some study is now being made of old age, and mental abnormality has been much investigated. But how to live wisely and happily between the ages of twenty and sixty—about *that*, almost nothing is known.

LEARNING IN SCHOOL

The second part of the book deals with learning or, better, the control of mental development. Here again, the effort is not so much to give a closely systematized psychological discussion as to bring together practical material from classroom experiments regarding such points as the effect of praise or blame upon pupils' work, the factors involved in errors and ways of dealing with them, the comparative efficiency of different methods of study, the causes of restlessness and fatigue in children, the amount which high school students remember of a subject a year after they have taken it, the extent to which a course in home economics brings about change in the dietaries of the homes from which its pupils come, the experimental results concerning the average school's contribution to the honesty of its pupils, their discrimination of good poetry, their ability to think.

Two limitations of the treatment must be pointed out. The discussion is of learning *in school*. But pupils also learn a great deal outside of school. Especially do they learn from each other, and *about* each other. Such learning is exceedingly important. But unfortunately very little is known about it. And again the limitation to learning during the school years requires only incidental treatment of the beginnings of knowledge in pre-school children, and of difficult problems of mental efficiency and self-discipline met in college and adult life.

Especially unfortunate is the omission of problems of methods of work, of fatigue, of thinking, of motivation as they affect the teacher. Such problems certainly are exceedingly important. Praise and blame from principals and super-

visors assuredly have very important effects upon teachers. With increasing teaching schedules and larger classes fatigue is a serious problem, and nervous breakdowns are becoming alarmingly frequent on many a teaching staff. There is surely needed a practical psychology for teachers. But knowledge is now too meager to permit such a treatment.²

THE CRISIS IN EDUCATION

There is at present a crisis in education. Obviously there is a crisis financially. But such constriction of resources has only emphasized a confusion already apparent. A conventional school neither understands nor has any program with reference to child development. And even in the task which it considers central, the furthering of formal learning, it seems extraordinarily inefficient. There is danger that the current increases in teaching load, the lack of equipment, and the frequent shortening of the school year, together with a lowering of professional morale (due to the greater burdens and greater uncertainties to which teachers are subjected, plus the extension of cancerous political influence) may cause a general educational deterioration.

In such a situation there should be a mobilization of every educational resource. The writer believes that psychology can give greater support to the newer education than it has hitherto. This volume is an effort in such a direction. It aims to inform the reader not about instincts and reflexes, but about children. And it tries to present an array of practical experimental work on learning which will be sensed as of direct help in teaching.

² In this last connection it should be noted, however, that throughout the volume the reader is urged to make real the topics under discussion by reviewing his own relevant experiences and considering them in relation to the point of view presented. Thus considered, much of the material will be found of value with reference to the teacher's own problems.

And now one last paragraph, giving what may be considered the central theme of the book. Modern psychological investigation tends to indicate that, to an extent hardly dreamed of even a decade ago, people are what the world has made them. In character, in personality, in usefulness, in happiness, they are the product of forces which can be controlled. And the chief agency for such control must be education. Further, the effectiveness of education can be increased manyfold. It is hoped that the treatment may give a new sense for both the responsibilities and the potentialities of educational endeavor.

PART ONE

DEVELOPMENT DURING THE SCHOOL YEARS

DEPARTMENT OF THE ARMY
OFFICE OF THE ADJUTANT GENERAL
WASHINGTON, D. C.

ADJUTANT GENERAL'S OFFICE
OFFICE OF THE ADJUTANT GENERAL
WASHINGTON, D. C.

CHAPTER II

GROWTH

THE most important, most helpful, most deceiving, most confusing, most neglected fact in education is growth: most important because the first consideration throughout the school years should be that healthy growth be achieved, most helpful because the plasticity and vigor of the growth period offer multiple opportunities for education, deceiving because education is constantly mistaking for its own accomplishment what has really come about through maturing, confusing because growth involves constant change, neglected because it is so obvious and yet so subtle.

Growth in intellect, personality, and character can be adequately understood only in relation to physical growth. To appreciate the fundamental biological character of growth in intelligence, the similarity between the curves for growth in intelligence and in physique should be noted. Only after consideration of the physiological changes going forward in childhood and adolescence can one come to full appreciation of the profound changes in interests and attitudes occurring in this same period. Anomalies of physical development are the explanation of many a "problem child."

For a child, the fact that he is constantly growing and changing is not simply a fact; it is an experience, presenting to him very difficult problems. Moreover, since in the child's world physical size and prowess play a large part,

the growth which a child has achieved determines in large degree the group of children with which he will associate, and his position and prestige in that group. And in the adolescent period physical growth may, and usually does, present manifold embarrassments to the youngster of either sex. It is not easy for the grown and relatively stabilized person to realize how bewildering it is to be growing—especially since these problems of childhood and youth cause many people so much unhappiness that they do not wish to remember them.

The concrete significance of differences and changes in physical size will be clearer if the reader will recall their bearings on his or her own childhood and adolescence. He or she may remember, perhaps, how very big adults, or even children in the fifth grade, seemed when he was in the second grade, or how awkward and immature he felt as a high school freshman in comparison with the seniors. It is also well to recall cases one has known in which the growth factors have played a large part in a child's life. For example, the writer has known the bright boy with ambitious parents who pushed him ahead in school until he was with others against whom he was so helpless in play that he became a diffident recluse; the exceedingly tall boy who withdrew completely from games with his fellows because he literally could not compete on a level with them; the stupid sixth-grade bully who tyrannized because he had been held back in the grades among boys too small to fight back successfully, and the slight youngster who worked himself into physical and emotional exhaustion trying futilely to make good in some form of athletics. Then there was the girl, small for her age, who became the pampered pet of both the teacher and the other girls in her class, and the big raw-boned girl who was acutely unhappy because she was so tall and large that most of the boys did not want to dance with her.

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erable childhood. These differences of height and weight from one age to the next thus give chronological age a special significance in the associations of childhood.²

As is now generally recognized, a major difficulty in accelerating bright children in school is that they may be

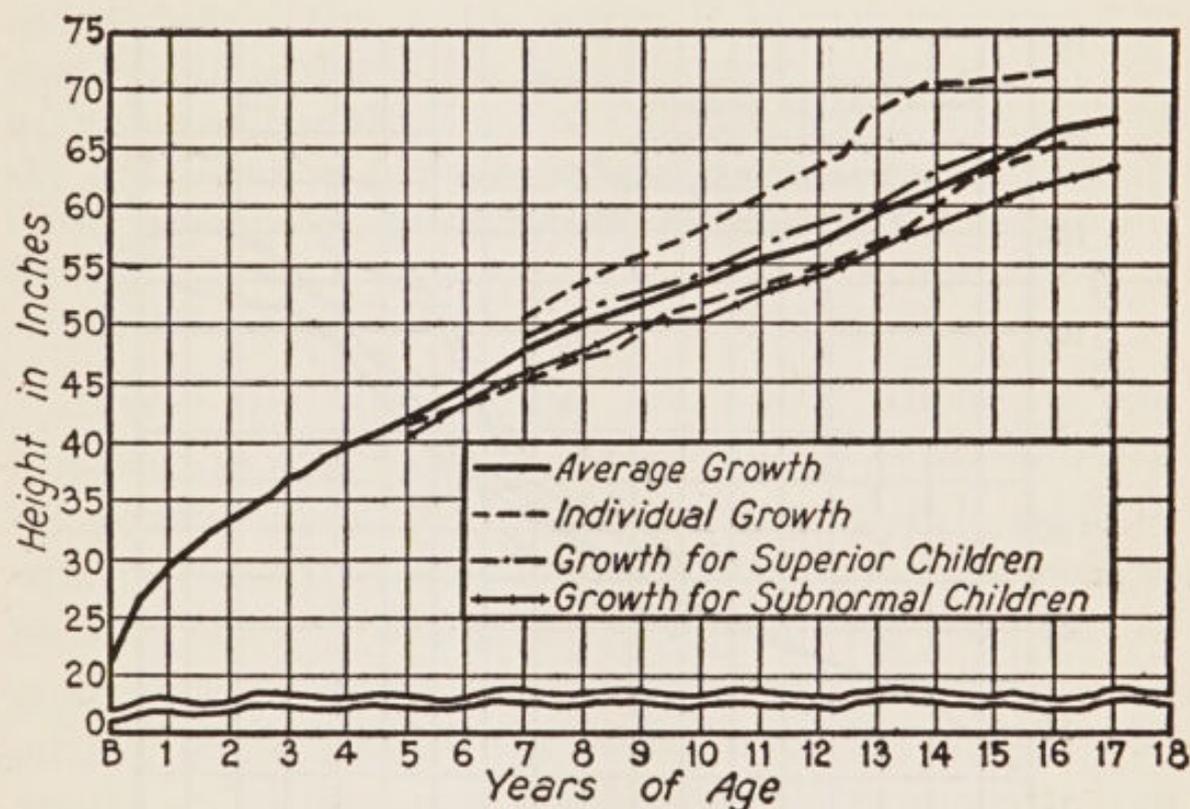


CHART 1.—Average growth in height of boys; also growth of (a) a group of intellectually superior boys, (b) a group of intellectually inferior boys, and (c) two individual boys. (Average and individual curves after Baldwin [1]; data for brilliant children from Terman [15]; and curves for subnormal children from Goddard [7].)

carried into an age group where they cannot compete physically. However, the physical superiority of the average

² It is interesting to note here that the boxing world considers the increase of weight for the average boy between fourteen and fifteen—about fifteen pounds—as more than sufficient to move a man from one boxing group into another, as from featherweight to lightweight. The average boy, between the ages of fourteen and seventeen, puts on enough pounds to change a man all the way from a lightweight to a heavyweight. And it must be remembered that fifteen pounds is proportionately more in the youth than in the man.

bright child makes some acceleration possible without running this hazard.

The pervasive effects of differences in physical size may be illustrated by the story of two brothers (2), one unusually large for his age, while the other was not only a year younger

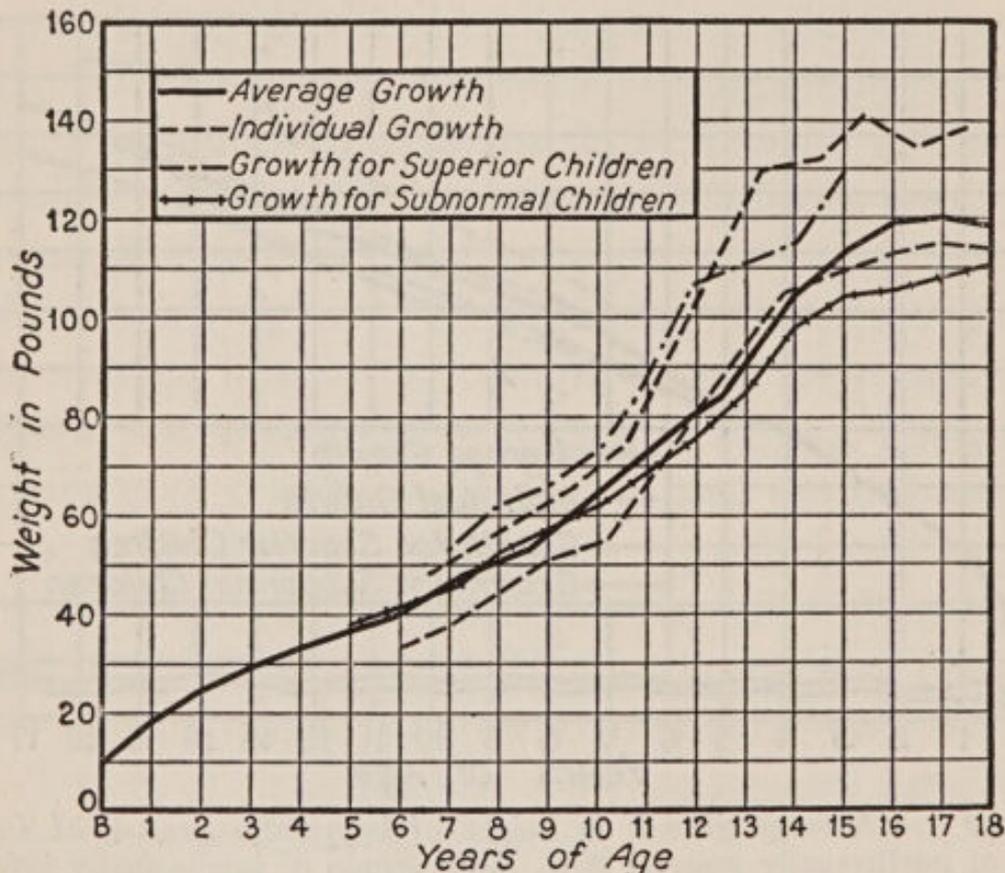


CHART 2.—Average growth in weight of girls. Growth of a group of intellectually superior girls and of a group of subnormal girls; also two curves showing growth of individual girls. (Average and individual curves after Baldwin [1]; curves for brilliant children from Terman [15]; and curves for subnormal children from Goddard [7].)

but small for his age. As far back as the younger one, James, could remember, his brother had imposed on him, teased him, made him do the unpleasant chores—backing up his impositions by actual physical combat whenever James rebelled. By the time the two boys had reached adolescence James had been so thoroughly cowed that he did not dare drive the family car, have a date, or wear the kind of clothes he liked. He did

somewhat poorer work in school than his brother, largely because his feelings of inadequacy became acute whenever he was faced with an examination. To compensate for his inabilities, James withdrew more and more from the social life of his fellows and developed a dream world in which he was the successful person he might have become in real life had he only been as large as his brother. It was not until his senior year in college that James began to study subjects that gradually showed him the source of his difficulties; he still remains shy and unsure of himself, and is frequently harassed by his earlier feelings of inferiority—the basis of which was a difference of about four inches in height and twenty pounds in weight during his childhood years.

Adult-Child Relationships and Size.—Almost wholly neglected in discussions of the psychology of childhood is the related inferiority to adults. Even in their relations with one another, shrewd adults recognize differences of physical size and vigor as of subtle but very great significance—the small man feels inferior and acts either submissive or defensively aggressive; the man of powerful physique may be either domineering or patronizing. But physical differences between children and adults are even more marked (and are also accentuated by multiple other differences of intellectual and emotional maturity and of prestige). The child is a pygmy among adult giants—and the physical inferiority continues into adolescence, when it becomes a force which interferes with the adolescent's urge to grow up and go away from his home. Childhood attitudes of submissiveness, fear, or resentment, and adult domineering could hardly develop as they do if it were not for the crude animal fact of the child's physical inferiority. Whatever the relations between a hundred-pound boy and

a two-hundred-pound principal, the mere difference in physical size is for both a fundamental factor in the situation. Some of the most obstinate cases of discipline in high school seem to have their root in the feeling of the youngster that he has at last grown to the point where he can fight back. A splendid feature of the modern school is this: that adult physical superiority is playing a smaller part³ and is being supplanted by a feeling of mutual cooperation, friendship and respect.

Sex Differences in Growth Rate.—It is also evident that growth proceeds at different rates for the two sexes. Maximum adolescent rate is reached by the girls about three years earlier—between eleven and twelve, as between fourteen and fifteen for the boys. From about eleven to fourteen girls average both taller and heavier than boys. Shrewd observers of children know that there are interesting consequences as regards the relations between the two sexes. The abundant health and vigor and all-round physical superiority of many girls during this period frequently bring participation (as never before or later) in boys' sports and amusements, and the development of a splendid physical confidence and poise. As a result, the boys either admit the girls to comradeship or else draw away from association with them and assume a scorn for them which seems in no small part a defense reaction—to which the girls respond by a great show of independence. It should also be noted that throughout childhood girls are on an average more mature physiologically than boys; even at six they are al-

³It is interesting here to contrast the descriptions of childhood misery in the stories of Dickens and the Brontës with modern novelists' descriptions of childhood.

ready about a year in advance, as is shown by various evidence such as the replacing of certain cartilages by bone. Puberty comes to them about two years earlier than in the case of boys. All these facts have a manifold significance for the school. Thus it will be seen later that throughout the school period the girls average somewhat more intelligent than boys. And in the secondary school the greater emotional maturity of the girl, as compared with that of the boy of the same chronological age, presents social, moral, and educational problems, the full import of which the average high school teacher seems not to realize. The average sixteen-year-old girl is physically and emotionally almost a woman, while the average sixteen-year-old male is yet little more than a boy.

Relation of Growth Rate to Intelligence.—One other group comparison requires brief mention. It is a common assumption that intellectually superior children are physically delicate or retarded in growth. It will be noted that the charts show brilliant children averaging somewhat superior in height and weight. Thus, Terman (15) finds a superiority in height of brilliant over average children of 1 to 3 inches at all ages (with an average final height at least 2 inches above the normal group), and in weight of 5 to 12 pounds (with an average final weight of at least 10 pounds more than the normal group). The assumption of physical delicacy on the part of the intellectually superior may be due in part to generalizing from the occasional extreme case, and in part to confusing real intellectual superiority with the verbal facility sometimes developed by the sickly child, as a result of greater association with adults and more reading; in part it is due to the fact that

educationally advanced children are in school rooms with children chronologically and physically older. And in part this assumption is perhaps a defense mechanism of the average and inferior person. On the other hand, intellectually inferior children average as inferior physically. Thus Wheeler (18) has found that dull children average two or three inches shorter and five to eight pounds lighter per age than children of average ability. For both brilliant and dull groups the differences from the average are small in early childhood, but tend to increase as the children grow older, resulting in final averages of significance for the three groups.⁴

Individual Differences.—So far the consideration has been of averages. But in physical growth—as in connection with every other topic that will be discussed in this volume—even more important than general trends is the fact that individuals may differ greatly from the average. The light lines on Charts 1 and 2 show growth curves for individual girls and boys. It is evident that each child's development proceeds to a certain degree in its own way. At any chronological age different youngsters differ greatly. Thus a group of 2276 boys 15 years of age were found to vary in height from 4 feet, 8 inches, to 6 feet, 2 inches; and in weight from 80 pounds to 161 pounds (1). It may justifiably be inferred that such differences are in large part normal. Decided dif-

⁴As further indication of the relation between lack of physical vitality and mental defect, the following facts may be presented (6) concerning the life span of defective and normal persons: The normal male child of 2 has an average expectation of 56.8 more years of life; the male moron of the same age has an average expectation of 52.2 years; the average male imbecile, of 29.6 years; and the idiot, of 20.1 years. Two-year-old male defectives as a group have an average expectation of only 30.1 more years of life—or 26.7 years less than that for normal babies.

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often well doubt it was the same person. As the child moves into adolescence there are strikingly rapid increases in the length of the long bones of the arms and legs, a change which produces most of the marked increase in height. The well known drawings by John Held, Jr., are no very exaggerated caricatures of the awkwardness of adolescent growth. Another skeletal change that is a repeated source of irritation to the organism is the development, then the discarding, of one set of teeth, with the final dentition being completed only during adolescence, or even later.

During the school years there are not only outward changes in size and proportion but internal changes in every system of the body—muscular, digestive, circulatory, genital, nervous. The nature of some of these changes is shown in Chart 4 (9). From this it may be seen that the nervous system has acquired most of its final growth by the age of twelve, that the lymphatic system grows with great rapidity at first and then becomes actually smaller, that the genital organs grow hardly at all until after the twelfth year, and that each of the various tissues of the body has a typical curve.

Whereas in the new-born child the muscular system constitutes about 23 per cent of the weight of the entire body, in the adult the muscular system is 43 per cent (15). And the nature of the muscular tissue is different in child and adult. Moreover, muscular growth is not uniform; the muscles of the legs, arms, and back have growth curves of their own. Nor is muscular growth always perfectly coordinated with growth of the skeleton so that there may be, especially at the adolescent age, embarrassing awkwardness

of movement. Rapidly growing children may have so much difficulty in sports that they are not willing to participate.

The circulatory system of the child is definitely different from that of the adult; his heart is smaller in proportion to the arteries; during growth the width of the aorta increases

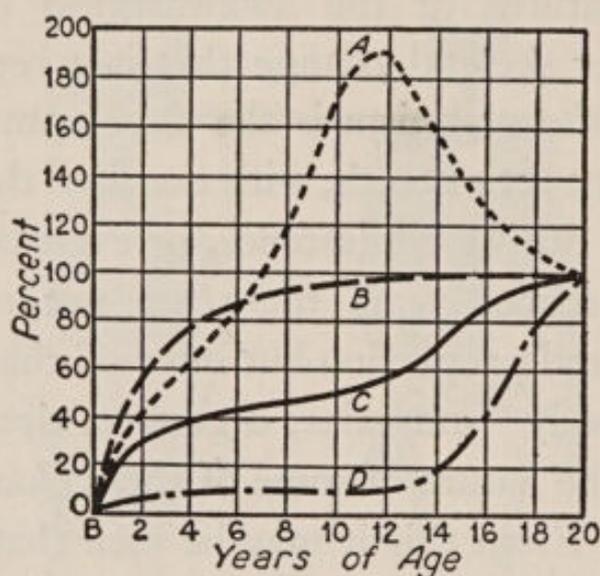


CHART 4.—The major types of postnatal growth of the various parts and organs of the body. The several curves are drawn to a common scale by computing their values at successive ages in terms of their total postnatal increments (to twenty years). *A*, Lymphoid Type: thymus, lymph-nodes, intestinal lymphoid masses. *B*, Neural Type: brain and its parts, dura, spinal cord, optic apparatus, many head dimensions. *C*, General Type: body as a whole, external dimensions (with exception of head and neck), respiratory and digestive organs, kidneys, aorta and pulmonary trunks, spleen, musculature as a whole, skeleton as a whole, blood volume. *D*, Genital Type: testis, ovary, epididymis, uterine tube, prostate, prostatic urethra, seminal vesicles. (From Harris, Jackson, Paterson, and Scammon.)

only three times but that of the heart increases twelve times. It is particularly important during the adolescent years to remember that some lack of balance between heart and arteries still persists and becomes, in fact, a source of actual danger. Children are not highly subject to social pressure and so will usually not continue exercise to the point of exhaustion, but adolescents are extremely sensitive to such

pressure. There is a long score against competitive athletics at the junior high and high school age because they stimulate boys and girls to extend themselves beyond safety and result in many a damaged heart whose owner must be careful the rest of his or her life.

The striking growth and then decline of the lymphatic system is well exhibited by the chart; and since lymphatic circulation is chiefly dependent upon muscular activity, the need for vigorous childhood is emphasized. Metabolism is more rapid in children than in adults. Accordingly, appetite is great. And especially is adolescent appetite marked, and often peculiar. Because of changes in internal chemistry involved in the physiological transformations of adolescence, plus the injudicious diet usually resulting from the adolescent's own selection of foods, the boy or girl is likely to have periods of indigestion, an unhealthy skin, and headaches.

Finally, there is the growth and maturing of the sex organs. Here, as nowhere else, is there consciousness that fundamental and mysterious changes are in progress. All too often puberty finds the child unprepared, bewildered, embarrassed, frightened—and the mature functioning of the organs does nothing to allay anxiety. The home fails frequently in its duty of informing its children on these matters, and the school is no better. The necessity for early and adequate instruction is shown by the table below, which gives the age of first menstruation for 3500 girls (10).

The author wonders whether the four little eight- and nine-year-olds were in any sense prepared for the momentous event, or if the fourteen girls whose first period was delayed until after they were twenty-one will ever regard

TABLE I: AGE OF MENSTRUATION FOR 3500 GIRLS [HOLLINGWORTH (10)]

Age in Years	Number Having First Menstrual Period	Age in Years	Number Having First Menstrual Period
8	2	18	195
9	2	19	91
10	4	20	31
11	41	21	8
12	178	22	10
13	458	23	2
14	715	24	1
15	778	25	
16	614	26	1
17	369		

themselves as normal. This table shows the majority of first menstrual periods to occur between 13 and 18, but the range is as important as the general trend. The onset of puberty for boys averages about two years later than for girls; the distribution is substantially as wide as that shown for girls. The secondary school group is thus made up of children some of whom are sexually immature and some mature. Many problems arise out of this situation. Indeed, these differences in degree of sexual maturity must be kept in mind by the high school teacher as the physiological background for many of the variations of attitude shown by the adolescents in her classes.

FACTORS AFFECTING GROWTH

A child's organism has its own natural rates and rhythms of growth and development. But it is clear that adverse circumstances might interfere with or delay these normal processes. Specific diseased or abnormal conditions will be described in the next chapter. Here certain general con-

ditions directly influencing growth and health, and indirectly having far-reaching effects upon personality and personal efficiency, will be pointed out. Among these factors are the child's living conditions, his physiological habits, his recreational opportunities, and his degree of emotional strain. These factors will be considered in order.

The Effect of Living Conditions upon Growth.—Various studies have been made of the relationship between the living conditions of children and their growth in both height and weight (15). The substance of all these studies seems to be that children who live in slum districts average, during the elementary school years, from 3 to 5 inches shorter and 8 to 12 pounds lighter than children from good homes. To date no one is prepared to say whether such differences are due to poor feeding, inadequate ventilation, miserable sanitation, lack of sunlight, insufficient recreation, overwork, or deficient inheritance. Probably all these factors work together.

The school of old-fashioned design did its bit toward hampering growth. The little red schoolhouse of sentimental memory in the crooner's ballad had inadequate lighting, no decent ventilation, unadjustable desks, and sanitation that was nothing to boast of. It was, in fact, an almost perfect environment for all children to contract every disease or disorder picked up by any member of the group. And the techniques of teaching imposed still further strain, especially upon the eyes and generally upon the whole body, because of the repressive discipline that forced the children to sit still and work intensively at tasks often too difficult for them. Modern schools and methods of teaching have materially improved the situation, but strain still re-

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small measure on children for their income. Irregularity of eating usually results in irregular and inadequate evacuation, which in turn has an unfortunate effect upon both efficiency and personality. Not only is the constipated child uncomfortable, but he is constantly subject to poisoning from waste products which form when elimination is slow. The effect of extreme constipation may be illustrated by the history of a college student as given below (12). This story shows also the irregularity in matters of sleep and feeding that led to the constipation.

Herman Ralston had an academic history of having failed two courses and of having never received a grade higher than a "C" during his year and a half of college. He gave a history of physical difficulties. At the time of his first interview he stated that he was extremely constipated—he averaged only two bowel movements a week—and that he had attacks of dizziness and impulsive vomiting which came upon him with practically no warning. He suffered from headaches and from some trouble with his eyes. He was also twenty-five pounds underweight, was troubled with insomnia, and had a pasty, yellow skin with numerous small eruptions. He complained of fatigue, but attributed this condition to the work that he was doing; he had a job as chauffeur for a doctor and was "on call" all night. As a result, he often did not get adequate sleep, and what sleep he did get was restless and in short snatches. He ate his meals when and where he had time.

In addition to these physical defects, Herman showed some quite marked emotional difficulties. He was unable to concentrate for more than a few minutes at a time, was easily irritated and somewhat irresponsible and flighty, felt that he was inferior to other students, was easily discouraged, thought people didn't like him.

The first efforts at correction of this boy's difficulties were directed toward remedying his physical condition. He was

given treatment to relieve his constipation until a bowel movement every day was established, and was also given a non-irritating diet, to which he adhered faithfully. His eyes were examined and corrected for a slight astigmatism and lack of muscle balance. His insomnia improved of itself as soon as he began to feel better. A place was found where he could work out-of-doors, in the daytime, at a florist's. As a result, Herman has ceased to have vomiting attacks, has gained fifteen pounds, and has developed a smooth, normal-looking skin.

With improved physical conditions, something could be done in training this boy to work more efficiently. He soon acquired systematic habits of work, and became able to concentrate for any reasonable length of time, was no longer jumpy and irritable, lost his hang-dog look, and began to consider himself as capable as other students. Soon he was competing on equal terms with others, both academically and socially. He has maintained an average only slightly below "B" for over two years since his period of adjustment.

Recreation and Growth.—Recreation is essential for children. Children really have to work in school. What they do may appear simple to the adult, but to the small child the work is as difficult as are the adult's activities in connection with his own occupation. Children may become overworked, although they are doing nothing more than keeping up in school with others of their own age. Teachers are sometimes guilty of depriving a child of recreation, either as a form of punishment or to give him extra training in some subject that he is slow in learning. In most cases the advisability of such a procedure is questionable. A child's parents also are often inclined to use his recreational time for service to them. Such things as running an occasional errand presumably do no child any harm, but

such occupations as selling papers on the streets after school or helping in a store are types of activity which, though often valuable experiences for a vigorous youngster, not only reduce his time for recreation but impose added strain upon him. It is not to be wondered at if a child who works for three or four hours after school arrives at school the next morning unable to concentrate, worn out physically, and with generally lowered efficiency. Moreover, healthy growth may be hampered.

Growth and Emotional Strain.—It was implied above that freedom from emotional strain was necessary for normal growth, health, and efficiency in school. Emotions are powerful drugs. They affect not only a person's overt behavior, but his entire internal physiology. For example, an outburst of temper increases the rate of breathing and the heart beat, causes the liver to pour its stored-up sugar into the blood stream, tightens the muscles, and stops digestion. Chronic emotional excitement of any kind thus tends to put a child in a tense, abnormal physical condition, and results in fatigue, indigestion, and irritability. In the present period of depression everyone knows people who age perceptibly from month to month because of anxiety. The causes of emotional strain in children often seem quite insignificant to an older person, but the effects are the same.

The writer knew a fifteen-year-old girl who was exceedingly humiliated and distressed because her allowance was 15c a week where other girls had 25c. Actual delinquency had resulted; she felt that she *had* to steal ten cents a week in order to keep her social prestige in the group. In another instance, a small child of foreign parentage became a chronic truant (although he liked his school work) and isolated himself

from other children, for no other reason than that he had to wear to school certain garments of foreign make. In both these cases the emotional condition was chronic and intense. The children were not only delinquent, when the matter was finally brought to official attention, but they were worn out physically from the strain involved.

The first year of elementary, of junior high, of high school, and of college is almost always a time of especial emotional strain because the individual is becoming adapted to a new type of school life. For many children these periods of stress are too great for both health and personality. At the elementary level, low resistance, nervousness, outbursts of temper, and delinquency are the child's most frequent types of response. Later on the mysterious "nervous breakdown" may appear—a condition of real ill health, but due chiefly to insufficient adjustment to some situation.

The writer remembers one small boy whose behavior was that of complete bewilderment during the first few days of school. He kept asking his mother, "Mother, why do the other boys keep taking my cap off and throwing it over the fence?" "Why do they laugh at what I say?" "Why won't they let me on the jungle gym?" He was, of course, merely being hazed, but his morale was almost broken. Such episodes naturally cannot be avoided; youngsters will hurt, humiliate or torment one another. And the one who cannot stand this strain becomes a sick child; for his dread of oppression, his distress at each unpleasant incident, and his humiliation in retrospect keep him in a constant emotional state.

The teacher in any grade needs to be on the lookout for such children. But at the times enumerated above, when the strain of adjustment is particularly intense, an even closer watch should be kept. There is some evidence to suggest

that such crises may even cause a temporary slowing of growth.

In connection with this discussion of physiological and emotional strain, the question of school athletics inevitably arises. What is the effect of school athletics not only upon those who compete in games but more especially upon those children who merely watch them? The strain upon the athlete is obvious, but he is usually watched with care and kept in good enough condition to withstand reasonable amounts of pressure. The onlookers, however, are far more numerous, are in only ordinary physical condition, and are frequently more excited than the players. If one could assemble after an important basketball or football game all the adolescents who had watched it, he would find many of them to be in a strained, exhausted, abnormal condition. Similar conditions may be observed during the "pledging" period in high school (and even college) fraternities and sororities. The effects of such hysteria as is all too often shown at such times are far reaching as regards both health and school efficiency.

PRACTICAL SUGGESTIONS FOR TEACHING

The teacher may feel that, while the facts presented in the foregoing chapter are interesting, there is little of practical significance as regards her work. As a matter of fact, there are a number of suggestions to the teacher contained in these first pages. A few are listed below:

- (1) Remember that differences in size make a great impression on children. Realize especially that your own size and maturity may stimulate responses of fear or resentment when you least intend such a result. Learn also to see in many an open rebellion a childish effort to get even with adults for what seems to the pupil an unfair advantage unfairly used.
- (2) Be alert to the matter of size in the grouping of children for instruction or for recreation. Attention should also be paid to those

showing extreme variations in size; such children are abnormal and should often be under medical care.

- (3) Never forget that children and adolescents are growing, changing, developing organisms; do not expect them to show balanced adult behavior.
- (4) Try to keep the conditions of your own schoolroom such that there is a favorable external environment for growth.
- (5) Watch children for signs of emotional strain, whether from overwork in school or overactivity elsewhere. Try to keep your classroom free from emotional tenseness; remember that normal growth and development are more important than the multiplication table.

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PROBLEMS OF HEALTH

CONCERNING the health of more than 25 million children in the public schools of the country, the following estimates, based on careful study, are given. Nearly 95 per cent have at least one decayed tooth (30); 15 per cent have adenoids or tonsils needing attention (28); over half of the children are, or have been, infected with tuberculosis, and 8 per cent will probably later succumb to the disease (28); an average of 25 per cent of children are malnourished (30), with the figure running as high as 60 per cent in some districts; 14 per cent do not have normal hearing (30); 15 per cent have more or less serious eye defects, of whom probably one-fourth need to be placed in sight-saving classes (30); something less than one-half of 1 per cent are cripples (30); about 5 per cent have speech defects (30). Indeed, less than one-third of the children appear to be free from physical defect, aside from one or two decayed teeth; one-third have minor physical difficulties, and the remaining third are seriously handicapped by ill-health or defect of some sort (28).

Such a situation is obviously very serious, and it is, in four ways, important to the school. In the first place, the school should take as one of its major responsibilities, the conservation of child health; and such a situation as was described in the above paragraph is a direct challenge to school health programs. In the second place, this situation

seriously handicaps the school in its conventional purpose of causing children to learn; the child who has defective and uncorrected vision, who is slightly deaf, who suffers from a focal infection or from malnutrition, cannot carry on his school work effectively. Further, many of these conditions involve disciplinary problems, often of a serious nature, for the ill child is likely to be the irritable child. Finally, ill health or physical handicaps have important, but often neglected, long-time effects upon the development of personality—effects which are frequently the determining influences upon an individual's whole future career. The school should have as a major objective the development of emotionally healthy, normal, well-balanced individuals. Illness always affects emotional tone, nervous energy, and temperament; and the circumstance of illness or defect also usually limits the opportunity for normal emotional adjustment and social experience. A crippled or malnourished child cannot participate in play on equal terms with average children. He may have a special position in the consideration of the adults in his family, which may lead to habits of dependency and hence limit his opportunity for developing self-confidence and hardiness. In school such a child may be favored, criticized, or petted; it is very difficult for the teacher to make desirable adjustments to the child's handicap without causing undesirable attitudes on the part of either the child or the class.

Child health thus becomes a concern of educational psychology, if that subject is to consider in adequate fashion the whole problem of child development—in intellect, per-

sonality, character, achievement—during the school years. A brief systematic survey of the field is therefore necessary. Throughout this chapter the reader is urged to consider cases of physical handicap or ill health that he or she has actually known, in order that something of the concrete reality of these problems may be further appreciated.

SENSORY HANDICAPS

Visual Defects.—Most concrete of the problems of this chapter are the defects of the sense organs. Here, from the point of view of difficulty in conventional school work the visual defects come first. The way in which these problems may be neglected and the extent to which they influence school work and conduct will be appreciated from the following example:

Some years ago, while giving a group intelligence test, the writer noticed a little boy in the front seat who went through each test at breakneck speed and then put his head down in his arms on his desk. The teacher remarked that she had tried to stop this sort of behavior but without effect, and added that the boy's work was slipshod and that he would not even attempt such work as drawing which required care and exactness. Inquiry of the child revealed that he had frequent headaches and occasional nausea from eye strain, and that his hurried work and the resting of his head upon his arms were means which he had hit upon for resting his eyes and minimizing visual discomfort. Another boy above normal intelligence was a frequent truant; when questioned, he said he detested school and the work made him sick. He explained further that after only a little use of his eyes the eye strain, headache, and nausea, plus the constant reprimands for inattentiveness, had made school intolerable for him. Being an intelligent child, he adjusted to an unbearable situation by staying away from it.

These two children were the unhappy possessors of farsighted eyes. Farsightedness is often overlooked because the child who has the defect can usually put sufficient strain for a few minutes upon his eye muscles to read the letters on any ordinary visual testing chart. He compensates, often perfectly, for his defect by forcing the muscles to make the lens of his eye more convex; but soon his muscles become fatigued, and he finds himself not only unable to see clearly but unable to stop the pain caused by the strained muscles. Obviously, something must be done; and, all too often, the youngster, unconsciously or not, neglects his school work rather than run the risk of more discomfort. Because the farsighted eye has too short a distance from front to back, it is only by imposing this constant strain on the lens that the child can see anything without blurring. The nearer an object is to the eye, the harder the muscles must work. It is thus evident that ordinary school tasks impose excessive strain.

At another time, the writer was asked to examine a girl who could not learn to read. What the child did was to read ten or twelve words correctly, her head turned to one side and with an effortful frown, and then suddenly produce a jumble of words partly from the page and partly from imagination. Examination showed that she had astigmatic eyes. The resulting strain made it impossible for her to keep the total adjustment of position and focus which gave best vision for more than a few seconds. The whole reading process then broke down, and she continued what she had read with whatever words occurred to her.

This defect, astigmatism, which is responsible for over half the cases of impaired vision, is due to some irregularity in the curvature of the eyeball or of the lens. As a result,

some but not all of the light rays striking the eyes are properly focused, and the child sees things better at some angles than at others. As a matter of fact, practically all eyes are slightly astigmatic, that is, the curvature of the eyeball is not absolutely perfect, but many of these slight defects have no serious results. The degree of strain imposed upon an eye by astigmatism depends upon the location and nature of the abnormality. In some cases glasses are not needed; in others they are imperative if the child is to avoid inadequate vision with its resulting ills of nervous tension and emotional irritability. The combination of astigmatism and farsightedness is perhaps the worst possible sort of common visual defect.

On still another occasion the writer saw a teacher reprove a child for leaving his seat and coming up to the blackboard, where the teacher had just written some problems in arithmetic for the children to work on. This youngster said he had come to the board in order to copy them. The teacher, instead of recognizing this behavior as a symptom of insufficient eyesight, saw in it only an effort to distract the attention of his classmates from what she was trying to do. So to his original visual defect she added both a feeling of resentment at unfair criticism and a self-consciousness which might easily lead him to disregard what was on the blackboard, thus concealing his defect, rather than again leave his seat. This child was, of course, nearsighted.

Of all the common eye defects, nearsightedness is the one no teacher ought to miss because the behavior of the child, in such action as shown above, or in bringing his eyes and his book close to each other, makes his trouble so clear and unmistakable. However, nearsightedness is the least troublesome defect, except in extreme cases, because it

imposes relatively little strain on the eye muscles. Although the nearsighted child cannot see anything clearly at a distance, he has only to bring himself and the object sufficiently near to obtain reasonably good vision. Incidentally, this defect is the only one regularly discovered by use of the conventional visual testing cards.

Nearsightedness and farsightedness are, as the names imply, exactly opposite conditions, and are due respectively to having too long or too short an eyeball. The behavior of the children having these two defects also is opposite. The one holds his books at the end of his nose, fails to see things on the blackboard, and rarely complains of headaches; the other holds his books as far away as he can, sees things easily on the blackboard, and complains of headache frequently. The teacher should have no trouble in recognizing these two types.

Within the past year the writer was consulted by a college student whose outstanding trouble seemed to be that she "hated" reading; she said she was so nervous at the end of a half hour of reading that she could not continue. She reported relatively little pain in her eyes, as would be expected since her reading periods were so short. However, if she drove herself to continue reading for two or three hours she developed considerable pain, dizziness and nausea. The writer had this girl read for about an hour, holding her to the task as steadily as possible; he then looked at the girl's eyes and found they no longer coordinated; when one eye looked directly at a spot on the wall, the other turned out to a very slight degree. This defect did not appear at all except after periods of strain, and even then would not be noticed by the casual observer. This lack of accurate convergence was the cause directly of dizziness, and indirectly of the nausea, general nervousness, and intense dislike for reading.

Such failures of the eyes to work together perfectly are due to a disbalance of the muscles attached to the outside of the eyeballs. The eye itself may be normal, or it may be nearsighted, farsighted or astigmatic. When the lack of muscular balance is sufficient, the child is cross-eyed. This extreme defect is found in not over 2 per cent of school children (28), and these usually develop the condition long before entrance to school.¹ A milder amount of muscular deviation is, however, not uncommon, especially among those children whose general health is not good, and is often far more irritating to the individual than the amount of the deviation would suggest.

Teachers should always do what they can to relieve eye strain in the classroom. In the first place, the lighting of the schoolroom should be adequate, with the light coming over the left shoulders of the children (that is, if they are right-handed) and being reflected from walls and ceiling, never shining directly into the children's eyes. Short recesses may be introduced to give the eyes a chance to rest, and such subjects as do not impose strain on the eyes may be sprinkled throughout the day so as to serve as further rest periods. As much material as is reasonably possible should be presented orally rather than visually. The print in all books to be used by children should be large enough so that they can read it with relatively little strain, and the paper should have no gloss. The children should be taught to stop as they read and look off the page from time to time, thus giving their eyes a rest. They should also

¹ If the defect is looked after early enough, it can be remedied; but in most cases, after entrance in school, it is too late for any very adequate correction.

not be forced to make their handwriting any smaller than they wish. Children should not be forced to copy, from either the blackboard or a textbook, any oftener than absolutely necessary, since the shifting of the eyes and refocusing is very wearing.

If a teacher has in her class children who show serious visual defects, these children should, if possible, be transferred to a special "sight-saving" class so that what vision they have may be saved and not used up during childhood by excessive strain. Children who are suspected of having defective eyes should be sent to a good oculist so that any defects may be remedied. Sometimes parents of children will not take the responsibility of seeing that this is done, and the correction does not take place unless the school authorities actually take part in the situation.

Finally, teachers should realize that most children will not themselves complain of eye strain. One has to remember that visually handicapped children do not usually realize that other people have eyes any different from their own. They may know that other children read with ease while they read with difficulty, but they attribute this situation to practically anything except poor eye-sight. And probably no child is likely to see any relationship between being sick to his stomach and farsightedness, or between general restlessness and astigmatism. Nor will he attribute his dislike for school to a muscular disbalance so slight that only an oculist can discover it. When children show such behavior as has been described above, they should be sent to the school nurse or school doctor with a request for a careful examination (a hasty examination may miss far-

sightedness or muscular disbalance) to see if eye strain may not be the source of their difficulties.

Auditory Defects.—Careful tests indicate that somewhere between 10 and 20 per cent of school children do not have entirely normal hearing, in addition to the 3 per cent who are seriously deaf (30). And in a large proportion of these cases the defect is not recognized. It is therefore important that teachers should be alert for symptoms of deafness.

Perhaps the most common sign of inadequate hearing is an appearance of stupidity. This does not mean, of course, that all stupid children are deaf (though as a matter of fact some 35 per cent of them (28) have been so reported). Another natural symptom is inattention to auditory stimuli. Furthermore, the child is likely to ask that questions be repeated. Sometimes the pupil does not hear at all when he is spoken to, and he may be given many an unmerited reprimand. If a child has been partially deaf from early childhood, he may have a quite markedly expressionless, monotonous voice, or the inflection may be inappropriate to the meaning. He may have imperfections or blurrings of speech and mispronunciations which are due to his never having heard quite accurately. Many deaf children are very poor spellers because of either a general blurring of sound so that the words are not clear, or complete deafness for tones at certain pitches so that certain of the letters are never heard at all.

Within the last year, the writer has come in contact with a case of this last type. The girl was a university student who averaged 25 misspellings on each page she wrote. The word "again" she spelled "aan"; "ventricle" appeared as "ventral";

other misspellings were equally as bad. Upon investigation it appeared that she never heard any *g*, *k*, *z*, *f*, or *s* sounds. She consequently omitted these letters from her spelling. By training this student to watch carefully for the position of letters (to use her eyes instead of her ears), and giving her some training in lip reading for the sounds she did not hear, it was possible to teach her to spell with almost normal accuracy.

Another common symptom that partially deaf children show is the turning of one ear toward the speaker, in the gesture quite common among old people. Nevertheless, in spite of such an assortment of symptoms, many children go through the grades with their defect unobserved until they are old enough to discover for themselves, or are told by friends, that their hearing is not normal.

The girl described above had supposed that her one handicap was failure to spell. It turned out, however, far otherwise. She had an odd personality, few friends, and a generally unrefined appearance. Her emotional maladjustments were many. She thought that people were unfair to her and that they were talking about her; she wondered why they laughed at things that didn't seem funny to her—and more than half suspected they were slyly laughing at her. These ideas were obviously fostered by her inadequate hearing.

A deaf child is almost inevitably maladjusted because his defect prevents him from partaking in a large number of children's games for which reasonably normal hearing is necessary, and from progressing in school at a normal rate. Almost always he builds up some defense against the situation by withdrawing into himself and making no effort to adjust to the world, or by projecting the blame for his inadequacies on to others, thus becoming a complaining, ineffectual individual. Congenital deafness is almost always

due to heredity. The majority of cases of acquired deafness come from various chronically diseased conditions of the nose and throat which spread through the Eustachian tube (connecting the middle ear and pharynx) to the ear; inflammation of the tube then prevents drainage from the middle ear. The result is fairly sure to be deafness. In other cases, an infection of the middle ear has followed measles, scarlet fever, or diphtheria. As a matter of fact, most children suffering from any one of these three diseases have ear infections at the time; and these, if neglected, may cause permanent deafness. Deafness may also be caused by adenoids, which block up the top of the nose and in some cases grow into the Eustachian tubes. The vast majority of cases of non-hereditary deafness originate during early childhood. During this period, then, it is particularly important that colds should not be neglected, that infected tonsils or adenoids should be removed, and that chronic catarrh should not be allowed to continue; children convalescing from a serious contagious disease should always be watched to see that the ears do not become infected. If a child's ear is infected and discharging, the child should receive immediate and proper treatment until the ear has healed.

It is sometimes amazing how teachers overlook altogether the matter of sensory handicaps, either visual or auditory, in estimating a child's ability. The writer was once making a school survey, and was asked to look at a certain child in the first-grade room who was a great problem, having been in that grade for three years without making progress. When the boy appeared for an individual intelligence test, the writer was amazed to discover that he was cross-eyed, that one eye was

totally blind, one ear totally deaf, and both ears discharging, and that he had a marked speech defect! These physical disabilities undoubtedly gave him an appearance of stupidity, but he tested as only slightly below average in intelligence. Considering his serious handicaps as regards the ordinary avenues of communication with the outside world, he had made good progress in his eight years of life. It had apparently not occurred to his teacher either that his defects might explain his stupidity or that anything might be done to alleviate any of these handicaps.

MALNUTRITION

Many people seem to understand by "malnutrition" that a child simply does not have enough to eat. This is true in some cases; but more frequently the fact is that a malnourished child has enough food, but not the right kind of food. Recent research in nutrition has shown that some very complex chemical substances, known as vitamins, are absolutely essential to normal growth and development. These substances are contained especially in fresh fruits, green vegetables, milk, butter, cod liver oil, and in the outside coating of most grains. It should be noted in passing that most of the foods which are rich in vitamins are relatively expensive. As a result, children of poor people are more likely to suffer from malnutrition than are those of wealthier people. Children living in mountainous or isolated districts where fresh fruits, vegetables and milk are little used are particularly likely to develop serious cases of malnutrition.

In general it may be said that malnourished children show their condition by being underdeveloped; that is, they are too short and too light for their age. They also have a softness of bone which predisposes them to such char-

acteristics as spinal curvatures. There are, however, a few children who are distinctly overweight (in an unhealthy way) and are still malnourished. Undernourished children usually have a dull, listless expression and lack vitality or spontaneity. They sometimes look more like little wizened old men and women than children. Other outstanding symptoms are their very rapid fatigability and their susceptibility to any and all diseases, especially chronic colds and tuberculosis. They are tired all the time; if questioned, they will respond that they are tired even before they get up in the morning. Because of this fatigue much school work is not undertaken at all, and tasks that are begun often remain unfinished. Even if the child does apply himself with his best efforts, he "wears out" much sooner than other children who are doing the same work.

Some years ago a little girl was sent to the writer for examination because of supposed mental deficiency. She had been in the third grade two years and was making no progress. This child was nearly twenty pounds underweight for her age (which was only eleven); she had a grayish pallor and a noticeably bad breath. She was so thin that one could feel her ribs standing out with fallen spaces in between them. She was markedly round-shouldered. She was also three inches under the average height for her age. While waiting for her interview, the child sat motionless and expressionless in a chair. She reported that she never had any breakfast before coming to school, and that her mother worked, so that when she went home at noon she had to get whatever lunch she could find in the icebox. At night there was a hot meal, but it consisted chiefly of bread, potatoes, and gravy. The writer did not examine this child at all as to intelligence (she was tired enough already without being subjected to this additional strain), but sent her back to the teacher with a recommendation that she be

sent at once to the school doctor. The doctor made a report to the child's parents concerning her malnutrition, but nothing was done about it (the parents were quite poor) until six months later when one day at school the child began to cough up blood. At this point the school authorities intervened, for tuberculosis is an infectious disease, and the parents were forced to put the child under appropriate care. Two years later, after adequate treatment, this girl returned to the school and tested normal for her age as regards intelligence. She had not, however, caught up with her age in either height or weight and she still stooped a bit, but other characteristics of malnutrition had disappeared. It is probable that she never will make up the inches she lost because of undernourishment.

Like the deaf child, the undernourished is likely to be mistaken for a child who is simply stupid. More often than not, both types are mouth breathers, and their open mouths give them an additional expression of stupidity. It is, however, true that malnutrition and real lack of intelligence often go hand in hand, because the same lack of proper feeding which has made the child thin and listless has also resulted in an inadequate development of his nervous system; and malnutrition is more common among subnormal children. Most undernourished children show an increased mental alertness when appropriate feeding is instituted; some do not.

The school is in a strategic position to do much toward the prevention of malnutrition, which is, of course, not an inherited but an acquired condition. If the home from which the child comes cannot, or will not, give him the food that is necessary for his growth, the school can step in and give the required feeding. The school lunch has become a fairly universal phenomenon, as has the serving,

in the middle of the school session, of milk or cocoa to those children who need extra nourishment. The school also can do something toward teaching the parents about the correct feeding of children. Most malnutrition is not intentional. Parents suppose their children are getting the proper food in both type and quality, and they are entirely willing to alter the children's diet if someone will tell them what they ought to do. Training can be given to the children themselves so that they will learn to select those foods that are most appropriate for them. The idea that children do not and will not like foods that are good for them is quite erroneous. Children usually like the kinds of foods they have been given regularly regardless of nutritional value.

For instance, one small child who was within two or three days of being four years old was told by her father that she might have anything in the world she wanted to eat for her birthday. The mother was somewhat disturbed by this announcement, because she feared the child might select food entirely inappropriate. She need not, however, have been worried, because the little girl had been fed, ever since she could remember, on a diet that was good for her. After some hours of reflection, this youngster announced that if she could choose whatever she wanted she would like for her dinner on her birthday the following: a soft-boiled egg, carrots, spinach, raisin bread, a glass of milk, and for dessert prunes with graham crackers!

FOCAL INFECTIONS AND DISEASED TEETH

During the past year the writer had in a special class a girl who was a constant source of trouble (18).

Dorothy Burt entered the rehabilitation class for probation students with a history of having failed the entire fifteen hours

she had elected the previous term. During the first two or three interviews and laboratory periods, Dorothy attracted considerable attention because of her excessive irritability and irresponsibility. She chattered almost constantly, interfered with the activities of half the other students in the room, talked back when corrected, and was generally a nuisance. Even during the interviews she seemed unable to stay still for more than a minute or two, but was twisting and turning in her chair, getting up, and walking around the room most of the time. Under the circumstances, a coherent history was a bit difficult to obtain, but in the end the situation became evident.

According to her own statement she had had several attacks of appendicitis and tonsillitis within the past two or three years. She had also had some sinus trouble and complained of a constant sore throat, cold and cough. She was given a physical examination, which revealed badly infected tonsils, and congestion around the area of the appendix. She carried a chronic temperature and had a rapid pulse. She was about twenty pounds underweight. By the end of the second or third week that she was under observation, she began to have quite evident choreic symptoms. Her physical condition was bad enough under any circumstances, but when forced into taking any responsibility it rapidly became worse. Indeed, any additional burden so immediately brought out her essential instability that almost nothing could be done for her.

Dorothy was advised over and over again to drop her school work and get her physical condition remedied. She badly needed operations on both her appendix and tonsils, especially the latter. During the term that she was under observation her sinuses became severely infected on two occasions. At the end of the term she failed one course and received a barely passing grade in two others. These marks were not good enough to keep her in school.

Even elimination from the University has not convinced her of the futility of trying to work with such an infected body as she has at present. She is still so irritable and irresponsible that

she will not be able to hold any kind of position, pass work in any school, or even get along acceptably well with any social group. It is the writer's guess that she will continue to get worse instead of better until some attack precipitates an operation, and that by then this girl's habits will have become so fixed that it will be practically impossible to "reeducate" her into any reasonable amount of responsibility and independence. Her flighty personality has been built up on a basis of her physical condition; but the attitudes of flightiness, inattention, and dependence have been so developed that mere removal of the sources of infection will probably now not change her very greatly.

To the initiated, nothing could be clearer than the conclusion that this girl was suffering from a number of infections that not only had undermined her health but had reacted most unfavorably upon her personality and behavior. The "focal" infection is an outstanding problem of health among people of all ages. These infections may be located in a number of places in the body; but for childhood and adolescence the most common locations in which such foci may develop are the tonsils, the ears, the appendix, the teeth and the sinuses. In all these cases, the infection is so located that it cannot drain out of the body, but rather must discharge its toxins into the blood stream which in turn carries the infected matter over the entire body. As a result, infections are more likely to spread than not, and other foci of infection soon follow the first.

The effects of such infections are numerous. They make an individual irritable, nervous, and often unable to keep still for long; at the same time they cause a fatigue altogether disproportionate to the exercise taken. This com-

bination of irritability which drives the person into action, plus an easy fatigability which wears him out far too soon, is likely to result in a nervous, neurasthenic, overwrought individual. Misbehavior in school, especially of the "explosive" type, is frequently due to the presence of infection. More than one "bad" boy or girl has been cured of evil-doing by the removal of the infection.²

Another important result of infection is the lowering of resistance to diseases. The child becomes susceptible to colds of all kinds, chronic headaches, indigestion, tuberculosis, and to all other contagious diseases, because of the lowered resistance of a system chronically undermined by the presence of infected areas. All in all, it is probable that neglected focal infections are among the most common sources of chronic ill health among both children and adults. Infected, decayed, or irregularly developed teeth also have important effects upon a child's health, growth, personality, and school work. These unfortunate results are none the less real because most of them are indirect and not immediately obvious. In the first place, dental difficulties inevitably mean poor mastication; the child develops the habit of bolting his food, with the result that it is inadequately digested, and the child tends to become malnourished. Secondly, the carious teeth are likely to set up reflex activities, thus causing considerable nervous irritation that may result in such symptoms as general nervousness, chorea, nervous vomiting, and the like. Because the teeth are so often neglected, they form the most generally per-

² As indicated by the case given above, there has to be a certain amount of reeducation after the removal of the infection. During childhood the usual school or home routine and discipline are often, but not always, sufficient.

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are a growth which occurs in the nasopharynx. The growth effectively blocks the nose, thus forcing the child to breathe through his mouth. In normal breathing through the nose, the dust particles in the air are partially prevented from entering the lungs by the hairs in the nose, and the air becomes warm before it reaches the lungs. The child with adenoids has to breathe cold, dirty air through the mouth into his lungs all the time, and thus is especially liable to throat or bronchial infections. Adenoids also are likely to block the Eustachian tubes, interfering with the normal functions of the ear and becoming a possible cause of deafness. The child with adenoids is another type of handicapped youngster who is often regarded as merely stupid. And, in fact, he often *is* somewhat stupid because his mouth-breathing chronically lowers his vitality, and the growth constantly reacts unfavorably upon his general development.

There is no remedy for adenoids except their removal. It is frequently found that the operation results not only in a real improvement in health and resistance to disease, but also in a greater general alertness and vigor.

ABNORMAL GLANDULAR CONDITIONS

The glands most likely to cause trouble during childhood and adolescence are the pituitary and the thyroid. Secretions from both seem to have a regulatory effect upon growth rate; the thyroid also affects the general metabolism of the body—that is, the rapidity and extent to which the body assimilates the food taken into it. Disorders in either of these glands bring about abnormalities of body structure, mentality, and nervous development. It is not

necessary here to go into details as to how these glands operate; the teacher needs only to be informed of some of the results attendant upon their malfunctioning.

The first point concerns the *excessively* fat, or tall, or short, or thin child. These conditions are usually direct results of glandular abnormalities, and are often accompanied by peculiarities of disposition. Some such children are sluggish, listless, slow-moving, dull; others are nervous, jumpy, irresponsible, flighty, over-excitable in every way. The sluggish ones inevitably appear stupid (sometimes they are really only slow and not dull at all), and the excitable ones are so inattentive and flighty as to make an equally poor impression concerning their fundamental ability. The things for the teacher to realize are that these children are not being purposely annoying, that they cannot be cured of their condition by ordinary school discipline, and that they are not to be considered as condemned for life to these abnormalities. A doctor can give them appropriate treatment which, especially if begun early enough, may literally work wonders in the alteration of their characteristics.

The writer knows of a college girl whose irregular attendance at classes had brought her to official attention. She pleaded her physical condition as a cause of the situation and was therefore sent to the medical examiner, whose report more than adequately bore out her statements. In fact, the doctor withdrew her from college and sent her home for a six-months' rest in bed. On the day of her medical examination she had one degree of temperature and a pulse rate of 124. Her basal metabolism test showed her to have a marked excess of thyroid activity. She was 30 pounds underweight, her eyeballs protruded, her hands trembled, her blood count was low. More-

over, she gave a history of fainting once or twice a week, of feeling her pulse beat all over her body and especially in her neck, of being forced to lie down and recover her breath every time she went upstairs to her room, of having acutely painful menstrual periods. Some of her absences were due to the strain of her monthly periods, others to such a general state of excitement and nervousness that she felt she could not sit still for the length of the class hour. In spite of her extreme condition no one of the six members of the faculty who had been seeing her almost daily for two months had noticed anything unusual; neither had the matron in the dormitory; the only person who had an idea of the difficulty was the girl's roommate, who stated blandly that she thought her friend ought not to have hysterics every two or three days!

Special attention should be called to the thyroid disorder that results in a goiter. This condition is particularly likely to affect girls during their adolescent years. Any high school teacher should be especially alert to notice any slight fullness in a pupil's throat or be on the lookout for the emotional outbreaks that may be caused by an oversecretion of the thyroid. Any such manifestations should be investigated at once before the situation becomes worse and both health and school progress are endangered. Moreover, suspicion of a glandular disorder of some sort should be raised whenever a girl has really severe pain during her menstrual periods. Many teachers do not fully appreciate the deteriorating effect on school work of the dread of the menses, plus the loss of work from non-attendance during the first two or three days of each period, and the lessened vitality for several days thereafter. It is educational economy to see that these glandular disturbances are remedied, or at least ameliorated, as soon as possible.

Painful menstruation is abnormal, and not the normal condition some people seem to think it.

Glandular symptoms of any kind should receive the prompt attention they deserve, not only for the preservation of health but also for the development of normal personalities.

NERVOUS CONDITIONS

The nervous child always presents more or less of a problem to the teacher. Sometimes he is also emotional, although this is not necessarily the case. Different types of emotional maladjustment will be discussed in a later chapter.³ The object here is to point out two types of nervous

³ Speech defects are not included in this chapter, in spite of their prevalence, because such a large proportion of them are due to emotional causes, and will therefore be discussed in a later chapter. Although most speech defects do not have an anatomical basis, occasionally one does. Some years ago the writer came across an excellent illustration of what happens when a child with an organic speech defect attempts to get along in a non-understanding school environment. The boy in question had only a rudimentary palate. He had been in the third-grade room for three consecutive years when the writer happened to give this class various tests. This boy scored not only at the head of the class but at about the median for the sixth grade. Inquiry was at once made to find out why this child was still placed so low in the school. His teacher explained that although she had made him stand up before the class and try to read day after day for three years, he still read so poorly that she was unwilling to promote him to the fourth grade. When asked if he did not read with comprehension silently, she admitted that this was the case, but stated that she thought oral reading so necessary for "cultural" development that she was unwilling to promote the boy until this educational feat could be accomplished. When the writer interviewed the youngster he found a sullen, unhappy, desperate boy who at first refused utterly even to attempt conversation. When finally persuaded that the writer was trying to help him, the boy, in the speech characteristic of a person with no palate, tried to talk. The writer reported the case to the school physician, and the boy was provided with an artificial palate which permitted him to speak almost like a normal person. At the writer's insistence, he was also moved up into the fifth grade, where he soon became well adjusted and successful.

In this case there is clear evidence of a real anatomical defect, but even more interesting are the maladjustments, social and emotional, that were pyramided upon the physical condition.

disorders, chorea and epilepsy, which occur among school children rather rarely but which are of sufficient seriousness for the teacher to be alert to them. Chorea is almost exclusively a nervous disease of childhood and affects girls far more frequently than boys. Its presence is shown by spasms in the facial muscles, or of other muscles usually in the upper part of the body. The muscles twitch and contract without volition on the part of the child, and often without her knowing that the spasm has taken place. When the disease appears in an intense form, there is no question in anyone's mind that the child is sick, but in its lighter forms it often goes unrecognized. It is especially important that children afflicted with this nervous disease should not be subjected to any type of neuro-muscular strain. Efforts at writing, or at any coordination of the hands, are extremely difficult for the choreic child and put upon her an added strain which makes the disease worse. As a matter of fact, choreic children, although they may have the disease in a very mild form, should not be in school at all, but at home in bed. It now seems probable that chorea is caused by the presence of chronic focal infections in the teeth, tonsils, or any other part of the body.⁴ What the choreic child needs is the removal of infections, then rest.

The precise causes of the disease called epilepsy are still not entirely known, but it is quite clear that the convulsions, which are the outstanding symptom of this disease, are precipitated by toxins or poisons secreted within the body. The convulsions cannot be entirely eliminated in

⁴ Usually chorea, rheumatism, and abnormal heart conditions go together as a trinity of troubles which result from neglecting focal infections.

many cases, but their frequency and severity can be considerably cut down by a diet from which all protein food has been eliminated. Like the choreic child, the epileptic needs freedom from strain and plenty of rest. The teacher cannot, of course, diagnose this disease, but she can send to the school doctor any child who shows even the slightest sign of convulsive movements. The attacks may vary all the way from severe convulsions in which the child loses consciousness to fainting spells or even momentary actions of an automatic character. For example, the writer once knew a child whose attacks consisted simply in his rising from his seat and walking a step or two across the room. He then seemed to remember where he was and returned to his seat. This behavior was, of course, peculiar, but his teacher never regarded it as of much importance. However, the disease was having a rapid degenerative effect upon his nervous system because he had four or five of these attacks every day. It makes no difference how harmless the automatic act or how incidental the moment of faintness may be. It is a possible symptom of a serious nervous disease which, if taken in time, can be treated to considerable advantage, even though in most cases it cannot, at present, be completely cured.

CONTAGIOUS DISEASES

The writer, some years ago, chanced upon two beautiful examples of what a teacher should and should not do in a time of epidemic.

While making a school survey, he came to a school where many of the children were absent because of an epidemic of measles. In one room which was particularly hard hit, only 4 of the original 38 children were still in school. It seemed that

one afternoon the teacher had observed that three little children who sat in adjacent front seats were very restless, irritable and disobedient—although usually they showed none of these characteristics. The teacher knew that there was an epidemic of measles in the school, and that one of the three disobedient children was a younger brother of a child who had already contracted the disease. She did not, however, recognize the various misdemeanors as symptoms of a rising temperature. She consequently separated the three children, putting them as far away from each other as possible. The next day all three were sick with the measles—and the children next to whom they had been sitting the previous afternoon had thus all been needlessly exposed. These children, of course, continued to come to school until the onset of the temperature, and in turn infected everybody else. As the result of her failure to recognize the true nature of the original disciplinary problem, she was instrumental in spreading the disease to every child in the room who had not yet had it.

In sharp contrast was the teacher in the first-grade room of the same school. She knew that her children would be particularly susceptible because the majority of them had never before been exposed. Therefore, every morning, as soon as the class assembled, she had the children march by her as she stood beside one of the windows. As each child passed, she looked at his nose and throat to see if there were any redness or other signs of trouble. She also looked him over generally to see if he were as alert as usual. She knew nothing of the technical nature of diagnosis, of course, but by this simple procedure she could tell when a child's nose and throat looked different from the way they had on previous days, and she could note symptoms of lassitude or nervousness. Any children who did not look right to her were sent at once to the school nurse. For the most part these children were found to be suffering from slight colds or other ailments and were returned to the class, but the few who were actually coming down with the

measles were located in this manner. At the end of the epidemic this teacher could truthfully say that no child had become infected with the measles while attending school in her room.

The ordinary public school teacher cannot, of course, be expected to become expert in the diagnosing of physical disease. She can, however, learn to recognize when children do not act normally, and she can send these children to the school nurse or doctor for further examination. Most of the children's diseases are characterized at the onset by an increase in temperature, and by some infection of the nose or throat. Consequently, children showing either of these two symptoms should be isolated at once from the other children.

There remains, however, one contagious disease about which the teacher should be more fully informed. This disease is tuberculosis. It now seems clear that the majority of tuberculous persons first contract the disease in infancy; it then passes through a secondary period, usually during elementary school. Finally it reaches a third stage, either during adolescence or a bit later; and it is then that the diagnosis of tuberculosis is made, often for the first time. It further seems probable that practically all people contract tuberculosis at some time during childhood. Most then recover from it. Children who are malnourished, children who have swollen glands in their necks, children who are already more or less crippled by any disease of the bones, children who are still weak from the after-effects of a contagious disease—all of them need to be watched to see that they do not develop an open case of tuberculosis.

It is a disease which is almost always present, and about which every teacher should inform herself.

PRACTICAL SUGGESTIONS FOR TEACHING

The prospective teacher may perhaps want some general rules for her guidance in applying the material in this chapter to her dealings with children or adolescents in the school room. With this purpose in mind, the writer suggests the following "rules":

- (1) Never assume that a child is merely stupid and that nothing can be done about it until you are certain that he is not physically handicapped or sick.
- (2) Do not let yourself develop the mental attitude, so easily communicated to the children and their parents, that aching teeth, infected tonsils, or pains of various sorts are just normal concomitants of "growing up" and are therefore of no importance.
- (3) Always be alert for symptoms of eye strain, malnutrition, infection, and so on. Children show their ailments clearly enough; try not to be blind to their needs.
- (4) Learn to look upon abnormal or unusual behavior of any kind as a symptom of *something*; in many cases irritation from disease conditions is an outstanding cause of such aberrations. Never condemn a child as "bad," "queer," or "erratic" until you are certain he is not sick.
- (5) Remember that school work puts strain on the eyes, ears, and nerves; that it is a drain on the child's vitality; and that it can become too great a strain for some children. Do all you can to lighten the load.

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CHAPTER IV

INTERESTS AND INCENTIVES

THE previous two chapters have dealt with physical growth and health as they may affect a child's psychological development, and they may have seemed more medical than psychological. But the consideration now turns to a subject clearly psychological in nature.

A major problem of every teacher is in finding the interests of her pupils and relating the school work to those interests. Closely connected is the problem of finding and utilizing motives and incentives for effective work. Such problems of psychological dynamics are obviously most important, and they are often mentioned by beginning teachers as the most perplexing with which they have to deal.

What, first of all, are the empirical data regarding the interests of children and adolescents? Two lines of evidence are obvious: the research regarding play, and the findings as to reading, "movie," and vocational interests. From these and other data, an attempt will be made to arrive at some understanding of the natural interests of children of various ages, and the factors bringing about these interests—with special reference to the relation of these matters to the activities of the school.

PLAY

If play is defined as those things which individuals do simply because they want to, then a catalogue of play is

evidently a catalogue of the activities which have some sort of natural appeal. Such catalogues have been made in various ways: by having children list the play they have engaged in, by having them go over lists of childhood activities and check those things they like to do, and by observing children's play to determine what is done and the influences which seem to bring about these activities.

The topic is a fascinating one for retrospection upon one's own childhood. The reader will find it interesting to go back in memory and list those things he did at various ages, in the country and city, on the school playground and in the neighborhood, in the winter and during the summer vacation. These reminiscences may well go back to an obscure memory of the pleasure, at the age of three or four, of blowing a whistle or digging in the sand or scuffling through autumn leaves or wading, the later joy of running with a wagon or coasting on a sled, the satisfaction of shooting with bow and arrow or sling-shot, building a hut, or inconsequential ranging through the woods. Simple games gradually appear—hide and seek, anty-over, or run-sheep-run. Later, team games, such as baseball and football, come to have a dominant appeal. And there is the new, embarrassing, exquisite pleasure of companionship with the other sex. The making and scanning of such a catalogue of childhood and youthful delights will doubtless bring no little amusement and reminiscent pleasure, with which there will be mixed a certain wistfulness and lingering nostalgia.

Changes in Play with Age.—The natural first question is as to the changes in play interests that come with age. The following table¹ from an extensive study of play based on 26,058 reports (18) of play activities from the first

¹ Modified from Lehman, H. C., and Witty, P. A., *The Psychology of Play Activities*, A. S. Barnes and Company, New York, 1927, p. 242.

TABLE 2: THE TEN MOST POPULAR PLAY ACTIVITIES AT AGES 5, 10, 15, 20

BOYS	
5 Years	10 Years
Playing with a ball	Football
Playing with blocks	Baseball
Playing with a wagon	Boxing
Playing house	Just playing catch
Playing horse	Riding a bicycle
Hide-and-peek	Basketball
Playing tag	Wrestling
Drawing	Playing cowboy
Playing school	Roller skating
Playing in a sandpile	Marbles
15 Years	20 Years
Basketball	Having "dates"
Football	Watching athletic sports
Baseball	Football
Driving an automobile	Basketball
Tennis	Listening to the radio
Watching athletic sports	Going to the movies
Hunting	Driving an automobile
Going to the movies	Reading the newspapers
Boxing	Tennis
Reading books	Baseball
GIRLS	
5 Years	10 Years
Playing house	Playing the piano
Playing with dolls	Going to the movies
Playing with a ball	Looking at the "funny" paper
Playing school	Playing with dolls
Drawing	Roller skating
Mulberry bush	Riding in an automobile
Playing with blocks	Reading books
Skiping	Playing school
Making things	Jacks
Jumping rope	Listening to the victrola
15 Years	20 Years
Reading books	Social dancing
Going to the movies	Playing the piano
Social dancing	Having "dates"
Playing the piano	Going to entertainments, etc.
Riding in an automobile	Just "hiking" or strolling
Having "dates"	Going to the movies
Watching athletic sports	Reading books
Going to parties, picnics	Watching athletic sports
Basketball	Card games
Doing gymnasium work	Riding in an automobile

grade to adulthood, shows the ten play activities reported by boys and by girls at ages 5, 10, 15 and 20, as most liked. It will be noted that some of these activities are not play in the strict sense of the word, the inquiry being broadly extended to those things which children like to do.

It will be noticed in general the five-year-old boys like to do simple things like playing with blocks; they imitate in simple ways the activities of adults, and play simple games like tag. Boys at ten like very active amusements like football, playing catch, riding a bicycle; at fifteen such active games continue, but they are more in the form of organized team games; by twenty the "sex-social" interest of "dates," and watching athletic sports have first place. Five-year-old girls play in much the same simple fashion as boys of this age. In middle childhood and adolescence they differ from the boys in the less active character of their amusements, in the earlier appearance of sex-social interests (doubtless related to the earlier physical maturing of the girls), and the greater prominence of such interests.

It must not be assumed that any of these changes are sudden. The following chart shows the percentage of children at different ages indulging in certain activities. It will be seen that in all cases the changes are gradual. Even simple activities, such as skipping rope or climbing, are indulged in right up into the adolescent period. A second chart showing the index of social participation should also be noticed in this connection. This index is simply the percentage of the total play activities which were carried on with other children. Once again there are no sudden

changes; rather one sees a continuity as regards this feature of play.²

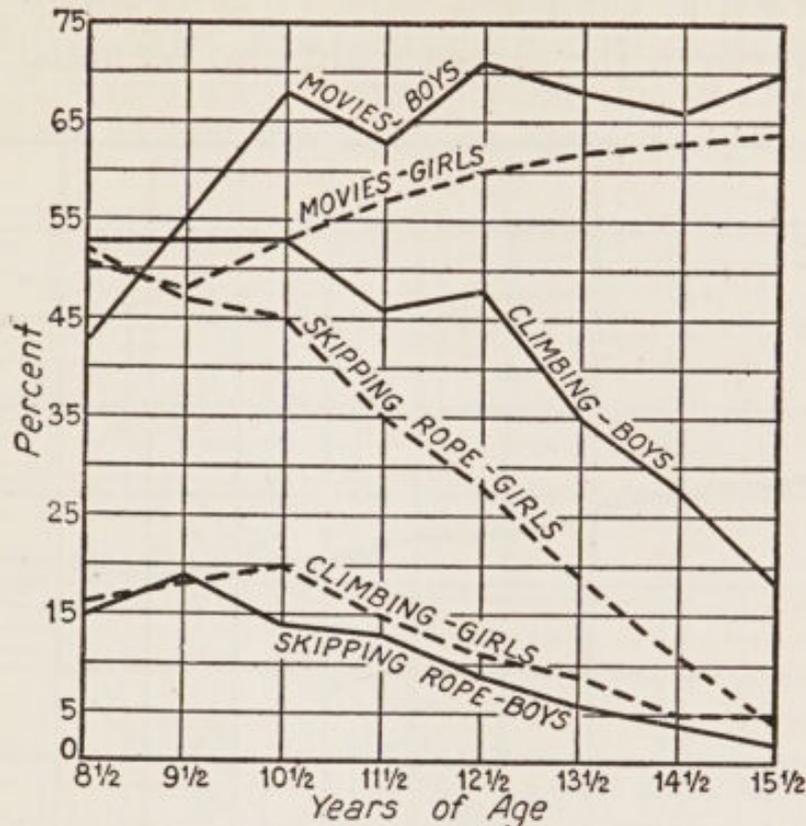


CHART 5.—Per cent of children of various ages (a) going to the movies, (b) climbing things, (c) skipping rope. (Modified from three charts in Lehman and Witty's *The Psychology of Play Activities*, copyright 1927 by A. S. Barnes and Co.)

The chart above is also of interest, for it shows the change with age in the number of different play activities engaged in. Again the changes are very gradual. The strikingly greater number of play activities engaged in by the younger children (the median is 40 at eight years,³ as

² Two further points should be noted here, however. The nature of the social adaptation changes with age to an extent not exhibited on this chart; the eight-year-old's group play is relatively unorganized and individualistic as compared with the play of older children. And below the ages shown on the chart, social play is less frequent; even where children are together, the play is often merely in the presence of, rather than with, other children.

³ The children in the first three grades mentioned a total of 800 different activities.

compared with 18 at twenty), the greater differences among younger children (the 25-75 percentile range is 28 at eight years, as compared with 11 at twenty), and the similarity between the sexes should also be noted.

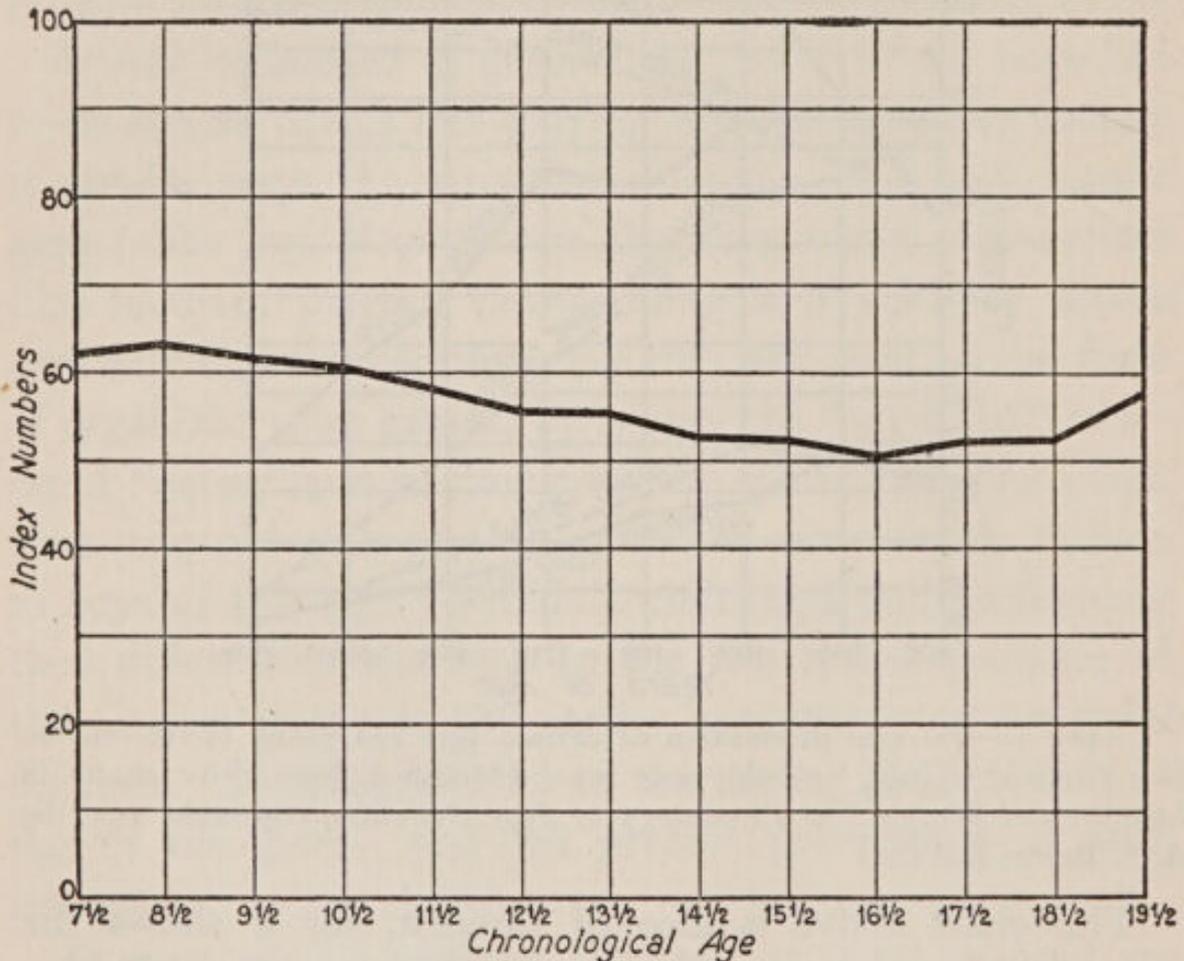


CHART 6.—Index of social participation from ages 7½ to 19½. (From Lehman and Witty's *The Psychology of Play Activities*, copyright 1927 by A. S. Barnes and Co.)

Only the effect of differences in general mental ability upon the maturity and character of the play life remains for brief mention. In general, children pedagogically retarded or behind in school tend to engage in more social activities than children who have progressed normally. Children who are ahead of the average grade for their age do not as a group show either fewer play activities or more solitary play; in short, acceleration seems to do no harm to the play life. Acceleration so marked as to carry a pre-adolescent child into an

adolescent school group would presumably be more serious, however. Exceptionally intelligent or gifted children read more and, largely as a result of this, apparently, engage somewhat less frequently than average children in social plays and games and in very active games, but indulge in about the same total number of play activities. In short, the gifted children

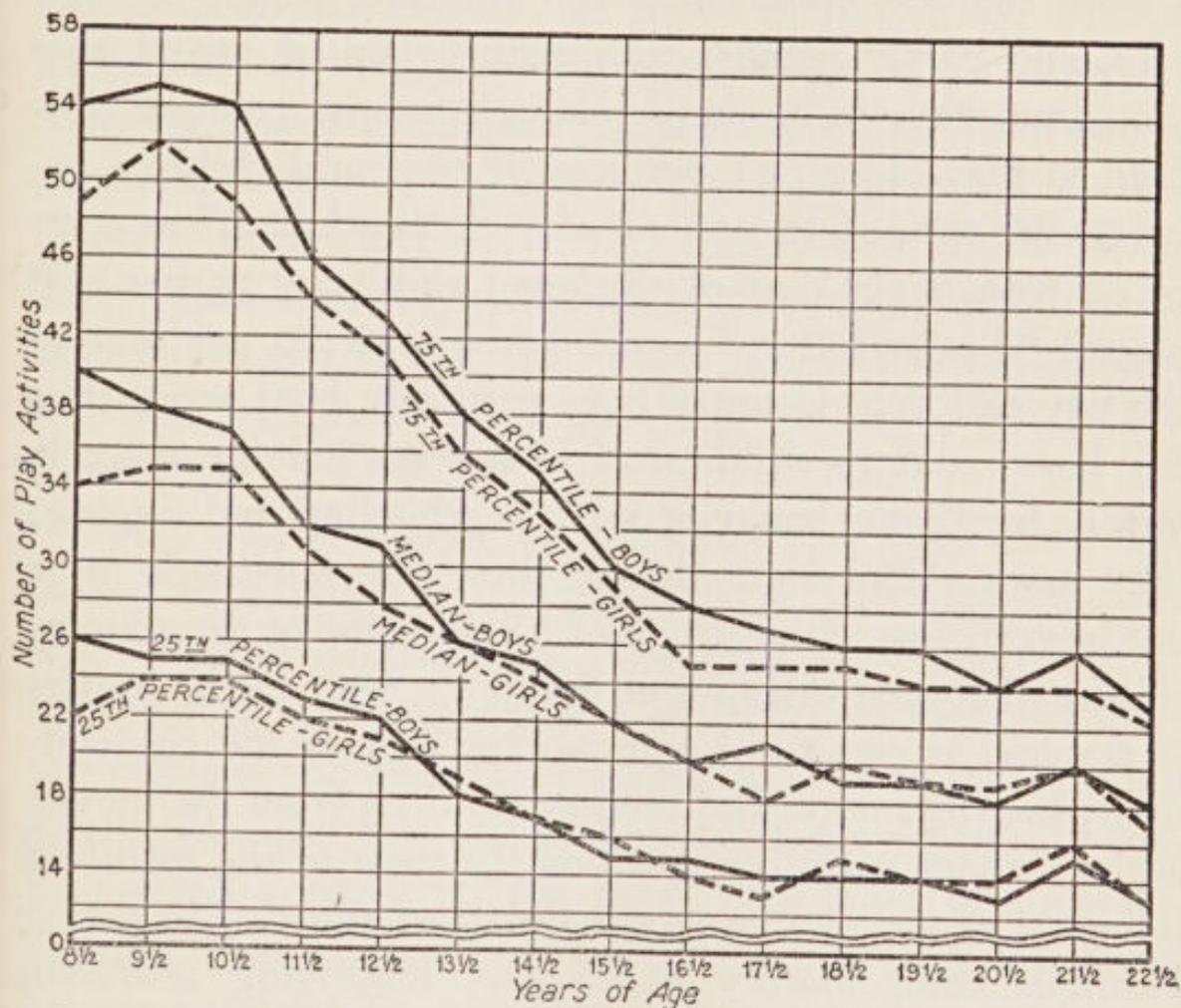


CHART 7.—Change with age in the number of different play activities engaged in. (From Lehman and Witty's *The Psychology of Play Activities*, copyright 1927 by A. S. Barnes and Co.)

seem not to show unfortunate limitations or peculiarity in their play, but the duller children read less, and engage more in social and active games.

Environmental Influence on Play.—The effect of different types of environment on play is a matter of great practical and also great theoretical importance. Certain con-

trasts between town and country children shown by the Lehman and Witty investigation are of interest here. In general, country children play games of a less highly organized and team character, presumably partly because there are fewer children of a given age group to make up a team and less opportunity for different groups to compete, and partly because in a play group of mixed ages the games have to be simple enough for the younger children to play. Thus, 41 per cent of the rural children between the ages of 10 and 15 played "Blackman," as compared with 7 per cent of the town children; 35 per cent played "Teeter-totter," as compared with 10 per cent of the city children. Country boys naturally hunt more than city boys; country children of both sexes indulge more in mildly boisterous behavior such as whistling and singing; they more often climb things, they ride horseback more but bicycles less. An average of 18 per cent of the country children between the ages of 8 and 15 went to the movies in a week, as compared with 60 per cent of the city children; the distance of the country children from the movies is the obvious major explanation. In view of the manifold influence of the movies (to be discussed shortly) in giving vicarious compensatory experience, modifying attitudes, ideals, and standards of living, such differences are of decided importance.

Other factors of physical environment or circumstances are important. Thus, if streams or lakes are nearby, swimming, canoeing, fishing, skating, building rafts and making precarious journeys thereon, are likely to be common activities—but otherwise they are hardly possible. The exhilaration of skating and skiing, the thrill of bobsledding

or the sociability of the sleigh ride are obviously not possible in a southern climate—and the lack of such winter sports would seem, to anyone who has grown up in the enjoyment of them, to make the total character of child life in the south a bit different from childhood in a northern state. Other factors are more special. Play, both at school and at home, is varied according to the nature of the play space, and according as various facilities, such as sandpile, seesaw or baseball diamond, are available. And it should be noted that these facilities have multiple effects. Thus it has been observed that, with younger children, the sandpile or the seesaw tend much more to bring children together sociably in their play than do dolls or a blackboard.

Fads, Fashions, and Conventions in Play.—Play thus varies with physical and intellectual development, and with physical environment. The third most important influence is social. And here it must first be noted that there are fashions and fads in the child as well as in the adult world, and also that games and other play activities may be handed down from one child generation to another;⁴ in short, that in their play children are greatly influenced by one another. Thus in the study already referred to, it was found that many of the younger girls in certain schools enjoyed turning handsprings; and this activity was traced to the influence of a private class for æsthetic dancing which some of the girls had been attending. In the writer's boyhood it was the fashion (he has not found it in any other

⁴ This continuity of child life is a fascinating and important thing; it is well illustrated in the way in which certain vulgar words are kept current among children, in spite of adult disapproval.

community) for boys in middle childhood to build what were known as lath tracks on which a peculiar form of railroad was played. It was also the fashion to build "cubbies," which were simply holes in the ground, roofed over with planks covered with dirt, and with a fireplace in a corner, the use of which made the hole almost uninhabitable. Sometimes a vigorous child leader has an important effect on play, carrying a group to dramatic Indian raids, or the construction of a nondescript "club house."

Certain larger social influences upon play also deserve mention. The organized team game seems to be largely an Anglo-Saxon product. American collegians prefer football, whereas the youthful intelligentsia of Germany have a special fondness for dueling, and the French prefer tennis to play between groups. But all this is presumably not because German or French youths lack some mysterious instinct or ability which tends to make English and American boys peculiarly fond of team games. Rather the explanation is to be found in differences in climate, in the size and character of the leisure class, and especially in the largely unknown development of the conventions of amusement. It must be further observed that these differences are being rapidly modified. The vogue of tennis in France is relatively new, although the game originated there. American baseball has no very long history, and its amazing popularity in Japan has come about in a short period of time. The present passion for golf in our country is largely a post-war phenomenon. In short, there is every evidence that the form which the play life of a community or a nation takes is determined by influences which are best

described as social; certain conventions are developed with respect to sport and amusement.

The writer is inclined to believe that the competitive character of much American play is to be regarded as such a convention. After all, many recreational activities, such as fishing, canoeing, hiking, dancing, and singing, are not competitive. The tendency to identify play with competitive games and sports may be a product of our highly individualistic and competitive socio-economic mode of life. The present emphasis on the competitive in recreation seems to be relatively recent, and, on the whole, unfortunate.

Sex Differences in Play.—The various ways in which such influences may work are well illustrated by the development of sex differences in play. More important in this respect is adult influence. Dolls are given to girls but not to boys; and girls are commended in their playing with dolls, whereas boys who play with dolls are made fun of by both adults and other children, parents even going so far as to take dolls away from boys who enjoy such inappropriate amusement. Boys are given carpenter's tools and mechanical toys, footballs, air rifles, magazines, and books about mechanical devices, sport, adventure. The father enjoys baseball, and he takes the boy—but not the girl—to watch, and plays catch with the boy. For a boy to engage in rough-and-tumble sports is considered only fitting and proper. But girls are likely to be scolded and interfered with if they indulge in such tomboy play—they may even be given vague but solemn warnings against possible mysterious injury to health or morals. In fact, sex differences in play, except as they are the product of a slightly earlier

puberty and a slightly lower physical vigor among girls, may well be entirely a product of convention.⁵

Play and Adult Life.—Very important and much neglected is the extent to which the play of children is an imitation of adult activity. Children play school and church, policeman, gangster; they play store; they are interested in dramatic activities, like aviation. Prominent events influence their play, such as the Lindbergh flight, a much-featured boat race, a war. Local adult life has its immediate effect upon child play, as in the imitation of local industries or episodes. Such play can obviously be made very educative. And it should be noted that this play usually mimics not only adult activities, but also the attitudes, prejudices, and moral code of the adult group concerned.

Finally, both child and adult play is greatly influenced, more or less directly and obviously, by commercial attempts

⁵ As a matter of fact, many younger boys *do* play with dolls. And there are plenty of hoydenish girls. Analogous cases in adult life are also interesting. The writer knows of a star college half-back whose hobby is embroidering, and of a woman whose favorite girlhood amusement was tinkering with machinery and who now owns a garage; the late George Eastman's two favorite amusements were hunting big game in Africa—and cooking. Girls and women are entering sports more and more. Changes in dress and in manners give a new freedom. Sex differences in play may soon largely disappear. And it may be added in this connection that sex differences in vigor and physique will probably then be decidedly lessened. Surely the extraordinary activity of the healthy boy must affect his physical development. Healthy girls seem about as active, if they are not restrained in such ways as have been mentioned. As a matter of fact, anthropometric data from Denmark indicate that girls and women are now taller and heavier than they were forty years ago, while men and boys are about the same; present-day women college students are bigger than were their mothers. And sports may affect not only size and strength, but also certain bodily proportions. For example, girls *can* throw like boys. If they commonly did so, and as often, sex differences in shoulder breadth might be lessened.

to make a profit out of amusements. The Yo-Yo or Mah-jong has a vogue for a while; the kiddie car, roller skates, and teddy bears become almost standard appurtenances of childhood. And the movie, the dance hall and resort, the pool room, the ubiquitous newspaper and movie publicity for football, bridge, cigarettes, modify youth and adult alike.

Because these social determiners of play have been so much neglected and are so important for the understanding of the educational potentialities of play, the reader should make a special effort to make real to himself in recollection of his own experiences the importance of such influences in determining amusement. The writer well remembers how fads for stamp collecting and for the catching and imprisonment of grasshoppers in small screen-covered boxes had their vogue in his boyhood. Then the popularity of the air rifle and of that pestiferous concealed weapon, the rubber-band slingshot, played a large part in boyhood episodes. An international boat race once set every boy to making model boats; the building of a new railroad bridge nearby caused the erection of numerous miniature derricks and bridges. The Spanish-American War set all the boys to soldiering; the reading of Scott's *Ivanhoe* in school led to the brandishing of wooden swords and lances throughout the neighborhood.

Individual Differences.—The individual differences in play are striking; differences of age, sex, and grade are relatively unimportant as compared with these individual differences. Lehman and Witty found that most plays were indulged in by less than half the children of a given age. As already mentioned, differences in the number of different plays engaged in were also great; thus 4 per cent of the boys and 5 per cent of the girls between 8 and 9 years

of age reported ten or less different play activities in a given week, while 8 per cent of the boys and 5 per cent of the girls checked more than 80. There are great individual differences as regards playing with other children. Thus, 2 per cent of the eight-year-old children show less than 5 per cent of their play activities engaged in with other children, while at the other extreme 9 per cent of the children of this same age reported 95 per cent or more of their plays as activities in which other children took part. Such data clearly suggest that information regarding the play of a child or adolescent should yield valuable material regarding his social adjustment—and probably the opportunity for the improvement of that adjustment.

In fact, observation would indicate that even such figures as are mentioned in the preceding paragraph do not adequately display the full significance of individual differences. A boy who plays mostly by himself appears also to play less active games and to be a leader less often in those groups he does enter. And the causes of individual differences are hardly hinted at. Differences in vigor and general health are undoubtedly important, as are also pre-school experiences in learning to get along with other children.

Intensive long-time studies of the play life of different individuals, from the nursery into adult life, are much needed. The reader will find it both interesting and profitable to outline his own recreational history and that of two or three of his friends, noting both causes and results of any special features. The writer knows a case where a Christmas gift of a set of carpenter tools to a boy became a dominant factor in his recreational interests and later choice of occupation. In another instance, a boy's illness when he was eleven years old so

interfered with his previous leadership in the active sports of his group that there resulted a withdrawal to solitary amusements which has been the most important element in his whole existence since that time.

Suggestions as to a Theory of Play.—The question now is as to whether, on the basis of the material which has been considered in the preceding pages, any general theory can be formulated. The following points are suggested in this connection.

It is presupposed, in the first place, that the individual is naturally active, physically and mentally. In considering play, the question is therefore not as to why the individual does anything, but as to why he indulges in the particular activities called play. The following factors seem outstanding: (a) Play varies with the physical and mental development of the individual. There is a gradual development from the more simple and active to the more complex and social, and the play of an individual at any particular age is in harmony with the stage of development he has reached. (b) Play varies with the physical environment and opportunity for play; play is activity which is in accordance in one way or another with the child's physical environment. Finally, (c) fads, fashions and conventions as to play, among both children and adults, are exceedingly important influences; play is activity which is in harmony, in one way or another, with the individual's social environment.

Because of the various ways in which these factors may operate, there are striking individual, community, and national differences in play, and differences from one generation to another. And yet there are also important com-

mon elements in the play life of children everywhere, because everywhere physical and intellectual growth proceeds in much the same way, because various fundamental circumstances and adult activities are common to most localities, and because play has in considerable measure become conventionalized. There is little evidence for any such common basic biological factor as is implied by the word *instinct*. Rather the most important phenomena would seem best described as the free activities of a growing organism in developmental interaction with a social environment.

It is necessary here to add a comment which, like the postscript in a woman's letter, contains some of the most important matter. Play is activity in which the youngster has the thrill of felt accomplishment. In play, he "works" at the level of his ability, where he can succeed. If a game is too hard for him, he drops out. Winning a game may not matter so much, unless the situation is so set up that winning is much stressed. But there must be the joy of catching the ball, making the canoe go, steering the sled around the curve, making the dress for the doll. Either a child or an adult may work at play and practice to learn how to do a particular thing. But when the activity really becomes play, success experiences are an essential part of it.

Play is thus an exhibition of activities which are most natural to a youngster in a particular total set of circumstances. It may take a great variety of forms. Within certain wide limits, which are essentially those of education also, it is highly modifiable. A teacher who will carefully observe the play life of her pupils will learn much not only about them but also about ways for improving her own

work. And if she can make play her ally, she may feel that she has mastered the teacher's art.

CHILDREN'S INTERESTS AS SHOWN BY READING, MOVING PICTURES, AND VOCATIONAL CHOICES

Three related lines of evidence regarding children's interests and their development are furnished by the study of their reading, the nature of their interest in moving pictures, and their vocational choices. Such interests can be studied in various ways. Reading preferences can be determined by the frequency of withdrawal of various books from public libraries, or the extent to which various volumes are worn or comparatively unused; librarians and teachers may be asked their impression of children's reading interests and preferences; and children may be asked at various times during the year what they are reading, or they may be asked to check on long lists the books they have read. The inquiry may extend to magazines and newspapers and include here not only direct requests from the children for indications of their likes but also the observation of children in libraries or elsewhere. In a study made under the direction of the writer, a student obtained a position as clerk at a newsstand and kept a record of the sex and approximate age of the purchasers of various magazines.

Movie interests can be determined by somewhat analogous methods. Pupils may be asked to check, list or describe types of movies which they prefer, name movies which they have recently attended, or check on long lists of pictures those they remember as liked or disliked; they may also be asked to list or check their favorite moving pic-

ture actors and actresses. Further impressions may be gained from such evidence as to the types of person or story which appeal. Attendance at movies, although it is inevitably influenced by the booking policy and other somewhat extraneous factors, may be of value. Observation of children's reactions to movies may in various ways be significant; there may be a record of the movies or episodes which are applauded either favorably or derisively or which arouse either favorable or derisive laughter. Children may be asked to indicate movies which they have seen twice, or they may be asked questions about various movies to see which pictures impressed them enough for them to remember the details afterward.

Here once more the reader will find it interesting to retrospect. In reading, memory may very likely go back to certain charming tales printed in large type and with line drawings, telling of other little children at the mountain or seashore or in friendly games together; there will be a lingering recollection of the satisfaction which was obtained in reading about the good times had by other children and somehow identifying oneself with them. Soon came, for the boy, a fascination in stories of adventure. Perhaps the *Swiss Family Robinson* was read and reread; the *Leatherstocking Tales* received their full share of attention. Still wilder tales may have had their surreptitious place, such as Nick Carter stories or other penny dreadfuls. Perhaps the Henty books took the boyish reader in courageous adventures to the most daring times of history. Or possibly the major interest was in tales of football heroes or triumphs in the ninth inning. With adolescence came a shift to the romantic story and perhaps also to the surreptitious reading of by no means respectable romances. Reminiscence of movie interests will probably show a gradual development

from the primary interest in adventure and the comics to more and more sophisticated, as well as romantic, presentations.

Reading Interests.—The results of investigations of the development of reading interests are roughly as follows. Children just beginning to read (about 6 or 7 years old) show special delight in short, profusely illustrated, rather fanciful stories about animals or fairies or other children. Typical are the *Peter Rabbit* books and the Thornton Burgess stories. Gradually there is a certain emergence from fancy to fact; and for three or four years, beginning with 9 or 10, the boys are interested in tales of active adventure, in invention and mechanics, in the lives of famous men, and in material about hobbies. A typical study (15) showed 32 per cent of the books to deal with war and scouting (such as Altsheler's *On the Plains with Custer*), 29 per cent with school and sport after the fashion of Barbour's *The Half Back*, 16 per cent with Boy Scouts, and 23 per cent with strenuous adventure such as in Mark Twain's *Tom Sawyer*. Around twelve or thirteen there may be a "reading craze," when the boy reads more books than ever before or after. Whole series, such as the Henty books, may be devoured. Meanwhile the girls read stories of home and school life, and show some interest in the boys' stories of adventure. A typical study of the books read by girls 10½ to 13½ years old showed that 37 per cent were studies of home life such as *Little Women*, 15 per cent stories of school life such as *Peggy*, 6 per cent fairy stories such as *Alice's Adventures in Wonderland*, 7 per cent were love stories; another 6 per cent had a historical background, and 10 per cent were miscellaneous. Relatively early, girls become addicted to romances and love stories

and sentimental trash (a level which many of them seem never to leave); and by the middle teens they are reading adult fiction.

Studies of newspapers and magazines (15) show almost 100 per cent of the younger children looking at the funny paper and, a little later, interest centering on stories, news, sports. Boys like *Popular Mechanics* and adventure magazines, of which the *Youth's Companion* and the *American Boy* are representative. Such a mixture of fiction and biography as the *American Magazine* affords was voted as most popular in one investigation, from age 14 on. The girls soon turn to such adult magazines as the *Ladies' Home Journal* and the *Cosmopolitan*; they also like the *American Magazine*. Magazines such as *True Stories* have a large appeal and magazines of adventure relatively little.

There are great individual differences in reading interests. For example, a boy may develop a hobby, such as archæology, mediæval history, the radio, or bridges, and read avidly along one special line. Available books in home and school naturally influence the reading choices greatly. A father's thrifty obtaining of a set of Poe with a magazine subscription led one small boy to a somewhat fearful reading of all that melancholy gentleman's short stories. The home library may be a very important influence, especially during the "reading craze." Gifted children read two or three times as much as the average child, and their reading is more likely to be informational.

The general trend is, then, quite similar to the trend shown by studies of children's play: first, simple little stories, then a gradual increase in complexity; in middle childhood, an interest in activity and mechanics on the part

of the boys, and in school and home on the part of the girls; and, with adolescence, a romantic interest. However, it is important to note this further point. Interests in both reading and the movies have a wish-fulfillment significance, for reading and movie choices show not merely what the person likes to do, but also what he would like to do or be, but cannot. The characteristics of the heroes and heroines at different ages are, therefore, especially important (15). Boyhood admiration is for strength, skill, courage, self-control; the hero comes through sundry crises to success and general recognition. Gradually in adolescence the romantic element is added to these characteristics, the hero being the handsome individual who wins the charming girl. The younger girl's heroines obtain the esteem of worth-while friends; this esteem usually involves an element of social position. Opportunities are described for the wearing of fine clothes and for pleasant social gatherings. There is the display of certain admirable social characteristics such as friendliness. The heroine of adolescence may still show such traits, but others become more prominent. She is attractive—if not beautiful, it is at least finally evident that she has sex appeal. She suffers bravely certain vicissitudes of love. And ultimately she is wooed by a most desirable young man. Usually either hero or heroine has wealth and social position, or prosperity is at least glimpsed around the corner.

Interests in the Movies.—As mentioned earlier, studies of the moving picture interests of children have been made by much the same general methods as were used in the investigation of reading and play interests, and the general findings are similar in character. The younger boys like

adventure stories, Westerns, and comedies (30). Girls of the same ages show the same preferences, but have an added interest in romance, clothes, society, and manners. The development is from the active, adventurous story (in which the characters are classifiable as either good or bad, the plot is stereotyped, and the conversation a negligible element) to the romantic story that unfolds usually against a background of wealth (with characters and plot nearly as stereotyped as before and with the conversation concerned mainly with love-making), and finally to the "adult" story in which the action is restrained, the characters a mixture of good and bad, conversations largely take the place of action, repartee is important in a subtle fashion, and the plot grows naturally out of the individualities portrayed.

During later childhood the boys prefer actors, and the girls, actresses. In adolescence, there is a marked change on the part of the girls, who concentrate on whatever man is the current "great lover" of the films; the boys do not show quite as obvious a shift, but they rank women stars far higher than they did at earlier ages. Children of all social classes seem to have approximately the same interests at the same ages, except that rural children show a marked preference for the Westerns and an especially marked avoidance of "society" films (14). In general, children dislike conversation and infinitely prefer action. During recent years the slapstick type of comedy has lost much of its earlier popularity.

Interest in the movies, like that in reading and day-dreaming, serves to give children a chance at vicarious adventure. By identifying themselves with the hero or heroine

they become, for the moment, the successful, daring character portrayed.

Movies have also a considerable effect upon play (30). Rôles of the hero and heroine are widely imitated in games. In most cases the victorious character played by the child in the play-situation is a "good" character; the bootlegger and robber are among the vanquished. Children seem largely to imitate those situations in the movies that fit in with interests already established, however; the imitation is not of any and every scene, but is highly selective in character (1). The boy interested in games simulating adventure copies a stagecoach robbery, just as his father copied the same scene from the circus. The young delinquent imitates a daring technique of housebreaking. The high school girl copies a new way of combing her hair, a new kind of blouse, a new way of setting a table. The adolescent boy who already has a biological urge toward girls but does not know how to approach them, imitates screen heroes—perhaps because only from the theater and from books can he obtain relevant information. The small boy who does not yet have the urge merely tolerates the love scenes and wants the picture to get along to something interesting. Thus pictures serve as models for activities and interests already more or less established.

Vocational Interests.—Further significant data with reference to this general topic are yielded by studies of the ambitions and vocational interests of children at different ages. The usual procedure is simply to ask youngsters what they would like to be or do when they grow up, or to ask them to check, on long lists of occupations, those which appeal to them most. In junior and senior high school it is, of course, possible to go further, and to obtain statements of vocational choice which in many cases are presumably not merely statements of interest but which

also take into account the actual possibilities for realizing these ambitions and available opportunities. These last-mentioned statements are, then, not purely indications of interest; they take some account of vocational reality. They have this added significance, in that they often have compounded in them the interests and ambitions of both the pupil and his parents.

The findings (8) are so much in accord with what has already been said about the development of interests that they need only brief mention. The younger boys desire to be firemen, policemen, soldiers, star athletes; that is, their interests are in the active and dramatic occupations. In middle childhood many of these interests continue; but in accord with the fascination which mechanical things have for many boys of these ages, there emerge ambitions toward engineering and invention. As the boy moves into adolescence these last interests may continue, but other interests appear. There may be a desire to enter business, law, or medicine, or to specialize in some high school subject, such as science or history. Various practical factors start to operate; the youngster begins to consider actual vocational possibilities, and he may look toward his father's occupation or the opportunities offered in a local industry. The social prestige of an occupation begins definitely to play a part. And since the white-collar job is considered more genteel, there is a general preference for such occupations as against the trades. In short, the boys again show a trend from the active dramatic occupations to the mechanical and then toward the influence of social factors.

Conventional attitudes operate much more than might at first be thought. Consider, for instance, the total disapproval

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lectual and the socially furthering; conventional attitudes play a large part; and vocational fashions are evident.

INCENTIVES

Pupils may initiate and for a time work enthusiastically upon a problem because of the immediate and direct interest which it has for them. In most school tasks, however, and in most long-time projects of adult life, the undertaking is kept going consistently as the result of influences somewhat apart from the activity itself. Thus, typewriting is practiced in the hope of obtaining a job, Latin is studied because it is necessary for entrance to the college of one's choice, the algebra lesson is ground out each day because of fear that one may flunk out of school, much time is spent getting ready for a dramatic tryout in the hope of obtaining a part in the club play, hours of grinding routine work go into writing a story for a contest in the hope of winning the prize, an uninteresting course in history is struggled with because the pupil wants to play football. Such motives and incentives are evidently a major factor in the dynamics of human conduct, and the wise utilization of them is a major problem in teaching. The question, then, is as to the effectiveness of such incentives in bringing about both learning and personal adjustment.

It should first be noted that the average pupil usually works far below his maximum capacity because he lacks adequate incentive. The reader need only recall his own superficial careless work in many classes to be convinced of this statement. Striking in this connection are results obtained in an experiment with two groups of college students (17). The first group consisted of ten freshmen in-

initiates to a fraternity who, on the last evening of a very strenuous "hell week" involving little sleep and much physical fatigue, in addition to the numerous embarrassments and emotional stresses common to such occasions, were required to spend twenty-four five-minute periods in arithmetic, being told that the results would play a part in considering their admission to the fraternity. This same work was later asked of 54 students working under ordinary classroom conditions, and presumably little fatigued or otherwise harassed. Yet the ten strongly motivated freshmen did remarkably well—almost twice as much work as the group working under ordinary school conditions.

The Effects of Social Incentives.—The total situation and the complex of incentives affecting these freshmen were, of course, very unusual. But very similar to ordinary classroom happenings was an experiment made by Hurlock (12). In fourth- and sixth-grade classes one group of children were named and praised before the rest of the class for their good work in arithmetic; the children in a second group were named and reproved for their poor work in front of the class; those in a third group were completely ignored, although they were in the room and heard the praise or scolding given the others. A fourth group were in another room and knew nothing of what was going on, but took the tests at the beginning and end of the experiment. The experiment continued for several days. At the end of the period, the children who had been praised showed the greatest progress, the reproved ones less, the ignored ones hardly any gain, and the fourth group no improvement. A somewhat similar experiment

was carried on with junior high school students (2). First a test was given. Teacher A then scolded her pupils as a group and threatened punishment if there were not improvements on the next test, while Teacher B commended her pupils and encouraged them to do better. The next day a second test was given, but Teacher A praised while Teacher B scolded. The total findings showed that 87 per cent of the pupils "did better after commendation."

Another experimenter (20) used various incentives as rewards—from chocolate bars to competition of various sorts, such as for the captaincy of a student group. The children participating in the experiment were also stimulated because they knew they were to be ranked on the blackboard according to their work. All types of reward brought about some improvement, but the social rewards were better than those of a material nature. When more than one incentive was used the output was higher than that brought about by a single incentive. Another study was made of the effects of competition as an incentive. With certain pupils it was found that rivalry between two children in a pair had more effect upon the work done than group competition between two halves of the class where the motivation came primarily from contributing to the total score of the group. Competition between groups, however, was better than no motive.

Further research upon incentives is especially needed to determine the possibility of social motivation of a cooperative rather than a competitive nature. It is already clear that group competition can increase individual output; for instance, a team of sixth-grade children (13) which was frequently informed of a gain over a competing

group, originally equal in arithmetical ability, was greatly stimulated to more and more effective work by both the competition and their own success. Under certain circumstances group competition may be even more effective than individual competition, but competitive activity may under other circumstances interfere with output. Working in a group apparently tends to increase speed, sometimes at the expense of quality. But the extent to which a cooperative, as distinct from a competitive, incentive might operate is not clear. From an early age the average American child constantly, in his play, his school, his home, finds the competitive motive developed to a high level of driving power. It may well be that the problem must await a differently organized non-competitive society before the value of cooperation alone as an incentive can be established.

The Value of Knowledge of Progress.—Of a different and very significant character is a study of the effect of knowledge of success and progress upon accomplishment. Two groups of fourth-grade pupils worked on a series of drill units in arithmetic (25). One group was provided with individual and class progress charts, while the other group worked without any such material. The two groups began with similar scores, but the one using the progress cards gained distinctly more than the other. In another instance, sixth-grade children who were being drilled on correct usage (32) gained distinctly more when each day they knew their score, their gain over the previous day, and their position in the class, than when they practiced without being informed of their progress.

It will be noted that these experiments rarely called for any punishment except reproof. The evidence for the disturbing

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as are harmonious with their physical and mental capacity, so that there are successes. Play is such activity as the child can succeed in. Books and the movies give opportunity for vicarious success and accomplishment of desire. Interests are nourished by success. Knowledge of progress is a highly effective incentive. (c) In play, in reading and movie interests, and in incentives, conventions are an important factor, differentiating the sexes, operating differently in different social and economic groups, in different nationalities and races. (d) Play activities, interests, and incentives are obviously affected by the total environment in which the child lives.

The assumption, then, is that the concept of instinct is unnecessary. It is assumed instead that the individual is naturally active, physically and intellectually. It is assumed, further, that in the progress of both physical and mental growth there will be a gradual increase in the complexity of physical activity and mental life; and it is further assumed that this growth may involve change, with changes in the physiological substrata; especially in connection with the sex tissues, there may be certain changes in the general tone and trend of activity. But there would seem to be no need for the assumption of elaborate innate reaction patterns. When small boys or men go hunting, it is rather to be inferred that they are following certain conventions of play, or copying certain adult activities of a more serious work character. And in connection with the multiple social factors, is it necessary to assume an instinct of "sensitivity to approval or scorn"? It would hardly seem so. With such a completely social animal as man, having such a long period of infancy and dependency, it would be most extraordinary if much of the earlier and most adequate learning were not concerned with social sensitivities. From infancy throughout life, people get things in proportion as they win

approval. Just as money comes to stand for everything that money can buy, so the attitudes of others toward oneself may well be found to have an even greater significance as regards the probable attainment of one's desires. After all, such learning need not be considered extraordinarily difficult, or the early development of such responsiveness surprising. Even animals learn to be acutely attentive and responsive to the slightly shown attitudes of human beings. Cats and dogs show surprising differences both in responsiveness and in mode of response to people, depending upon the family group in which they have grown up. It has been shown by Katz and others that in animal groups a certain social organization is built up.⁷ That in man such learning should proceed much further and that social attitudes should become involved with all other attitudes and largely dominate them, would seem inevitable.

PRACTICAL SUGGESTIONS FOR TEACHING

And now, what are the outstanding points in application to the work of the teacher? Perhaps the main suggestions may be summarized as follows:

- (1) Interests and incentives are highly social in character. The child is the product of the society in which he lives. Your work will be effective in proportion as you recognize these facts. Try to observe the social forces that are exerting pressure upon the children you teach so that you may sense what is driving them into their particular modes of activity.
- (2) Because interests and incentives come from group attitudes and conventions, they are highly modifiable. The schoolroom is one place in which this modification takes place. Try to realize that the potentialities of education are almost limitless in this field of controlling interests and incentives. What is already the product of modification can obviously be modified again.
- (3) Study the children in your classes to find out what they like to

⁷ In fact, observation suggests many parallels between problems of human and animal social adjustment. Thus, when all but one of a litter of kittens are drowned, the remaining little beast seems to develop a somewhat different behavior both to humans and to other cats. Psychologists talk of the psychology of the only child; it would be interesting to study the psychology of the only kitten.

play, to read, to see in the movies, and what they wish to become. Then try to harness these interests to the task of mastering the subjects in hand. If none of the work in school can be harnessed to any interest of the learners, there is something so radically wrong with the school that the chances of educating the children are very slight. Children's interests will drive them into activity; it is your business to guide this process so that the activities may lead to an education.

- (4) Remember always that interest and accomplishment are nourished by success, and that reading, moving pictures, and day-dreaming serve a major function in social development by furnishing vicarious success experiences beyond what are possible in reality. If you wish to become a wise teacher you will see to it that each child often has the thrill of sensed accomplishment. An essential part of your job is to adjust work to capacity so that each child *can* succeed.
- (5) Try to use the natural interests of children instead of trying to repress them. If you can do so, your worst problems of discipline will never appear, and you yourself will achieve a well earned feeling of success in the art of teaching.

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CHAPTER V

THE SOCIAL PSYCHOLOGY OF CHILDHOOD AND ADOLESCENCE

IT WAS pointed out in the previous chapter that the interests of children are within wide limits determined by the groups with which they are associated, and that adolescent interests are almost entirely social in character. It was also emphasized there that the incentives and motives influencing both children and adults are primarily social; and in the next chapter problems of emotional stress and of delinquency will be seen as almost wholly social in origin. In the pupils' social development is thus to be found the key for understanding the most difficult problems with which a teacher has to deal. The guidance of this development along healthy and desirable lines might well be the first purpose of a modern school; the almost complete neglect of this phase of the child's education might be called the outstanding weakness of the traditional school. A broad, yet concrete and practical, consideration of what may be called the social psychology of the school years is therefore an essential of educational psychology.

In this connection it must first be realized that the school is only part of the child's life—and that vitally important and even crucial happenings in the pupil's existence may occur completely "off stage" as far as the school is concerned. The pupil really lives in three different social worlds—the home, the school, and the "child society"

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Types of "Poor" Homes.—By a "poor" home many people seem to understand one that lacks money, good sanitary conditions, and physical comforts. To be sure, in a poverty-stricken home children are likely to grow up with inadequately nourished bodies, meager education, minds functioning on a low level, and a twisted outlook on life. But such a home is only one of many types, and it is probably less frequent than some of these other types. There are many homes in which mere lack of money is no more than a contributory factor in any case, and often no factor at all, but which are what might be called "psychologically poor homes." A few illustrations will serve to bring out certain typical situations that make a home "psychologically bad."

Arlene was an only child of a widowed mother. All during her childhood she was troubled with asthma, although probably not in sufficiently serious form to have prevented her from going to school if her mother had not preferred to keep her at home as company. Arlene never attended school until she was eighteen years old; her mother tutored her at home. The child was never allowed out with other children because her mother feared the play might become so rough as to precipitate an attack of asthma (though as a matter of fact there seems never to have been any attack sufficient to justify the child's exclusion from normal childhood society). As a result of all these precautions, Arlene grew to be a reserved, shy, repressed young girl who, when she first entered public school, had not the faintest idea of how to get along with young people of her own age. Her mother had communicated to her some basic facts about sex relationships but had colored this information in such a way that Arlene had an abnormal dread of allowing any boy to so much as touch her. After high school she went to a girls' college in her own home town

and continued living with her mother. She found that she liked the society of other girls but did not know how to get along with them, that the girls did not like her, and that many of her customs and ideas aroused ridicule. When she was about 20 she experienced a sort of nervous breakdown which consisted essentially of a conflict between her desires for the social approval of her classmates and her fear of attempting any social relationship. At the end of this period she apparently made a decision to continue her policy of isolation. From then on her work has always been satisfactory but her personality is still in many respects that of a child.

She is now a woman about forty, and has become a reference librarian—an occupation which permits her to stay mostly by herself. She still lives with her mother in a large house built by her father at a time when he expected to have a long life and a number of children. Arlene is an intelligent, efficient worker, but she has never had any normal social life or the slightest love affair of any kind, and she continues to be sheltered and protected by her mother. How she will adjust herself after her mother dies is a serious question.

As everybody knows, the favored child is more or less of a nuisance. The writer has a friend who has six children, the third of whom has some artistic talent. The mother herself was interested in drawing and painting as a girl and is very happy to find one of her children following her in similar interests. She has therefore neglected her other five children even to the extent of taking classes in art school with her ten-year-old daughter so that she can keep up with Evelyn's progress. Little Evelyn, however, is no fool. She capitalizes on the situation at every opportunity. Where the other children in the family all have to take their own dishes out into the kitchen and wash them after dinner, the mother or somebody else usually waits on Evelyn. Where the other children have to go to school regularly and to church on Sunday morning, Evelyn is able to dodge either school or church by the simple expedient of get-

ting out her paint-box and showing signs of artistic activity. If there is housework to do, it is never Evelyn who does it. Whenever one of the other children becomes incensed at the family injustice and reacts to the situation by an outburst of temper, by "picking on" Evelyn, or otherwise, the child is immediately punished; Evelyn's tears are dried by her mother, who promises to protect her from further aggression. The net result is thus a home in which five children are growing up with an antagonism toward both their mother and their sister, while one child is developing complete dependence upon her mother and a feeling of superiority toward not only the children in her family but all other children with whom she comes in contact. She expects everyone to give way for her. On a recent occasion a visitor to the family happened to take more notice of Evelyn's little brother than of her. Evelyn presently walked up to the visitor and tried to get attention in a number of childish ways. When none of these succeeded and it was evident that her brother for the moment was to be the center of attention, Evelyn threw herself on the floor in an outburst of temper, kicked her heels, yelled and cried for some ten minutes until she had finally focused the attention of the visitor upon herself. It is easy to see that this whole situation is just about as bad for Evelyn as it is for anybody else; but all six children are growing up with twisted personalities because of the mother's absorbing interest in one of her children.

The writer once knew a ten-year-old boy who was a chronic absentee from his home, though not a truant from school. This boy rarely went anywhere in particular, nor was he as comfortable hanging around alleys, dozing in doorways, slipping into garages, or walking the streets, as he could have been in his own home where the standard of living, from a material standpoint, was above average. He seemed, moreover, to be alone in these expeditions. There was at first a suspicion that he was getting into petty thieving or sex adventures, but there seemed no evidence to support this theory. Investigation of the

home, however, yielded illuminating results. The mother was having an "affair" with an automobile salesman, an older sister was engaged in one amorous episode after another, and the father was guilty both of incest with his oldest daughter and of homosexual relations with his oldest son. It was supposed that the boy in question knew nothing of all this, but actually he had known a good bit for two or three years. It is probable that he had been subjected to sexual experiences with various members of his family, although such episodes were either purposely suppressed or actually forgotten. In any case, the home had become a place of horror and a source of abject shame—so much so that even nights in the cold dampness of city alleyways were preferable.

It is an educational commonplace that a divided home, whether or not there has been a divorce, is a poor environment for children. The writer knows one adolescent boy whose parents were divorced just after he entered high school. He spends six months of the year with one parent and six months with the other. The divorce was granted upon particularly unpleasant grounds, and this boy has had to listen to both sides of the story from his parents. In neither home is he permitted even to mention the other parent. Neither parent approves of the way the other one is bringing up the boy during his or her six months of possession. The result has been all too obvious. Although he entered adolescence with a normal social adjustment, he has now become quite estranged from his former friends. In the first place, this shifting of residence every six months interrupts any acquaintanceships which he may develop in either place. He is, therefore, regarded as something of a wanderer, and the other adolescents do not quite understand why he does not stay in one place any longer. Some of them are acquainted with the grounds of the divorce and make unpleasant comments upon them. In short, he feels himself the center of disagreeable comments and criticisms wherever he goes. He has changed from a cheerful, lively,

well-adjusted boy to a distinctly isolated, introverted, unhappy personality. It is not unnatural that his school work has suffered during this period; and recently there have been certain minor delinquencies which, while not particularly serious in themselves, are symptoms of an unhappy and unadjusted individual. His latest grievance is that he cannot join certain high school societies in the town where he lives, because the father does not have money enough to pay the dues, whereas in the town where his mother lives there are other societies that he does not care to join, although the mother has plenty of money with which to pay the dues there. On the whole, the boy is miserably unhappy and is carrying around with him a load of maladjustments caused almost exclusively by his home situation.

Everett (23) came from a "good, old-fashioned" home. He attended church twice a week, was active in the Senior Endeavor, was vigorously opposed to smoking, dancing, card playing, drinking, or petting. He regarded most modern novels as filthy, and suspected the morals of any women younger than his mother. All thoughts of sex had been rigidly suppressed. He was Sir Galahad come to life—but a good deal of a nuisance around a fraternity house. He tried to maintain his standards, but the steady influence of jokes, bull sessions, tales of friends' amorous adventures, and pornographic literature have gradually brought him to a state of complete bewilderment. The situation is intensified by his parents who talk to him frequently upon the evils of life, tell him how boys who think too much about sex go insane, insist upon his continued acceptance of religious dogma, and warn him against falling in love. In his college classes he finds many things which affront his religious beliefs; in his social environment he finds many friends, whom he admires, but who break every restriction he thinks essential to a decent life. Everett is the epitome of bewildered adolescence, trying to find an adjustment between the narrow uncompromising views of his home and the

more lenient standards of society. His parents have managed to ignore the realities of modern existence; by so doing they have passed on to Everett a crucial problem of learning, somehow, to get along in a society that outrages his ideas of decency at every turn. While the process is taking place, Everett's academic work is suffering. And on every visit home his parents catechize him to discover what evil habit is sapping their son's vitality. Neither he nor they can see the distinction between social conventions and fundamental moral issues, or between theology and religion, nor appreciate the possibility of healthy companionship between the sexes, and a sensible knowledge of the facts of sex without immorality. Whatever the outcome, bitterness and misunderstanding are almost sure to result.

The above cases illustrate the "child-isolating" home, the home with the favorite child, the immoral home, the divided home, and the narrowly moral old-fashioned home. But this list by no means exhausts all the types of poor homes. Also to be mentioned are the home where there is chronic dissension (whether or not the child is directly involved), the home from which the adults are chronically absent during the hours when the child is out of school, the home in which foreign customs and attitudes are so insisted upon as to force the children to adjust to two different types of customs and attitudes, the home that is antagonistic to school and to all endeavors on the part of the children to better their position in life, the home so totally out of keeping with others in the neighborhood that its children are constantly gibed at and are not acceptable to those who would otherwise become their friends, the "high-pressure" home that keeps pushing its children along in school or into other lines of activity until they are under

constant strain, the home that takes in boarders (in case these individuals are of questionable character or their presence is a source of irritation), the home where the children are neglected because the parents either are overworked and cannot care for them or are wealthy enough to leave them to be brought up by indifferent hired help, the home where there is only one parent (although an unusual parent may be able to compensate for the lack of either father or mother), the home that lacks discipline and allows the children to do as they please (thus imposing upon their parents and upon one another), the home of which the children are for any reason acutely ashamed, and the home that contains one totally atypical and hence misunderstood child. Even this list does not exhaust all the possibilities of psychologically bad features of home environment. The cheerful thing about these various unfortunate home influences is that most of the difficulties can be corrected if the adults in the home once understand what is happening. Parents love their children; but they nevertheless impose their own ambitions upon them because they do not foresee what effects such action may have. By educating parents—and especially by educating the next generation of parents—it should be possible to get rid of many of these situations which, as a matter of fact, are about as unfortunate in their consequences for the parents as for the children.

Characteristics of "Poor" Homes.—In reading through the above list and in further consideration of other types of poor homes one has known, the question naturally arises as to whether there may not be some way of summarizing

the general features of the poor home. The writer suggests the following principles:

The poor home fails to give security to children. Constant nagging, criticism, quarreling, emotional scenes; absence of the parents when the child needs them in a crisis; presence of outsiders, whether relatives, boarders, or servants; open neglect of children's needs; continual efforts to force children beyond their capacities—all these things mean that the child cannot relax and feel safe in his own home. After all, children are not very big or strong or capable in self-management; the world has its terrifying aspects, and emotional crises are many. If a youngster cannot trust his home to protect and guide him, it is a poor home—no matter what material comforts there are or how secure the place may seem to the adults who live there.

A home is "poor" if it is passing on its own burden of maladjustment to its children. The foreign parents who force their customs upon their Americanized youngsters; the home dominated by generally outgrown religious and moral standards, no matter how sincere the belief in them may be; the home that is completely out of touch with its neighborhood group because of its own inherent peculiarities—any of these are merely thrusting upon the children a task of social adjustment that the adults themselves were unable to complete. The efforts of the children to straddle two sets of customs usually ends by a repudiation of one or the other, and usually, if the child has enough vitality, in a definite break from parents and their modes of thought.

The home in which children are unfairly treated is sure to cause trouble. The home that differentiates the others in its treatment of the favorite child, the eldest child, the youngest, the ugly duckling, the unusually bright, the unusually dull, or the physically handicapped child, is a poor home—both for the child who is thus singled out and for those who are not.

The completely adult-dominated or totally child-dominated home are poor places for either child or adult. The one leads

to a repressive attitude, ridicule of children's naïve but honest efforts, antagonism toward children's educational or other plans, and a general attitude which maintains the old-world idea that children are assets because they can be made to contribute either to the physical comfort of adults or to a pleasant expansion of adult egos. The child-dominated home is almost as bad, and is often at its worst in the case of the only child who is the center of attention and whose slightest whim assumes the proportions of a command.

There is no doubt that homes are gradually becoming better places to live in, as regards both material comforts and emotional tone. Just as the present generation of babies is being brought up much better than their grandparents as far as diet, hygiene and health are concerned, so too they are being better educated as regards discipline, self-direction, personality, and social adjustment. The poor home may never disappear; but if all that is known about the reactions of children to their home situations can be made as much a part of common thinking as many matters of physical hygiene are rapidly becoming, there should certainly be many fewer maladjusted parents and children, and many more harmonious homes.

The teacher can help in the spread of such ideas in the course of the inevitable talks with both children and parents. She needs also to have an understanding of the social forces in the home for the very important practical reason that the child inevitably brings to school with him the maladjustments he finds at home and his school work is much influenced by this emotional load. Probably a majority of the problems of discipline and motivation have their roots in a "problem home."

THE CHILD AND HIS SCHOOL

The Influence of the Teacher.—The central figure in a schoolroom has always been the teacher, for it is she who daily guides the destinies of those she teaches. In the past she was an even more dominating figure than at present—in fact, too dominating for the healthy personal development of many children.

Anyone who does not already appreciate the dominating position of the teacher, both in the schoolroom and in the total social world of the school child, should think back over his or her past experiences with teachers. If the reader has been in a school system where promotions were made every half year and has attended both a junior high and a high school, it is probable that he has been taught by about thirty different teachers and has, therefore, some little basis for judgment concerning them. Such queries as the following might arise: Have you never had in class a teacher who told you exactly how and where you were to stand when you recited, decided for you what other student you might work with on any project involving more than one person, insisted on your writing compositions upon topics of her own choosing, instructed you exactly how problems were to be solved, and was not willing for you to use any technique of your own? Certainly you have had at least one such teacher, who stifled any inventiveness or individuality on the part of her pupils. Did you, most likely in your early days in school, have a teacher who mothered and protected you far beyond your needs, and who became almost a mother-substitute in your own thinking and emotional attitudes? Was there never a teacher who had distinct favorites and marked dislikes among the pupils? Do you not remember the pretty little golden-haired girl in the front row who was always the one sent out of the room on pleasant errands for the teacher, who brought the teacher flowers, who always got the cleanest paper and the

best-sharpened pencils; and was there no difference in the teacher's attitude toward this child and the "ugly duckling" who sat behind her and dipped the blonde curls in the inkwell because there seemed no other way of getting even momentary attention from the teacher? Did you not have, during your high school career, a teacher who more or less openly fell in love with some student in the class, or, even more frequently, a teacher who permitted students to fall in love with her? Do you not know certain acquaintances who dropped out of school because of their dislike of some certain teacher or teachers? On the other hand, do you not have acquaintances who have gone on in a particular type of work for which they were ill-adapted and in which they had no real interest, merely because the teacher in whose class they had been taught the elements of this subject was a very likable personality, and your acquaintances mistook interest in the teacher for an intrinsic interest in the subject itself? Have you not yourself been influenced into altering your own behavior, often distinctly for the better, through the dominant position of a particular teacher in your scheme of existence? If the reader will think back over the teachers in whose class he or she has sat, it will undoubtedly be clear that they have had a more or less permanent influence for better or for worse.

One of the efforts of the modern school is to make the position of the teacher less dominating, to make her less of a dictator and more of a comrade to the children. The teacher is considered as a guide who tries to turn natural childish activities into useful channels, and as one who may, through the utilization of childish interests, bring about an education. Because of her dominant position in a child's life, a teacher who does not take into consideration the social psychology of childhood can do much harm—even with the best of intentions. The following is an example (20):

"U" had always gotten on well enough with other youngsters and was reasonably popular until he began to study Latin. The Latin teacher was strict and unpopular, but this lad worked hard and did unusually well, with the result that the teacher singled him out, praised him, pointed out his excellence to the others, and generally held him up as a model for them. The boy liked this recognition of his efforts and was encouraged to study still harder. However, his former friends began to turn against him, and even to sneer at him, because he was so obviously a teacher's favorite. Since he was no longer asked to go with others during his leisure hours, he began devoting himself still more to study, an activity that led to greater mastery of Latin and, in turn, to further praise. Gradually he withdrew altogether from social contacts, eventually developing an introverted personality; and by the end of the year he had changed from an acceptable, sociable, agreeable boy to a brooding hermit simply as a result of the lavish praise publicly bestowed by an over-zealous teacher. The isolation continued into the university and was the determining factor in his whole later life.

The above study also in part illustrates an attitude toward children that has been found common among teachers. In general, teachers like those children who are quiet, obedient, and passive, and dislike those who are original, unusual, and active (35). Of course, the latter are the more troublesome in the conventional classroom, but the fact that they are nuisances in a rigid routine does not prevent them from being both more normal and more promising than the quieter children. The writer has heard more than one teacher openly praise the behavior of a prospective dementia præcox case, who was, to be sure, no trouble whatever to her since he sat passively still unless told to do something, whereupon he carried out directions

in a stolid and conventional manner. Repressed children are almost always "good"; and any healthy, vigorous child in an average schoolroom is sure to have moments of "badness" when he and the teacher fail to see eye to eye on what should happen next. As a matter of fact, the teacher usually need not worry about the over-active, mischievous child; he will work out his own destiny. But the shy, repressed, diffident child needs quiet, tactful encouragement and help in finding assured and comfortable relations with other children and with the teacher. Thus aided, such a child may develop remarkably; but without such help he may continue throughout life at a level much below his real capacities—or perhaps ultimately develop some chronic neurotic or even psychotic condition.

A recently reported case (34) illustrates very well how continued teacher-indifference and misunderstanding may permanently stunt a sensitive child's development. A sensitive girl, of good ability, met with nothing but chilling indifference or actual rebuffs to her early childish enthusiasms and efforts to "make good" with her teachers. She became shy and hesitant, seemed to her high school and normal college teachers to be of very mediocre capacity, accepted this evaluation, and is now herself an unhappy, unsuccessful teacher in a small town. A little encouragement and intelligent help from any one of her teachers might have made over her whole existence.

One further word remains to be said, especially to teachers in high school. Unless a teacher is totally uninteresting or given to repulsing every sign of friendliness made by the pupils toward herself, she is sure to be confronted sooner or later with some girl who has a "crush" or a boy who has an attack of puppy love. Such situations call for both

tact and prompt action. Perhaps the best thing for the teacher to do is to find something objective and unemotional that the boy or girl can do for her; at the moment they are burning up with energy that they are only too glad to expend on her behalf. Assisting her gives them a natural outlet for their emotions, which will otherwise find forms of expression embarrassing to all concerned. Steady, routine, unemotional tasks will soon wear out the usual transient devotion—and that is an end to the matter. In cases where the feeling does persist, though it becomes less profound, there is the basis for real friendship; gradually the intensity of emotion dies out, and what is left is a sincere liking that is an asset to both teacher and pupil. During the violent stage, however, the main things for the teacher are (a) to provide outlets, and (b) to prevent any possible scenes by arranging that the pupil concerned is never alone with her. Such a program will usually carry even the most flaming devotion through to a state of indifference without loss of dignity and respect.

The Social Atmosphere of the Schoolroom.—The relation of the teacher to the individual child is undoubtedly an outstanding element in the social psychology of childhood. Important also is the “atmosphere” of the classroom, for it is possible to develop a feeling of naturalness and nervous relaxation or of tense effort and artificiality. Much of the school’s influence on children depends upon this “atmosphere,” which may cause them to love school or to dread it. Thus in some schoolrooms a child may not move out of his seat without asking permission, may not ask the simplest question of his next-door neighbor, may speak only when spoken to, must stand up while he recites,

must always go to and from his room in a line of pupils, and must suppress all the activities which interest him outside of school hours. In other words, there is a very definite break between school, which represents work, and play, which represents something quite different. In the past, the atmosphere of the schoolroom has generally been one of formality and repression. Progressive teachers are attempting to change this situation and to make the school a place in which natural childish activities and interests may be guided in such a way as to bring about a good education. The effort is to make the school the center of childhood society, rather than a place in which children become unsocial, or even anti-social.

Take, as an example, the preparation of a lesson in geography. If thirty children in a schoolroom are all told to study the geography lesson for a half hour, it is practically inevitable that some whispering and talking will occur. In the old-fashioned school such communications almost inevitably were regarded as signs of disobedience. The goal of the teacher during such a period appeared to be to keep the children quiet. She did not seem to realize that such quietness meant mental stagnation; for if any real mental activity is going on in a classroom, there is almost certain to be some physical activity also. There would seem no good reason why the children who are preparing their geography lesson should not read for a little while, and then get together in small groups, each one of which is to work up for presentation to the others a certain portion of the lesson. Such an arrangement gives the children a chance to talk, in a profitable way, about their work, rather than leaving them to the inevitable surreptitious whispering about inconsequential matters. It gives them an opportunity to move around, and thus removes the strain which comes from holding the same posture for any long period of time. It also

gives them a chance to learn how to get along with one another, to fit into a group, to cooperate toward a common end. Moreover, it provides an atmosphere of eager interest and participation in something really exciting. In schools which have tried to socialize their work, the achievement in school subjects seems to be at least as good as it was before, and, in most cases, better. In addition, the children learn something much more important for both present happiness and adult success—they learn how to cooperate with one another. A feeling of naturalness and security from undue repression during school hours is unquestionably an important favorable element, and a feeling of repression and artificiality a positive detriment.

One further point must be stressed as regards the classroom situation. A class, as a group of children carrying on common tasks under the guidance of the teacher, becomes a social unit having certain characteristics as a group and developing a certain group morale. A vigorous teacher can do marvelous things in developing in such a group splendid traits of cooperativeness, loyalty to the group, and interest in worth-while endeavor; under an indifferent teacher or a frequent change of teachers, there can be a certain moral deterioration, as has been shown by actual experimental data (12). Teachers should realize their responsibility in this respect, and should appreciate the extent to which children are capable of developing a group consciousness (9)—as will be indicated in the discussion of child society.

Not only a class, but a whole school, may thus develop a morale of great educational significance. The writer once knew of two high schools which strikingly illustrated this fact. One was under a vigorous principal who had been head of the school for many years, had chosen his teachers in accordance with his ideals, and had built up habits and ideals of conduct

which permeated the entire school. The other school was subject to school board politics, had changed principals every year or two, and was notorious for its chronic scandals. The influence of the first man not only pervaded his whole school, it affected the entire community. The influence of such devoted principals, and of teachers thus devoted to their work, is one of the finest products of education.

The School as a Center of Student Social Life.—In addition to the influence of the teacher and the classroom upon children, there is a further rôle played by the school in the social life of childhood and adolescence. The school acts as the ever-present background for the development of the child society to be described in the next section. It is largely at school, on the way to and from school, or on the school playground, that children make friends with one another. Many a friendship has developed between pairs of children because they sat next to each other in school. The writer recalls one instance in which a boys' club resulted from the simple fact that a half dozen youngsters rode daily to and from school together on their bicycles. The school not only contributes in these incidental ways, but also makes direct efforts to provide for social life among its pupils. Thus the school play, the classroom party, the Hallowe'en party, the school Christmas tree, furnish opportunity for socialization. Especially in the junior high and high school years is the school a vital background for the flowering of social interests. Club meetings, dances, rehearsals, team practices, parties—all these go on within its walls or under its supervision. And the teacher should realize that in providing for these activities the school is

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the characteristics of one level shading gradually into those of the next without any break, and that there are large deviations on the part of individual children from the typical behavior described below; nevertheless, it will be found profitable for descriptive purposes to distinguish roughly the following levels of social development: early childhood (3-6 years of age); middle childhood (7-11 or 12 years); late childhood or pre-adolescence (11-13 years for girls, 12-14 for boys); early adolescence (13 or 14 to 16 or 17); and later adolescence (18-21).

Early Childhood.—Before the age of entrance to school, and for a year or more thereafter, the average child is relatively more individualistic and less social than at any later time. Observation has shown that any really social activity is infrequent at the beginning of this period (1), that most of the time children experiment actively and alone with material objects (1), that competition between children is not brought about even under pressure (11). Not until after the age of four, and sometimes not until as late as seven, is the child sufficiently aware of the presence and attitudes of other children to compete with them. As late as the first grade (19), at least 25 per cent of the free conversation among children appears to be virtually a monologue, not used to serve any social aim (as determined by careful verbatim stenographic reports). During this period children do develop a number of individual friendships, but their reactions to group situations are relatively slight (22). Such groups as are spontaneously formed are small, being composed of 2, 3, 4, or 5 children (15), and even these small groups do not stay together for more than 15 to 20 minutes. The child's awareness of any norms of social

behavior, except those specifically taught him by adults, seems rather slight, although by the end of the period some progress has been made in the simple social skills of waiting for one's turn, taking it when it comes, playing games according to rules, not tattling on other children, and the like. The outstanding loyalties, or emotional attachments, are for adults, usually the parents or the teacher. Adults are still the child's main source of social and emotional satisfaction.

Middle Childhood.—Children of these ages typically play together in preference to playing alone. The groups are composed of from 6 to 8 or 10 children, with some tendency for these groups to be unisexual. The games engaged in require a certain amount of cooperation among the members, but are usually competitive only between individuals. The group is not hard and fast as to membership; its personnel varies considerably from time to time. Group undertakings are fairly frequent, although many of them are not completed because the group does not hold together long enough. The children within a single group (16) are usually from families of about the same socio-economic level, they live fairly near one another, and they are of approximately the same mental age. The group begins to have a definite effect upon the children, who can be trusted to teach each other very thoroughly the advantages of playing honestly, doing one's share of any work, dividing the spoils evenly, and so on. Children now show a clear preference for other children rather than for adults. In fact, one of the great values of child society is that it breaks up a child's emotional fixation upon his home—a devotion of immense social value among younger children but of

decreasing utility as the children grow older. It is during this period of middle childhood that the often too-intense parental attachment (the normal mother- or father-fixation of the small child) is meeting with its first real competition.

Later Childhood or Pre-Adolescence.—These are the years when the “gang” is often the chief motivating force in a child’s life. The gang is typically composed of children of the same sex and of similar social backgrounds; similarity of mental and chronological ages is not always apparent. The size is somewhat larger than for the previous period, about 10 to 15 children, and the group has a much more closely knit organization. It is usually clear who is and who is not a member; there are certain specified places and times for meeting; the activities are usually social in nature; there may be a particular badge or other sign by which the “belonger” is known; there is often an element of secrecy. There is in most groups a definite leader. Since the group takes its character from that of the leader, several studies have been made of these outstanding children (7). It has been found that leaders are usually normal or slightly above in intelligence, usually larger than the other children of the group, socially more mature than the others, of an extrovert personality, and in general the “good-mixer” sort of individual. A really good leader is bright enough to think of interesting things to do, and, through a combination of the gentle word and the iron fist, he can hold the group together until the satisfaction of accomplishment becomes an additional and often sufficient motive for finishing the undertaking.

Many people seem to think that because a few gangs are bad, all of them necessarily must be. Quite to the contrary,

they are actually among the truly educative influences of a child's life. The gang is a powerful influence which is good more likely than not. It demands loyalty and cooperation as no other agency in childhood does. And because the boy or girl submits to this domination, he or she will inevitably learn at least some of the tricks of civilization. Competition between gangs is common and is not a bad thing unless it takes on some anti-social form of expression. If children are allowed to develop their own society with only such aid from adults as may be needed to prevent anti-social behavior, they will give one another a thorough grounding in such social techniques as working harmoniously with others toward a common end, settling differences of opinion, being decent and responsible toward one another, and so on. The writer has seen a group of boys constitute themselves an informal court on a question of ownership of a baseball bat which had been lost, conduct a hearing that included citation of boyhood "common law" such as "finders keepers, losers weepers," and settle the matter with a fairness, intelligence, and directness which might well be the envy of adults. The writer sometimes doubts if adults *can* teach children these desired social traits; but children can and will instruct each other.

The gang is for most children sufficiently forceful not only to break down still further the early childhood fixation on the parents or other adults, but also to substitute a new fixation upon one or more of its own members. If the boy or girl of 11 or 12 years of age will tell whom he or she likes most, in circumstances where there is no compulsion to show the conventional devotion to parents still expected by adults, the answer usually reveals the main

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derstanding and respect through hours spent in tinkering with an airplane motor. If such clubs are well organized they become cross-sections of the school population. Finally, these groups are usually so managed as to give the boys and girls preliminary training in the handling of formal meetings: there are duly elected officers, the children learn the duties of each officer, the meetings are formally called to order, the members learn that only one person may have the floor at one time, that motions must be seconded, that the will of the majority must be obeyed, and so on. These clubs are so valuable from so many points of view that many schools set aside one hour or more of school time each week for club gatherings; each child may go where he likes, the only requirement being that he attend the meeting of some one of the numerous clubs. Such gatherings lose their value if the adults of the school dominate or interfere too much, although some control is necessary if the clubs are to serve as educative devices.

It is during the period of early adolescence that a final shift in the nature of the "love-object" should take place. The attachments between boys and girls of this age are desirable and necessary for the development of both. However, the shift to heterosexual interests will be satisfactorily made only if there are plenty of potential love-objects in the immediate environment; the girl must have a number of boy friends, and the boy a number of girl friends. Spontaneous adolescent society will provide such acquaintances if adults do not interfere unduly. Many psychiatrists have called the achievement of heterosexuality (a natural healthy interest in the other sex) the main problem of the

adolescent years. Certainly this problem (36), and the problem of getting free from crippling home control (13), are the two outstanding tasks of the adolescent boy or girl. Sometimes parents, in an excess of fear that "something will happen," surround the adolescent with so many restrictions that *nothing* happens, and the boy or girl never entirely grows up—a far worse tragedy than any the parents were trying to prevent.

Various outcomes, all unfortunate, may result from such excessive restraint. Sometimes the second type of fixation (centering affection upon someone of the same sex) continues into adult life. Such a situation, which may be more or less completely homosexual, is especially likely to develop in the case of girls who are sent first to a girls' boarding school and then to a girls' college, and who, in consequence, do not during their adolescent years form the many friendships with boys which would naturally bring about a healthy shift to a heterosexual interest. Or the shift may be made, but acquaintance with the other sex be so limited that a satisfactory mate is not found; or the other sex may be so idealized because of lack of acquaintance that when marriage takes place the discrepancies between ideal and actuality are a chronic source of unhappiness. Or a mother may manage to keep a son's emotions centered upon herself through childhood and into adolescence so that he either never escapes emotionally or else falls in love with an older woman who is a "mother substitute." A father-daughter relationship may be analogously prolonged to an unfortunate outcome.

Later Adolescence.—As mentioned in the first chapter, this period is beyond the ages with which this volume is primarily concerned. Boys and girls of these ages are typically, and most desirably, away from home, either at college or at work. Even if they continue to live at home the

family sees little of them, for the new life outside of the family circle is too alluring. The college fraternity or sorority is a climax to adolescent social trends in its undemocratic character, formalities, and insistence upon the loyalty and conformity of its members. Also characteristic are the extra-curricular activities, which on the whole are educationally valuable (6), but which usually do not reach those who most need such experiences. In the work world, social groups grow mainly out of associations in work, in the boarding house or neighborhood, in church, lodge, or other organizations to which one may belong. A distinguishing characteristic is the change in the attitude toward work, in school or out. The boy or girl realizes that he or she must earn a living, and the achievement of economic independence becomes the major objective. With the attainment of that goal, and with the selection of a final "love-object" or mate, there is completed the emancipation from home begun the day the child entered the first grade. The child has become an adult.

Summary.—In looking back over this spontaneous social life at various levels, one is struck with the following general trends: The typical group grows from 2 or 3 children to 20 or 25 as the years go by; the groups tend to become more closely-knit and to draw a more clear-cut line between the member and the non-member; the complexity of the activities undertaken by the group and the resulting requirements for cooperation increase from period to period; the dominance of the group over the child's activities becomes stronger and stronger. The groups are of great social value in teaching children fundamental social skills and attitudes, but the values tend to be received in inverse

proportion to the need of them. The child's emotional attachment begins with devotion to his parents or other adults, gradually changes to his most intimate friends of his own sex and about his own age, then shifts to persons of the opposite sex but about the same age, and finally narrows down to a single person of this last type.

THE PRESSURE OF ADULT SOCIETY

During childhood, adult society and child society rarely affect each other explicitly to any great extent; adults hardly realize that there is a "child society." As children become adolescents, their interest in adult activities naturally increases and their society gradually takes on the characteristics of the adult groupings until the two merge. From early childhood, however, amusements or activities designed primarily by and for adults attract the attention of children and influence them in their attitudes. And in innumerable subtle ways—in talk at home and conversations overheard on the street, in neighborhood and school gossip—the words and, still more, the acts of adults have their profound influence upon the formation of child character. These adult influences upon child society remain for brief consideration.

It would be difficult to exaggerate the importance of such influences. The competitiveness of childhood games may conceivably be a product of a competitive economic system; recent experiments in Russian schools (25) (28) are of great interest in this connection, as showing the extent to which the attitudes of a child group are influenced by the adult life around it. Children from different social strata show different habits in group conduct. The whole subject is of fascinating importance, and deserves much wider investigation.

Community Morale.—Influences coming from a given neighborhood are always important in considering an individual child. It will shortly be shown that delinquency, as a type of behavior, seems to be developed especially in certain neighborhoods. Various communities may differ strikingly in community spirit, moral tone, and direction of interests; sometimes the intellectual and moral tone seems attributable chiefly to the influence of one vigorous individual. The nature of the local industry is an important factor. The social groups in a community differ markedly in their points of view and in their influence upon children. In certain adult "crowds" freedom of speech, freedom of attitude toward the Eighteenth Amendment, and various other freedoms, are a matter of some pride. In certain such groups children are regarded more or less as being in the way. In other groups, totally different patterns of behavior are developed.

Two specific examples of such influences have recently come to the writer's attention. In one community it is a habit for adults to shepherd small children across street intersections, or otherwise to help them, and to comfort any child in the slightest trouble. There is a common adult attitude of responsibility for, and delight in, children. And the youngsters show an unusual degree of adjustment, confidence, and real friendship toward adults.

In another instance, the writer had occasion to go over results from some tests of honesty given to children in rural Nebraska. As part of the materials for what appeared to be a test in arithmetic, each child was furnished with a box containing a quarter, two dimes, two nickels, and three pennies. The children could not possibly have known that any theft would be discovered, and there was plenty of opportunity for

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Anyone who has seen that Negro classic, *The Green Pastures*, must have been impressed with its sincere, reverent picture of the beliefs engendered in an emotionally immature, relatively uneducated, naïve group by the teaching of a fundamentalist brand of religion. Children develop rather analogous ideas, which influence their free relationships with one another.

In the second place, the church serves as a center of social life. It usually has its Sunday School, its Christian Endeavor, its choir, its clubs, its basketball team. It is a center for various meetings and other social events. As previously mentioned, it serves also as a background factor in the formation of friendships among children. Through all of this, the church enters into child life in much the same way as does the school. In some communities the church is equipped far better than the local school as a place for child and adolescent social adjustment under supervised surroundings. Furthermore, especially in the years beyond the childhood level, the church often acts as the chief point of contact between an individual and the social life of a new place. All this may have little to do with religion, but these social functions of the church remain of considerable importance.

Religion occasionally plays a significant rôle in the life of individual adolescents. Conversions, entrance into a convent or monastery, plans for a life of service, meditations on life and death, fanaticism, renunciation of a world not half understood—all these are frequent phenomena of the adolescent years. These attitudes are largely a product of church teaching, reinforced by religious experiences and reading. Not everyone has such experiences, but no one can

doubt their far-reaching importance to those who do. The individuals are, temporarily at least, marked off from the life of their acquaintances, who treat them with either awe or derision. During these years, there is also interminable discussion on religious and moral topics, and to this the church makes, or has made during the individual's childhood, distinct contributions. Most adolescents who go to high school and college come to some conflict between religious and scientific points of view. Even if no clearly religious conflict is involved, there is usually a period of indecision during the change from unchallenged, childish moral ideas, to mature attitudes of lenience and toleration toward different standards of moral conduct. The church, aside from its part in raising these problems in the first place, has a hand in settling them, chiefly through the personal influence of its ministers with whom youngsters talk over their problems. The church thus enters into adolescent life at critical moments—even though its daily influence may not be large.

Influence of Adult Amusements on Children.—It was pointed out in an earlier chapter that adult activities act as models which children imitate in their play. Adult amusements have their manifold influence on children. In a college town, the social life of the high school may largely mimic that of the university. A country club may be built for adults, but it usually has a marked influence on the social life and social standards of the adolescents of the community. Especially do the moving pictures have pervasive effects upon both children and adolescents. They influence adolescents' ideas as to what is "fashionable" in manner, talk, and indulgence in tobacco or cocktails. They

influence the ideas of both adults and children as to what may be considered an acceptable standard of living, for they sometimes show a luxuriousness which most unfortunately makes many youngsters dissatisfied with their homes and the modes of behavior which home and school encourage them to follow. In fact, their influence upon moral attitudes and ideals is so great that the topic will be returned to in a later chapter.

The effect of adult society upon children is thus sometimes beneficial and sometimes not. But it is clear that many of the activities, ideas, attitudes and motives appearing in child society are furnished to children through their contacts with the adult social world. Child society is very much apart from adult society, yet it is surrounded by it, influenced by it, and often in conflict with it. This last phase will be returned to in a later chapter, in considering delinquency.

INTEGRATION OF HOME, SCHOOL, CHILD AND ADULT SOCIETIES

Although these various social influences have been taken up separately, they operate simultaneously, and interact continually on one another. Fortunate indeed is the child for whom all these influences are harmonious. The writer has often had occasion to deal with unlucky youngsters who have been battered and bruised beyond endurance by the terrific and inharmonious pressures exerted upon them from these various sources. No one of them may safely be omitted if there is to be adequate understanding of the social psychology of childhood and adolescence. The integral action of these forces may well be studied in the

formation of children's friendships and gangs. A typical situation is revealed below:

In a certain residential neighborhood lived 19 children, whose interrelationships will bear study as examples of the many influences involved. There was, to start with, mere geographical propinquity, as shown by the following map of the neighborhood involved:

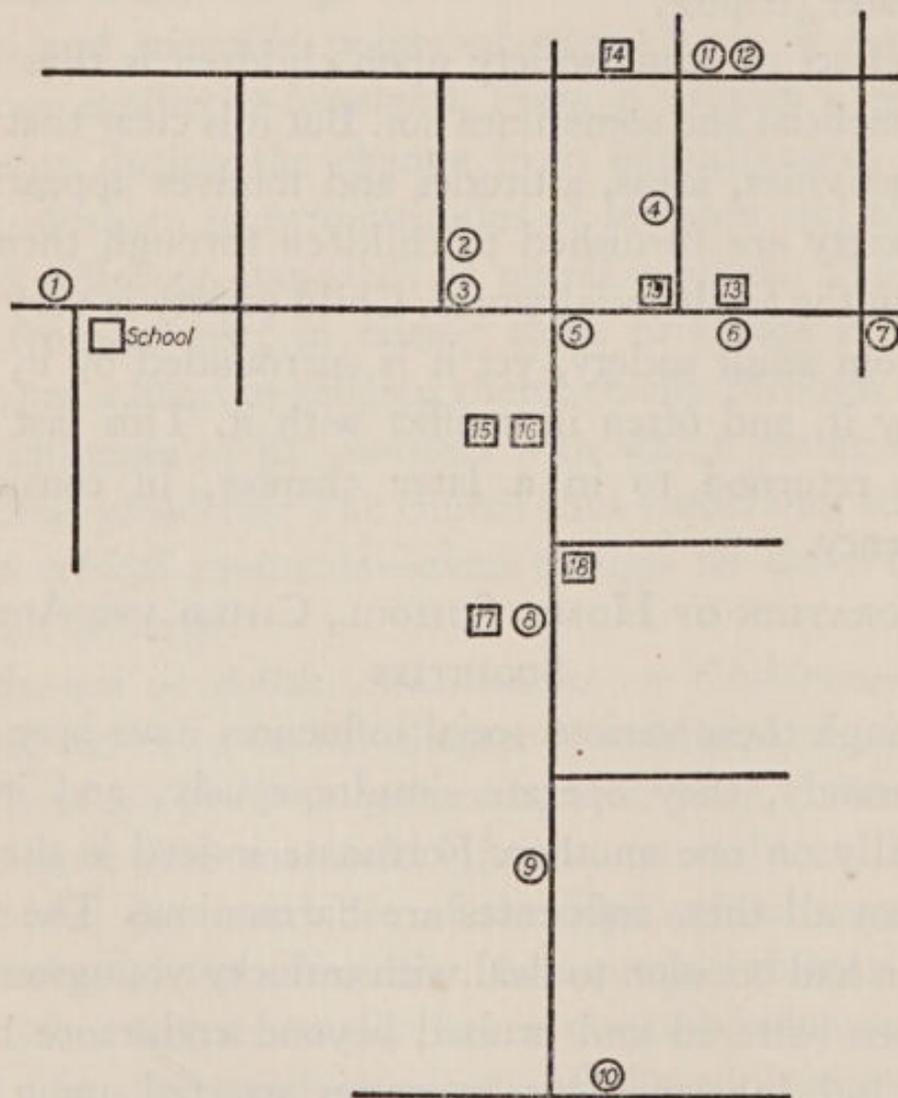


CHART 8

The squares and circles stand for the location of the homes of boys and girls, respectively. Girls No. 2, 3, 5, 9, and 10 formed the nucleus of a gang of the late childhood years, of

which No. 9 was the leader. Girl No. 1 came into the gang at times because she was in the same grade at school, but she lived too far away to participate regularly. No. 4 was the daughter of the grocer who supplied the neighborhood; her family's social status led to discrimination on the part of adults, and this attitude filtered through to the children, who were thereby made suspicious and unwilling to accept her. No. 8 was three years younger than the others and, although she was tolerated, she was never an intimate because of her age. (She and her twin brother were called "Dot" and "Dim," and served as the "children" when the others played "house," but "Dim" revolted and by the time he was eight fought the hated nickname until it was forgotten; his sister tagged along with the others, partly because she was sometimes babied and partly from sheer lack of other companions.) No. 6 was a rowdy on whom well-bred little girls looked askance. No. 7 was an invalid who never went to school; she entered the group only occasionally. Nos. 11 and 12 were nice children; their family had high social and economic standing, but they were Catholics; in a highly Protestant community, it was "thumbs down" on these innocent victims of adult religious antagonism. Boys 13, 15, 16, and 17 plus Girl 6 formed a second gang in the neighborhood. Boy 14 was a little younger and lived a little farther away than the others; however, from early childhood he was deeply attached to Girl 5, who was also something of a tomboy and often joined the predominantly boys' group, bringing this younger boy in with her. Boy 18 was the neighborhood bully and had to be tolerated in the group, but was not a desired member. Boy 19 was a defective who was nice enough, but dull company. There were thus two gangs that overlapped, but did not compete because of their different activities. The nucleus of one group was composed of five girls, with seven other girls sometimes included, but never on intimate terms. The nucleus of the other gang consisted of four boys and a girl, with the frequent and harmonious addition of another boy and girl and the occa-

sional inharmonious addition of a bully and a defective. Girl 5 vacillated from one group to the other, with Boy 14 following her unless the nature of the girls' play excluded him.

It has already been indicated that adults had something to do with these groupings. The fathers of Girls 2, 3, 5, 7, 9, 11, and 12 and Boy 14 were in a profession, were in good civil service positions, or else were independent business men. The fathers of Girl 8, Boy 17, and Girl 10 owned small shops, and were lower in the economic scale than the preceding group. The father of Girl 1 was a piano tuner; of Girl 4, the neighborhood grocer; of Girl 6, a factory foreman; of Boy 13, a bookkeeper; of Boys 15 and 16, a factory worker; and of Boy 19, a clerk in a store. The social and economic levels of these adults operated distinctly among the children in excluding Girls 4 and 6 and helping exclude Girl 1 from the girls' gang, and in making it difficult for Boys 14 and 17 to remain in the boys' gang. Adult religion settled the matter for Girls 11 and 12; chronic illness excluded Girl 7. Unacceptable personalities entered into only two cases—Girl 6 and Boy 18.

The school also contributed its bit. Girls 1, 2, 3, 9, and 10 were in one room; Girls 4, 5, and 6 in the grade below; Girl 8 in the next lowest grade; Girl 7 not in school; Girls 11 and 12 in parochial school. Boy 15 was in the room with the first five girls; Nos. 13, 16, 17, 18, and 19 were in the next room, and No. 14 one room lower. Common school experiences thus served to reinforce extra-school activities, while different schools or grades contributed one more barrier to acceptance.

The table on page 141 summarizes the total situation.

The five girls in the girls' gang were, with one exception, the same age, their families were from the same social stratum, all belonged to Protestant churches, all had acceptable personalities, all but one lived near the center of the group, all but one were in the same grade. Intelligence and size had little influence on the groupings. A similar situation held for the boys, whose gang was recruited from a somewhat lower

TABLE 3: CHARACTERISTICS MAKING FOR INCLUSION IN OR EXCLUSION FROM TWO CHILDHOOD GANGS

No.	Age	Socio-Economic Status	Religion	Personality	Geographic Location	School	Intelligence	Size	Inclusion in Gang
Girls 1	10	Low	Unit.	Fair	Distant	Gr. 5	Average	Small	Girls' Girls' Girls', Boys' Boys' Girls' Girls'
2	10	High	Unit.	Excellent	Near center	Gr. 5	Average	Average	
3	9	High	Congr.	Good	Near center	Gr. 5	High	Large	
4	10	Low	Method.	Excellent	In center	Gr. 4	Average	Large	
5	10	High	Episc.	Good	In center	Gr. 4	High	Average	
6	10	Low	Episc.	Eccentric	Near center	Gr. 4	High	Large	
7	12	High	Congr.	Fair	Near center	None	Low	Small	
8	8	Good	Congr.	Excellent	In center	Gr. 3	Average	Very small	
9	10	High	Baptist	Excellent	In center	Gr. 5	Average	Average	
10	10	Good	Congr.	Good	Distant	Gr. 5	Average	Very large	
11	9	High	Catholic	Good	Distant	Paroch.	High	Average	
12	10	High	Catholic	Excellent	Distant	Paroch.	Low	Small	
Boys 13	10	Low	Baptist	Excellent	In center	Gr. 4	High	Average	Boys' Boys' Boys' Boys'
14	8	High	Congr.	Excellent	Distant	Gr. 3	Average	Small	
15	11	Low	Presb.	Excellent	In center	Gr. 5	Average	Average	
16	11	Low	Presb.	Excellent	In center	Gr. 4	Low	Average	
17	8	Good	Congr.	Excellent	In center	Gr. 4	Average	Small	
18	12	Low	None	Bully	In center	Gr. 4	Low	Very large	
19	14	Low	Baptist	Excellent	In center	Gr. 4	Very low	Average	

stratum of society than the girls'. The only atypical member among the boys was Boy 17, who, driven on by his hated nickname and the tendency of older girls to treat him as a plaything, forced himself along in and outside of school until he had compensated for the handicaps of age and size. Girl 6 was one of those eccentric, unmanageable children who, from early childhood, fit in nowhere and prefer to sacrifice social satisfactions to the maintenance of their own individuality. Evidently a constellation of factors—age, geographical nearness, similar social and economic status, attendance at the same school, and church affiliation—led to the groupings. Any differences in these respects, or any marked deviations in age, personality, health, school grade, intelligence, or size were likely to bring about mere toleration or exclusion. The reader is urged to make a similar map and table for some childhood group he has known.

A pupil's existence as a social being, and his social development, are thus a product of a bewilderingly complex total of influences from home, school, companions, and the adult world about him. And the problems he presents can never be understood without some knowledge of this total. Neglect of this fact is perhaps the most serious fault of the average teacher.

THE LIST OF DO'S AND DON'T'S

If you have a "problem pupil" be sure to find out about his home; the probability is that you will find there the most important cause. And until you know something about the homes from which your pupils come, you cannot really understand them.

Do not permit yourself to handle a class like a drill-master putting recruits through their paces (though this may be the easiest procedure to follow). Rather, consider your class a social gathering of which you are the host. And like a good host or hostess, try to make everyone feel at ease and bring everyone into the conversation, meanwhile keeping yourself tactfully in the background.

Watch your pupils before and after school and on the playground, and at social and athletic events, noting the leaders and the nature of the various groups, the habitual followers, the unhappy outsiders and companionless children. You will thus gain much insight into many of your classroom problems. And if you can unobtrusively and tactfully find friends for the friendless children and turn those groups from snobbery and the silly aping of high society into friendly usefulness, you may feel that you have made a major contribution to the welfare of your pupils.

If you are to understand your pupils, you must know the neighborhood and community from which they come. It is, therefore, desirable that you should live in the community, spend most of your week-ends there, attend neighborhood and community gatherings. Such acquaintance will not only help you understand your pupils; you will thus make contact with various people (physicians, clergymen, leaders in the local women's clubs, business men interested in "the boy problem") who may help you in dealing with any special problems which arise in your dealings with your pupils. And the community will like you much better if you thus show interest in it.

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CHAPTER VI

PROBLEMS OF EMOTIONAL STRESS AND OF DISCIPLINE

THUS far the child has been pictured as interested in a great variety of matters—eager for approval, for the recognition of others, and the accomplishment of his purposes. It has been shown that knowledge of success is a potent stimulus to further efficient endeavor. But what are the effects of continued failure, of frustration of interests, of the dragging sense of continued inadequacy in efforts to achieve, of continued disapproval or neglect on the part of teacher and fellows, of insecurity, uncertainty, fear? Here is a problem of major importance, as yet relatively little studied experimentally in the classroom. However, it is a major problem of both mental efficiency and mental hygiene, and is quite capable of experimental study. One need only think over a list of individuals he has known to see the importance of the problem over a period of time.

There was, for instance, the boy in the fifth grade, not very bright, regularly given failing marks by an impatient teacher, either disregarded or tolerated by the other children, hesitant and ineffectual in playground competition, criticized and bullied at home. The boy seemed in a chronic state of bewilderment, because in most of the situations he had to meet he did not know what to do. Similar in the nature of his difficulty, but different in everything else, was the highly intelligent college lad who had failed a course because he had used most of his leisure time for work, had made no friends, and had upset his



digestion with worry and irregular meals; he was bewildered, worried, excited, and on the verge of panic because he did not know how to meet the manifold problems presented by his first college year. If emotion is defined as a state of excitement and comparative disorganization created when the organism is confronted with a situation in which it does not know how to act, then it is clear that these two individuals were suffering from a chronic emotional condition.

That emotional strain can make the individual both miserable and ineffectual is generally recognized. It is also a matter of common psychological knowledge that such conditions interfere with digestion, sleep, and circulation. Continued strain may thus bring about not only emotional distress but actual physical ill health. It is an unfortunate commentary upon the failure of teachers and principals to understand boys and girls that such emotionally stirred-up individuals are common in schools and colleges throughout the country.

In the history of an emotional disturbance there seems to be, first of all, an obstacle of some sort that prevents the child from doing the things he desires, or a situation with which he does not know how to deal. The youngster soon becomes irritable, disorganized, bewildered, and shows his disturbance by intellectual inattention and inadequacy, restlessness, excitability, and many physiological changes. Emotion is to a psychologist very much what fever is to a physician—a condition of heightened functioning symptomatic of something wrong somewhere. And this disturbed condition easily spreads to other situations, because of the excitement and general nervous tension. Thus the sensitive child who has been severely criticized and blamed for fail-

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dent would doubtless have failed more college classes and dropped into some line of work where he would have been unhappy and embittered, and the dull boy would probably have gone from truancy to petty delinquency, or even serious criminal acts.

The first practical question, then, is as to situations which commonly cause such bewilderment or frustrations. The results of emotion, abnormalities of emotional life, and problems of discipline will then be discussed. •

COMMON CAUSES OF EMOTION IN CHILDREN AND ADOLESCENTS

From the above discussion it is clear that almost any situation may cause emotional distress if it is unfamiliar to an individual or interferes with what he is about to do. However, certain situations occur so frequently during the school years, that they deserve brief mention.

Adjustment to a New School or Neighborhood.—Nothing brings about acute emotional disorganization any more quickly than the transplanting of a child or adolescent from one environment to another, without preparing him for the transition. Every first-grade teacher knows that the first day or two of school is a time of great emotional distress for many children because they do not know how to get along with the other children or how to behave in their strange new surroundings. A somewhat similar difficulty is presented when a child enters junior or senior high school; and if he goes away from home to college, an acute problem often appears. In each case, some of the youngsters do not feel that they can make their social and other contacts proceed in the accustomed fashion, and they are emotionally excited in consequence. When a family moves, adjust-

ment to the new community or neighborhood, especially if it is somewhat different in social customs from the old, may cause great difficulty.

Adolescent Social Adjustment to the Other Sex.—Adolescent boys or girls who are finding their way into heterosexual society are in similar distress. For instance, there was the high school boy calling on a girl for the first time who did not know how to leave, nor did the girl know how to suggest his departure. Two embarrassed and miserable adolescents sat in the front parlor until well after midnight, talking of the same things over and over again, until at last the girl's father intervened and none too tactfully started the lad on his way. The next day the story was circulated by the father as a joke; but it was no joke to the boy and girl concerned, both of whom developed antagonisms and fears that remained with them for years.

Anyone can remember incidents of a painful nature that came during the period of heterosexual adjustment. Who has not known a boy who secretly worshiped some girl for weeks, but did not know how to approach her? Or a girl who was introduced to a most charming young man—and then could not think of a thing to say? Or the boy who takes a girl out for the first time and does not know which show to see, whether or not to buy her a soda afterwards, or if she expects to be kissed when he leaves her? And who can forget the agony he or she went through, at one time or another, in regard to the suitability, in the eyes of the opposite sex, of one's clothes and appearance? Such matters are sources of amusement and irritation to adults, but to the adolescents concerned they are potential or actual tragedies.

School Failure as a Cause of Emotional Problems.—Continued failure in school is another common and potent

cause of emotional disturbance. It was stressed in a previous chapter that success stimulates learning; similarly, here it is stressed that failure disorganizes a child and actually prevents learning. Naturally, a child cannot always be successful. Occasional failure is inevitable, and to such a situation he can and must learn to adjust himself. But continued failure is a condition that normal adjustments will not solve. Rather, it drives the individual on to abnormal forms of reaction in order to find escape from an intolerable tension. Every year we read in the newspaper of children who have killed themselves rather than face further poor school work. These unhappy youngsters probably did not know that there was work in the world at which they could succeed; but there is no reason why their teachers should not have known and seen to it that the boy or girl was transferred to other kinds of work.

Social Conflict.—Because children and adolescents are subject to such varied social pressures at home, in school, on the playground, and at church, it is only reasonable to expect social maladjustment to be of special significance in creating feelings of inferiority, frustration, and despair. Throughout the case studies in this chapter one can see the importance to the child of having friends, doing as others do, knowing how to mix with others, and being able to hold his own in conversation or play. In the home such social forces may be at work as to develop in the child feelings of insecurity, shame, or fear. Inadequate social adjustment, if continued over a sufficiently long period of time, is certain to result in profound emotional distress.

Vocational Problems and Emotional Distress.—In later

adolescence especially, there is a further cause for prolonged emotional disturbance in the case of children who are headed toward a vocation for which they are poorly adapted because of lack of interest, inadequate ability, inappropriate character traits, or any other reason.

The drawn-out emotional strain of first attempting an impossible vocation and then giving it up is only too common. But even this is preferable to the longer stress of pressing on to a goal not particularly desired, obtaining a job not especially wanted, and pursuing uninteresting tasks days after day for a lifetime. The writer knows one man, now over forty years old, who wanted to be a doctor. This man has attempted in vain to meet the requirements of a half-dozen medical schools. His friends have tried to discourage him, but to no avail. Even after his marriage and the birth of his first child he returned to college for one more trial, and he was then finally convinced of his own inadequacy. He is now the head of a department in a large store, is interested in his work, and is far better adjusted than ever before—but he wants his oldest boy to study medicine. For about fifteen years this man wore himself out with his unceasing efforts to enter a profession closed to him through his own lack of ability, but even now he is doing his best to pass on the same maladjustment to his son, whose I.Q. is only 87. Another acquaintance of the writer's became, through force of circumstances and not in the least through desire, a grade school teacher. Her work was satisfactory enough, but she disliked it thoroughly. At first she made efforts to interest herself, but eventually she came to detest every child in the room, to dread every day of work, to force herself through her daily tasks. In the end there came a day when she could not make herself go on. She had the good sense to resign at once; but she is now middle-aged, weakened by years of emotional distress, and faced with the necessity of starting somewhere all over again.

Choosing a vocation in which success is likely and interest reasonably high is extremely important, because a wrong choice dogs one's footsteps and often breaks one's courage through the strain of continual maladjustment to a situation that must be faced every day. At the present time the world-wide depression is making matters worse, for it is forcing adolescents to choose any type of work in which there is even a possibility of employment, regardless of its nature or attractiveness. Furthermore, it is blocking many a sound vocational ambition because the boy or girl cannot afford the needed schooling; and it is breaking the hearts even of those who can finish their training because so few can find a job. The prolonged emotional strain may be expected to produce an embittered, prematurely exhausted generation.

EFFECTS OF CONTINUED EMOTION

In general, the emotional stress affects intellectual efficiency, general attitude, and physiological condition. Indeed, these are the symptoms by which strain reveals itself; they appear, regardless of age, in individuals who are subjected to prolonged emotional strain.

Effects of Emotion upon Intellectual Efficiency.—Such individuals, whether children or adults, show intellectually a certain degree of abstractedness and inefficiency. It is particularly hard for them to keep their minds on what they are doing, and at times they may become so emotionally blocked that they are unable to do anything at all.

The writer once observed a student who was taking a final examination and who simply looked steadily at the paper before her and wrote nothing. From to time she moved rest-

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sheer perversity but to an underlying, unsolved problem of adjustment.

Physiological Effects of Emotion.—Physiological symptoms of emotional disturbance are numerous. Disturbances in sleep are perhaps most frequent. The child may suffer from insomnia or nightmares, or merely from general restlessness and discomfort when asleep. Because his sleep is not restful, he wakes up in the morning already tired, and with less and less vitality each day for use in forcing himself to overcome his intellectual abstractedness, moodiness, or irritability. In most cases, digestion also is affected. Sometimes a long emotional strain almost paralyzes the digestive organs so that little food can be taken and even less assimilated, and there may then be marked loss of weight. Both constipation and diarrhea may be exclusively emotional in origin. Naturally appetite is soon affected, and the total digestive discomfort is sufficient to keep the individual in a distinctly abnormal physical condition. During periods of violent emotion there are changes in the chemical composition of the blood, in the blood pressure, in heart beat, and in breathing. Even though the emotion is somewhat less intense, these changes persist in some degree.

The picture painted above has a certain resemblance to that for malnutrition presented in an earlier chapter. Indeed, it is often impossible to tell without a case history whether a particular child is suffering from actual malnutrition or from a secondary condition induced by prolonged emotional strain. However, in addition to his lowered physical condition, the overstrained child has an irritability and an intellectual inattention that do not usually characterize the child who is merely malnourished.

THE PATHOLOGY OF EMOTION

If the emotional difficulty is great and continues over a period of time, various results may follow, depending upon the individual's vitality and ability, his previous habits, and the total situation. These results of continued emotional stress are so common, play such a large part in classroom difficulties—such as discipline—are so frequently misunderstood, may have such serious consequences, and put such serious responsibilities upon the teacher, that they must now be carefully considered.

Emotional Exhaustion.—The first of these results occurs when the individual remains face to face with his difficulty, and is worn out by it. The outstanding symptoms are those enumerated above, only in more acute form; the individual is abstracted, inefficient in work, unable to concentrate, irritable, sleeps poorly, is restless, has indigestion, and shows marked and chronic fatigue. Such a condition is known technically as neurasthenia, and if a general collapse ensues is usually referred to by the popular phrase, "nervous breakdown." Such people have carried an emotional maladjustment until it has exhausted them. They have neither solved their fundamental problem, escaped from it, nor become adjusted to it; they have merely gone on and on living with it until it has overwhelmed them. The nervous breakdown may occur at practically any age, but is most common in adolescence and early adult life.

Some years ago the writer knew a girl who became a neurasthenic invalid. She was an only child. Her mother died when the girl was born, and the child was "brought up" by her father, of whom she was very fond. During her first year in high school her father married a woman who had a daugh-

ter also in the first year of high school. The step-sister was a bright, vigorous, attractive person who soon overshadowed the other girl socially and academically. The girl's father was so in love with his new wife that he did not sense his daughter's difficulty—and she felt that she had lost her previous close companionship with him. The situation both at home and at school became unbearable. Her work went to pieces, she lost appetite, slept only irregularly, began to complain of headache, backache, indigestion, eye strain, and attacks of dizziness and faintness. Eventually she took to her bed, where she stayed most of the time for over a year. There was no evidence of physical disease, although her physical condition was not good. But the emotional invalidism did have these two advantages; it kept her away from the situations where she could not successfully compete, and it brought her (as an ill person) more attention from the family than she could otherwise obtain. She could not really solve her problem and was continually hurt and exhausted by it; she stayed in the place where it was most acute—her home.

The neurasthenic is finally worn out because he neither solves his emotional problem nor finds any emotional relief. Other individuals, although failing to solve their difficulties, manage nevertheless to avoid them in some degree. Such pseudo-solutions will next be discussed.

Escapes and Pseudo-solutions.—Perhaps the most obvious thing a person can do when faced by an unpleasant situation is to run away from it. Sometimes the escape is actual; the child leaves school, the man resigns his job, the wife leaves her husband, the mother abandons her illegitimate child, and the adolescent joins the army or navy as an escape from home supervision or a disastrous love affair.

The writer has an acquaintance who obtained a good position as chief clerk in a business office. It was soon apparent that

he could not get along with his office force. Actually his failure to control the situation boiled down to the two facts that he did not give adequate directions for what he wanted done and that when annoyed by an error he shouted at the offender, making a public display of what could have been settled quietly. His subordinates were generally efficient workers, and they resented having the mistakes made through inadequate guidance aired so conspicuously. The man sensed the attitude of hostility readily enough, worried about his failure, was unable to sleep, lost his appetite—and became more crotchety than ever. One day he did not come to work. Inquiry revealed that he had left town during the night. He is now living on the family homestead in the country, his defects not only unremedied but intensified by the bitterness of failure.

His difficulties might have been dealt with rather easily, for he needed to give more adequate directions and to speak quietly. But instead of analyzing his troubles and solving them, he ran away from the entire situation, and wrecked his whole future career. Such “escapists” are more common than most people realize.

Some people cannot or will not run away, in the sense of actual flight to a new locality. However, they may still escape almost as completely by other behavior. Perhaps the most common type of compensatory reaction is daydreaming. To be sure, everyone daydreams a bit, because everyone meets obstacles to the carrying out of his desires. If the desires are not especially vital or the daydreams not so habitual that they interfere with a youngster's real work and play, such imaginings give some emotional relief, and no harm is done. The trouble comes when a child settles back to habitual daydreaming, instead of trying to “make good” in his work or play. Such a condition may arise when a child who is not very aggressive or sure of himself is

faced day after day with a total situation that seems utterly unsolvable. He cannot run away permanently, although he may make the attempt. Since he is not vigorous or assertive, outbursts of indignation and resentment are not likely to occur; but a retreat from the whole unbearable situation is both possible and comfortable—he can simply not notice what is going on around him, but substitute daydreams in which he plays with imaginary companions, is liked by them, dominates them, and can do as he wishes. If the maladjustment to the child society, schoolroom, or home continues long enough, he will build up a habit of running away from reality; and probably, in later crises of his life, he will again resort to fantasies instead of trying to meet and solve his problems. While it brings temporary relief, habitual daydreaming is an escape mechanism that leaves the individual without any real, lasting solution.

If such symptoms as have been described are indulged in long enough, the individual concerned may develop dementia præcox—may become insane. The essential characteristics of this disease are a complete withdrawal from reality and a concentration upon a world of fantasy. Such a person has so entirely substituted his fantasies for the actual happenings of the world that he no longer distinguishes his daydreams from reality.

The writer once knew a young man suffering from dementia præcox who was rescued with the utmost difficulty from a burning hospital because he blandly insisted that there was no fire. But a few weeks later this same young man had to be put into a straight-jacket to keep him from injuring himself in his efforts to leap out of the window because he *thought* there

was a fire. When there was a real fire he did not notice it, but when his daydreams concerned a fire, he reacted violently.

Such absorption in a world of fantasy can be so extreme that the individual does not feel pain; he suffers only when his daydreams lead to suffering, and he is so utterly inaccessible to any stimuli from the real world that no one can get his attention, and consequently no one can "talk him out" of his delusions. Dementia præcox is the most common form of insanity. As implied by the name, it starts relatively early, usually during the years of adolescence. It thus presents a very serious problem. The condition appears to be practically incurable, but it is preventable. Case histories of dementia præcox patients almost inevitably show that the beginnings of the disease can be traced back to odd behavior, long before the child completed his schooling. Parents rarely appreciate the danger in the early stages of this condition; and unless the teacher does, no preventive steps are likely to be taken.

The unhappy, socially isolated youngster who finds relief in reverie is a rather common problem in the schoolroom but is often overlooked because he is so quiet and well behaved. In a case known to the writer, a girl moved from the country and went to a large city high school. There her somewhat boisterous, unsophisticated efforts at friendliness were met with rebuff. She was at first hurt and bewildered, then irritable and defiant. Her class work slumped badly. But gradually she seemed to become reconciled to the situation, and would sit for a period of time apparently deep in thought, occasionally smiling to herself. A little later she dropped out of school. She tried to hold a job but was too abstracted and absent-minded to be employable. Gradually she lost contact more and more with the real world, and lived completely in her imagina-

tion. She sat for hours apparently in a daze, smiling oddly from time to time; she developed queer mannerisms which appeared to be related to her imaginary experiences, and occasionally became suddenly excited or exhausted apparently without reason. In the end she had to be sent to an insane hospital.

These extreme cases are not common; but the possibility of such an outcome should make the teacher consider carefully any pupils who show such symptoms. The final collapse rarely comes while the individual is in school. However, the teacher should realize that the disease has its start in the conditions of frustration and withdrawal into an imaginary world described above, and she should appreciate the school's responsibility for getting such youngsters back into a normal existence before their isolation is so complete that nothing can be done.

Other less complete retreats from reality are shown by those who find emotional satisfaction through the movies, reading sentimental stories, or in a highly emotionalized religion. Some people lose themselves so completely for a time that the movie or story becomes reality for them, and they themselves live the scenes in imagination. Often the incidents of the story are embroidered by the reader with brief daydreams. In any event, he becomes identified emotionally with the characters of the play or story, and is oblivious to reality. It should also be mentioned that the type of reading matter often reveals the nature of the unsatisfied longings. The physically weak boy not only dreams of being an athletic hero, but also reads fiction or sees movies of heroic events. The homely and unpopular girl dreams of being popular and sought after, and finds a

wistful pleasure in romance and in stories of girls who were happy in their home and school lives. The compensatory nature of these activities is obvious. Religion sometimes fills a similar rôle, since religious fervor involves a certain retreat from reality—although the reader must not suppose that all religious interest is of this character.

The writer once knew a girl who, during her adolescent years, came into such continual conflict with her mother's domineering temperament that frequent quarrels arose. After each such scene the girl would go to the church, kneel before a statue of the Virgin, and pray fervently for courage to bear the cross of her mother's temper. She then felt distinctly relieved of her emotional tension. It should be noted, however, that she was hardly nearer to a solution of the difficulties between her mother and herself than she had been before. This behavior represents, then, a failure to solve the fundamental difficulty. . . . This girl at last fled from her problems completely by committing suicide at the foot of the Virgin's statue.

Failure to solve problems may be further illustrated by the history of a single family, consisting of a mother, two daughters, and a son. The mother has been a nervous invalid for years; however, since she has occasional outbreaks of temper during which she gets up out of bed and walks around, there is no evidence that her difficulties are anything but an escape mechanism. Usually she lies in bed all day and has her oldest daughter wait upon her. By the simple technique of being sick all the time she has managed to escape the burdens of housekeeping and the other difficulties incident to the maintaining of her family. The oldest sister, who is a woman of considerably less than average intelligence, is a haphazard and unreliable housekeeper who finds her emotional satisfaction largely in reading, going to church (where she gazes adoringly at the minister) and to the movies. She has no friends and is, in fact, regarded as a distinctly tiresome bore. Although she is now a

woman of 40, she still reads the most trashy of sentimental stories and gets intense emotional satisfaction from them. The second daughter is the only person in the family who has succeeded at all in adjusting herself to reality. She teaches school and thus supports the family. She also finds it necessary, more often than not, to get the evening meal after she returns home, and she is constantly distressed by the need of settling quarrels between her mother and her sister. This woman, though hardly 35 years of age, is at present dying of cancer of the intestine. Her condition was conceivably brought about by the digestive disturbances incident to the prolonged emotional strain of somehow keeping her family together. The brother, who is ten years younger than his sisters, is a chronic drunkard. He is not by any means unemployable as far as his ability is concerned, but he can rarely hold a job for more than two or three weeks because when some little thing goes wrong he escapes from the need of adjustment by getting drunk. Here, within this single family group, is one person who is escaping reality by being a nervous invalid, a second who lives in the realms of fantasy and sentimental daydreaming, a third who is escaping by means of liquor, and a fourth who is dying—essentially of exhaustion.

Rationalizations.—Thus far, two common and unfortunate results that may be brought about by a persistent “obstacle-situation” have been presented. The person may struggle along until he is worn out, or he may avoid the problem either by running away from it or by retiring into a false world of imagination. The third inadequate reaction which the individual may make is this: he may falsify the situation to himself so as to minimize the problem.

Extremely common are certain mental mechanisms called “rationalization,” “projection,” and the “sour grapes” type of response. Suppose, for instance, a boy

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Overcompensation.—Overcompensation, another reaction to frustration, is the result of feelings of inferiority. However, it takes a quite opposite form from that shown by nervous breakdown and exhaustion, for the individual seems to take on an access of self-confidence and desperately starts out to make himself appear adequate when he really is not. He pushes himself ahead and into everything, brags about his achievements, is generally obnoxious, is usually resistive to discipline, and tries constantly to “show off.” But a little close observation will usually show the condition for what it really is. The bewildered and unhappy youngster is frantically trying to conceal his difficulties and to bluff through, somehow, the situations with which he is having trouble. Sometimes such extroverts succeed and emerge with a real adjustment and a truly self-confident personality. Sometimes, their specific bluffs called, they collapse utterly, with courage gone and spirit broken. The boy in the illustration below was able, because of good native ability and the considerable assistance given him, to achieve a partial adjustment; his case demonstrates the sort of symptoms that appear in the school room.

William Nelson came to the university from the farm. His education had been gained in a small township high school and before that in a one-room country school. His whole manner, dress, and speech showed the sort of background he had. Upon entering the university he went into pre-medical work and was getting along fairly well when he was sent to the writer because of personal difficulties with his instructors and with the assistants in his laboratory courses. They reported that this boy was often extremely conceited, that he talked back to the teachers in an aggressive manner, that he domineered over the other students in such a way as to irritate them, that he

talked continually about his cleverness, and generally conducted himself in a manner that was most unpleasant to those about him.

He appeared for his interviews dressed in the most up-to-date, "noisy" clothes, talked in a loud and familiar manner, and in general seemed to be trying to give the impression that he was a sophisticated and very self-sufficient collegian. The picture presented by this student is familiar to those who deal with problems of emotional maladjustment. He had as the basis of his trouble the much-talked-of "inferiority complex," which is common among students who come from small places and find themselves unprepared to compete socially with most of the students at the university. This boy's grammar and dress immediately gave him away as a farmer, and he therefore adopted an extreme manner and dress to overcompensate for the inferiority which he actually felt. His impertinence and his talking back to his instructors are to be thought of primarily as efforts to appear to them a competent individual who could handle any situation with a debonair and confident manner. His occasional efforts to domineer over his associates were, similarly, frantic efforts to assert his adequacy and thus conceal his inadequacies from both them and himself.

It is evidently vital that the teacher should understand these conditions for what they are and should help the youngster to a real adjustment, instead of adding to his already intolerable burden by well-intentioned but ill-timed disciplinary measures which, at the very best, can serve only to eliminate certain symptoms and can never solve the underlying situation.

Hysteroid Reactions to Emotional Distress.—There remains one other reaction which children may make when frustrated and in emotional distress. Some peculiar, inade-

quate response may be hit upon and used because, for the time being, it seems to work.

The writer knew a dull, third-grade boy, who was failing in school, chronically scolded by his teacher and looked down upon by the other children, who one afternoon vomited his lunch—partly because of indigestion and partly because of emotional distress from a scolding. To his utter astonishment his illness caused sympathy from teacher and children, and he was for the first time in his life the center of attention. Thereafter, whenever he was scolded or his desires were blocked in any way, he would vomit. In another case, a little girl had been told some smutty stories that had greatly disturbed her, especially because she was assured, on what she considered undebatable authority, that her adored mother and father had indulged in the practice so lewdly described to her. She could not reconcile what she had heard with her previous estimate of her parents' moral infallibility. The conflict continued to disturb her, causing general restlessness, careless school work, and sexual fantasies. Finally, she struck out at her problem and discomfort by stealing a sum of money from the cash register in her father's store. This act seemed, by some obscure reasoning, to bring relief. Of course it solved the situation only temporarily, and her vexation soon returned. Presently she again stole something. When caught and at last questioned sympathetically, she could only say that she stole because it made her "feel better"; inasmuch as she never made any use of what she stole, this explanation seems likely. Several of her thefts followed directly when she received more sex information from an older child, thus precipitating the fundamental problem once more.

Such special devices for getting attention or one's own way range all the way from the small child's simple tantrums to almost unbelievably bizarre, hysterical episodes. But they all have this in common: they originate in frustra-

tion and emotional distress, and are devices for relieving that distress and achieving in some form the frustrated desire. In handling such cases, therefore, it is exceedingly important that one should seek the cause and not merely the symptoms. Obviously, to expose the girl for her unconscious subterfuge or punish the boy for his gastric gymnastics might or might not suppress the particular symptoms in question, but would only increase the emotional distress, and almost inevitably other similar devices would soon appear.

In both cases, the hysterical symptoms disappeared after their cause was understood, but, unfortunately, not until after both teachers and parents had punished the children severely. There is nothing more senseless than punishing a hysteric. For the boy, the treatment consisted in his removal into a class where he could progress and where he was as capable and acceptable as the other children. During the period of his readjustment any vomiting was simply disregarded. When he could gain normal attention and satisfactions in other ways, his vomiting ceased. The girl was given one talk after another until her deep conviction as to the nastiness of sex relations had been replaced by an attitude of understanding and respect. The stealing has since disappeared. Both children are at the moment free from their previous troubles, but their freedom may not continue. The dull boy will undoubtedly meet with failure again, and the girl will probably find heterosexual adjustment and marriage difficult. Both children have already set up hysterical modes of response, and these reactions have been ground in by punishment, reproof, and misunderstanding. It is likely that in another crisis these same or other hysterical actions will be resorted to. Such behavior is not forgotten; it merely lies quiescent, awaiting the familiar stimulus of emotional strain.

These two examples illustrate a number of points in regard to the hysterical type of response. The response is often irrelevant to the stimulus and, indeed, is in many cases a veritable accident. It is almost always dramatic, explosive, and attention-getting. It operates as a form of emotional discharge, thus making the individual more comfortable. It often turns the situation from something distressing to something pleasurable by the simple expedient of playing on the sympathy of others. It offers a temporary, dishonest solution of the underlying problem, which, however, remains virtually untouched and in readiness to set off another explosion in the near future.

Stammering.—Among the unfortunate effects of prolonged emotion is stammering. As mentioned in Chapter III, a few unfortunate children thus afflicted have actual anatomical defects at the basis of their difficulty, but most stammerers have no physical handicaps—the entire cause is emotional distress. Nothing shows this more clearly than the fact that the stammerer usually has trouble only in certain environments. When he feels relaxed and comfortable he speaks normally, but he has trouble when embarrassed or excited. School obviously involves numerous opportunities for embarrassment to a stammerer, and he is therefore likely to get worse as his schooling continues. Most cases largely clear up early in adulthood, after the stresses of adolescence and schooling are past—leaving, however, unfortunate residues of shyness and reticence.

The causes of stammering are usually complex. Any one of the situations mentioned in the first section of this chapter may be responsible. Efforts to force a left-handed child into right-handedness not infrequently cause stam-

mering, for reasons not yet clear. Sometimes a particular emotional episode appears to have initiated the trouble. But there are usually various accessory circumstances. The following case shows how the situation cumulates.

During the last year the writer has come in contact with a college freshman who stammered. This boy's speech developed at a normal rate until an accident when he was about four years old. While taking a bath, he reached out of the tub and put his finger into an electric light socket, burning his hand slightly and frightening him a great deal. For some reason not entirely clear, he did not speak any more for about six months. His initial failure to speak was probably due to sheer fright and may have been persisted either to show how badly he was hurt (thus arousing sympathy) or because his muteness brought him constant attention. After this period he began gradually to speak again. When he was sent to school, he was, however, not yet talking as readily as the average child. His first-grade teacher was impatient with the boy, who was either mute or at best made only clumsy efforts to speak. All through grammar school his speech development lagged behind that of other children. His teacher always hurried him because he was so slow, and soon his efforts to talk resulted in a stammer which grew more serious as time went on. His teachers, at various times, tried scolding him, talking to him sympathetically, ridiculing him, punishing him—but nothing did any good. His dread of classes and especially of reciting became acute. By the time he reached college he was terrified of every class he entered, although he did not readily admit it. When called on, he trembled all over and often said nothing, even though he knew the answer. One curious fact was that he stammered outside of class *only* when he talked to middle-aged women, never when with his friends. Apparently teachers were the major source of fear.

In this case one sees, first, an emotional shock to which a response of a somewhat hysteric character was made, in the

failure to talk any more for about six months. Then he was put into a school environment which completely bewildered him; he could not speak well enough to make his ordinary wants known, and the teachers were too impatient with him to wait for his stumbling speech to communicate his ideas. As a result of the situation, he found himself caught in an emotional dilemma: he *had* to go to school, his teachers *would* call on him to recite, he *could not* prevent stammering, and he *knew* he was making himself unpleasantly conspicuous. No wonder he grew worse!

Treatment for this boy consisted first in obtaining men teachers in every course for a year or two. Secondly, he had conferences with a clinician, in which he came to understand the source of his trouble. And, third, talks with a few sympathetic, kindly, middle-aged women were arranged. The result of these combined treatments was a letting down of his fear and a resulting marked decrease in the stammering.

The child with a speech defect is almost always ridiculed and made fun of, at least by the other children if not by the teacher. It is, therefore, to be expected that a stammerer will develop various secondary emotional attitudes, such as shyness, or irritability. The teacher should always be on the lookout for children who are beginning to show a speech defect, or already have one. In only rare instances is there anything wrong with the speech mechanism; usually the difficulty is wholly emotional. As one expert has said, "Stammerers can always sing, swear, and soliloquize." Fluent speech under some circumstances and a stammer under others make it clear that the defect is not physiological.

Belligerency.—Occasionally one finds a person who is too vigorous to admit defeat, too pugnacious to run away, too clear-headed to fool himself by pseudo-solutions. Perhaps the only response he has left is to fight back at a

world that is so uncomfortable. This type of behavior is not as common as those previously described, but it leads to acute and stubborn problems of discipline in the school or at home.

One clear example of this has recently come to the writer's attention in the case of a boy who has almost completely terrorized his companions and teachers. This lad's father is in the penitentiary—unjustly, according to the boy. For a time after the commitment the boy remained in a somewhat dazed condition, was publicly humiliated by comments from the other children, and ignored when invitations for parties or any social gathering were being issued. Presently, however, he began fighting back. He knocked down anyone who twitted him about his father; when a little girl ignored him he twisted her arm until he had forced her to kneel and apologize; he threw rocks, with deadly aim and intent, at others. Sometimes his cruelties were practiced on children too young to resist, presumably because he could get release from his emotional strain in proportion to the pain he inflicted. Gradually, his bellicose attitude spread to adult society. On one occasion he tinkered with the brakes on a teacher's car so that they would not hold, and the teacher was nearly killed. At another time, he entered a neighbor's house and fixed a heavy weight over the front door; when the woman of the house returned from market the weight fell on her head and stunned her. Twice he set fire to valuable property. This blind striking-back at society was his method of response to intolerable humiliation.

It goes without saying that the "getting-even" type of behavior is very dangerous. But it cannot be cured by punishment, the only technique familiar to society. Many criminals develop from just such a tortured boyhood. In the early stages, sympathetic understanding, reeducation, and a directing of emotional release along some other line

are possible. If treatment is delayed until the attitude "jells," little can be done—and society is menaced by another hardened criminal who is the result of its own failure to understand the first manifestations.

Four different general types of behavior have been presented in the above discussion. None of these reactions really solves the fundamental emotional problem or adjusts the sufferer to the world about him. The neurasthenic is overcome by his problem, the daydreamer runs away from it, the rationalizer and the hysteric neatly dodge it, the overcompensating case and the fighter strike out at it blindly.

Just why one child will drift into one form of response and a second child into another is not clear. Differences in physical vigor doubtless operate, but social factors are undoubtedly even more important. The reader probably knows some families in which nobody ever cries as a response to discomfort, and other families in which crying or hysterical outbursts are the expected forms of response to any type of difficulty. That such matters are subject to training is perfectly clear; for example, boy and girl babies cry an equal amount, but men cry far less than women, and swear far more. The mores allow the girl to cry but not to swear. Presumably, the particular type of reaction developed is understandable only in terms of a child's total experience from birth.

THE DIAGNOSIS OF DISCIPLINARY PROBLEMS

Thus far, this discussion has been restricted to chronic emotional conditions because, in a child's total development, these are far more important than the occasional outburst of talking back, uncontrollable laughter, fighting, swearing, or crying, and because, being more extreme and persistent, they show more clearly the important phenom-

ena involved. Furthermore, the discussion was not restricted to emotional problems as they appear in the school, because it is vital that emotional distress be understood as a whole, with reference to the child's total existence. With this background of general discussion given, the question now arises as to what understanding may be obtained concerning episodes of conflict in the school. Since disciplinary problems are usually reported as the most difficult with which the young teacher has to deal, any insight into such problems which may be obtained should be of great value.

Chronic Emotional Distress and Disciplinary Problems.—First to be considered are situations in which the chronic emotional conditions discussed in the previous section under the pathology of emotions may cause disciplinary crises. Only a brief review should be necessary. First, the three important results of chronic emotional stress should be recalled: (a) intellectual abstractedness and inefficiency, (b) general irritability and moodiness, and (c) poor physical condition. Here obviously are three possible causes of disciplinary trouble, for the child that has difficulty in working will be irritated; if he is doing poorly and is frequently inattentive he is likely to be subject to reproof from the teacher; his moodiness and irritability evidently offer direct potentialities for schoolroom conflict; and his physical discomfort makes him restless and increases his irritability.

Of the special conditions mentioned in the previous section, it is evident that belligerency and overcompensation are almost bound to bring frequent episodes of classroom conflict. The pupil may create puzzling classroom problems, or develop a hysteroid type of behavior, like stealing, which is directly delinquent. The day dreamer and the

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tinuing difficulties of discipline, in holding her charges to these tasks.

Finally, in the average school, there are numerous instances of maladjustment between work and ability. It has been reiterated that the success experience is essential for a healthy mental hygiene. The boy in the algebra class who cannot learn algebra is a frustrated, unhappy, resentful youngster who is almost certain to cause the teacher trouble. The daughter of the local grocer who is being made to wade through *Comus*, though without the slightest understanding, is more than likely to pass notes or whisper to her neighbor. The highly intelligent girl in the first-year class who can read French better than the average third-year pupil is almost certain to show periods of inattention which are irritating to her teacher.

In the conventional school, then, there are many conflicts between pupil and teacher which are the fault of the school, not the pupil. It may almost be said that the more healthy and intelligent the pupil, the more frequent the conflict. The teacher therefore will do well, if minor disciplinary problems are frequent in her room, to consider whether the source may not be primarily hers. To be sure, she is largely helpless to remedy certain of the faults above mentioned, like those in the course of study. But, if she understands the situation, she will at least be more tolerant; and ultimately perhaps, on some curriculum committee, she can do her bit toward making things better. In numerous little ways she can do much to bring the work into more vital contact with the needs and interests of her class.

The Analysis of the Specific Disciplinary Episode.—The above discussion has been general. Actually, of course, any real disciplinary episode is a concrete, specific affair, born of a variety of obscure influences which may include all the factors mentioned above. A consideration of the following episodes should make this clearer. The reader is also urged to review his own observation of disciplinary crises, attempting to untangle the causes of them in somewhat similar fashion.

In a certain school Miss A was one day sent into a classroom to get hold of a group of tenth-grade youngsters who had gotten completely out of control. The class had started on its downfall in a curious fashion. In the middle of the room there were two small columns that supported the ceiling. One chronically failing boy whose seat was behind a column evidently became completely exasperated and proceeded to "shin up" the annoying post. The teacher unwisely shouted at him and he, being well out of reach, proffered some replies. In a few moments another lad had climbed the second column. Someone suggested a race between the climbers; in a moment there was a group at the foot of each post, thus preventing the teacher from laying hands on either boy, and before long an elimination tournament was in progress. The teacher shouted, scolded, and even cried. At this point Miss A was asked to do something. She entered the room at once, sat down at the desk, and corrected themes. Not the slightest attention did she pay to the students, who presently discovered that climbing dusty posts was not much fun. When the groups had dispersed of their own accord, the teacher took a hand. First she asked the two boys that started the trouble what had ailed them. They replied that the posts were a nuisance. She then asked if there were not some more sensible solution than climbing them. In a few minutes the boys of the class were at work moving the desks around the room until the difficulties of seeing and hear-

ing were reduced to a minimum. By this time the session was at an end. On the following morning Miss A entered the room to find a couple of lads climbing the posts again, but she simply smiled at them, went on with the interesting lesson she had prepared for the day, and soon the boys went back to their seats. The childish boy who had started the trouble continued his gymnastics two or three times that day, but Miss A never faltered for a moment in the work she was doing. By the second day none of the pupils even looked up at these antics and, the third day, the performance was greeted by adverse comment from the other pupils. Miss A smiled to herself and knew the crisis was over.

In this case, the outburst was clearly a reaction of irritation, on the part of a failing boy, against the chronic handicap of having the post in the way; and this reaction was elaborated and continued because the lad found that it made him the center of attention and interest and hence was in delightful contrast to the legitimate class activities in which he could never make good. The class gleefully aided and abetted him because the episode gave them welcome opportunity to shake free for a few minutes from a conventional school routine and get up, move about, talk. The incident was successfully handled by eliminating the immediate cause (the seat behind the post), and by bringing it about that the proscribed activity (post climbing) brought social disapproval rather than applause.

In another instance a bright, nervous, high-strung third-grade child refused point-blank to read aloud a simple little story about animals that talked, because she regarded it as silly. The order was repeated, the stubbornness increased, and the exasperated young teacher told the child she could not leave school until she had read the story aloud. At five o'clock the deadlock was broken by the principal, who required merely

that the girl read a passage from any book, whereupon the youngster proudly pulled from her desk a copy of *David Copperfield* and read a passage with gusto. Once again the underlying causes of the trouble were multiple and of long standing. In the first place, the child was not well. The work was far below the level of her interests and her ability; the episode was the climax of an accumulated exasperation at work which she considered beneath her. And she craved the satisfaction of showing what difficult material she could and ordinarily did read.

In still another instance, a highly intelligent high school girl was required to make a "notebook" in geometry by copying the theorems in the book *exactly* as they appeared there. Not even a variation in the lettering or position of the figures was allowed. The girl soon sensed the futility of the routine copying and asked first that she be excused from this drudgery if her class work was satisfactory, or at least that she be allowed to turn the figures about, better them, work out variations in the proof. These suggestions were all indignantly vetoed, and the girl slammed her hated notebook in the teacher's face. . . . Here the fault lies so obviously in a stilted method of teaching as to need no further comment.

In the background of all these episodes one sees a gathering rebellion against a series of stupidities on the part of the school. To be sure, the school is not always wrong! The moral is that one should stop and study a situation before administering punishment. The reader should recall to mind disciplinary episodes which he has observed and attempt to analyze them in similar fashion. Obviously, such episodes can never be understood without understanding the children involved; also, a social situation is evidently always involved. Even where the fault is the pupil's, analysis is still needed if the punishment is to be effective.

THE HANDLING OF PROBLEMS OF EMOTIONAL DISTRESS

There remains the bringing together of the implications pervading this entire chapter in regard to the handling of problems involving emotional distress and discipline. The following suggestions appear of outstanding importance.

The Distinction between Symptoms and Causes.—It is, first of all, fundamental to distinguish clearly between symptoms and causes. The youngster who is a school problem because he is irritable, wastes his time in reverie, or is truant, delinquent, or restless, is most decidedly not adequately dealt with if a teacher tries merely to scold him out of his irritability, to interrupt his “wool-gathering,” to have him pursued by the truant officer, or punished for his wrong doings; on the contrary, such treatment may aggravate the difficulty. The forms of behavior which have been listed above must be regarded as symptoms of some underlying frustration or conflict—they are the child’s frantic S.O.S. for help. The difficulty can be adequately handled only if the cause is understood. This search for causes is admittedly much more difficult than efforts to eliminate symptoms. The search is likely to lead beyond the school to the home or child society. It may most embarrassingly point a finger at weaknesses of the teacher herself. But until the cause *is* understood, all that will be achieved is the elimination of particular symptoms and the forthcoming development of other symptoms that are just as bad—perhaps worse. Moreover, the analysis will yield the teacher further rich returns in a better understanding of herself and of children.

The Necessity for “Objectivity.”—The second point has

to do with the comparatively simple but vital question of the teacher's manner and attitude in dealing with problems in this field. It is prerequisite to any success in handling emotional problems that a teacher should *not* meet the situation by displaying emotion herself, for the whole difficulty will be decidedly increased. She must not permit herself to become angry or upset, nor must she go to the other extreme and indulge in a weak deference to the child's behavior. To be "objective" means that she should maintain a calm, friendly attitude of open-mindedness and desire to understand. When a pupil displays insolence, anger, or stubbornness, the teacher is extremely unwise who adds to an already surcharged atmosphere any emotion of her own. In fact, it may be said that sarcasm and disagreeable scoldings—while a form of relief to the teacher—constitute the worst possible method of procedure. Often nothing more than a calm good nature and a refusal to take a bit of excitement too seriously, are all that are necessary to handle a disciplinary situation.

All that the experienced teacher used, in the first example above, was a quiet placidity that operated both to calm the pupils and to make it evident that she could not be "razzed" into making a Roman holiday for them. The incident would never have occurred in one of her own classes because the eccentricities of youth never disturbed her. On another occasion, in her home-room group, a boy put his feet on the desk as he read his lesson, the while watching her to see what she would do. She did nothing. Indeed, she seemed to have a blind spot for those feet. After a while the boy took his feet down. Suddenly the teacher came to life and thanked him, but went on to explain kindly that if he simply could not study in any other posture she would certainly not allow the

conventions of a schoolroom to interfere with his education. The feet remained on the floor the rest of the year, without any damage to the lad's scholarship.

The teacher's chief practical technique in dealing with emotional and disciplinary problems is a quiet, good-natured, sympathetic, but not sentimental, talk with the child to determine the real cause of the trouble. Since these underlying causes are often highly personal and may involve something of which the child is much ashamed or about which he feels acute humiliation, any questioning before the class will usually produce only a worse outbreak, or at least gain no ground. A friendly talk with the youngster alone, preferably after any emotional heat has subsided, is the desirable procedure.

"Objectivity" means further that the teacher will not be shocked or upset by any distressing information that may come to her. For instance, a desperate youngster may blurt out to her a story of some sex episode which seems to her very disgusting. But she must not show that feeling; in fact, she must try not to show any unpleasantness about such matters, any more than a physician feels disgusted when he sees a sick person. Rather, as with a physician, there should be only a desire to help. If the teacher is well read in such matters, she should know that certain episodes and habits not uncommon among children are not so abnormal as once supposed (2) (6). Her first service to the child should be to get him out of his emotional bewilderment and into a state of understanding in reference to his troubles.

Finally, a great help in maintaining discipline is a ready sense of humor of the same type as the child's; an adult humor sometimes only adds oil to the fire. Emotional tension can most easily be relaxed by comments which are

amusing to the offender. And there may come for the child in that connection a perspective which will be of great aid in the solution of his problem.

The "Developmental" versus the "Police" Point of View.—An administrator is likely to judge a teacher as satisfactory in proportion as she keeps order. Similarly, it is all too easy for a teacher to consider satisfactory those pupils who never upset the order of her room, and to consider unsatisfactory those children who "disturb the peace" (28). Such is a police point of view. However, if administrators consider the healthy development of each child as the main objective of education, criteria for rating both teacher and pupils will, as was pointed out in a previous chapter, be very different. From the point of view of healthy development, the quiet, repressed, retiring child who finds his satisfaction in daydreams or reading rather than in actual vigorous activity, is on the whole the most serious problem mentioned in this chapter. The lad who overcompensates as a reaction to emotional distress is likely to be a classroom nuisance; but this behavior shows a vitality and a courage to strike out against his difficulty—a reaction that augurs well for his ultimate development. The active, healthy youngsters who are restless in a conventional school program are right, and repressive discipline is wrong. The teacher with a developmental point of view, then, will not estimate children in proportion to their quietness and orderliness. Her room will not, in the conventional sense, be orderly. She will consider it one of her major functions to aid children in resolving an emotional *impasse* in which they may become involved, instead of punishing or criticizing them. Her whole point of view

toward her pupils, her estimate of them, and the nature of her classroom procedures, will be radically different in consequence. Moreover, she will have a classroom in which the children can feel secure from emotional stress, and she will therefore seldom be faced with crises demanding disciplinary measures.

PRACTICAL SUGGESTIONS FOR TEACHING IN THE HANDLING OF EMOTIONAL PROBLEMS

To the inexperienced teacher nothing is so bewildering as the emotional attitudes developed by the children or adolescents in her classes. The suggestions below may, in the light of the entire chapter, be found useful.

- (1) Remember that emotions are powerful drugs that affect a child's whole organism, preventing learning, not aiding it.
- (2) Preserve a calm, sympathetic, unemotional atmosphere in your own schoolroom, so that the children may feel secure there and will relax whatever tensions they may bring with them from elsewhere. Do your best not to add strain by your teaching methods or your own personality.
- (3) Remember that prolonged emotional states are due to a continued failure on the part of a child to solve some fundamental problem. The symptoms of emotional preoccupation are clear enough; try not to be blind when the distress signals are flying.
- (4) Do not be so foolish as to punish a child for such symptoms. Recognize them for what they are and try to find out what lies behind them. Don't let yourself be so "razzed" that you lose your own sense of proportion.
- (5) Be alert to escape mechanisms of all kinds. The human animal is full of them—and often they are of real value. But in cases where they are leading the child into emotional danger do not be afraid to take a hand in preventing their further development. Locating the source of trouble may take several weeks; in the meantime you can try to revive an interest in real life on the part of the children who are running away from reality. You can also quietly neglect hysterical manifestations while you are investigating the sources from which they have arisen.

- (6) Remember that if you do not help these children it is likely that no one else will until after the period of prevention has passed.

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CHAPTER VII

THE DEVELOPMENT OF INTELLECTUAL EFFICIENCY

IT SEEMS to be commonly assumed that the major purpose of school is the development of intellectual efficiency. But this should *not* be the major purpose; the school should conceive its task much more broadly and with much greater emphasis on such factors as were described in the preceding chapters. However, the development of this efficiency is certainly one major purpose, and consequently the factors involved in efficiency must be considered. Four are of importance.

In the first place, (a) an individual is efficient in proportion as his methods of work and his attack upon problems are effective. It should then be one task of educational research to determine what methods of work and of attack upon intellectual undertakings are most efficient, and a major task of the school to train children in the use of such methods. Strangely enough, neither obligation has been generally recognized. The problem is obvious, however; one need only contrast the methods of work used by different students as he observes them in a library or study hall. Here one student takes notes on the back of an envelope where another has a carefully arranged notebook; one settles down immediately to work and is rarely distracted, while the other fusses about and glances up at every stir in the room or passing truck outside; one has her notes in

careful outline form, while the other has a series of disjointed observations. In the business world also, differences between people in the efficiency of their way of going about things are noticeable; a large factor in a man's usefulness to a firm is the efficiency of his work habits. Habits and methods of work (in school, methods of study) are, then, important factors in intellectual efficiency—so important that they will be given more adequate discussion in Chapter XV.

A second factor (b) in intellectual efficiency has been dealt with in a preceding chapter: many individuals of excellent ability are ineffective because of what may be called emotional blocking which interferes with the free and vigorous exercise of their abilities; in contrast, individuals of less capacity may be highly effective because their ready activity leads to multiple accomplishments.

A third item (c), which is obvious in character, is the individual's total equipment of information and skill available for any task which may be awaiting his efforts. In short, a person is efficient, other things being equal, in proportion as he is informed about the tasks he may be called upon to do and has any special skill which may be involved in doing them. There is here an obvious lesson for education.

Thus, individuals are efficient in proportion as they have efficient methods of work, are not subject to emotional disturbance, and are informed about the tasks they do; the total of these three factors is most important. But there is a residual factor, overemphasized in current educational discussion, which remains, (d) a general capacity. It is clear that just as individuals differ in height and bodily propor-

tions so they differ also in their natural innate facility in learning and their quickness of understanding, in ways which imply the existence of biological factors—of nervous systems which are innately more or less capable; it is clear that some men are born to be intellectually tall and others to be intellectually short. And it will be expected that this factor, commonly called *general intelligence*, will put limits upon the extent to which the other factors mentioned above can operate. But it should also be clear (and this is a point not adequately recognized at present) that, for individuals within the limits of innate capacity which may be considered as normal, differences in the first three features will be exceedingly important in determining realized adult mental efficiency. And this may be even more true of persons of superior mental endowment.

The reader will find it interesting and instructive to observe students in the library and in class in relation to the four factors discussed above. With reference to the first factor, he may well keep a record for several students, through a study hour in the library, of the number of minutes it takes each one to settle down to work, the number of times each glances up, talks to someone, moves around. Great differences in use of time and in application will be observed. Several notebooks may be looked at to see how students differ in the orderliness of their work. For evidence of the second factor, the reader should look especially for the two extremes—the very diffident, hesitant, anxious person who recites stumbingly because of embarrassment and seems chronically interrupted in his work by his emotional distresses, and the expansive ready-spoken youngster who displays all his wares with great fluency and moves through his work with a rush. The importance of being adequately informed with reference to any topic is well shown by the contrast between students in a course on mediæ-

val history, for example, who have read many good historical novels dealing with this period and the students who have had no previous information about the subject. For many of this last group the events are hardly more understandable than a report of happenings on another planet. As for the fourth factor—innate general ability—everyone knows some people who seem to have a gift for seeing the crucial issue in a discussion, grasping the essential points in a situation, and seeing significant relations which escape the average person. And there are other people who may be referred to as “just naturally not very bright,” who are inferior in such respects. Such differences in original capacity are clearly fundamental.

This chapter will present the results of investigations regarding mental efficiency with special reference to this last factor, and attempts to measure differences between individuals in this respect. But it should be understood that actually the measurements have to some extent involved the first three factors also, and as the discussion proceeds these factors will be referred to from time to time. Moreover, it will be found enlightening, in further bringing out the importance of these factors, to discuss first the nature of special abilities and disabilities before considering general mental ability. This important practical problem will therefore now be turned to, although it may seem somewhat aside from the major theme of this chapter.

THE NATURE OF SPECIAL ABILITIES AND DISABILITIES

Special Abilities.—In addition to variability in general capacity to learn, certain children show decided differences in special capacities for learning along definite lines. Thus the teacher notices that one child has mechanical ability, another shows musical talent, a third has artistic gifts. Other children show limited capacity or even complete lack

of ability along one or more of these special lines. Still others, who undoubtedly form the majority, seem to have neither special talent nor disability, but rather approximately equal development in all fields. For purposes of vocational guidance, any differences in special abilities that do occur are important. However, the source of these variations is not so clearly innate as is sometimes supposed, and their nature and development are worth separate consideration. The writer here presents the case of a childhood friend, in order to show how special talents may be, and often are, developed.

Ellen was the only child of a woman whose husband had been killed in a tragic accident shortly before Ellen's birth. The mother had done a good deal of work in oil painting, designing Christmas cards, china painting, artistic photography, and so on, for her own amusement. She had an income sufficient for herself and Ellen, and so could continue her dabbling in art. Her two consuming passions became her daughter and her artistic productions—many of which were truly excellent. As soon as Ellen could hold a pencil in her hand she was shown how to draw simple objects. The drawing lessons were short, but there were several of them in the course of a day. At other times the mother kept pointing out that this old house would make a lovely picture, that that tree was beautiful against the sky, that the color of the cream pitcher blended perfectly with the wall paper behind it, and so on. By the time Ellen was five years old she had visited more museums than most people do in a lifetime. And always her mother was with her, commenting, explaining, enthusing. Ellen's own efforts were greeted with praise and joy; nothing so pleased the one adult who made up the child's entire society as a voluntary drawing or coloring of something. But enthusiasm was not the whole story, for the mother went over every draw-

ing and showed Ellen where it could be improved. Until seven years of age the core of Ellen's existence was the study and appreciation of art, carried on under the intimate supervision of an intelligent and talented adult.

When Ellen entered the second grade of school at seven, she amazed her teachers and playmates because she could not read a word, knew no childhood games or stories, could write nothing except her name—which she used in signing her “pictures”—and did not know a single number combination. But she could, and did, draw marvelous scenes on the blackboard. At recess time there was almost always a group of awe-struck youngsters gathered at the board watching Ellen draw. It was her one moment of success, for her recitations consisted of one failure after another. Because she hated being at the foot of the class and had reasonably good general ability, she soon improved in her school work, but she never excelled—partly, at least, because all her leisure time went into drawing and painting. At both home and school the one thing that paid dividends of praise and admiration was her artistic activity. The highest thrill of Ellen's childhood came when her mother allowed her to put a tiny bit of paint on a picture the mother was to exhibit, especially when the picture later received a prize.

As Ellen progressed into adolescence, and the peak of her mother's ability passed, the two became loving and thoroughly cooperative rivals. Ellen docilely went through the motions of school work, and achieved some popularity in the drawing classes or by making posters, but she really “lived” only at home with her mother. As Ellen grew into adulthood and realized how one-sided her development was, she made a few honest efforts to escape into other lines of work; but her mother and, indeed, the entire community would have none of it. By that time she was labeled as a coming young artist, and the wealth of the family prevented the turning aside of such ambition in order to earn a living. . . . Ellen is now a woman of fifty. She has never achieved any such position as

her apparent capacity at the age of seven seemed to promise. She does commercial illustrating, makes high-grade posters for advertising, does excellent photography, designs Christmas cards, monograms, programs, and occasionally paints a picture. A few have been exhibited but, while they show an excellence of technique, they receive no prizes.

Did Ellen inherit artistic talent, or was her skill the result of intensive, continued training? Did she have a "natural" enthusiasm for art, or was her interest due to the fact that only by such activity could she receive the attention of others? If the mother had adopted a girl who had no artistically inclined ancestors and had put her through this course of training, blocking off all other possibilities of emotional satisfaction, what would have been the result? Perhaps the best conclusion one can come to is that Ellen may have inherited some special capacity, but that her really amazing technique was gained through untold hours of concentrated effort inspired by praise from everyone she knew.

From the above study we may conclude that training and innate ability become so completely intermingled that it is impossible to tell what was inherited and what acquired. Undoubtedly in the past there has been far too much emphasis on the innate factor and too little consideration of the part played by social pressures of various kinds. The writer would hardly agree that one could "make" a genius out of a child with no special talent whatever. Study of the biographies of great artists and musicians, to take specific examples, indicate five rather obvious factors in their development: the inheritance of certain special physical and mental traits; the early and consistent gaining of emotional satisfaction from the exercise of these skills; the concentrated practice to which the child was encouraged by his pleasure in his own skill and the recognition it gave him,

often reenforced by a consistency of practice required of him by a parent; the gradual narrowing of his interests through the mere lack of time to pursue other possible activities; and, finally, a strong economic drive during the period of young, vigorous manhood or womanhood. It may be that the girl in the above study has not fulfilled her early promise because there has never been any economic pressure or because her narrow mode of life has shut her off from a sufficient variety of experiences. To be sure, the prominence of the inherited element varies from case to case.

The writer knows one small musician who began his career at the age of three when, at a concert to which he had been taken by his mother, he became almost hypnotized by the violin soloist. The dramatic rôle of the soloist impressed him so profoundly that he pestered his parents for weeks until he got a cheap violin. All of this story thus far is sheer environmental accident, but this hardly explains why he should have sat entranced through three solid hours of concert music, or why, upon getting his cheap instrument at noon on a certain day, he should have learned to play the scale and two simple melodies before nightfall, or why he should have progressed to the point of playing in the school orchestra while he was still only in the kindergarten. Although such unusual special ability is rare, it is worth cultivating when it does appear.

Special Disabilities.—Also interesting are the cases of marked disability. For these an innate basis is rather less evident than it is for cases of talent. Thus the cause of the spelling disability shown by the girl whose history was given in Chapter III resolved itself into slight deafness, plus poor teaching, plus emotional blocking. Similarly, the majority of disabilities, when studied intensively, appear

to be due to some constellation of non-inherited circumstances, the most outstanding of which is emotional blocking. This feeling of being unable to progress in certain subjects comes from specific experiences in which first efforts met with defeat or ridicule. Examples will make this point clearer.

The writer has known many college students who were convinced they could not learn a foreign language through lack of sufficient "linguistic ability." The true causes, however, were quite otherwise. Some of these students failed in a language for the same reason they failed other things—lack of sufficient general intelligence to do any work of college level. Some failed through lack of adequate study methods. The majority were merely unprepared for the work; they did not even know which words were nouns and which were verbs; which words were singular, and which plural; they had never heard of a tense, a case, a participle. Their knowledge of English grammar was practically non-existent and, in many cases, their own use of English was awkward and incoherent. Their language course involved constant use of terms and ideas with which they were unfamiliar; they became utterly confused and, not knowing where else to put the blame since their other work was satisfactory, they thought they *could* not learn a language.

Cases of children who cannot seem to learn reading are often completely curable because the disability is found to be due to inadequate eyesight, some frightening experience, fear of standing up before the class to read, and so on; however, if such situations continue long enough a blocking is set up that functions like a true disability.

In another instance, during the writer's high school career, a student was sent to him to be tutored in Latin. The student reported a complete inability to obtain a translation. Imagine the writer's surprise when this student went at the job of

translating a sentence by stating orally the grammatical construction of every word: "*Homo*—a noun in the masculine gender, nominative case; *sapiens*—an adjective in either masculine or feminine gender, nominative case, probably modifies *homo*," and so on for every word. At the end of the elaborate analysis the student looked up with tears in her eyes and reiterated her despair at being unable to translate! Her book had no vocabulary in the back and she did not own a dictionary. Neither she nor the teacher had ever discovered that an overemphasis on grammar had led to her assumption that constructions, if classified sufficiently, would result in meanings. She actually did not know how one got from Latin to English words except those given orally by the teacher in class.

A single discouraging initial experience may create a settled feeling of frustration and consequent emotional blocking along a particular line.

A friend produced the following poetical gem when she was a little girl; the exact rendition is made possible by the recovery of the paper among some long-unused toys in the attic of her house.

"Oh minty ellum, oh weping willow
Lend me thy shade, I praye
For the brantches of oak and helmlock
Will lend me there shad,
Will thou not do the same way?

Tall pine and birtch will lend me,
Fair mapel and fir the same.
And for me a strangre
Will thou not do it agan and agan?"

This poem, achieved after strenuous labor, was presented to the family, and aroused raucous laughter and various adverse comments on the spelling, handwriting, and punctuation in

particular. There was not a word of praise. That night a disappointed seven-year-old child put her only poem away; she never wrote another. As literature this production is well below zero; but had even one iota of commendation been forthcoming, the child would have written more—and better—poems as she gained greater skill and confidence. To be sure, she would not in any probability have become a poet; but her single experience blocked off all further use of poetical form as a means of expression.

The writer is convinced that most special disabilities and talents along particular lines are explainable in the light of some physical handicap, dramatic incident, emotional satisfaction or distress, or interest or indifference on the part of loved adults; only occasionally is there some innate factor. Whenever there is special ability it is socially valuable and worth conserving; however, one should not expect to find such manifestations often.

THE MEASUREMENT OF GENERAL INTELLIGENCE AND OF SPECIAL APTITUDE

Now to return to the consideration of general mental ability, or general intelligence. It is first necessary to attempt a more adequate definition. General intelligence has been variously defined as capacity for meeting new situations, common sense, ability to reorganize past experience, ability to generalize, readiness of insight into problems, and capacity to learn. The teacher need not trouble herself with the niceties of definition, but she may well emphasize the ideas of capacity to learn and to generalize. The concept of general intelligence, and of individual differences therein, should therefore mean to her that with age there is a growth in potentialities for education, and that students

differ in this respect. Since these differences in potentiality are great, it is most important, if each child is to be educated according to his capacity and need, that they be determined. And since it is difficult for the teacher, as she observes a child, to distinguish this last factor, innate capacity, from the other three factors mentioned above, special means for investigating the problem are necessary. These are the so-called intelligence tests.

Individual Tests of General Intelligence.—Historically most important, and most significant with reference to the problems involved, is the Binet Scale (4) which was issued in its first form by its originator in 1905; the form best known in this country, however, is the Stanford Revision of the Binet Scale, devised by Terman at Stanford University (56).

The test is given to one child at a time, and consists of simple little questions which seem to the child more like an interesting game or chat with the examiner than a test. For example, the child is asked what he would do if it were raining when he started to school, or if another child struck him without meaning to—such questions being put to a younger child to see if he has a sense for dealing with everyday minor emergencies, physical or social. Absurd statements are made, such as, “A man said the road was downhill all the way to town and downhill all the way back home,” to see whether the child can tell what is foolish about such a statement. Certain pictures are shown the child, and he is asked what each picture is about. If he merely names the objects shown in the picture, his response is considered relatively elementary; if he describes what is

going on in the picture, his response is on a somewhat higher level; if he senses a story or situation back of the picture, his response is rated as still higher. He is given simple stunts to do, like counting backwards from 20 to 1, repeating a series of numbers which are said to him, or reconstructing a sentence the words of which have been mixed up; questions requiring practical generalization are also asked, such as telling in what way wood and coal are alike, or defining *justice* and *charity*.¹

In short, the effort is to include in the examination ideas or things to be done which the child would know about from his everyday experience in play or general observation—and distinctly always to avoid any information or skill taught in school. In the effort to measure the fourth factor—innate mental capacity—the third factor, relevant special information, is minimized by having the information called for such that all children have about equal opportunities to learn it. The second factor—emotional blocking—is made minimal by having the test given to one child at a time, always with special effort on the part of the examiner to win the child's confidence, make him feel comfortable and at home, and so eliminate emotional distress of any sort which might interfere with the child's work upon the examination. The first factor—methods of work—is in large measure controlled by having short tasks which put no strain upon the child's attention or perseverance, by having interesting tasks which naturally hold his attention, and by having the examiner constantly watch the

¹ It is strongly urged that the instructor demonstrate giving the Binet tests, and have a sufficient number of the complete Stanford-Binet blanks so that each student may have a copy while the examination is going on.

youngster so as to keep him systematically applying himself to the work. The score which the child makes on the examination is in consequence determined largely by his innate general ability, since the examiner keeps every child to a maximum effort in an emotionally favorable attitude, and uses material generally familiar to children.

The student should obtain a copy of the Stanford-Binet blank, and look over it with some care. It will be noted that there are tests for each age, each test having been put (in making the scale) at that age where about three-fourths of the children pass it. The usual procedure is to give a child six tests at each age, beginning with an age at which the child can comfortably pass all the tests and proceeding up to one at which he can pass none. The score is then figured by considering the age where he passed everything as the "base" (assuming that all tests below this age could have been passed had they been given), and then adding to this "basal year" two months for each test passed in any higher year (each test of the six counting as one-sixth of a year, or two months). The total score which is the sum of these values, is the "mental age," which is commonly abbreviated as M.A. Suppose a child passes all the five-year-old tests, four of the six-year, three of the seven-year, two of the eight-year, and fails all of the nine-year tests. The total score would then be 5 years plus 8 months, plus 6 months, plus 4 months—or a total of 6 years and 6 months. This is his mental age, and it shows that his mental development is approximately that of the average child of about $6\frac{1}{2}$ years. This concept of mental age is commonly used, and its connotation should be thoroughly understood.

It was said that the child above mentioned showed a mental age of 6 years and 6 months. But whether this shows a normal intelligence or not cannot be known until his actual chronological age is considered with reference to it. Suppose his chronological age is 6 years and 3 months; it is then clear

that he is, in intelligence, approximately a normal or average child, since his mental and chronological ages are so nearly the same. But suppose his chronological age is 8 years. It is then evident that he has not grown mentally as much as he should have; he is mentally under par. The usual way of expressing a child's intellectual standing with reference to his age is to show the result in percentage. If a child is 10 years old chronologically, but tests 7 years old mentally, it may be said that he shows 70 per cent of the mental growth that should be expected of him, or has an "intelligence quotient" of 70. This quotient is ordinarily referred to as the I.Q. If he is 10 years chronologically and tests as $11\frac{1}{2}$ mentally, he shows an I.Q. of 115. In finding the I.Q., both mental and chronological ages are expressed in terms of months, and the mental age is divided by the chronological. For instance, if a child's chronological age is 8 years and 3 months, and his mental age is 10 years 8 months, his I.Q. would be 128 months divided by 99 months, or 130.²

The Stanford-Binet scale is by far the most widely used and generally recognized individual test (a test given to one child at a time). There are, however, various special individual tests for special purposes. The Binet examination has this limitation, that it is almost entirely verbal. For a child who has a speech defect, who comes from a home where English is not spoken and who therefore does not

²Terman considered that adult intelligence was reached at 16, and he therefore used 16 as the chronological age in calculating the I.Q. of individuals over 16. Present evidence is that the Stanford-Binet Mental Age of the average adult is, as will be mentioned shortly, about $13\frac{1}{2}$. Some psychologists therefore use 14 as the adult chronological age in figuring the I.Q. Others correct the I.Q. as calculated by Terman, to allow for the lower average mental age. For discussion of the problem see Pintner, *Intelligence Testing* (revised edition), pp. 81-85, and Maxfield. *American Association for the Study of the Feebleminded, Proceedings and Addresses of the 48th Annual Session*, 1924, pp. 191-196.

know the language well, or who appears to be much more mechanically than verbally minded, "performance" tests can be used—simple puzzles to be solved, or other things to *do*. The Pintner-Patterson scale (39) is, perhaps, the most widely known. It consists chiefly of various form boards and picture puzzles that do not require any reading.

Group Tests of Intelligence.—These individual tests obviously cannot be given to large numbers of children because of the time and labor involved; and therefore methods of testing entire classes are desirable. A considerable number of such tests are now available. Those for the upper grades consist of blanks on which appear such questions as:

Are apples good to eat? Yes No

The day before Thursday is: (a) Wednesday (b) Tuesday (c) Friday (d) Sunday.

Cheese comes from: (a) milk (b) plants (c) eggs (d) butter.

What is iron never without? (a) coldness (b) polish (c) weight (d) rust.

Head is to hat as hand is to: foot glove shoe coat wrist.

The chief problem is to put the questions in such a form that the pupils can cover a large number of questions within a fairly short time, so that a reasonably satisfactory measure of this complex thing called "intelligence" can be obtained. And when so many questions are asked, it is desirable also to have the material so arranged that it can easily be graded. Hence the use of questions like those above where, instead of writing answers, the child simply checks the answer he thinks correct for each question. A

pupil can answer 200 or more such questions in 40 minutes, and the paper can be graded in 3 or 4 minutes. It will be seen that the examinations require the ability to read (assume that the child is at least above the threshold in reading ability, so to speak), but that the questions are, in general character, like those of the Binet. That is, they deal primarily not with material taught in school, but rather with matters with which the child should be familiar from his everyday experience. It is evident that the examiner cannot control the pupil's attention so well or make sure that each pupil's emotional attitude is favorable; therefore these group tests do not so well keep constant the first two factors mentioned at the beginning of the chapter. However, the usual group examination has many more questions than the Binet, and it is sufficiently interesting so that it holds the pupil's attention well; consequently the results are reasonably trustworthy.³

The group tests are even more verbal than the Binet. And they are somewhat "schoolish" in character, since they involve reading and information partly of a rather academic nature. Results may therefore be influenced somewhat by any reading disability. Inferences based on such tests as to probable success in a vocation must be made with great caution. It might best be said that such tests measure general academic ability.

Group tests for the first two grades present a special

³ The student should procure or look over two or three sample group intelligence tests, such as the *Terman Group Intelligence Test for Grades 6-12*, published by the World Book Company, Yonkers, New York; the series of *Detroit Intelligence Tests* or the writer's *Classification Tests*, the last two published by the Public School Publishing Company, Bloomington, Illinois. Representative of the tests for the lower grades are the Pintner-Cunningham group tests for the first grades, and the primary tests included in the two series just mentioned.

problem because the children cannot read well enough to take examinations like those just described. Therefore pictures, geometrical forms, and similar materials are used. A test in one such examination (51) consists of a page showing 30 pictures, in each one of which one part is wrong (for example, one picture shows a letter with a stamp in the wrong corner); the pupil is asked to find this part and put a cross on it. Another test consists of a series of pictures, each showing several similar objects and one which is different from the others (in one picture are four dogs and a cat); the pupils are told to mark the thing which is different from the others. Here again, the aim is to present familiar material and simple tasks so as to permit each child to show the extent to which he observes well, listens carefully to what is said, or sees the relationship between objects.

The score on these group tests is, usually, the number of the questions answered correctly. This figure can be converted into a mental age by comparing the score for a given child with the average score for each age made by a large number of children. Suppose a total of 6000 children eight years old, who are tested to establish the norm, average 79 points, and about the same number of children nine years old average 91 points. If a given child scored 85, he would be considered to have a mental age of eight and a half.

It is, of course, then possible to find the I.Q. by dividing the mental by the chronological age, as explained for the Binet. However, because of special features of group tests which need not be gone into here, it is usually best not to figure the I.Q. Rather, the results may be expressed as a percentile;

or, instead of finding the mental age, a child's score may be compared with the grade norms. If the norm for the third grade is 68, and a child scores 69, he is considered to have approximately "third-grade intelligence." For such uses as grouping children into grades or sections, the grade norms are more practical than the mental ages.

Students often become confused as to the comparative significance of M.A. and I.Q. It should be realized that M.A. is a statement of a child's *intellectual maturity* without respect to the years he has lived, while the I.Q. is a statement of the *relationship* between the length of time he has been alive and the ability he has developed in that time,—his brightness. A six-year-old with an I.Q. of 150 and a twelve-year-old with an I.Q. of 75 both have an M.A. of 9. They can do tasks of roughly the same difficulty. But their potentialities are very different. Four years later the mental age of the first child will probably be around 15, and of the second, about 12.

A child's M.A. increases as the years go by, at a rate indicated by his I.Q., until he reaches his adult level of ability. Theoretically, the I.Q. should remain unchanged. Numerous studies of this have been made by retesting the same children at different times (10) (9). The results seem to indicate that the I.Q. of an individual test given by a trained investigator is likely to vary an average of six points one way or the other on successive testings. Thus, if a child has an I.Q. of 93 when he is six years old, he may be expected to show an I.Q. between 87 and 99 when tested later. There are, however, some rare instances in which changes as high as twenty points have occurred, presumably because the child concerned was emotionally blocked on one occasion and not on the other, or some other special factor affected one testing or the other. In general, as already mentioned, an I.Q. based on group tests cannot be considered trustworthy. Unless otherwise stated, an I.Q. should be understood to have been obtained with the Stanford-Binet examination.

Tests of Special Aptitudes.—Tests of special abilities—mechanical, linguistic, and so on—are also available, although their value has not been clearly demonstrated. They usually present a youngster with typical problems involving the special abilities being investigated. For example, a test of mechanical ability may require the pupil to put together the pieces of a bicycle bell so it will ring; a test of musical ability may ask which of two chords played for him is the more dissonant; a test of linguistic ability may present a sample vocabulary, usually in an artificial language, which is to be first memorized and then used in various ways. The test may also include background needed in the field, such as the grammar necessary for the study of a foreign language. These tests are obviously measures of ability plus training, but they are nevertheless of some value. Although most pupils do as well on one special aptitude test as on another, an occasional child scores unusually high or low along some one line; and such results are undoubtedly of value in calling attention to these cases so that they may be further investigated.

Rating Scales.—In addition to, or in place of, tests of general or special ability, various schemes are available for obtaining systematic judgments of the abilities or other traits of pupils. One common form of a rating scale is shown below. The rater is supposed to make a mark on each line to represent his judgment on each point called for concerning the pupil being rated. The dots indicating the successive ratings of the same pupil may be joined, and a “profile” drawn. A sample of such a profile, giving a striking summary of a child’s characteristics, is as follows:

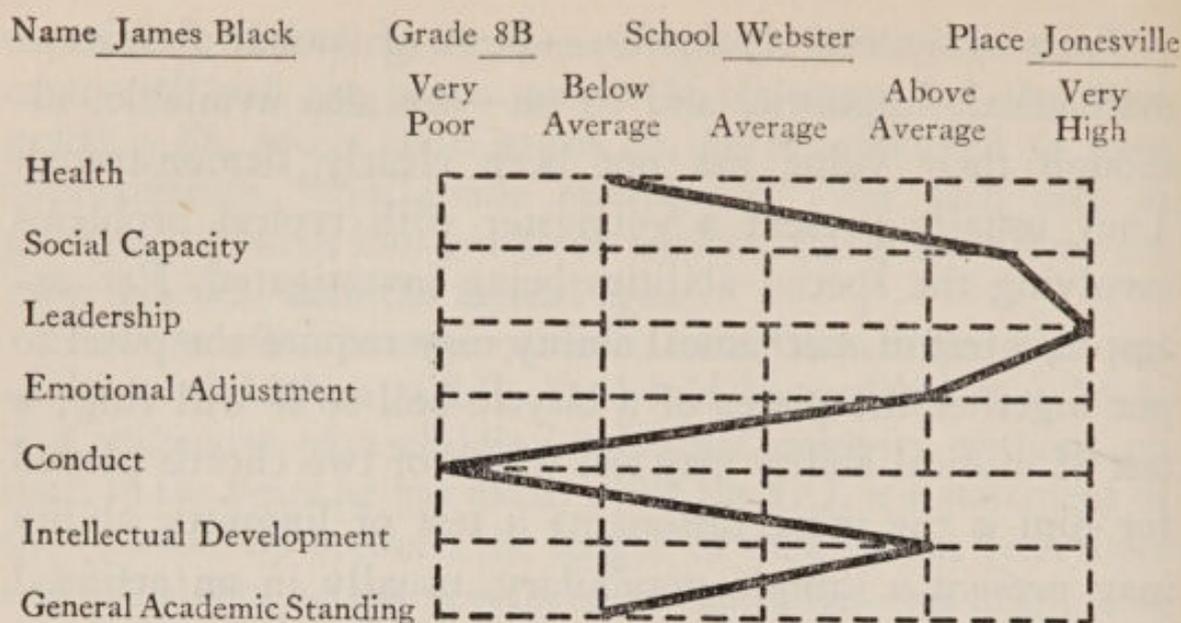


CHART 9.—A profile graph made from ratings.

This child shows high intelligence, excellent social capacity, unusual capacity for leadership, and good emotional adjustment; also striking is his strong tendency to misbehavior. His health and his standing in his school work are below average. Here is obviously a "problem" child whose characteristics are presented in organized form by means of the ratings.

Ratings by a single judge are usually not as trustworthy as the score on one good test, for too often the rater is prejudiced or does not really know the pupil as regards the trait in question. But ratings may cover points for which there are no good tests, and if enough ratings are obtained, the average for all of them may become of much significance.

All the measuring instruments above discussed—the individual and group tests of general intelligence, the tests of special aptitudes, and the rating scales—have their uses. For the busy teacher the group test is the most practical,

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average educational attainment and did not give an opportunity for the adult mind to show itself. The almost complete lack of systematic information in regard to development along any line during early adult life and middle age makes any conclusion on this point impossible at the present time.

Individual Differences.—In the rate of intellectual development, as elsewhere, there is great individual variability. The curves below (3) show differences in the growth rates for groups of individuals having different degrees of ability.

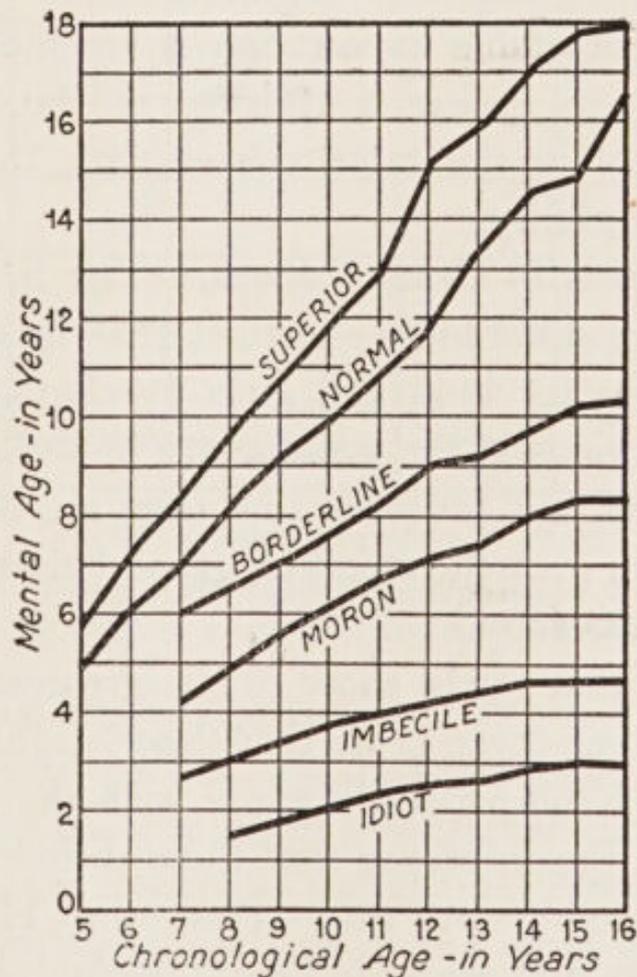


CHART 11.—Curves of mental growth for brilliant children, normal children, borderline cases, morons, imbeciles, and idiots. (From Baldwin and Stecher [3], and Kuhlmann [34].)

The top curve is for a group of children who, on the original testing, were well above average; the second group on the first testing were exactly at age in their mental development; the third group on the first test showed a slight retardation in mental growth. The three lowest curves show the mental growth of morons, imbeciles and idiots, respectively (34). It should be noted that the differences between the bright, average and dull children increase as the children grow older; for example, at 7 years of age, the averages for the superior and the "moron" or high-grade feeble-minded groups are 4 years and 1 month apart, whereas at age 16 they show a difference of 9 years and 8 months. The inevitable expectation is for more and more maladjustment to appear if children in the two extreme groups are kept in the same classes with those of more nearly average ability.

Sex Differences in Growth Rates.—The first point concerning the sex differences shown is that they are slight; the distributions for boys and girls overlap so much that the small variations in the average are of little educational significance, and it is probable that they are due primarily to differences in growth rate. The graph below (3) is typical of the results found.

It appears that girls show their greatest superiority during the two or three years that their height and weight are superior. If comparison is made with the curves given in Chapter II, the inference that these differences are primarily matters of growth rate seems valid. However, taking together the differences in height, weight, physiological maturity, intelligence, and emotional attitudes, it would seem clear that boys and girls of the early adolescent years differ to a quite marked degree.

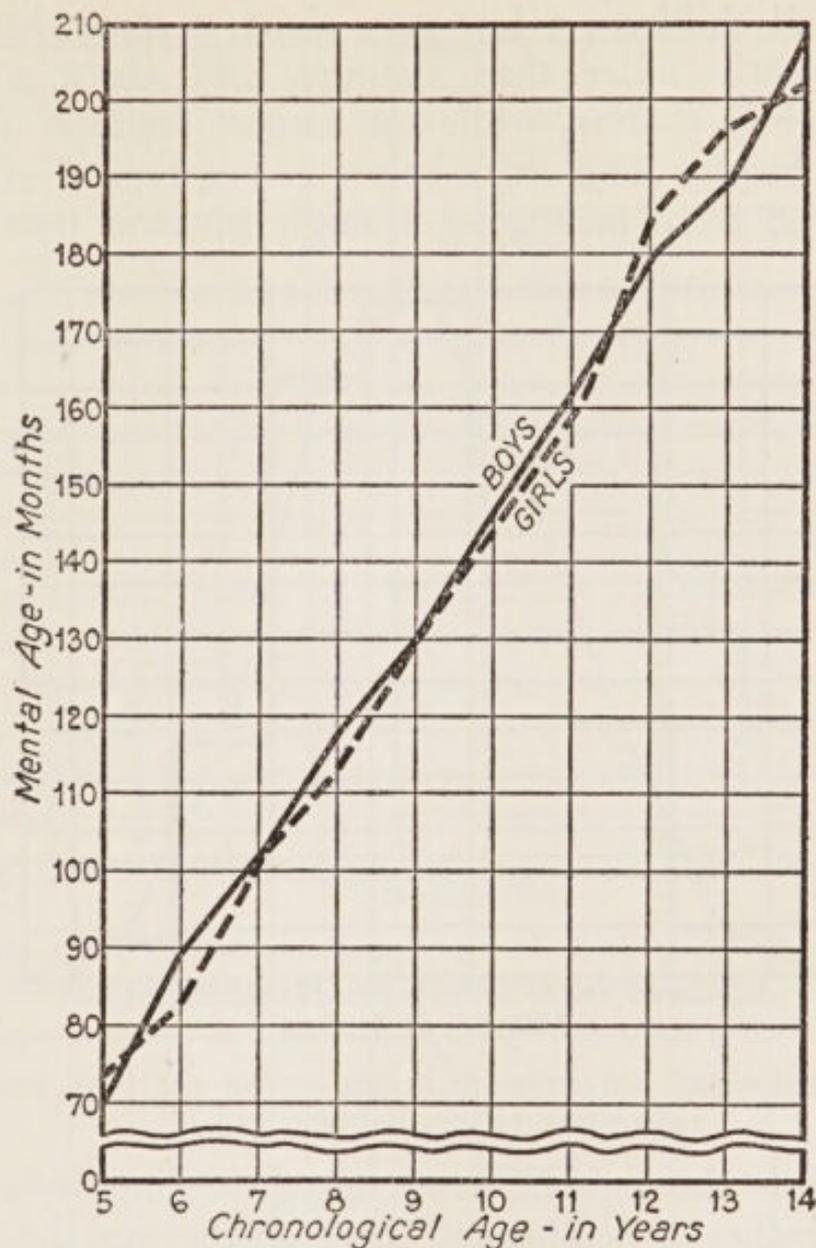


CHART 12.—Comparison of the mental development of a group of boys and a group of girls. (From Baldwin and Stecher [3].)

THE DISTRIBUTION OF INTELLIGENCE

Any observant person soon becomes aware that all people do not possess the same intellectual capacity. Results from intelligence tests have shown intellectual ability to be distributed among individuals in the same general way as any other variable trait, such as height or weight.

Thus it is obvious, from even a superficial consideration of a large group of children of the same age, that there are a

few very tall children, a few very short, a somewhat larger number slightly taller than average, and about a similar number slightly shorter, while the largest number are about average in height. The chart below (2) is typical of the results obtained from measuring a single physical trait.

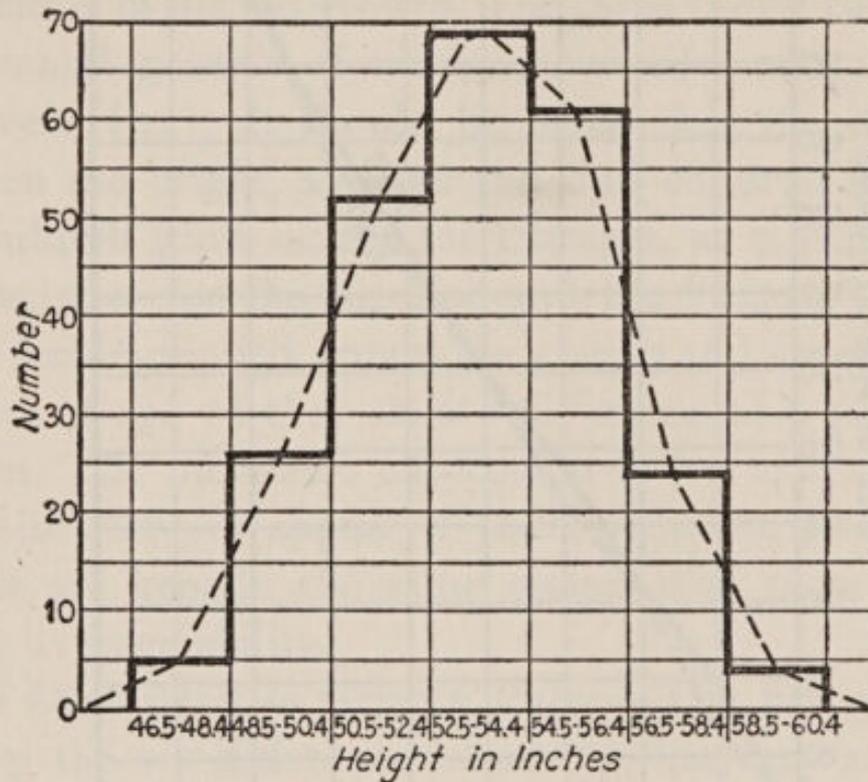


CHART 13.—Individual differences in height among 236 boys, aged $9\frac{1}{2}$ to $10\frac{1}{2}$ years. (From Baldwin [2].)

In this graph the figures across the base line indicate the number of inches of height, and those up the side the number of children who had attained each of these heights. The tallest children were slightly over 60 inches, and the shortest only $46\frac{1}{2}$ inches in height. In the center there are 69 children who were between $52\frac{1}{2}$ and $54\frac{1}{2}$ inches tall. A curve is made by joining the mid-point of each column; this curve is not quite symmetrical, because the cases are too few, but it is very nearly so.

When intelligence is measured, the results distribute themselves in the same way. Two sample studies are given below, one (48) in terms of M.A. and one (56) in I.Q.:

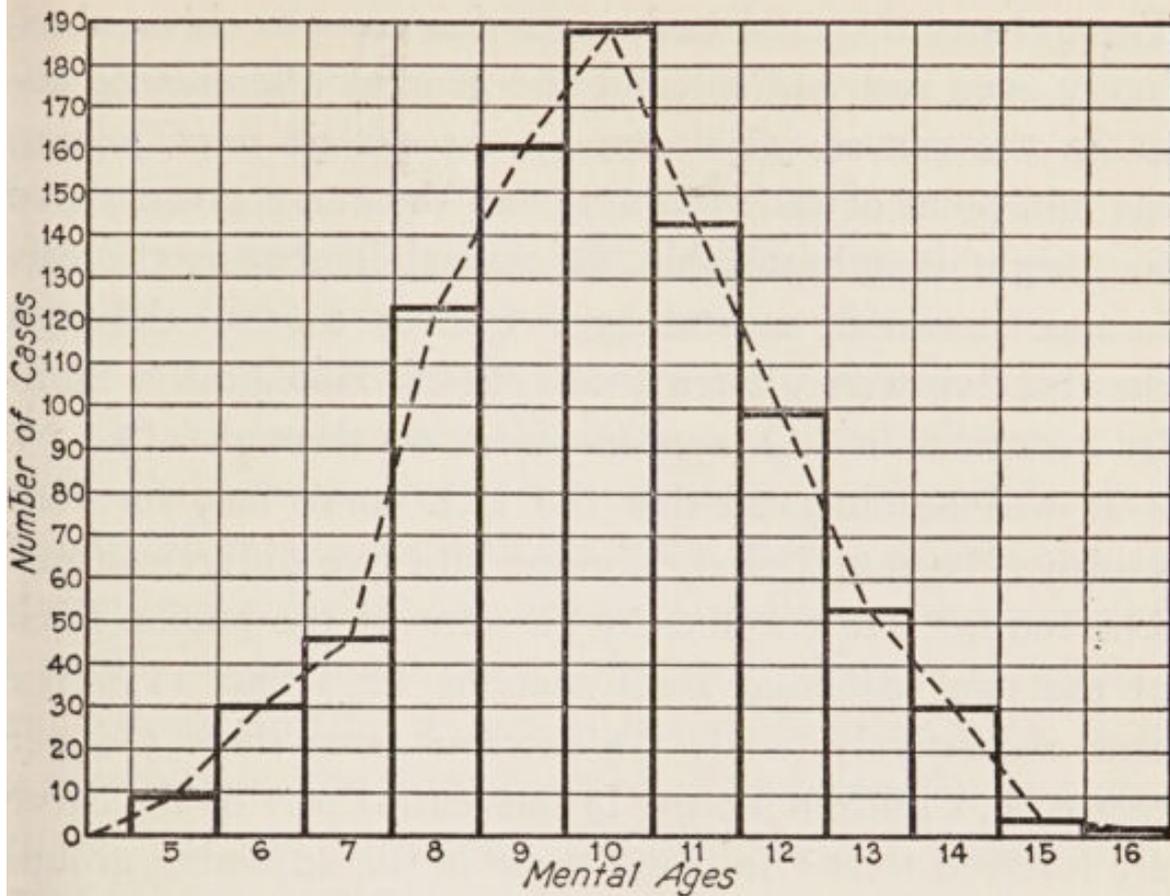


CHART 14a.—Distribution of mental ages of ten-year-old children, as shown by a group scale of intelligence. (From Pressey [48].)

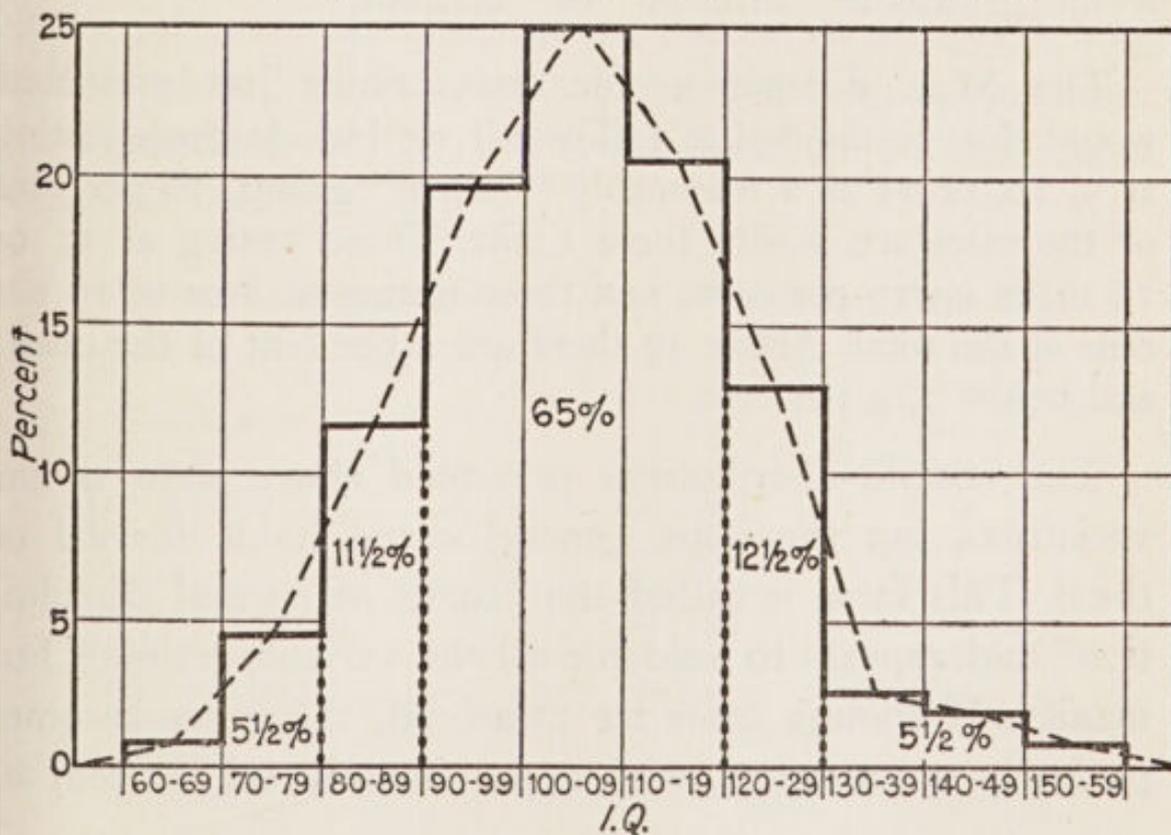


CHART 14b.—Distribution of I.Q.'s of 112 kindergarten children. (From Terman [56].)

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the cases usually considered in the "normal" area, 17 per cent in each adjoining division, and 3 per cent at each extreme. These divisions are purely arbitrary and are made for convenience only; in fact, other division points are sometimes used. The differences in intelligence form an unbroken series from the very lowest to the very highest. There is no abrupt change between the feeble-minded and the normal, or between the latter and the brilliant—any more than there are abrupt changes anywhere in the heights of various individuals. Each different level shades almost imperceptibly into the next. Brilliancy is primarily a matter of having more of the same thing, and feeble-mindedness a matter of having less of the same thing, than is possessed by the average child. This being the case, division lines must be arbitrarily placed; and those given seem as good as any.

Although the grouping given above is sufficient for ordinary purposes of classification, the curve of I.Q.'s may be divided still further, in case one wishes to demonstrate the significance of the extremes. Such an elaboration is presented below:

TABLE 4: CLASSIFICATION OF I. Q.'s (adapted from Terman)

<i>Classification</i>	<i>I.Q.</i>	<i>Per Cent of All Children Included</i>
Genius.....	140+	.25
Very superior.....	120-139	6.75
Superior.....	110-119	13.00
Normal.....	90-109	60.00
Dull.....	80- 89	13.00
Border-line.....	70- 79	6.00
Feeble-minded.....	below 70	1.00
Moron.....	50-69	.75
Imbecile.....	25-49	.19
Idiot.....	0-24	.06

The feeble-minded are divided into three levels—moron, imbecile, and idiot. An idiot is a person whose adult development shows a mental age of not over two years; an adult imbecile has a mental age between 2 and 6 or 7; a moron achieves a mental age between 7 or 8 and 9 or 10.⁴ The "border-line" cases develop a final mental age of not more than about 11. They are too intelligent to be often committed to institutions as defectives, but they are not intelligent enough to master the ordinary elementary school curriculum or to keep out of trouble unless they are given specific training—and often not even then. The present complex civilization is too much for them. They are the group that, in school, present extremely difficult problems of adjustment.

Intelligence is, then, distributed in an unbroken, gradual series from idiot to genius. The largest number of people have average ability; as we near either extreme the number of cases becomes less and less. Intelligence takes its place as one of the variable, measurable traits of humanity, and it varies in precisely the same way as has already been shown to be true of these other characteristics.

Effect of Grade Classification on the Distribution of In-

⁴ Feeble-mindedness, as the term is ordinarily used, means much more than merely a low score on the tests, for a "social" definition is also involved. Idiots are persons who cannot look after their own bodily needs; they must be fed and waited on throughout their whole life. Imbeciles can protect themselves from ordinary dangers, can walk and talk, and can learn a few simple skills, but they cannot earn a living, have no grasp of the ordinary rules of conduct, and are almost without inhibitions. Morons can learn to read and write, can earn a living at simple tasks if they are supervised; they cannot, however, manage their affairs "with ordinary prudence," they are incapable of planning, have extremely poor judgment, are only slightly inhibited by social pressures, and will not work without constant supervision.

telligence.—The distribution of abilities in any particular grade in a school is not quite as wide as a distribution by age because the school has made some attempt to put into each grade children of somewhat similar ability. However, the variations in intelligence within a grade are marked. The table below, which reveals a typical situation, shows the distribution of mental ages for the first, second, and third grades of a single school (57).

TABLE 5: OVERLAPPING OF STANFORD-BINET MENTAL AGES IN THE FIRST THREE GRADES OF PALO ALTO, CALIFORNIA (Terman [57])

Mental Age	First Grade	Second Grade	Third Grade
13½	...	...	2
13	...	...	...
12½	...	...	6
12	...	...	2
11½	...	...	4
11	...	2	6
10½	...	4	12
10	2	...	12
9½	...	2	38
9	...	16	40
8½	6	28	24
8	8	38	16
7½	29	26	10
7	44	32	6
6½	40	6	...
6	24	10	...
5½	12	...	...
5	4	...	...
4½	...	...	...
4	...	...	...
3½	2	...	...
Total	171	164	178
Median M.A.	7.2	8.4	9.4

Two points should be noted in respect to this table. First, there is much overlapping from grade to grade. For exam-

ple, there are children with mental ages of 7 through $8\frac{1}{2}$ in all three grades. In the third grade there are six children with mental ages at the median for the first grade, and two with mental ages above the probable median mental age, 13, for the seventh grade. In the second place, even after the school has grouped children, there are still differences so great as to make teaching the pupils as a group without further classification very difficult. In the example above, the variation in mental ages for grade 1 is $6\frac{1}{2}$ years; for grade 2, 5 years; and for grade 3, 6 years.

This problem is by no means confined to the elementary school level, for almost as wide distributions of ability occur in high school, and even in college. Intelligence tests have been given to successive freshman classes for the last ten or twelve years in many colleges. The results are uniformly the same, in that the lower end of the distribution of ability among these college students is at approximately the average for seventh-grade pupils, while the upper end contains many individuals of superior adult intelligence. There is no escaping from this problem of variability in the mental capacity of students.

The Selective Effect of Schooling.—The usual public school education operates in a selective manner, gradually eliminating the duller pupils. The graph below (56) gives the distribution of I.Q.'s for a class of first-grade children and a class of high school freshmen. What has happened during the intervening eight years is clear. The children with the lowest I.Q.'s are still in the grades or else have dropped out of school. Further elimination of a similar character goes on in high school. The table presented be-

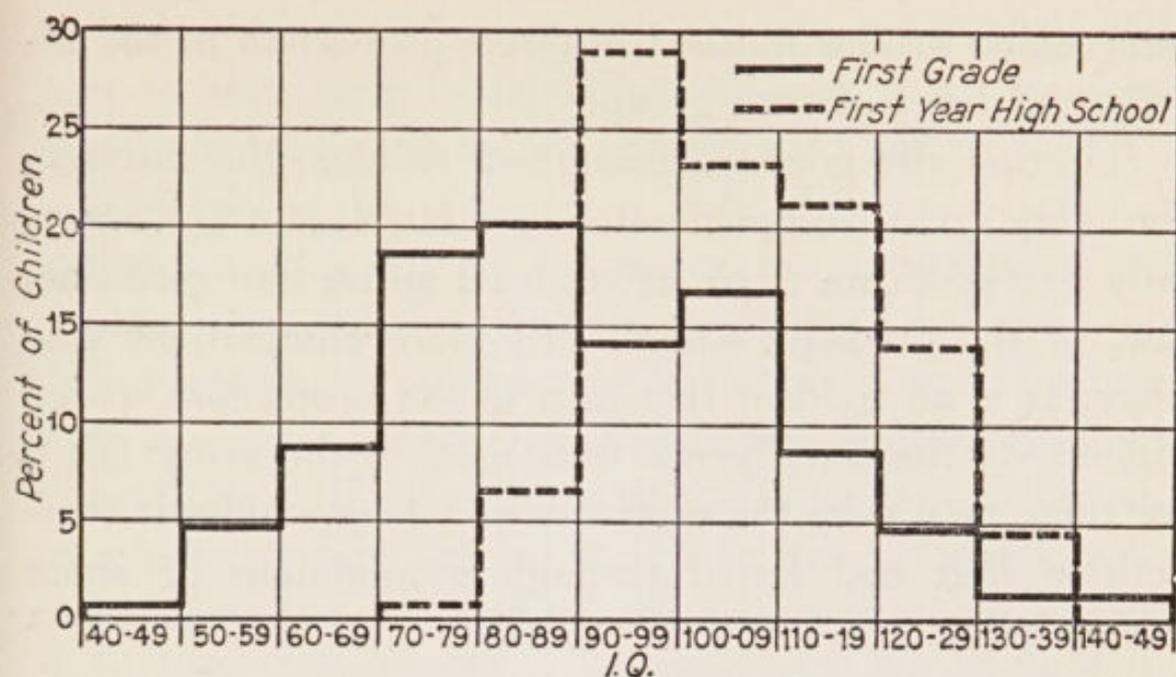


CHART 15.—The I.Q. distribution of first-grade children and of first-year high school pupils (56).

low (53) illustrates what usually happens. This group of 131 pupils entered a certain high school as freshmen. Their I.Q.'s were distributed as follows:

TABLE 6: RELATION OF ABILITY TO PROGRESS THROUGH HIGH SCHOOL
(from Proctor [53])

I.Q. on Binet	Number of Cases	Completed 4 Years of High School	
		Number	Per Cent
125 or over	19	19	100
115-124	27	26	96
105-114	24	20	83
95-104	36	27	75
85-94	22	9	40
75-84	3	0	0

All of the very superior children completed high school, but none of the dullest group did; and members of the

intervening groups finished in direct proportion to the intellectual level of each group.

Selection also goes on throughout college. For instance, for every 1000 freshmen entering a large state university, only 350 graduate (15). If students go on into medicine, law, or the graduate school, still more eliminations take place. It is no accident that men in the professions scored highest on the intelligence tests used in the army (61), for these men were the survivors of a long scholastic competition that had lasted through a minimum of about twenty years.

SCHOOL ADJUSTMENTS TO DIFFERENCES IN ABILITY

Retardation and Acceleration.—In response to this problem of individual differences, schools have made adjustments of various kinds. One of the earliest methods, begun long before the appearance of intelligence tests, was to require poor pupils to repeat a grade, thus keeping them behind others of their age until they were in grades with younger children of the same general capacity to learn, and to accelerate unusually bright children by giving them double promotions, thus putting them considerably ahead of other children of their own chronological age.

There are two significant results of this procedure. The first is that it undoubtedly narrows the distribution of abilities in each grade, because children are kept back or pushed ahead until they are with others of like capacity. The second is that it often warps the personality and development of the retarded or accelerated youngsters. A study of individual children under such a system shows at once that those who are heavily retarded are not profiting by thus

repeating the work because it is not adapted to their abilities; in fact, their initial failure showed this. Moreover, they have long since become discouraged and dispirited by being kept in the same room year after year, and have stopped making efforts to master the conventional curriculum—the only thing offered to them. They often show delinquencies and other forms of emotional maladjustment such as are the outcome of chronic and constant futility of effort. The brilliant children at the other end of the scale may be accelerated beyond their capacities for social adjustment; they, too, are likely to form a discontented, isolated, maladjusted group. They are merely going through the conventional school curriculum at a faster rate than other children, but are not learning anything more or anything different. Some other means of adaptation to this problem of variability is, therefore, necessary beyond the simple procedure of retarding the dull and accelerating the brilliant.

Homogeneous Grouping.—Historically, the next movement was the formation of homogeneous groups of children; that is, in certain large cities, the children of each grade were divided into three or five groups on the basis of their school record or their scores on tests of intelligence.

In the case of a fivefold division, there would be set up one class for the brilliant youngsters, perhaps to serve several adjoining school districts. There would be, within each district, perhaps one class for bright children at each grade level, and in each school several classes of each grade for children of normal ability. There would be, also, one class in each school—sometimes more, depending on the character of the district where the school was located—for dull children. And, finally, there would be a single class, again serving three or

four school districts, for the feeble-minded children. The idea behind the making of such a division was, of course, to get together the children of equal ability and to give them whatever type of training seemed to be most desirable. The number of classes of each type in each grade for any three or four districts would depend upon the number of children of the various levels of intelligence within those districts. In an average district about 60 per cent of the children would be in the "average" classes, about 17 per cent each in the "bright" and "dull" classes, and 3 per cent in the "brilliant" and "feeble-minded" groups. Districts of more or less favored character would deviate according to the percentage of children in each type of class.

Under such an arrangement, the children in the brilliant classes covered the conventional school curriculum a little faster than did other children, and also had a number of subjects not included in the usual curriculum. The classes for bright children added a few extra features, but not nearly as many. The numerous classes for average children retained the same curriculum as had been in force before the homogeneous grouping took place. The classes for dull children were restricted to the mere essentials of the conventional school curriculum, thus giving these children more time in which to master these essentials. The defective groups were given a totally different kind of training with the intention of fitting them during their childhood years for the various vocations they might enter after leaving school. Thus, the curriculum was to be made different for each of the supposedly homogeneous groups.

Such a grouping as has just been described was called a "five-track plan" (57). This plan really meant that the school maintained five different curricula to be used with pupils of different degrees of ability. It was the purpose of this plan to give children of all degrees of ability enough work so that the members of each group would progress at about the same rate, thus making it possible for children

of all groups to play together on the playground and have a common social life. It should be pointed out that a necessary feature of this plan is such establishment of five *really different* curricula, each based on the capacity of the students who are assigned to a particular group. The major problems in the administration of this plan have been to provide adequate enrichment of the curriculum for the two highest groups, to provide the equipment necessary for the training of the lowest group, and to persuade the teachers of the next to the lowest group to concentrate upon the minimal essentials. Unless the plan is carefully supervised, it tends to become merely a difference in the rate at which these various groups of children progress through exactly the same subject matter.

However, even with careful supervision and adaptation of the curriculum, there arise certain further difficulties. For example, children who are homogeneous in respect to their general intelligence may still differ greatly in their ability to read or to solve problems in arithmetic, in the quality and speed of their handwriting, in their ability to write English or to spell, or in their knowledge of history (7). If the grouping is based on intelligence tests, plus scores from educational tests, the variation is somewhat less, but great differences still remain (31). It seems clear that the advantages expected from homogeneous grouping have not been realized (6); the problem of meeting individual differences has not been solved by this movement to group children according to their general capacity, or even in accordance with both capacity and achievement.

Methods for Individualization.—The question now arises as to the next step in the adjustment of the school to differences among its pupils. The answer appears to be in the essential individualization of much of the school work

so that each child may proceed at his own rate. Even if it were possible, such individualization of work along every line would hardly be advisable, because the social development of children necessitates their functioning as a group at least some of the time during school hours. It therefore seems necessary to work out some sort of balance between a completely individualized program directed toward the mastery of the essential elements in the various subjects, and a socialized program which favors the development of normal social adjustments among children in the classroom.

A variety of materials designed for individualizing instruction are now available. In the drill subjects (arithmetic, handwriting, spelling, reading, algebra) systematically organized series of practice tests and exercises make possible a large measure of self-instruction and individualization; ingenious exercises involving pictures permit even first-grade children to instruct themselves in reading by such individualized techniques. Practice tests will be further described in Chapter XII. Recently numerous work-books in a variety of subjects have been published; these consist of carefully organized assignments, exercises, and simple tests by means of which each pupil can largely guide his own learning. Various schemes for the organization of work so as to give each pupil considerable freedom in use of time and methods of work may also be employed, such as the Dalton Plan; the work for a month may be presented as a "contract" which organizes and assigns the work over a period of time. In Chapter X this problem of individualization of instruction will be returned to, and methods of adjusting to individual differences will be further discussed. Evidently a great variety of procedures are possible; there

may be special reading assignments, or projects adapted to different pupils' interests and abilities. A teacher will find here many opportunities for the exercise of educational ingenuity in adjusting to each child's needs, while still providing occasion for group discussion, and for cooperation in large undertakings where each child makes his distinct contribution *and* profits by the efforts of the other pupils.

Special Problems of Adjustment at the Extremes.—In addition to the general desirability of as much individualization as may be practicable at all levels of ability, there remain certain special problems of curriculum and method in adapting school work to the needs of the children in the 3 per cent at the extreme ends of the distribution.

The children at the upper end are peculiarly difficult for the average school to deal with. They learn so fast that keeping them busy is almost impossible; and because of the ease with which they achieve practically perfect results they are likely to become the outstanding loafers in the class. Sometimes they become disciplinary problems, largely because their hands are idle and Satan has been more fertile with suggestions for activity than the teacher has.

The writer once sat beside a brilliant youngster who solved the arithmetic problems in his head while the teacher was writing them on the board; but he soon learned that if he handed in his paper at once he merely got further practice on problems for which he obviously needed no practice. One cannot expect a brilliant child to be a fool. He played all manner of pranks, often without detection, read adventure stories, and generally amused himself. At the end of a half-hour, during which he had ruined the concentration of everyone in the neighborhood, he would solemnly hand in his paper. Both teacher and pupils disliked him because he con-

tinually outwitted them. This boy's net gain from school could have been summarized under the title of "how to be successful though lazy."

If such bright youngsters are given extra promotions they soon get into classes with older children who will not accept them socially and among whom they will inevitably feel lost, unpopular and inferior—in spite of excellent school work. The writer knew a boy who had been pushed on so fast in school that he entered a university at the age of twelve—a little boy in short trousers. This youngster would come home from brilliant class work in Greek and play blind-man's buff, tag, and mumbly-peg with children even younger than himself. Not even a brilliant mind can stand up long under the strain of such terrific social maladjustment. On the other hand, if a school does not accelerate these children it deprives them of incentive. The situation is much the same as if a ten-year-old boy of normal ability were kept in the kindergarten. If the school segregates its brilliant children in a class where they can compete among themselves, another social situation may arise in that they are regarded as queer by the other children and soon come to regard themselves as insufferably superior to the common herd. Perhaps the best arrangement is to have some advancement, since brilliant children are, as a rule, larger physically and more mature socially than the average child, and a real enrichment of the curriculum in each grade so that they keep busy at worth-while activities in the age group that seems most fitted to their level of social development.

Adaptation of school work to the children at the other end of the scale is almost equally difficult. One has to

realize that these children will be unable to master much of the conventional curriculum under even the most favorable of circumstances, and that other elements can be learned only by literally years of painstaking effort and trouble. The adaptation of the work to these pupils should be preceded by a thorough analysis of the conventional curriculum to isolate those relatively few skills that these defective children really can and must learn. This academic work can then be spread in rather thin doses over the entire school program. These children need, first, a rather specific vocational training and, second, a program of socializing and character building which will prevent them from finding their vocation in the criminal group. There is plenty of room in modern industry for feeble-minded boys and girls of good character and reliability who have learned, through training in school, to be happy in their success in relatively uninteresting and routine occupations. In fact, it seems as if there were more "feeble-minded" jobs than there were people to fill them. The writer knows of a firm that regularly requests social agencies to send them reliable, feeble-minded workers. Such boys and girls are quite able to carry on the simple work necessary in many industries and, what is more important, they are willing to continue with such work month after month in spite of routine and monotony, thus cutting down markedly the expense incident to a turnover of labor.

The writer once knew a feeble-minded man who got a job operating a machine that stamped the covers on to bottles. It required several hours of practice for this man to coordinate the pedal he worked with his foot to the approach of a bottle on a carrier. When he finally mastered this sim-

ple calculation he began to enjoy himself thoroughly. In fact, he sat at this machine seven hours a day for several years, apparently perfectly content with his work. It was something he could do and a job for which competition was so slight that he could hold his position. In fact, the company for whom he worked valued him highly because, before hiring him, they were unable to find a man who would operate the machine for more than three or four weeks before becoming so bored that he resigned his job. This man's existence consisted of running this simple machine, of handling the small amount of money that was paid him, and of getting along in the social life of his community. All the academic skills that he ever used could probably have been taught even a man of his dull mentality in a year's time, yet he had spent eight years trying to master a formal education for which he had no talent whatever. Upon leaving school he had gone through a period of mild delinquency, had been in reform school for a while, and then had been employed at casual labor for two or three years. It was not, however, until he was placed in this extremely simple economic job that he could ever enjoy security and contentment. Moreover, he had a feeling of accomplishing something, of being useful. He settled down, forgot his delinquent ways and practices (which had apparently been the reaction of a bewildered organism to an environment that it could not understand), and devoted his spare time to going to the movies, shooting pool, and pursuing other relatively harmless and simple diversions.

If school authorities and teachers would realize the simplicity of the demands made by life upon the defective individual, a curriculum really suited to their needs might be evolved.

GROUP COMPARISONS BY MEANS OF TESTS OF INTELLIGENCE

The unversed reader may suppose that the children in the same grade in different schools will test approximately

the same on tests of various sorts, or that children of a given age will on the average show similar scores regardless of such factors as the social and economic level of the parents, the children's nationality or race, or their residence in the country or large cities. Similarity among groups with diverse backgrounds is, however, rare. More common are such situations as are reported below.

Differences between Schools in the Intelligence of the Children Attending Them.—Some years ago the writer had occasion to give intelligence tests and tests in the important school subjects to all the second-grade classes in a small city having five elementary schools (50). The light bars on the chart below show the results from each school on the tests of school work (total score in reading, arithmetic, spelling). The pupils in School 1 are evidently doing very poorly in their school work, and those in School 2 very well. It might be inferred that the second-grade teacher in School 1 was inefficient, and perhaps should not be asked to return the following year, and that the teacher in School 2 was very superior.

The results of the intelligence tests, indicated by the shaded bars, show that no such inferences are warranted. The work in School 1 is poor because the children are dull, and good in School 2 because there is a high average intelligence among its pupils. When the school work is considered in relation to the "pupil material" (intelligence of the pupils) in each school, it would appear that the effectiveness of the teaching was about the same in all five schools—in other words, the children were doing about the same in proportion to their abilities.

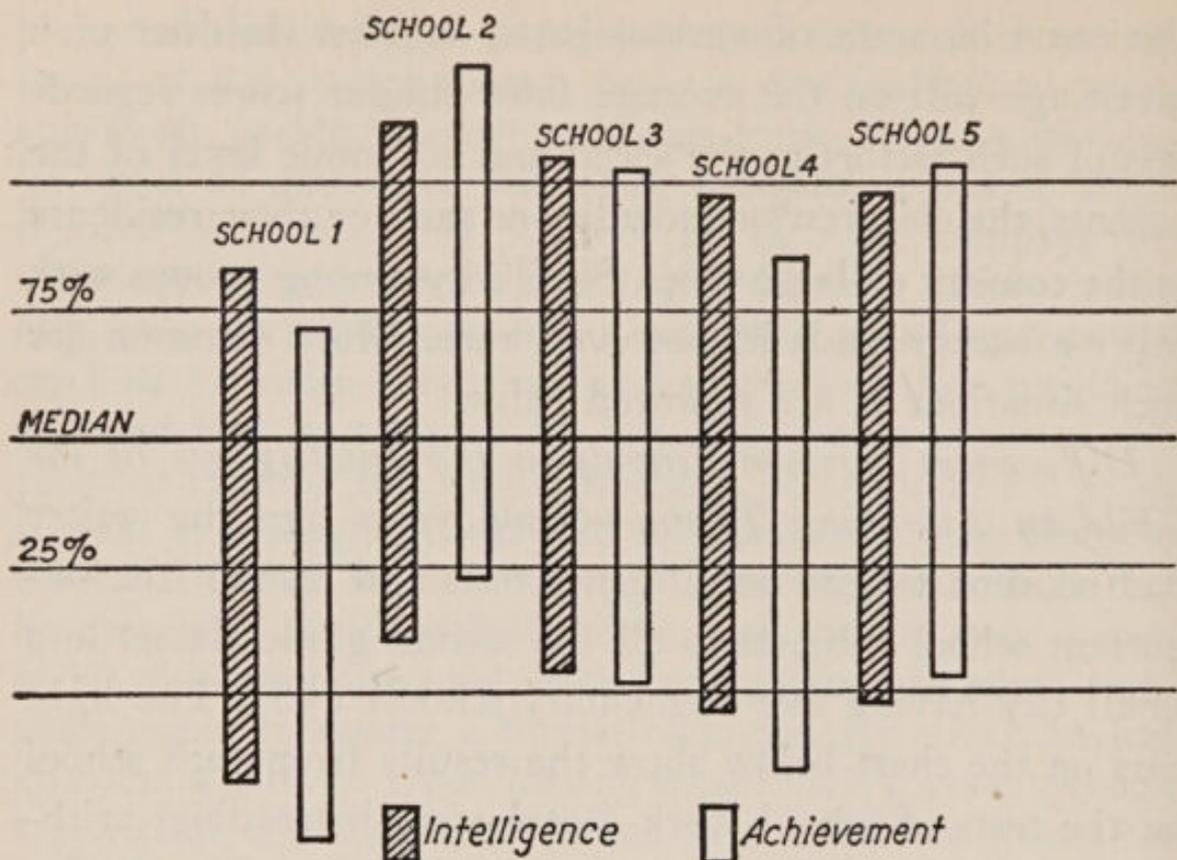


CHART 16.—A comparison of the second grades in a school system as to (a) achievement and (b) intelligence (50).

The writer well remembers being warmly thanked by the principal of a school in a very poor district for "saving her life." She explained that her school had been severely criticized for the poor work in reading and arithmetic. But a group intelligence test which the writer had given in her school showed the pupils to average below any other school in the city; when this fact was allowed for, it appeared that the teachers in her school were doing excellently. Since a beginning teacher often starts in a poor school, the reader may find it worth while to keep in mind such findings.

Differences in intellectual level in different schools in the same system have been found repeatedly. Terman (57) has reported five first-grade classes to range in median M.A. from 5-7 to 7-8, and in median I.Q. from 76 to 112. Coxe (12) found the sixth grades in 24 Cincinnati

elementary schools to average in M.A. from 10-8 to 13-10, thus differing more than three years in mental age. Dickson and Norton (14) found that 29 eighth-grade classes averaged in mental ability from the norm for the sixth to the norm for the tenth grade. These differences become critical when pupils from several grade schools enter a common junior high school (44). Again at the entrance to high school, and for a third time at the beginning of college, there is this same vital problem of somehow adjusting to the diverse needs of the youngsters coming into these higher institutions from a large variety of "feeder" schools in which both the intelligence of the pupils and their educational attainment differ markedly. Thus Keener (30) found that the median M.A. for freshman classes in Chicago high schools ranged from 12-3 to 15-5 on the Otis group test (M.A.'s of individual freshmen ranged from 7-6 to beyond 18-6); and studies of high school senior classes have shown equally striking differences (5).

Relations of Economic and Social Status, and Race, to Intelligence.—Other group studies have compared country with city children, white with colored children, children of professional men with those of day laborers, and children whose parents were farmers in a district where the land was barely usable for agriculture with those whose parents farmed good land. A word of caution is necessary in regard to all these studies. At the beginning of this chapter four factors were mentioned as affecting mental efficiency—methods of work, emotional condition and attitude, relevant background information, and innate general capacity. Efforts to measure differences between individuals

or groups as regards this last factor must keep the first three factors constant. But this is not easy in comparing such groups as the above, for the third factor especially gives trouble. Intelligence tests attempt to cover only general information which every child in the average American environment should have about an equal opportunity to become acquainted with; and the better tests are probably in large degree successful in this endeavor. But when the comparison is between pupils from very good and very poor homes, between country and city children or those of different races, differences in total background experience almost unquestionably play some part. As a check on the importance of this factor, two sets of figures are given below for certain of the comparisons, one set showing results from young children on a group test made up of pictures and other material not involving reading, and the other set showing similar findings with older children using typical group tests of intelligence for the upper grades, involving reading. The differences are slightly greater for the upper grades, thus suggesting a situation such as mentioned above. But they are nevertheless so consistent as to suggest also that differences in innate capacity do exist between the groups. A variety of factors are doubtless involved, and the question will be returned to shortly. A number of sample investigations have been summarized in the table below showing the percentage of children of certain ages in one group scoring above the median of children of the same ages in another group, or above the general norms. The ages concerned and the type of test used for all studies are indicated.

TABLE 7: GROUP COMPARISON BY MEANS OF INTELLIGENCE TESTS

A.	Per cent of country children above the median for city children (49)	
1.	Ages 6, 7, 8 (non-verbal test).....	22
2.	Ages 10-13 (verbal test).....	25
B.	Per cent of children above norms for their age from homes located in (a) a good farming district, and (b) a poor farming district (46)	
1.	Ages 10-13 (verbal)	
a.	Good district.....	36
b.	Poor district.....	20
C.	Per cent of children in each classification, according to father's occupation, testing above median for their age	
1.	Ages 6, 7, 8 (non-verbal) (49)	
a.	Professional men.....	79
b.	Business men.....	60
c.	Artisans.....	54
d.	Laborers.....	38
2.	Ages 10-14 (verbal) (47)	
a.	Professional men.....	85
b.	Business men.....	68
c.	Artisans.....	41
d.	Laborers.....	39
D.	Per cent of colored children above median for whites (45)	
1.	Ages 10-14 (verbal).....	14

The general conclusion would seem to be that the more able individuals tended to be found in the cities, and that professional men (and their children) had more native capacity than laborers and their children. Hence, differences between schools would be largely accounted for in this connection; the schools with poor "pupil material" are in the poorer neighborhoods where the less capable people live. In the country, it is only the stupid and shiftless farmer who stays on unproductive land.

All this is probably true. But two recent investigations dealing with race differences show how complex some of these problems are, and how cautious one must be about inferring differences in innate capacity as the major factor.

In the first of these studies (32) the investigator merely classified the scores of 425 Negro boys twelve years of age on the National Intelligence Test according to the length of time each boy had been living in a large city. Those who had been there less than a year made the lowest score; next were those who had been there between one and two years, and so on, year by year; the curve of the rise in score was even for each successive year of residence in the city until the sixth year, when it flattened out. The differences shown here are those between boys of the same age, the same race, and the same country environment before their move to the city. The rise in scores is thus clearly due to environmental influences, and certainly suggests that such influences cause some of the differences commonly shown on test scores between the two races.

The second investigation (33) compared the results on performance tests for measuring intelligence, for Indian and white boys both living on an Indian reservation. The results showed no superiority for either group, but rather differences in the method of procedure. The Indian boys of all ages worked more slowly and made fewer errors than the white lads who lived near them, went to school with them, and played with them. Indian life puts no premium on speed, while "white" life holds up speed of action and thought as a main objective. Presumably, these characteristics are "inherited" socially, not physically, by each group. It is further suggested that the general superiority of white children over other races on intelligence tests may be due in part to this continual pressure for speed that results in the white youngsters working faster and thus answering more questions in a given length of time.

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ciency of the schools in the states concerned (1). The same situation was found in the second study mentioned, in that the school and library facilities, and other opportunities of an intellectual character appeared distinctly superior in the Kansas town. The conclusion that the differences shown are more a result of educational and cultural environment than of innate ability is not unreasonable. Here again, one finds these other factors so intermingled with innate ability that he cannot be sure what is being measured, because it seems likely that these other factors have had an appreciable influence upon the results.

Equally interesting are the differences that may be brought about in the distribution of ability throughout the grades in a school system by variations in educational policies, even though the capacity of the children in the communities investigated may be essentially the same (44). This point is well illustrated by the chart below. In this case, a group intelligence test was given to all the children from the third grade through the twelfth in two cities of about 12,000 population each. The graph to the right shows median score per grade and reveals School System B as averaging definitely superior in every grade to System A. For instance, the eighth grades of the former test about the same as the ninth grades of the latter. From this result one might assume either that School System B had a superior type of "pupil material" or that it was unusually successful in teaching this material. However, when the results for these same children are distributed by age, as shown in the left graph of the chart, it becomes clear that the children in the two systems average almost exactly equal in ability. The two school systems have, therefore, cre-

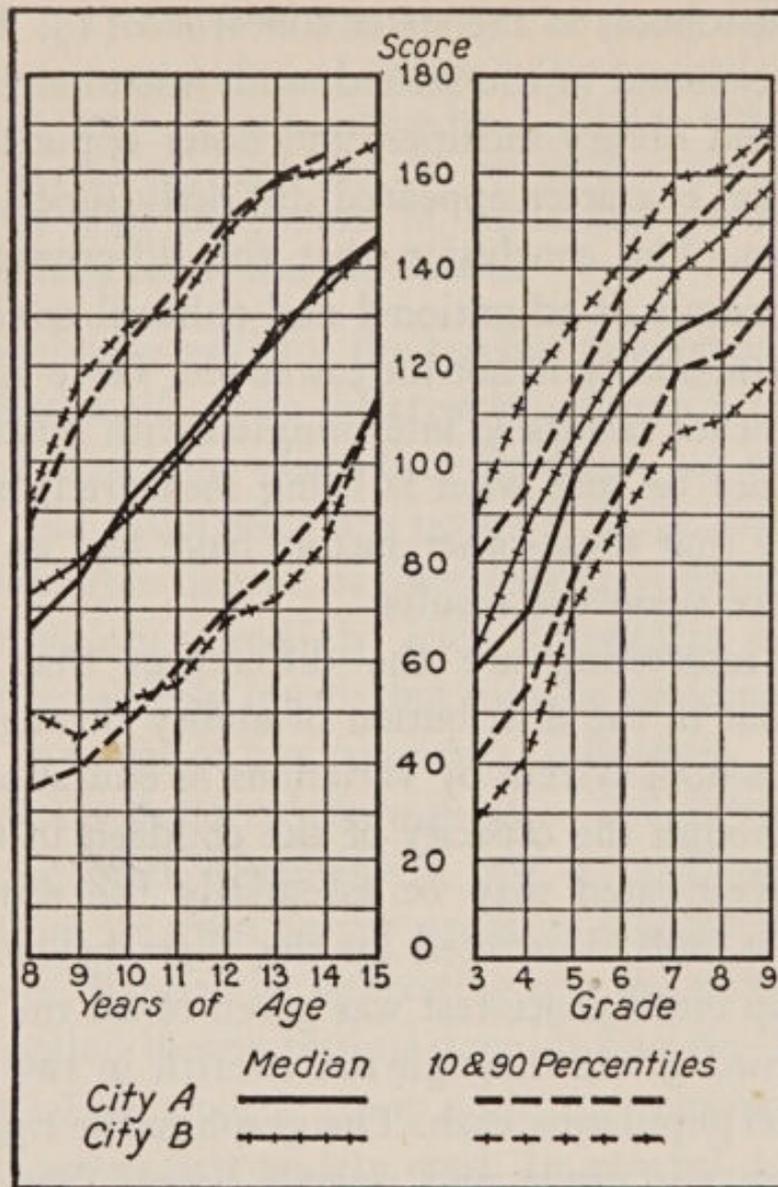


CHART 17.—A comparison, by age and grade, of the intelligence of the school children in two cities (44).

ated a situation educationally different out of almost identical intellectual material. Further study showed the grade differences to be due primarily to different promotion policies in the two towns. School System B retarded its children to such an extent that the average chronological age per grade was about five months above that for System A. This excessive retardation so discouraged a great many of the children that they dropped out of school as soon

as possible and therefore never reached the upper grades. School System A, on the other hand, pursued a liberal promotion policy and tended to promote every child every year. As a result, the average age per grade was less than in School System B, and the children were so encouraged that more of the duller ones continued into the upper grades; even those who dropped out of school at the legal age were in a higher grade than the similar class of children in System B. These contrasting promotion policies caused System B to require a higher standard of ability for entrance to each of the grades than did System A. The higher standard in the former may appear desirable until one remembers the large number of unhappy, retarded children who never continued beyond the middle grades of elementary school. A heavy retardation will undoubtedly raise the grade averages, not only in intelligence but also in achievement, but at the expense of the best possible individual development of the children.

In making comparisons of communities and schools, one must always be alert to the differences that are caused, not by the innate ability of the pupils but by the artificial grade grouping resulting from the particular promotion policies adopted by school officials. Unless one knows the chronological age of children in the same grades in different schools or school systems, he is quite unable to make any valid comparisons as to the meaning of the test scores.

THE TOTAL EDUCATIONAL SIGNIFICANCE OF RESEARCH ON INTELLECTUAL EFFICIENCY

The question is now as to the total significance of the extensive and, in some respects, confusing data surveyed in

this chapter. The following conclusions seem to be indicated: (a) There are striking differences in intellectual efficiency between individuals, and distinct differences between schools and communities, or between children coming from different economic and social groups. These variations seem to be due to a complex of differences arising from some combination of the following four factors: methods of work, emotional adjustment, total equipment of general information and skill, and innate mental capacity. (b) Taking children as it finds them at a particular time, it is necessary for the school to adjust to these differences, in both curriculum and methods. Some adjustment can be made by grouping children according to their general capacity as shown by intelligence tests, preferably supplemented by results from educational tests and other evidences of efficiency. However, the differences are so great, and special differences in error patterns in this or that subject are so marked, that almost complete individualization seems necessary for any adequate adaptation. (c) There has been a tendency for the school to underestimate the significance of the first three factors mentioned above. They are, however, of pervasive importance, as is brought out clearly by attempts to analyze the factors involved in differences between races or other groups having considerably different cultures. (d) The school needs to understand better the significance of the wide variations in intelligence and the interrelations of ability with the children's entire previous histories and social backgrounds. Intelligence does not grow or operate in a vacuum, and studying it while ignoring other factors is a very inadequate and totally unsound procedure. The occasional extremely stupid child, whose future

is so limited by his innate capacity that intelligence is the supreme factor, is the exception, not the rule. In general, the total complex of circumstances must be considered in studying the intellectual efficiency of a child, a class, a school, a community, or a race.

PRACTICAL SUGGESTIONS FOR TEACHING

Because the general school work and behavior of children are inevitably influenced by their level of intelligence, and because the treatment which should be given children by the school is even more closely related, the teacher should come to some conclusion in regard to the mental efficiency of each group of children she is to teach. The following suggestions may be found useful.

- (1) Give an intelligence test to the children in your room soon after they have been assigned to you (or else make use of the results from previous testing). The test results will be of use to you in a number of practical ways.
- (2) Remember that in assigning children to a particular section or in giving them individual treatment, you should take into account not only the intelligence of the pupil but also his personal efficiency in going about his work, his emotional stability, and his previous preparation. Assignments based on any one of these four factors alone are almost certain to be unsatisfactory.
- (3) Try to individualize your instruction as much as possible, adapting the work to the total development of each pupil. Get acquainted with such materials as will permit you to do this.
- (4) Expect to find that children in the same grade in different schools test differently in both intelligence and achievement. If the schools in your community vary markedly in these respects, some account should be taken of this situation when children change from one school to another. The need for this appears also at entrance to a junior high or high school because the children come from various grade schools whose standards are probably different. It is often worth while to work out some definite plan of transfer from one school to another, or assignments to one section or another, for children coming from different schools.
- (5) In interpreting the results from intelligence tests for a child, a school, or a community, try to "see through" the particular test

scores to the social situation influencing these scores so that you will not be misled as to their significance.

- (6) Remember that even if intelligence is relatively unmodifiable, children of any degree of intelligence sufficient to permit them to enter school can be trained to be useful and happy. Try to educate the dull and the brilliant in ways that will make them socially useful and will give them a successful adjustment to their world.

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CHAPTER VIII

THE INDIVIDUAL CHILD

THE previous chapters have shown striking differences between individuals as regards growth, health, interests, social development, emotional distress, and capability. It remains to bring all this material together so as to see the total richness of individuality shown by any real child when his characteristics as regards all these various traits are considered. The fathers of our country were mistaken in fact, though perhaps not in spirit, when they said that all men are created equal. If one adds to the obvious differences in the heredity of children such other important differences as are engendered by environment, he finds that, far from being equal, all men are born with different hereditary characteristics and are from birth subject to varied environmental influences. It would be truer to say that all men are different. For the teacher, certainly, the differences between children are of outstanding importance. The sooner she realizes that each child is an individual, unique organism of given propensities which have been altered and realtered by pressures of all sorts, the better both for her own development as a teacher and for the healthy development of those she teaches. These differences are also of value from a social point of view. Society changes because people in it are unlike one another; in periods of history during which complete conformity was required, progress was extremely slow. One should not, of course,

go to such an extreme as to believe that no conformity whatever is desired among people; the insane asylums and bread lines are full of the end results of unrestrained individualism. None the less, individual differences are of the utmost importance to the teacher, who is faced with the task of developing each child both as an individual and as a member of society.

To illustrate the extent of differences within a single group of children, the results of a concentrated study of 34 fifth-grade children are reported. This group was given medical examinations, tests and questionnaires of various sorts by means of which the differences were studied. These children varied in height from 47 to 60 inches and in weight from 55 to 103 pounds. Only two children showed no defects; 7 of them were far-sighted, near-sighted, or astigmatic; 14 needed to have their tonsils removed; 31 had at least one decayed tooth; 4 had impacted teeth; 3 had adenoids; 1 was a cripple; 8 were seriously malnourished; 1 was slightly deaf. In social adaptation the group included 3 distinct leaders, 1 child who took no part whatever in the social life of the class, 1 bully, 1 truant, 2 delinquents, 1 chronic liar, and 4 extremely boastful children. Of the 34, only 9 were without at least one admitted specific fear, obsession, or other unusual emotional attitude; 2 children were so queer as to be classed as "eccentric." The I.Q.'s of the class varied from 68 to 147; 3 children were classifiable as brilliant, 5 as bright, 16 as average, 8 as dull, and 2 as defective. Two children had marked musical ability, 1 drew unusually well, 4 had superior mechanical skill. In educational tests they varied as follows: in arithmetic skills, from the second- to the seventh-grade level; in arithmetic reasoning, from second to eighth grade; in speed of handwriting, from third to sixth grade; in quality of handwriting, from second to eighth; in spelling, from third to seventh; in reading rate,

from second to ninth; in reading comprehension, from fourth to eighth grade.

The differences above illustrated are not extraordinary or unique in any way. They are differences that will be found to exist in any typical, unselected group of school children.

Many teachers fail to see any but the more obvious differences among their pupils because they do not know how to study children—much as all Chinese look alike to a non-oriental, most children seem alike to these teachers. Once any phenomena are studied, however, differences appear, and they come to attention in proportion to the number and excellence of the techniques for study. First to be considered here, therefore, are methods for the study of children; following this there will be some consideration of the different types of children teachers may find from such study. If modern education is to be adjusted to individual differences and to the needs of each child, the methods for discovering these differences and for understanding children must first be generally known and widely used.

TECHNIQUES FOR THE STUDY OF INDIVIDUAL CHILDREN

The best method for an intensive study of individuals is what may be called the "case study" method, the essence of which is the gathering together in an organized way of all kinds of information from all sources and the coordinating of these many and varied items concerning a given child in such a way as to see him as a real, living individual reacting to a real, particular, and understood environment. Although some of the work of gathering this information is of a quite routine nature, the major objective of the case study method—to see the individual as a whole—should never be forgotten. A complete case study usually cannot

be made for every child in a classroom; however, teachers should be familiar enough with case study methods to be able to use them for children who especially need individual study; and the teacher will find that an intensive study can well be made of any child and is likely to be extremely profitable.

Organization of Information.—Data about a youngster come from many sources: the teacher's observations, parents' opinions, the statements of other children, the behavior of other children toward the youngster in question, the pupil's present school work and record of work in previous grades, his scores on tests, his regularity (or irregularity) of attendance, the school nurse's report on him, information from visiting teachers or school clinics, statements from his family physician, experiences of his teachers in earlier grades, complaints about him from various sources, and so on. The teacher is often troubled not so much by lack of information as by its profusion and diverse character. The facts about a child inevitably come to the teacher's attention in a helter-skelter order, with the result that, while most teachers know much about the children they are teaching, there is no systematic attempt to coordinate the items. The case study outline presented below furnishes the teacher with a simple means of systematizing the information that reaches her, seeing what further facts she needs to fill out the picture, and coming to an understanding of the child as an individual. What the teacher needs is, obviously, something that is (a) so short that it can be remembered, and (b) so simple that it will actually be used as a part of the regular job of teaching. It should also be noticed that the writer has employed the mnemonic device of correlat-

ing all the headings so that memorization of the outline is almost inevitable merely from reading and discussing it. The outline follows:¹

- I. History of the Child's Family
 - A. Medical History
 - B. Social and Emotional History
 - C. Intellectual History
 - D. Educational and Economic History
- II. History of the Child's Life to Date
 - A. Medical History
 - B. Social and Emotional History
 - C. Intellectual History
 - D. Educational (and Economic) History
- III. The Child's Present Condition
 - A. Physical Condition
 - B. Social and Emotional Adjustment
 - C. Intellectual Development
 - D. Educational Adjustment

The first two sections contain the historical background needed in order to understand what may be revealed by the third section. It should be noted that in each section the first item deals with physical conditions, past or present; the second, with social adjustments, including emotions and interests, past or present; the third, with intellectual development, both in the family and the individual; and the fourth, with the achievement in education or the economic accomplishment of the child and his family.

Making a Case Study.—In using this outline it is not necessary to begin with the first item; one rarely does.

¹ Adapted from *Mental Abnormality and Deficiency* (see ref. 20 at end of chapter).

Something about the child's present condition in all four fields is usually obtained first. Later on, the inquiry widens to the child's own past history, and eventually to the family background because of its importance in understanding the child's behavior and attitudes. Even for the experienced worker the facts can rarely be made to appear in logical order, but there is no reason why they cannot be *recorded* logically no matter what their order of appearance.

Something should probably be said about the sources of information. Concerning the family, the teacher can often obtain information from the school principal, from the parent-teacher association, or from visiting teachers. For the child, there is first the pupil himself who must necessarily furnish many facts, directly or indirectly. One line of inquiry would probably be concerned with the child's physical condition, inasmuch as peculiarities of all sorts often have their basis in deviations in physical development or in health. The teacher, of course, is not trained to make such investigations herself; but she should know that a good physical examination is invaluable in understanding a child, and she should be able to relate the results of such an examination to a child's behavior. She would do well also to know what facts are included in a really good medical examination, in order that she may not be satisfied with a superficial report. Another line of inquiry leads the teacher to consider such items as the child's social relationships (with his family, other children of both sexes, and the teacher herself), his emotional attitudes (fears, obsessions, outbursts of temper, infatuations, and so on), his play and reading interests, and his vocational intentions (their nature and appropriateness for his abilities and opportunities). Such information comes to her partly from her own observation and partly from the testimony of others who know the pupil. For determining the child's intellectual level, the teacher

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responses, for otherwise the number of questions she should ask is exactly zero. However, given a friendly atmosphere, there is still the matter of what queries are likely to yield the best results. Below are listed quite briefly such questions as are essential. Others will arise in the course of a conversation about any particular child, but those below may be regarded as the core of the catechism. The reader emphatically should not get the idea that a teacher sits, pen in hand, and fires these questions at a child's mother or other relative. As a matter of actual practice, the questions are worked into the conversation in a natural way, and appear in whatever order seems easiest and most appropriate at the moment. At the end of a really *good* interview with the child's mother, for instance, the latter does not realize that an interview has taken place, but rather regards the matter as a charmingly sympathetic conversation during which she and the teacher pooled their experiences concerning the child. As a matter of fact, some of these questions usually cannot tactfully be asked directly, but the answers may be inferred in one way or another. In general, the following four "fundamental" don'ts for the young interviewer should be kept in mind:

1. Don't ask personal questions until there is a friendly and sympathetic relationship between yourself and the other person.
2. Don't write down anything in the presence of the person being interviewed (unless the individual gives you a specific address or some other item that he or she obviously expects you to make a note of), but be sure to write down the results as soon as you can thereafter.
3. Don't insist upon sticking too closely to your questioning; let your companion ramble on inconsequentially at times. This incidental conversation not only makes the person feel at

home with you and as if he or she, not you, were directing the conversation, but also answers many of the questions you intended to ask—and some that would not have occurred to you.

4. Don't talk too much. Try to guide the conversation rather than to dominate it. The more you talk, the less you will add to what you already know.

Possible Items in a Case Study.—By the various methods mentioned above, answers are sought to such questions as the following. Many of these questions can evidently *not* be asked direct; the teacher can only draw inferences regarding them from various things she sees and hears. For most cases no information need be obtained on certain of these issues. However, this somewhat lengthy series of queries will show something of the range of information which may be relevant.

I. History of the Family

A. *Medical*: Are there any apparently hereditary tendencies to disease in the family? Has any near relative died of tuberculosis?² Is anyone in the family at present suffering from any disease? If so, what?

B. *Social and Emotional*: What is the social standing of the family in the community? How many and what people make up the family? Is the normal family organization broken in any way? If so, why? Is there discrimination against the family's race, religion, etc.? Are the parents Americanized? Have there been any delinquents, eccentrics, drunkards, or criminals in the family? Are any members known to be immoral? Are there any chronic dissensions occurring in the group? Are the members harmonious? Is there any favoritism shown among the children?

² Information on venereal diseases would be entirely relevant, but it is usually unobtainable and should not be asked for.

- C. *Intellectual*: What seems to be the mental level of the family? Are any members feeble-minded or insane?
- D. *Educational and Economic*: How far have the members of the family gone in school? Were their school records good, average, or poor? How old were they when they reached the last grade attended? (Retardation can be figured from this item.) At what age did they leave school? Why? What is the occupation of the father? Of other members who have jobs? What is the general economic status of the family? Were they ever dependent on charity? If so, why, and for how long? Are the earnings of the family sufficient for its size?

II. History of the Individual

- A. *Medical*: Was the child's birth normal? At what age did he learn to walk and talk? Is he susceptible to nose or throat infections? Do his colds tend to hang on? Does he complain of pain anywhere? Does he get tired easier than other children? Does he have any known physical defects or handicaps? Is he nervous? What diseases has he had? Have they left any permanent effects? Does he eat enough? Will he eat sensible food? Has he had chronic digestive distress?
- B. *Social and Emotional*: How old was he when he began to play voluntarily with others? What kind of children does he play with? Does he get along with others? Does he have any special fears or worries? Has he been hard to control, bad-tempered, mean? Is he delinquent?³ Does he have any habits that distress others? Is he too domineering or too quiet? Is he the butt of jokes? What is his position in the family (oldest, youngest, second child, favorite, etc.)?

³ If the answer is affirmative, this point should be gone into rather thoroughly, further questioning depending on the nature of the delinquency.

Has he been as fair and honest as can be expected of his age? Has he been a trouble-maker either at home or in school? How has he spent his leisure time? In what has he been interested?

- C. *Intellectual*: How has his apparent brightness compared with that of other children of the same age? What has been his I.Q.? Has he seemed to have any special talents or disabilities?
- D. *Educational and Economic*: At what age did he enter school? Has he been promoted ahead of others of his own age? Is he retarded? What level of work has he done in each subject? Does he seem to be progressing unevenly? What scores has he made on educational tests in previous years? Has he been in the right grade for his achievement? Has he needed any special educational treatment? (For children who work): What work has he done? How much has he earned? How much time has it taken per day? Has it brought him in contact with undesirable people?

III. The Child's Present Condition

- A. *Physical Condition*: Does the child seem to be healthy? Does he have chronic colds or coughs? Does he have infected ears? Are his teeth normal in appearance? Is his posture normal? Is he markedly under- or over-weight in proportion to his age and height? Does he show any symptoms of eye defects? Does he complain of pain anywhere? Is he often absent on account of illness? Does he seem to get tired faster than other children? If he has had a medical examination recently, what were the results?
- B. *Social and Emotional Adjustment*: Does the child seem to get along well with others in the classroom? Does he play normally on the playground? Does he select other children of about his own age and ability to play with? Is he looked down upon by his classmates? Is he typically a leader or a follower? Is he

at present mischievous or otherwise troublesome in school? Is he responding normally to school discipline and correction? Has he recently been caught in any delinquency, and if so, what? Would you consider him at present a socially maladjusted child? What are his current interests?

C. *Intellectual Development*: What is your own opinion of the child's intellectual development in relation to his age and grade? Should he be in the grade where he is now? What intelligence tests has he recently been given? What was his rating on the tests? Has he recently displayed any special ability or disability? Is he now in need of special educational treatment on the basis of his intellectual development?

D. *Educational Adjustment*: Is the child accelerated, at age, or retarded in his grade placement? Does he belong in the grade where he is now placed? What kind of work is he doing in each subject? Is this work generally in proportion to his ability? Has he been given educational tests recently? If so, with what results? Is there any remedial work he particularly needs? Is there any subject from which he could be excused temporarily to put more time upon any special weaknesses? Does he learn as rapidly as other members of the class? Would you regard him as a maladjusted child educationally?

As will doubtless be appreciated, the questions under the study of the "present condition" are merely a continuation of the inquiry started under the "history of the individual." In fact, the child's personal history, when it becomes recent enough, turns into his present condition. In general, the last heading should be reserved for those items of information about the child and his activities noted during the period that he is in a given teacher's room. The items

included here consist primarily of a combination of her own observations of the child, plus the results of recent testing.

In order to show what a case study of a particular child looks like when it is done, and to illustrate the sources of information by which the facts were obtained, the author has included such a study as it was written up by the child's teacher. In this particular instance the only persons interviewed were the child's mother and an older brother. Everything else came from the school records, the teacher's own observation, or the use of tests. Special attention is called to the conclusions which the teacher wrote at the end of the study. She might or might not have arrived at these same conclusions without the use of the case study technique, but it is probable that she was materially helped by the orderly arrangement of the facts she knew. It is interesting to note the way in which the evidence for the conclusions reached is presented with increasing definiteness as the case study proceeds. This woman was a good teacher largely because she became really acquainted with the children by means of a case study technique.

Name: Everett. Age: 13. Grade: 9. Year: 1928.

I. History of the Family

- A. *Medical History*: The family appears to be unusually healthy and vigorous. No one in the family group has been ill for years beyond an occasional cold and childhood diseases.
- B. *Social and Emotional History*: The family has recently moved into a much better residential district than the one in which they had previously lived. The father is a foreman in a shoe factory and was content with the previous location of the home, but the mother has social ambitions and insisted upon the

recent moving. The family consists of the two parents, two sons and two daughters. The oldest son refused entirely to go to high school, went away to a nearby town to work, and completely disappeared for over a year, during which time he did not communicate with his family. Since then he has gone to work in a local concern, has married, become a respected member of the church, and seems to be normal in every way. The members of the family are anything but harmonious. All are extremely vigorous, healthy, aggressive individuals; each one wants to run the entire family all the time. To an outsider the bickering and quarreling seems quite extraordinary, but the members of the family seem to take it for granted. Apparently it goes on all the time. The mother belongs to a considerable number of women's clubs and is an officer in most of them. This interest takes her away from home much of the time, and leaves the control of the family to the older of the two girls, who is quite unequal to dealing with the situation.

- C. *Intellectual History*: The mother is highly intelligent, as is the youngest daughter; the father and the other children are well above average in ability. There is no history of mental abnormality in the family.
- D. *Educational and Economic History*: Both parents finished grammar school, and the mother went on to a girls' academy for an additional year. The children all have good school records. Father and oldest son work in a shoe factory. The family has always been economically independent.

II. History of the Individual

- A. *Medical History*: This boy has always been healthy and strong. He has a vigorous appetite, plays and works with the greatest energy.
- B. *Social and Emotional History*: Everett plays with

other boys of about the same age but is not popular with them because of his aggressive and dominating attitude. He has frequent outbursts of temper when other children will not do exactly as he wishes, carries grudges for a whole week at a time, and will take out his feelings by small acts of meanness. He has two or three times become enraged at the teacher and stayed away from school for a day, but has always returned of his own free will. Everett does not go out of his way to be a nuisance in school or even at home, but he reacts to restraint by an outburst of temper and violent retaliation against what he regards as an infringement of his rights. If a group of boys his own age will not let him run everything, he prefers to play with younger boys whom he can usually dominate. He has shown no marked interests but enjoys himself most when he is directing the play of smaller boys.

- C. *Intellectual History*: Everett is above average in intelligence. He appears to have considerable musical ability and has been the soloist in a boys' choir for the last two or three years. He sings with perfect assurance and is delighted at an opportunity to stand up before an entire congregation and show how well he can do.
- D. *Educational History*: Everett entered school at the average age and has made normal progress since. He has no particular weaknesses or special talents in the academic subjects. He has never failed anything. After school he has a paper route, but it takes him only a half-hour to cover it because he rides a bicycle and has high accuracy in pitching the newspapers on to the front porches as he rides by.

III. Present Condition

- A. *Physical Condition*: Everett has abounding health and

energy. He is now a boy of 13, but he looks to be nearer 16 and is developing into a strikingly handsome young man. He seems never tired, in spite of the fact that he is in a constant state of activity.

- B. *Social and Emotional Adjustment*: Everett gets along well enough in class except that during the Friday afternoon "assembly" he always wants to do most of the reciting. His most recent episode on the playground consisted in knocking down a boy smaller than himself because this youngster refused to climb up a tree and get down Everett's hat from a place where it had been thrown. After some argument a very casual apology was wrung from Everett, but the next day Everett managed to tip over an ink bottle on the other boy's completed drawing—doing it so adroitly that it appeared the sheerest accident. When Everett is talked to by an older person he is suave and polite, but such talk produces little modification of behavior. He was recently made "policeman" of the playground for a week, but while he undeniably kept order the other children would not tolerate him. His one ambition is "to be the head of something."
- C. *Intellectual Development*: Everett recently took an intelligence test, earning an I.Q. of 121. This result was expected from observation of him in the classroom. He undoubtedly has musical ability, and sings with an understanding and delicacy of feeling far beyond his years. Although the pitch of his voice is steadily lowering, until he is now an alto, his voice has never broken—either in singing or conversation.
- D. *Educational Adjustment*: Everett is at age for his grade; he could probably be accelerated a year to advantage. His last report card showed the following grades in singing, reading, arithmetic, geography, history, drawing, handwriting, deportment, and

effort: 100, 98, 94, 91, 90, 86, 80, 78, 75. He would get all marks above 90 if he would apply himself.

Summary and Conclusions

Everett is an aboundingly healthy, vigorous boy who comes from a home where quarreling is the mode. His mother's social ambitions occupy so much time that she makes no effort to control her children. Everett's great desire is complete domination of people and things. When his authority is questioned he shows explosive rage at the time and then settles down into a grudge. Since he has good ability, the problem is to find some mode of expression that will permit of reasonable dominance and then persuade him to curb his excessive desires in this direction.

GENERAL TYPES OF CHILDREN

Although all children are individuals and different from one another, nevertheless it is profitable and convenient, in thinking about them and dealing with them, to classify them as of certain general types. There is, in the first place, the large group who may be called average children.

The Average Child.—This group includes all those (a) whose growth is roughly between the 25th and 75th percentiles for their age and sex, and whose physical defects are not particularly noticeable, either as to number or seriousness; (b) whose social ability does not deviate much from that of other children of the same age and general social level, whose delinquencies are so minor that simple treatment at school or home is quite adequate, and whose behavior is sufficiently like that of other children in the group that it does not come often to official notice; (c) whose intelligence quotient is roughly between 85 and 115, and (d) whose standing in vital school subjects is not more than two grades above or below the grade normal to

their age. Rarely would one find a child precisely at average for his age and grade in every particular; however, the "normal" group includes all those whose deviations are relatively minor. To illustrate this most common type, three studies are given of the same child at 5, 10, and 15 years of age. It should be noted that each of these accounts covers the "Present Condition" section of the outline.

At 5 years: Jack is 32 inches tall, weighs 35 pounds. His ears ache when he has a cold. His mother has to be careful that he does not eat too much meat, of which he is inordinately fond. His posture is not perfect, as he has a tendency to stoop and push his head forward. In the kindergarten or in his play about the neighborhood he gets along well enough with the other children, although he is in no sense a leader. He plays from preference either alone or with one other child. It makes no difference whether his playmate is a boy or girl. In a group game, such as London Bridge, he is likely to wander off in a few minutes and forget what he is supposed to be doing, or else to jump up and down excitedly but not continue with his part in the game. If left to himself he digs in the sand, plays with blocks, slides down the school slide, chases other children aimlessly, colors pictures, rides his tricycle. He cannot coordinate well enough to catch a ball or to direct his aim in throwing one. He can dress himself, except for lacing his shoes, although he prefers to be dressed. He wears without comment whatever clothes are laid out for him. He has twice stolen money from his mother's purse, and is occasionally caught in minor falsehoods; when confronted with proof of his guilt he cries. Jack's I.Q. is 109. He has been in kindergarten for a year already and is attending again this year. He has learned to print his own name and a few names of other familiar objects; most of these same words he can pick out on the page of a book. He uses about 2000 different words in his speech—

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sudden attack of self-consciousness during it and would not do as well as he could have. His standing by subject ranges all the way from a fourth-grade speed of handwriting to a reading vocabulary so large as to be above that of the average adult. His speaking vocabulary, however, is restricted chiefly to such catch phrases as: "Oh, yeah!" "Sez you!" and the like. He is now studying algebra, French, English composition, shop work, and history—all of which he dislikes about equally. However, he still reads a good deal and, locked into a bureau drawer, there are a number of poems and even one attempt at a novel. His marks vary from excellent in English to almost failing in algebra. Aside from a slight leaning toward literary pursuits—probably too slight to be of any vocational significance—this lad is just plain, average boy. He is a distinct individual, however, with such obvious variations in characteristics and achievement as are typical of average children.

The Brilliant Child.—The children of this type constitute not over 3 per cent of the total school population, but they form an important and often maladjusted group. They are children (a) who are usually larger than others of the same age and sex, and healthier than the average; (b) they are naturally inclined to be sociable (but become unsocial if pushed beyond their normal group), are about as likely as average children to become leaders, participate more (if left with others of about this age) in extra-curricular activities than the average child, and show little tendency to delinquent behavior, but some inclination to become isolated and odd. In personality they are of all types, depending in considerable measure upon the treatment given them by others. Their emotional development sometimes shows a maturity equal to their intellectual standing but more often is about what would be ex-

pected from children of their chronological rather than their mental age. (c) They have an I.Q. of at least 125, are generally accelerated in school, learn with unusual rapidity, are quite independent in their thinking, have wider interests than most children of their age, and are usually omnivorous readers. Some of them are specially gifted along a single line, but most of them are generally superior. However, they often show almost defectiveness along mechanical lines and a preference for sheer verbalism. (d) They are almost invariably accelerated in school and are turning out superior work. Achievement tests usually show them to be capable of even more advanced work than they are doing. They come from homes where there is real interest in learning; more often than not the father is a professional man; other children in the family are usually bright but not brilliant. All studies of brilliant children indicate that they do not tend toward mediocrity as they grow older (2).

The teacher with an inquiring mind can hardly fail to locate the brilliant child. His entire history points him out. His rapid learning, intellectual vigor and maturity attract immediate attention. Sometimes such a child is shy and sensitive, and only his or her written work makes clear the superiority; but more frequently their very brilliancy tells them they are superior, and they have little hesitancy in showing it. A case study of a brilliant child is as follows (2):

Name: Verda. Age: 17. Grade: College Freshman. Year: 1929.

I. History of the Family

A. *Medical History*: There is no history whatever of physical defects in this family.

- B. *Social and Emotional History*: In Verda's paternal ancestry are many successful business and professional men. Her father started as a life insurance salesman at the age of 19 and has always been successful. He is a person of unusual qualities of social leadership, plus considerable mechanical, musical, and literary ability. Verda's mother is descended in direct line from Governor Bradford, of early Massachusetts, and is related to many notable individuals. She is a prominent member of the College Woman's Club of her city. The family consists of the two parents and this one child. In their neighborhood the family are thoroughly respected and influential. They have many social contacts, and are successful in all of them.
- C. *Intellectual History*: Although there are no test results available for any of Verda's ancestors, it is clear from their social and economic histories that they were persons of more than average ability.
- D. *Educational and Economic History*: No information is reported in this case study in regard to the educational opportunities of the parents. The father has been a successful insurance salesman for a number of years. His income is more than adequate for the needs of his family.

II. History of the Individual

- A. *Medical History*: Verda's only serious illness was a double mastoid operation before she was three years old. Since that time she has been vigorous and healthy. She is above the average for her age in physical development from any point of view. She learned to walk and talk several months earlier than the average child.
- B. *Social and Emotional History*: Most of Verda's early playmates were neighborhood children. Since she has

entered school most of her friends have been schoolmates of her own age, although she has always had many friends among her parents' social group. Her few intimate friends are classmates of superior mental ability. She has always had exceedingly active interests, especially in theatres, dramatizing, and the more active types of play. She has, however, at times still a slight tendency to make reading, writing, and composing her main interests, and because of them has withdrawn somewhat from social groups of children. She has, however, fair gifts of leadership and is by no means an unpopular or isolated individual.

C. *Intellectual History*: Her first test of intelligence at the age of eleven gave her an I.Q. of 175. A repetition of the test gave an I.Q. of 186.

D. *Educational History*: Verda entered school in the high fourth grade at the age of 8½, but attended only the last two months of the school year. Her elementary schooling was obtained in a private school, and her high school work in a public high school. Throughout her school career, almost all of her marks have been A's. She has had no extra promotions, because her parents preferred not to jeopardize her social development by pushing her along in school into a group of children who were much older than she. She earned a scholarship at her private elementary school because of superior academic ability, and in high school she was a member of the school honor society. On all achievement tests she has always stood high, but in tests in literature her standing has been phenomenal.

III. Present Condition

A. *Physical Condition*: Verda appears at the present time, when she is part way through college, to be in practically perfect physical condition. She is unusually large and vigorous.

- B. *Social and Emotional Adjustment*: She participates actively in student life by attending parties and dances, by contributions to the college paper and magazine, by playing the piano for her friends to dance, by composing music, stories and plays, by writing skits and songs to be used in the programs of school organizations. In general, her social adjustment appears to be of a high order because she is popular as well as competent in extra-curricular activities. Her main interests are still in literature and drama.
- C. *Intellectual Development*: Her most recent intelligence test indicates that she has a mental ability equaled by only a few children in every 100,000 children in the public schools.
- D. *Educational History*: She is at present making an almost "Straight A" record in college, with only about six hours of outside study each week. Her work, especially in literature, shows marked ability and literary talent.

Recognition of the brilliant child is a social service to the community, for such a youngster has intellectual assets that the world cannot afford to lose.

The Defective Child.—Children of an extremely defective mentality do not get into the schools, for the idiots are kept either in institutions or at home. A fair proportion of the imbeciles enter school but do not get beyond the second or third grade; they are easily distinguishable from normal children, even by the inexperienced person. The morons and borderline cases do continue in school, are not so defective as to attract instant attention, and make up the bulk of the children needing special training in the regular public schools. Moreover, if not distinguished

early and given sound training along lines in which they can make progress, they form the class of children and adolescents from which the majority of juvenile delinquents is recruited. At least 10 per cent of the general school population (morons and dull normals) is made up of children whose dullness constitutes a serious social challenge. In general, these children show the following characteristics: (a) they are undersized for their age—although often larger than the chronologically younger children with whom they are placed in school—are often sickly, malnourished, susceptible to any infection, have more physical defects than the average child (8), and are frequently absent on account of illness; (b) they are likely to be teased and picked on by other children, are easily led into misbehavior, are more often disciplinary problems than not, generally play with children who are much younger, and are more likely than brighter children to be maladjusted socially and emotionally; (c) their I.Q. is not above 75, they are usually recognized as stupid by the other children, and show relatively few and very simple interests; (d) they learn academic subjects slowly and only with effort, they show special difficulties in grasping generalizations or principles, they rarely read anything voluntarily, and are usually retarded one or more grades; their scores on educational tests generally indicate that they are not retarded nearly as much as they need to be if they are to understand the work.

With such a long list of symptoms to observe, it seems as if any teacher who thought at all about the children in the class could recognize such extreme cases. An early recognition is essential for both the defective and the brilliant

child because for neither of them is the typical school routine a good treatment. In the case of the defective there is the additional argument that he is more likely than not to become a public charge in one way or another if adequate training and adjustment are not provided; the problem becomes, then, one of serious social significance.

The case study below describes a typical feeble-minded child. The reader should note that some evidences of defect have been clear almost from birth.

Name: Wilbert. Age: 13. Grade: 4. Date: 1930.

I. History of the Family

- A. *Medical History*: The father of the family is a tall, lean, underweight individual, who appears duller than he probably is because of his very near-sighted eyes, adenoids, decayed teeth, and slight deafness. The mother appears to be a normal woman physically.
- B. *Social and Emotional History*: The home consists of four rooms on the upper floor of a two-story house. The house belonged to the mother's family and was a comfortable residence at about the time of its construction in 1885. It is, however, now out of date and somewhat unsanitary. The lower floor is rented to another family. The family group consists of the father, the mother, and two boys. They do not take any part in social affairs of the neighborhood; neither of the adults belongs to any club or organization of any sort. When the mother was younger she went to church, but appears never to have been able to build up a social life in church organizations. The neighborhood has deteriorated considerably since the building of the house, and the family is now about normal for the district in which they reside. No one in the family has any record of delinquency or criminal activity. Aside from two or three school books

that the children are using, there is no reading matter whatever in the house; they do not even take a daily paper.

- C. *Intellectual History*: There are, of course, no test results for either of the parents, but the father is considered definitely dull and stupid by his employer and by acquaintances who have known him since boyhood. The mother's rating would appear to be approximately low normal.
- D. *Educational and Economic History*: The father did not succeed in completing the fifth grade of elementary school, which he left at the age of 13 to go to work. The mother graduated from grammar school, but never went further. The father was employed in a variety of simple jobs, such as errand boy, delivery clerk for a grocery, and so on, until after his marriage. At about this time his wife's father died, and he tried to go on with the small shoe business developed by his father-in-law. In a couple of years, however, the small business went out of existence because of the inability of this man to manage the various necessary details. He accordingly went into bankruptcy, tried a variety of jobs of one kind and another, and eventually went to work for a large department store, where he has since remained. He is pleasant, courteous, and has succeeded, by handling the stock for years, in becoming so acquainted with the resources of his particular small department that he has developed into a quite acceptable salesman. The income of the family has always been barely sufficient to look after their simplest needs, although during the last few years the situation has improved somewhat.

II. History of the Individual

- A. *Medical History*: The younger boy's birth was per-

fectly normal. He did not, however, learn to walk until he was two years old, and at the age of three and a half he was still talking only a few words. At entrance to school he still talked with a slight speech defect and a small vocabulary. He had not picked up anything about either reading or writing. At the age of three, he had a severe double mastoid which necessitated an operation. His recovery was slow, and throughout his childhood he has had recurrent infections in his ears. He had the usual children's diseases, but did not recover from them with anything like the rapidity of the average individual. His teeth are noticeably irregular, malformed, and childish in appearance. He has always been underweight for his age.

- B. *Social and Emotional History:* This boy has always played with children two or three years younger than himself. He enjoys such games as tag, hide and seek, blind man's buff, hare and hounds, hop-scotch, or jumping rope. He does not seem to grasp any social disapproval of his playing games typically played by girls. He is not accepted on equal terms by boys of his own age, who are inclined to look upon him as a "sissy." However, he plays harmoniously with both boys and girls younger than himself. Even here, however, when a group of children chooses sides, he is likely to be one of the last children chosen. He shows little interest in anything.
- C. *Intellectual History:* At entrance to school, this boy appeared so retarded that he was sent home and his mother advised to keep him out of school for another year. This advice was followed. He was given an individual test upon his return to school a year later and earned an I.Q. of 67.
- D. *Educational History:* After his poor start in the first grade, this youngster has progressed four grades in

six years and a half. His marks in deportment, effort, and handwriting are always good. Those in spelling are fair; and those in arithmetic were (in the first two or three grades) good, but have been getting worse in the fourth grade. His marks in reading have been failing from the beginning.

III. The Present Condition

- A. *Physical Condition*: A recent examination shows this boy to be 16 pounds underweight for his age, which is now thirteen. He has decayed and infected teeth, discharging ears, and a noticeable appearance of lassitude. He had at the time of the examination a cold which had persisted for several weeks previous to that time.
- B. *Social and Emotional Development*: This boy has two bosom friends, one of whom is eight and the other nine. Recently these children have been building a house, but this boy seems to do most of the work, while the other two act as overseers for the job. He does not, however, seem to realize that he is being imposed upon. On the school playground he runs around rather aimlessly, slaps other children on the back, climbs around on the jungle-gym, lets out a war whoop once in a while, but seems to be fairly well accepted by the other children in the group. He has not been observed to enter into any real games, however, either at his own initiative or at the request of other children.
- C. *Intellectual Development*: This boy has been tested within the last six months and earned an I.Q. of 69. A group intelligence test a little earlier gave him an I.Q. of 73. His ability is a little above average for third-grade children.
- D. *Educational History*: Tests have recently been given in reading, spelling, arithmetic, handwriting and

geography. He scored at the bottom of the class in all but one test, namely, handwriting. His spelling and arithmetic are over two grades behind his present placement, and his reading score was below the second-grade norm—the lowest given on the norm sheet. His last standing in school, according to his last report, shows an Excellent in handwriting, a Poor in spelling, and a failing grade in arithmetic and reading.

General Conclusion and Summary

This boy is clearly a defective child. Everything in the history of his family and his own career suggests this fact over and over again. Recommendation is made that he should be sent to a special room where the curriculum is better adapted to his abilities than in the regular schoolroom, or else admitted to an institution.

It should be pointed out that this child apparently inherited his defect, for there is no record of accident or disease that could account for his difficulties. Such a finding is typical for defective children who are capable of attending school at all; children who are defective because of accident or disease are generally either idiots or imbeciles. Feeble-mindedness needs to be recognized early; the child will not outgrow it, and he is so dull that only long years of training will suffice to educate him in such ways as he needs. There is, however, more and more evidence to the effect that the defective child can be so educated and adjusted as to take a place in society. Thus, in one follow-up study (17) of 55 feeble-minded children, 60 per cent were found to have made a complete social adjustment, and 70 per cent were regularly employed. Similar results have been found in other studies of the

same problem. Defective children can become useful and respectable members of their communities. But such an outcome is not likely without special training of the children, plus such guidance of the parents that they will cooperate with the school in the training needed by the children.

The Emotionally Maladjusted Child.—As indicated in a previous chapter, there are so many different forms for the expression of emotional difficulties that a characterization of such children as a group is difficult. There is no doubt, however, that at least 5 per cent of school children (12) are markedly peculiar in their emotional and social attitudes, while a considerable additional percentage show deviations of a less fundamental but still serious nature. The entire group includes as outstanding varieties (a) children who will not mix with others but prefer to live and play alone in a dream world of their own imagination, (b) children who have marked fears and obsessions which cause distinctly abnormal conduct, (c) children who are extremely moody, excitable or melancholic, and (d) those who are delinquent in spite of having fair intelligence and no evident motive for their peculiar conduct.

Perhaps the first idea for the teacher to grasp is that these aberrations have a sensible and understandable cause if the child's history can be traced. The situations causing the peculiarities, the incentives to abnormal conduct, *can* be found, and, once found, remedial measures will bring about at least some improvement, and often a real cure. For no other type of unusual child is the case study technique so essential, for the motives driving these children are to be found in essentially social situations—at home, in

the neighborhood, or at school. Usually the teacher cannot expect to give adequate treatment by herself, any more than she can expect to diagnose or cure diseased conditions of the body; her part is, in both cases, locating the children in the first place and sending them, whenever possible, to specialists for treatment.

A second valuable idea for the teacher is that peculiar conduct is *always* important. It means something; it is a reflection of some real difficulty, and, if persisted in, it will lead to more serious trouble. To be sure, it will sometimes "cure itself" because the causes of it are, for one reason or another, removed; but cures are far more likely and certainly more immediate if someone takes an intelligent interest in consciously removing the causes and not leaving it to mere chance. The teacher is in a particularly strategic position because she sees representative members of "all the children of all the people," and therefore has a good basis for judgment as to whether or not a child's behavior is unusual; parents who have only one or two children of their own to observe are often poor judges because they do not see enough different children. The writer knows one family which did not think it remarkable that a four-year-old should worry because his clothes would not stay clean, another in which a four-year-old girl would not go to the toilet unless accompanied by her father, and another in which an ardent exhibitionist, aged three, was thought "cute." No experienced teacher would make such an obvious mistake as to think these children were manifesting perfectly normal behavior.

A case study of a peculiar child is given below. It illustrates only one kind of abnormal behavior shown by school

children. But it does show the way in which peculiarities are explainable in terms of a child's history, and it should serve to drive home once more the point that odd behavior has both significance and an understandable cause. The study given previously in this chapter (page 261) and those in an earlier chapter (pages 105-109) may be included under this point.

Name: Pauline. Age: 16. Grade: 10. Date: 1926.

I. History of the Family

- A. *Medical History*: The father is an extremely nervous and excitable person, but seems in good health. The mother was over forty-five when her last child was born, and has since been too exhausted to do more than a little of the housework.
- B. *Social and Emotional History*: The family is respected in its better-than-average neighborhood. The father belongs to several men's organizations. The family consists of the parents and four children. The mother's control over the children is weak and the father's erratic, but the family seems harmonious enough.
- C. *Intellectual History*: The family seems above average in this respect. A collateral branch of the family contains many eccentrics, but there are none in the direct line.
- D. *Educational and Economic History*: The mother left school in the eighth grade, but the father is a medical college graduate. For several generations the men have been doctors, ministers, lawyers, or teachers. The father is a successful doctor and earns more than enough to support his family.

II. History of the Individual

- A. *Medical History*: The girl is the youngest. She was an eight-months' baby and has never been strong,

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usually daring and courageous person in all other circumstances.

The fear first began early in the summer during a visit to a home where a distant relative had committed suicide. The entire family group left by the suicide consisted of eccentrics, all of whom blamed the others for the tragedy. It took three days for the clan to gather, and during that time the girl was in the midst of a group made up of excitable, unstable persons who had outbursts of crying and moaning, of angry recriminations or remorse, of pitiful fear. The girl slept in a room with two women relatives, one of whom declared she could not sleep a wink as long as the corpse remained in the house—with the result that there was no peace for anyone for two or three nights. The burial ceremony was the first the girl had ever attended, and she was somewhat frightened by it. When she reached home after the service an unusually severe thunderstorm broke. She suddenly displayed intense fear, screamed, acted like a maniac. When the storm had passed she had to be put to bed in an exhausted condition.

Since this episode, which took everyone totally by surprise, she has had recurrent, but milder, attacks of fear whenever there is a storm. It is probable that the storm is associated definitely with ideas of death, funerals, corpses, suicide, and the emotional behavior of eccentric relatives. In any case, she has an almost uncontrollable fear.

- C. *Intellectual Development*: There seems every evidence of a higher than average intelligence, in spite of the emotional display.
- D. *Educational Adjustment*: At the beginning of the school year this student was exhausted and her work not as good as it had been, but since the summer

storms have ceased, her work has returned to its usual high level.

IV. Summary and Recommendations

This case shows a marked emotional response to a single situation on the part of an individual already high-strung and nervous. Reasoning with her does no good. Every effort should be made to build up her physical and nervous health. A period of time away from home, as in a good summer camp (and in a locality where thunderstorms are infrequent) might be very beneficial. In school, calm and quiet handling of any emotional upsets is important. Because of her life-long habits of emotionality she may not in any event fully recover her equilibrium until she is considerably older.

As mentioned in an earlier chapter, there is a considerable suspicion that it is from the ranks of these chronically maladjusted, unhappy, emotionally upset children that the adult lunatics, perverts, and eccentrics are recruited. Experience has shown that the task of curing such later conditions is difficult, if not impossible; the chief "cure" consists in prevention—and the teacher must often be the person to initiate the preventive measures by singling out the children who are in need of them.

The Physically Handicapped Child.—In this group are included all those who are blind, deaf, crippled, or tubercular. The recognition of the more extreme cases is simple enough, but, as indicated in the second chapter, mild degrees often go undetected for a long time. Those whose handicaps are severe require such special types of education that the state has to provide separate schools to meet their needs. However, there are always a few somewhat handi-

capped children in any school, and these should receive individual and sympathetic attention from the teacher, although babying and excessive protection should be carefully avoided. To some extent the problems of these children are vocational, but to a much greater degree they are emotional in character. The child must learn to regulate his life in some manner that is emotionally acceptable to him and at the same time physically possible for his handicapped body. The task is one of successful reconciliation to the inevitable, and adjustment to a routine of life admittedly less varied than that of other people. It can be done, but the child needs serious help. The study below may serve to indicate the general nature of the problems involved, and the way in which adjustment may be brought about.

Name: Dorothy. Age: 17. Grade: 11. Year: 1920.

I. History of the Family

- A. *Medical History*: The medical history of this family is entirely negative.
- B. *Social and Emotional History*: The family is well accepted in the superior neighborhood where they live. Both parents belong to a number of clubs and associations. They entertain frequently. The family consists of the parents and three children. The home is well furnished and comfortable.
- C. *Intellectual History*: There is no history of either defect or abnormality in the family. All members seem above average in ability.
- D. *Educational and Economic History*: The mother graduated from high school and the father from college. The children are all progressing normally in school. The father is a successful independent business man with an income of about \$10,000 a year.

II. History of the Individual

- A. *Medical History*: This little girl was born a hunch-back. The cause of the difficulty is not known, as there is nothing in the heredity to account for it. The mother's condition during pregnancy and the birth were normal. The other two children show no defects. Everything possible has been done for the child, but the defect is apparently incurable.
- B. *Social and Emotional History*: This child has, throughout her life, been treated as if she were perfectly normal. Her parents take her everywhere with them as they do the other children, and never make the slightest excuse for her appearance. In the home she has been accepted exactly on a par with the other children. There has been neither avoidance of her nor extra attention paid to her because of her defect. Her parents have quietly led her to accept her handicap and to go forward within the narrow confines of possibility with a well-adjusted, eager, happy life. She has always played with children of her own age. She seems to have had an almost complete acceptance by the children in the neighborhood. Everyone tries to help and protect her.
- C. *Intellectual History*: On entrance to school she was given a Binet examination and received an I.Q. of 135. Various group tests since that time have given I.Q.'s from 120-145.
- D. *Educational History*: She has had one double promotion and is now half way through high school. Her marks have been uniformly superior.

III. Present Condition

- A. *Physical Development*: Aside from her deformity, this girl appears to be in normal health. She is practically never absent from school and has had no illness worse than a cold for several years. She seems to have normal energy and vitality.

- B. *Social and Emotional Adjustment*: This girl's relationship to the other pupils of the school is almost normal. There are a very few students who do not accept her, but her agreeable personality and her ability have materially lessened any discrimination against her that might otherwise exist. Most of the time neither she nor anyone else seems to be aware that she has a deformity. She is careful, however, to avoid situations where her deficiency would keep her from participation. She attempts only games she knows she can play, stays away from dramatics or any place where she will have to make a public appearance, and compensates by standing at the head of the class in most subjects, by reading a great deal, and by other quiet amusements. Gradually she has become more and more interested in books, and is now headed toward either reference work in a library or editorial work of some sort. She is very eager to earn her own living—probably as a means of showing the world she can get along as well as anyone.
- C. *Intellectual Development*: She has had no recent tests, but her school work and general personality suggest a high intellectual development.
- D. *Educational History*: Her excellent work continues. Her work in English is especially remarkable.

Summary

This girl's parents have managed by judicious planning and treatment to bring this cripple up as a practically normal individual. They have encouraged her to go forward along lines where her physical handicap will not be too severe, and have taught her to stay within the limits of her physical capacity and endurance. As a result of this treatment she has no abnormality of personality.⁴

⁴ This girl is now married, has two normal children, a host of friends, and seems to have achieved an excellent adjustment.

All that has been said in a previous chapter concerning the effects of failure and frustration must be remembered in dealing with handicapped children. The essence of their treatment is that they must succeed in *something* if a collapse of personality is to be avoided. The specific means vary with the case, but this one principle is vital to adjustment.

The Delinquent Child.—This classification rather cuts across all those previously given, since a child may be delinquent and at the same time brilliant, of normal intelligence, feeble-minded, peculiar, or physically handicapped. However, because of the increasing seriousness and frequency of juvenile crime of all sorts, it is worth while to consider these children as a group, with the purpose of seeing—in so far as research has thrown light on the subject—why children become delinquent.

In the first place, it is clear that delinquency is a social phenomenon; one would, therefore, first look for its causes in the children's social background. The following map, from a study of the relationship of delinquent behavior to different localities in Chicago, is of interest in this connection (26).

Clearly, juvenile crime in this case has definite centers from which it radiates into adjoining districts, losing intensity as the distance increases. The most obvious of these centers is the "Loop"—the chief business district; other minor centers may be observed on Radials VII and VIII. These districts are of the following character:

1. They are either primarily business or heavy industrial areas—not residential.

or girl living in one of these districts inevitably has delinquent companions—there is almost no other kind to be had.

From this study one may conclude that the code of delinquent behavior may be diffused from focal points in the same manner as other types and standards of behavior; that delinquency will grow up in areas where the dominant business or industrial interests and the changes in the character of the population keep ordinary standards of conduct from becoming stabilized; that once a delinquent code is set up, it is transmitted from adults to children like any other code of behavior.

A second method of approach has been to study the family constellation (16) of delinquent and non-delinquent children. The home whose normal constellation of two parents and their children is interfered with in any way is significantly more likely to contain delinquents than a home in which the pattern is not broken.

Finally, typical studies of the offenders themselves have been made (a) by comparing delinquent boys with their non-delinquent brothers (4) and (b) by comparing delinquent girls of normal intelligence with non-delinquents of the same sex, age and intelligence, whose homes were of the same cultural and economic level (6). Such studies reveal the following traits:

1. The delinquent boys as a group were not as bright as their well-behaved brothers. Their median I.Q. was only 75, as compared with 86 for their brothers.
2. These delinquent boys showed distinctly inferior work on tests in all academic subjects, but markedly superior stand-

- ing (higher even than for the general population) on all tests of mechanical ability.
3. The delinquent boys were retarded in school $2\frac{1}{2}$ times as often as their brothers.
 4. Even when low general intelligence is kept out of the picture, differences still remain. Thus, the delinquent girls think fewer things to be wrong, but have more worries and wider interests than non-delinquent girls of the same ability. They are more emotional and have more difficulty in inhibiting their responses. More of them than of the normally behaved girls report open rebellion against their surroundings, and feelings of physical discomfort and inferiority.

In the light of the above studies, how can we characterize the delinquent child? In a large proportion of cases the following facts would be true: (a) He lives in a "delinquent" district and has friends among other juvenile offenders; (b) he is taught to admire the criminal code; (c) he comes from either a very small or a very large family, and his family group is likely to be broken in some way; (d) he is a dull or actually feeble-minded child who for years has been competing unsuccessfully—as shown by his retardations—in a school system where there is a premium on academic learning and a customary complete failure to provide any outlets for his mechanical skills and interests; (e) he is an unhappy person who sees little or no future for himself along conventional lines and is turning to delinquency because it offers an outlet for normal longings, such as a desire to receive favorable attention, to escape from oppressions, and to find more satisfying means of self-expression. The delinquent is a socially

sick person for whom immediate and understanding aid is essential if a permanently criminal career is to be prevented.

Name: Milly. Age: 12. Grade: 3. Date: 1931.

I. History of the Family

- A. *Medical History*: The father is a thin, underweight, tubercular-looking man who has a slow shambling gait and lisping speech. The mother is overworked, chronically tired, underweight, and subject to moods of depression. Both parents pick up every infection that seems to be going around the neighborhood, and shake off such infections as colds only with great difficulty.
- B. *Social and Emotional History*: The family has a distinctly poor standing even in the run-down section of town where they live. Neither of the adults has the slightest degree of social interest, except that the father occasionally frequents the poolroom when he has a little extra money he thinks he can afford to lose. Milly has six sisters, all older than herself.
- C. *Intellectual History*: No test results are available, but the father is considered by his associates to be stupid and slow. The mother is regarded as bright enough but somewhat queer. A maternal aunt was in an insane hospital with a diagnosis of manic-depressive insanity.
- D. *Educational and Economic History*: Neither of the parents graduated from grammar school. The father has been employed at various jobs in the cotton mills. His pay has never exceeded \$18 a week. During much of the time the mother also works in the cotton mills and leaves the care of the family to the oldest girl. The second and third girls have worked in the mills from time to time, but have had no steady employment and have earned money as prostitutes when funds from any other source seemed too low. There

has been no effort to keep the younger children from learning about sexual experience. The next two sisters are over-age members of the eighth and sixth grade, respectively. The youngest child, Milly, is now in the third grade.

II. History of the Individual

- A. *Medical History*: Milly has always been underweight and round-shouldered. She seems to have a chronic cold. Her tonsils and adenoids have for years been infected. She is generally listless, and fatigues much more easily than other children.
- B. *Social and Emotional History*: She usually stands about and watches other children play, although she does seem to get some enjoyment out of playing with younger children. Ever since she entered school she has been chronically detected taking small objects such as pencils, or pennies, that did not belong to her. Usually she does nothing with these objects, but carries them around with her in her pocket. Milly herself can give no explanation of why she steals.
- C. *Intellectual History*: During the second grade Milly was given a test of intelligence. At this time she received an I.Q. of 82.
- D. *Educational History*: Milly entered the first grade at the age of six, stayed two years in the first, two in the second, and is now spending her second year in the third. She has appeared to have an interest in her school work, but she has never been successful in any of it. Her marks have varied from "Failing" to "Average," but have never been "Good" in anything. She seems to be distinctly unhappy over her failures and to feel keenly that she can never do anything well enough to be acceptable.

III. The Present Condition

- A. *Medical Condition*: Milly's medical condition con-

- tinues approximately as indicated by the above section, except that she has recently been losing weight.
- B. *Social and Emotional Adjustment*: Milly's social adjustment has recently become worse. She makes no effort whatever to mingle with other children. Occasionally some other child makes a disparaging remark to which Milly has on three occasions responded by slapping the child who criticized her. She has gained notoriety and attention by using profanity and telling obscene stories. She has twice talked back to the teacher—a thing unheard of in her earlier years. There have been rumors among the children that Milly has been having sex experiences. A week ago she was detected in stealing a silk blouse from the counter of a store. She explained this act by saying that boys liked her and she wanted to look well, but had no money.
- C. *Intellectual Development*: Milly has just been given a Binet examination on which she earned an I.Q. of 80. This rating is considerably higher than her inadequate school work would suggest.
- D. *Educational History*: Recent tests in reading and arithmetic indicate that Milly's grade placement is almost exactly right. It is the opinion of the teacher that Milly is able now to do fourth-grade work with a reasonable amount of effort, but she does not think Milly could be given sufficient incentive to work so that an extra promotion would be possible. In spite of Milly's fair ability, the fact remains that she has made most inadequate educational progress.

Summary and Conclusions

Milly appears to be a child of dull normal mentality who has an intense dislike for school work, probably because she has never been successful at it. During her early school years she showed her maladjustment by maintaining a somewhat sullen

attitude toward the school, by almost complete bewilderment as to how to get along with other children, and by occasional petty thieving of objects that she did not use. More recently, Milly has begun to fight back at a world which she regards as mistreating her. She has also developed an interest in boys and sex experiences generally. Her telling of obscenities seems to have been the first thing at which she was ever successful in getting attention. This girl has already started on a career of delinquency. Further delinquencies are inevitable unless something of a socially acceptable nature can be devised at which Milly will be successful. Her prejudice against academic work is by now too strong to be overcome, but it is possible that training along some vocational line that would lead to self-support might rescue her from the delinquent trend that she has been showing little by little ever since she entered elementary school. With her family background it is clear that her people cannot be expected to help her very much. If the school does not step in, nobody else will.

The delinquent child—like the defective, the brilliant, and the eccentric—needs to be located early and studied intensively if a permanent criminal career is to be avoided. Most records show that adult law breakers began their anti-social careers while still in school. Once again, the need for observant and understanding teachers is shown to be vital to society.

THE EDUCATIONAL DILEMMA

This chapter has reiterated, by general statement and concrete example, this theme: that each pupil is a unique individual, different from every other pupil, presenting individual problems which must be understood if there is to be optimal development. But in the public schools of this country there are 26 million pupils. Education is thus a tremendous mass problem. To state that there must be

both mass education and individualization seems to present an impossible dilemma.

It is better to say that there is here presented the greatest challenge to educational ingenuity and resourcefulness. Methods of mass education must be devised which will nevertheless give maximal opportunity for the development of desirable individuality. Of course, it can be done, and the following steps may be expected to work slowly toward the solution of this major problem.

In the first place, the school will recognize the necessity of its knowing something about each individual child *in his own world*. Chapters V and VI have suggested that a majority of the most highly significant things in a child's life are "off-stage" as far as the school is concerned. There must be some means whereby a school will not only know each child as a pupil, but also know how he figures among his fellows and in his home—will see each child in his total social environment. At least a minimum of such knowledge is the essential prerequisite for any educational program which really recognizes individual needs.

Prerequisite to any adequate handling of each child's problems is adequate school medical and health service. There must also be counsellors (these should have access to clinical psychologists, psychiatrists, and vocational experts, for aid on special problems), whose business it will be to accumulate knowledge about each child and guide educational efforts with reference to each youngster's needs. Moreover, there must be individuals (the counsellors, or others specially trained in social work) who visit homes and make it their particular business to coordinate home and school for the welfare of each pupil. All these problems the teacher must know about, for at present she must often do all these things if they are done

(the suggestions for case study have been made with this in mind). But the writer believes that in the schools of the future the counsellor will be a separate individual, specializing in the study of individual problems of child development, much as the school health officers are now recognized as necessary specialists, in addition to the regular instructional staff.

In the second place, instructional material and procedures will be so reorganized as to be easily adjustable to the needs of each pupil. There must be adequate provision for the special needs of special cases—the physically handicapped, the subnormal, the brilliant. But the adaptation must go farther—it must recognize the largely unique character of each pupil's educational needs. The point is reiterated in this volume,⁵ and need not be stressed again here. The problem is primarily one of educational ingenuity. Once it is realized that the task of education is not to teach children but to facilitate their learning, it will be appreciated that schemes can be developed which will individualize education without putting any impossible burden upon teachers or educational resources. In fact, it might be said that the problem is to free each pupil from unnecessary routine and to give him maximal means and opportunity for self-education; in proportion as this is done, the task of the teacher will be lightened.

In the third place, there will be a much greater utilization of the social forces within every pupil group, for educational purposes. In any natural child group, the children educate one another; they adapt to each other's abilities and personalities. Consequently the group can be made a power-

⁵ In chaps. vii and x.

ful influence for the development of desirable individualities.

Finally, as school, home, and community come to work more closely together and to understand better their common problems, many difficulties with which the school now wrestles, and other difficulties which trouble the pupil, will not arise. Thus community welfare projects may accomplish a great deal—it has already been pointed out that problem children usually come from problem neighborhoods. Improvements in community recreational facilities will decrease the number of delinquents and of socially isolated pupils. Programs of parent education may be made of distinct service. The community is itself a major educational influence, capable of making rich and varied contributions to the education of each child within it.

Education, then, must see each child as an individual, must further his total development as an individual. And mass education, in the world of today, need not interfere with this aim. Rather, it may make available greater educational expertness and more varied and richer educational possibilities. The apparent dilemma presented by the need for an individualized development in a system of mass education may be merely an opportunity as yet unrecognized.

SUGGESTIONS FOR TEACHING

The writer believes that the following rules will be found useful in helping teachers to appreciate the individual character of the children they teach.

- (1) Never let yourself regard a class of school children as a group of identical individuals. Expect to find differences in all possible fields, and adapt your teaching to the needs of each child; this is perhaps your chief task as a teacher.
- (2) Study each child's condition (physical, educational, mental, social,

and emotional) as soon as possible after he is assigned to your room. Try to find explanations of his condition in terms of his past history.

- (3) Never allow yourself to regard peculiarities of conduct or attitude as unimportant. Try, rather, to find the underlying condition of which the deviations are only the symptoms.
- (4) As soon as you can, train yourself to recognize different types of children. It is well to remember that if teachers do not recognize unusual children there is a good chance no one else will.
- (5) Always keep in mind the fact that a reasonably satisfactory adjustment to the world is possible for individuals of almost any level of intelligence. Abnormalities and delinquencies are due to some lack of adjustment, explainable in terms of a particular social *milieu* and a given set of social pressures. If you approach such problems without any feeling of fatalism you will find nothing is so immutable that sympathetic understanding plus intelligent remedial measures cannot improve, if not wholly cure, the maladjustment. Remember that delinquents, criminals, and lunatics are made, not born.

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PART TWO

LEARNING IN SCHOOL

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LEARNING IN SCHOOLS



CHAPTER IX

THE COURSE OF LEARNING

FOREGOING chapters have presented important facts in regard to the school child—the learner. The remaining chapters will be devoted to a discussion of the ways the learner acquires skills, information, and understanding in school, and the factors involved. Actually, the two topics are inseparable, for there is no learning without a particular learner whose characteristics enter into his rate and procedure in learning, and there is no individual who is not continually in the process of learning something. In the consideration of learning, some typical results from learning experiments will first be presented, with a discussion of the outstanding features of learning “curves.” The next chapter will attempt some explanation of the nature of the learning process, with experimental data to show how various factors may influence the progress of learning. Later chapters deal with methods of appraising and directing learning, evidence regarding the permanence of learning, causes and prevention of fatigue in school, effects of learning one subject upon progress in another, and possibilities as regards the development of more general traits such as ability to think, or honesty, or æsthetic sensitivity.

LEARNING CURVES

The natural first step is the consideration of specific evidence regarding the average progress of learning in school

subjects.¹ Next, curves will be shown for individual learners. Finally, data on the learning of specific items of information will be considered.

The Course of Average Progress in School Subjects.—The practical first question is as to typical progress through the school years in representative school subjects, for from such curves some idea may be obtained as to how the schools are now doing their work. Three graphs are presented. The first shows progress in the elimination of errors in English composition from the third grade into college (18). The second shows improvement in an important element of reading skill from the first grade into college (5). The third exhibits progress in spelling, arithmetic, and reading comprehension over five school years (grades 2-6 inclusive) (10). Such curves give a valuable long-time view of the way the schools are doing their work.²

The following graph shows the decrease in errors in capitalization, punctuation, grammar, and sentence structure from the third grade into college.

The methods used in gathering and compiling these data were simple and straightforward. Samples of the written work of pupils in several elementary and high schools were first

¹The reader familiar with the literature on learning will be struck by the omission of classical studies on the learning of nonsense syllables, telegraphy, and typewriting, or the progress of animals in escaping from a cage. These admirable investigations have been eliminated on the basis mentioned in the first chapter—this volume deals with the learning of children, in school. It therefore seemed practically desirable, and interesting as an experiment in the treatment of the topic, to confine the illustrations in the first instance to progress in school subjects.

²The first two curves do not show the progress of the same individuals from year to year but instead exhibit the general course of educational advance by successive cross-sections of a school population. Such a method has its limitations. However, it is regularly used in the study of growth—and seems of value here.

obtained, as well as papers written in various college classes. These papers were carefully gone over, and all errors in capitalization and punctuation, grammar and sentence structure, were checked. The errors of each type on each paper were then

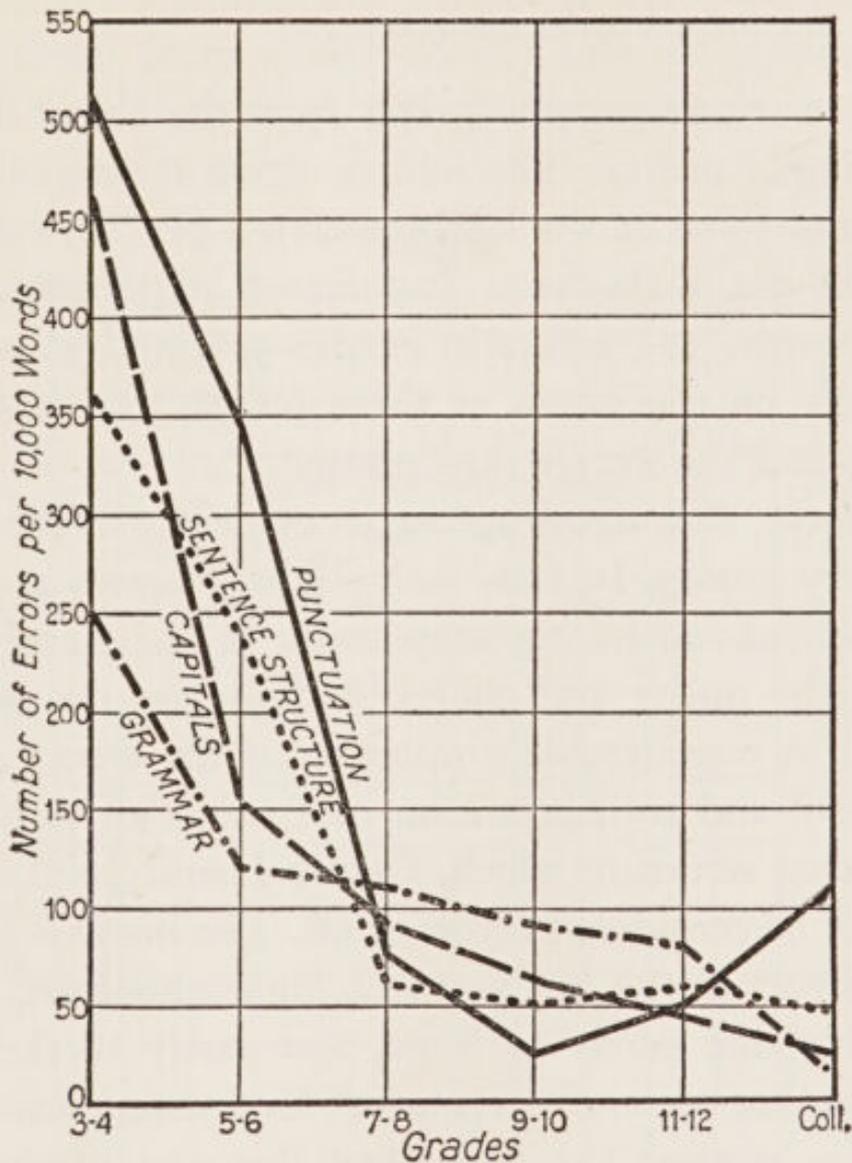


CHART 19.—Decrease in errors in punctuation, capitalization, grammar, and sentence structure from the third grade through college (Seaton [18]).

counted, and also the number of words in the paper, so as to take account of its length. The results for all pupils in each grade were combined to show the total words and total errors of each type in that grade. For each grade, the number of errors of each type *per 10,000 words* was next calculated, by

the use of a slide rule; since different amounts of written work were obtained from the different grades, this step was necessary to permit a fair comparison from grade to grade. To condense the material, the results for adjacent grades were averaged—the figures for grades 3 and 4 were combined, for 5 and 6, and for all college students.

The construction of the graph from the above data was then a simple matter. The figures across the top show the grades, and those at the left, the errors per 10,000 words. In grades 3-4 there were 505 errors in punctuation per 10,000 words, 345 errors in grades 5-6, and so on. Dots were made on the graph at these points, the dots joined by lines, and the graph thus plotted.

The most striking progress is evidently made in the elementary grades. In fact, such slight progress as appears in high school and college may really be due merely to the fact that the duller and poorer students are dropping out of school. A considerable proportion of the errors made in high school and college are on nice points of punctuation and sentence structure which, from a liberal point of view, would not be considered errors at all. The increase in punctuation errors in the last years of high school and college is probably due partly to haste, and partly to the use of more complex sentence structure.³ Everything considered, the curves suggest the possibility that the mechanics of English composition may, like handwriting, be handled entirely in the elementary school. Certain further problems touched upon here will be returned to in the next chapter. However, it should be clear that such curves,

³There is also the possibility that the increase in college may be due to unwise efforts to teach niceties of punctuation which only confuse the student.

showing progress in a subject throughout the school years, are of great interest and value.

The next graph shows progress in skill in reading from the first grade to college, as indicated by the number of "fixations" of the eyes per line of print. Since the better readers make fewer fixations, the smaller numbers have been put toward the top, and thus progress is shown by a rise in the curve.

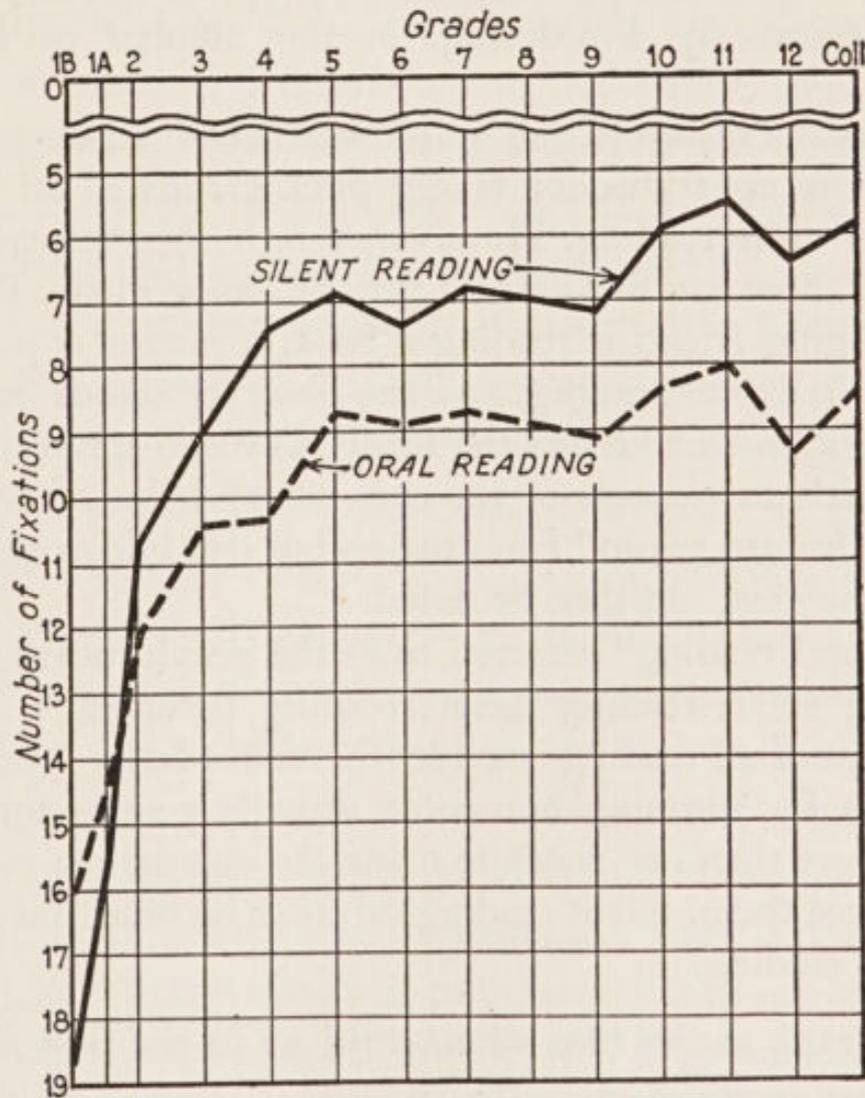


CHART 20.—Grade medians for eye movements in silent and oral reading: number of fixations per line of type (Buswell [5]).

A brief explanation of the eye movements in reading is here necessary. As an individual reads a line of print, his eyes glance

along it. They do not move in a single, even sweep, however, for while the eyes are moving, nothing is seen. Instead, the line is covered by a series of quick short movements, each followed by a fixation when the eyes take a snapshot, so to speak, of that part of the line at which they are then looking. Poor readers must make many such stops on each line of print because they have to look at each word and often at each syllable before they can make out the words and sentences. Good readers can "take in" two or three words at a glance, and therefore require few fixations per line. Thus, progress in reading skill is well shown by a reduction in the number of fixations per line.

The results shown in the graph were obtained by means of an elaborate apparatus for taking photographs of an individual's eyes while reading. However, rough observations of the nature of these eye movements may be easily made. If, while some obliging friend is reading a book, a mirror is placed on the page he is *not* reading, and the observer stands behind in such a position that he sees the reader's eyes in the mirror, the small, quick movements of the eyes across a line of type, and the long "return sweep" from the end of one line to the beginning of the next, can then be noted.

The "oral reading" referred to in the graph means reading out loud; silent reading means reading to oneself. At least 95 per cent of all reading is evidently of this latter type, where one reads for meaning but needs actually to say the words hardly more than one needs to name the objects in a picture in order to see them. Silent reading can thus be much more rapid than oral reading.

The graph shows that when children in the first semester of the first grade read orally, their eyes average 16 fixations for a line $3\frac{1}{2}$ inches long. Silent reading by these same youngsters averaged 18.6 fixations per line. By the second grade, however, silent reading requires fewer fixations and

hence becomes distinctly more rapid than oral; the children can read to themselves (or "see meanings") faster than they can say words. The eye-movement skills involved in oral reading become "set" by the fifth grade at approximately 9 fixations per line; the rest of the curve shows a level which appears to indicate a limit beyond which it is not possible to go—a limit presumably due to the fact that it is possible to speak comfortably and intelligibly only about so fast. Silent reading also shows a decreasing number of fixations up to the fourth grade, after which there is a level; but there is another lift in the curve (increase in speed) beginning with the tenth grade. This final increase may be due to the elimination of the poorer readers, but it at least shows that faster than fourth grade reading *is* possible; and it will be shown later that with special training there can be still greater increases in speed.

The next graph shows the average progress of 42 pupils for five years, in reading, arithmetic, and spelling, as shown by objective tests given annually. Such repeated measurements of the same individuals are especially valuable, since they permit one to follow through the influence of various factors upon the progress of an individual or group. The first two graphs were based on results for different individuals in each grade, and consequently they indicate (for instance) how many errors in punctuation a group of third-grade children make as compared with a group of college students; they do not show the progress of the same children from third grade to college. The results exhibited in the graph below are from grades 2-6, and show consistent progress over this period in these elementary school sub-

jects. From the two previous graphs it would be inferred that if these children were followed into secondary school their gains in these three subjects would become less until a level was reached.

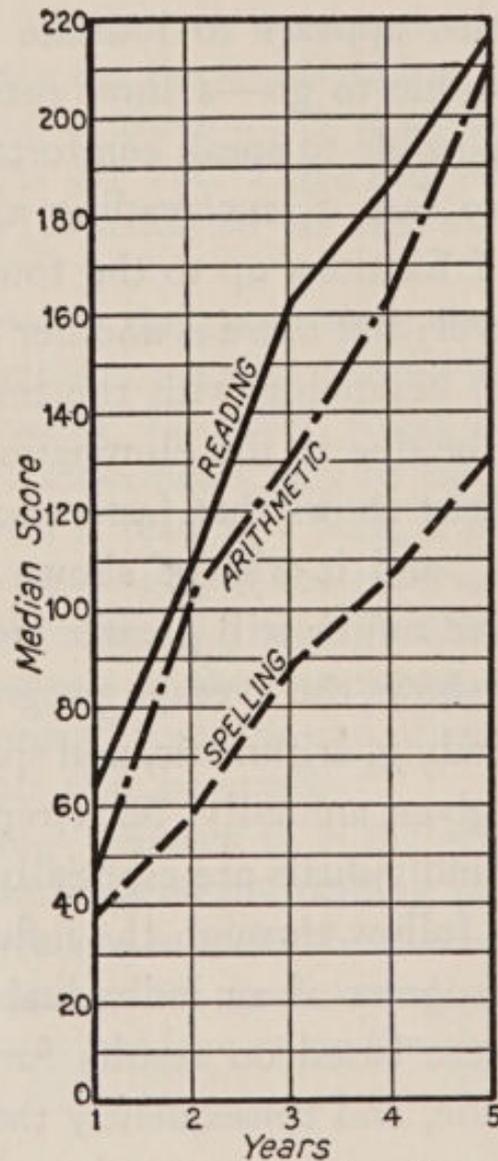


CHART 21.—Improvement in three school subjects over a period of five years (Hildreth [10]).

To show progress in a secondary school subject, the curve below (9) is included, showing the increase in Spanish vocabulary from first- to eighth-semester Spanish classes, as determined by a hundred-word vocabulary test.

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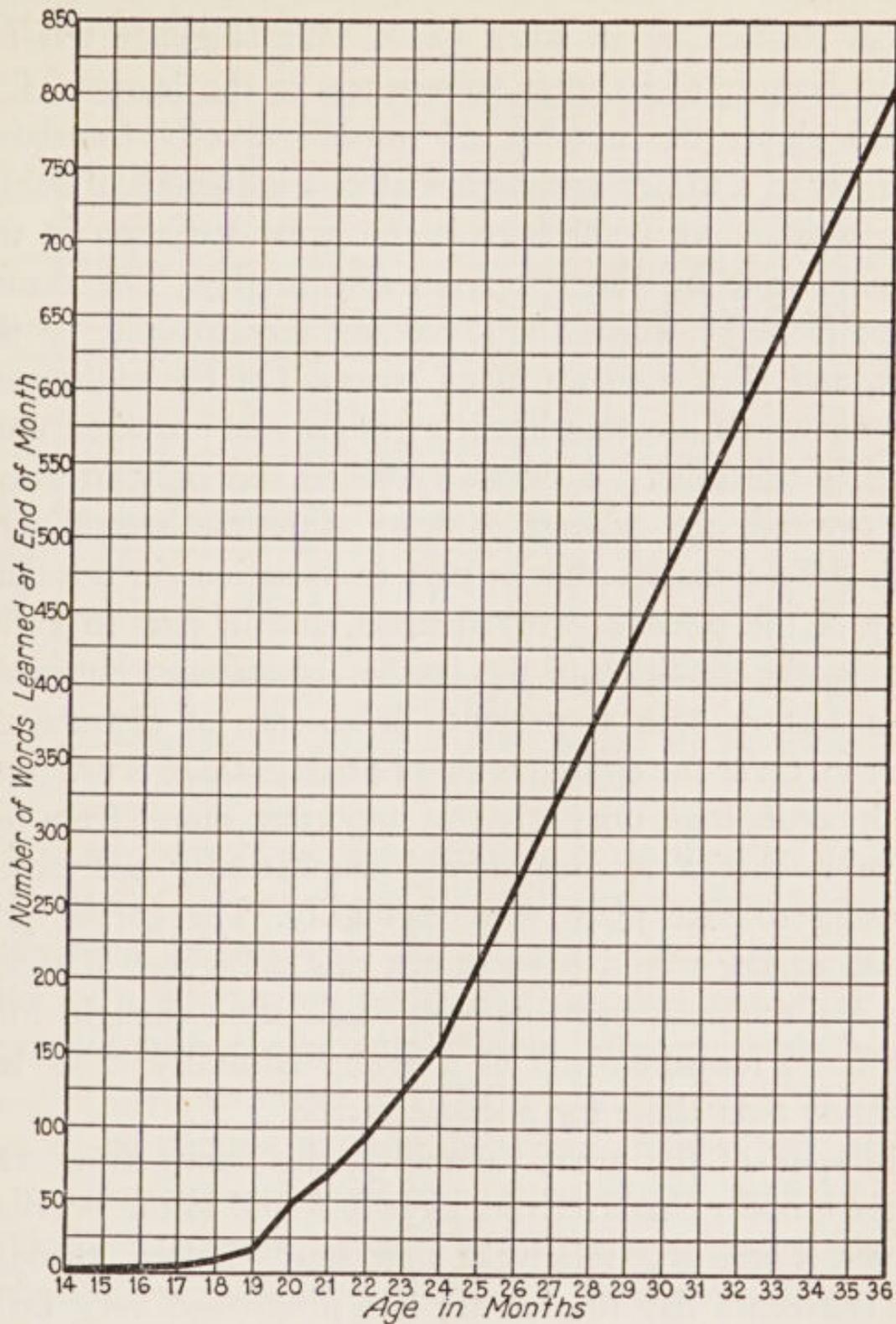


CHART 23.—Growth in vocabulary of a child from 14 to 36 months of age (Nice [12]).

A second individual curve shows the day-by-day learning of Russian by an adult (22). This language was selected because of its utter strangeness to the learner. The record shows the number of words correctly translated each day in a fifteen-minute test after a half-hour of study. The outstanding point here is the great variation in the amount done on the test from day to day. The record drops from 35 words translated one day to only 10 the next, and then goes up to 43 words. On the eighteenth day 69 words are translated, a record not exceeded until the fifty-third day; on the thirty-fourth day only 10 words are covered, the poorest showing since the second day. Such differences are due in part to variations in the difficulty of the passages worked upon, and in part to variations in the condition of the learner; moreover, numerous other factors, such as presence or absence of distractions, enter in. Over the entire period of 66 days there is progress, but it occurs most unevenly. An important moral from this curve is that a teacher should emphatically *not* expect learning to take place with regularity. The curves presented earlier would have shown this same sort of variation had the measurements been made often enough. Furthermore, measurements of a group naturally show less variation than those for a single person.

In spite of the great variability, this curve shows two of the broader characteristics already found in the previous curves. There is a relatively slow start—indeed, through the thirteenth day the learner had progressed very little. Then comes a spurt of improvement, followed by a plateau, or period of no progress, through the forty-seventh day. At this time there is another distinct gain, with the learner re-

maining at this third level throughout the remaining 20 days of the experiment.

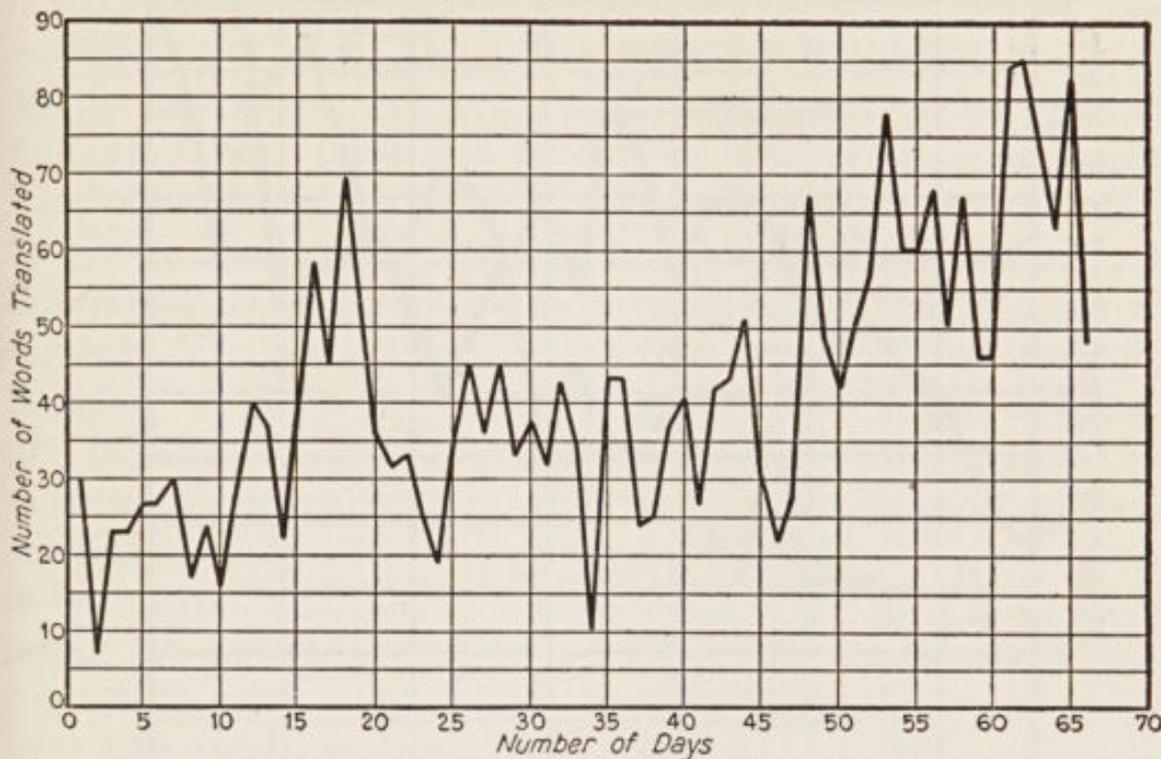


CHART 24.—Showing the number of words learned per day by an adult studying Russian (Swift [22]).

The next graph shows progress in multiplication for two children (2). It anticipates the last section of this chapter in showing the marked improvement which children can make in a short time under experimental conditions, as compared with the relatively slow progress in the usual school situation. However, the graph has been included here to exhibit the marked differences in the total shape of the learning curve which may be shown even by two children of the same age and about the same initial ability. One child progresses rapidly at first, then slows down; the curve for the other child is the reverse of this—concave, with rapid progress at the end of the experiment. The marked short-time fluctuations are also evident.

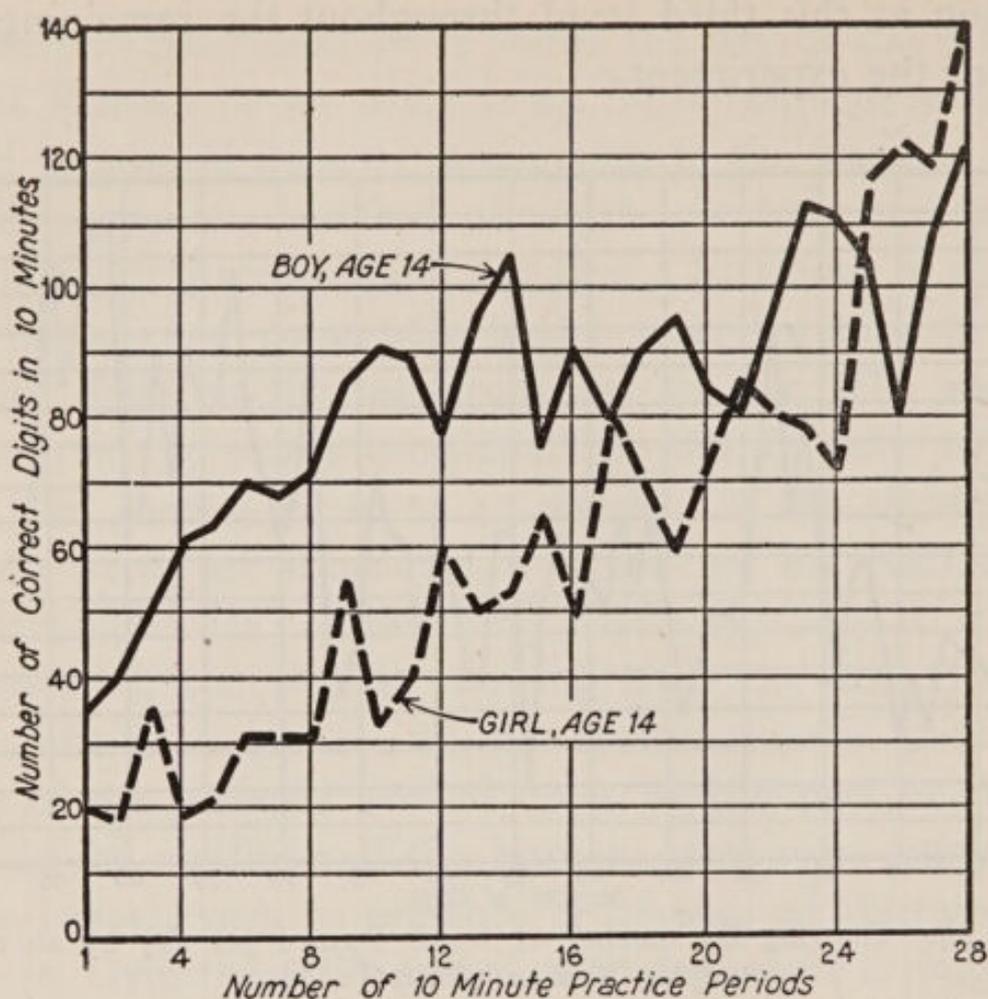


CHART 25.—Improvement made by two individual children in mental multiplication of two-place by two-place numbers, recorded by 10-minute practice periods (Brooks [2]).

During recent years much work has been done in the writer's department on the remedial training of college students who showed special handicaps in one subject or another. These individuals were given training daily and were tested for progress once a week. The results presented below are (a) for a boy whose handwriting was so illegible that reeducation was necessary, and (b) for a girl who could not spell. The boy's training extended over a period of 10 weeks, the girl's over 20.

The boy presented a peculiar handicap. He was naturally right-handed, but had a tubercular condition in the wrist bones

of his right arm, with a resulting malformation that rendered the use of that hand practically impossible. He therefore wrote with his left hand, producing a script that any experienced teacher would judge to be that of a left-handed person writing with his right hand. The handwriting was well below the average for the second grade when this boy started on his reeducation. It at once became clear that he was trying to use right-hand techniques with a clumsy left hand, and he was therefore taught to use a more appropriate slant and to hold his pen differently, thus permitting him to form the letters more accurately. The test paragraph he wrote each week was rated for "quality" or appearance, and "speed" or the number of letters per minute. In order to free the results from the scoring scheme of the particular handwriting scale used, they have been expressed in terms of the per cent that each week's score in both speed and quality was of the average for eighth-grade pupils in general—since this level of performance is good enough to carry most people through the ordinary needs of life. The excellence (quality) of this boy's writing improved fairly steadily, with a period of little gain from the fifth to the seventh week and an apparent loss at the end of the training, due probably to the concentration of his attention on the imminent examination week with the resulting neglect of his handwriting practice. His speed score suffered considerably at first while he was trying to form the letters more carefully; but once he had mastered these fundamental skills his speed rose markedly, and then became stabilized at approximately 90 per cent of the average eighth-grade rapidity in writing.

The girl was tested once a week with 20 words chosen at random but in equal proportions from four different columns of the Ayres Spelling Scale—each column of which contains 30 to 50 words of equal difficulty. The weekly tests thus varied but were all equally difficult. Some words were used as many as three times, but not in successive tests. The words in these four columns were not specifically studied, unless the girl did it on her own initiative; the test papers were not returned to

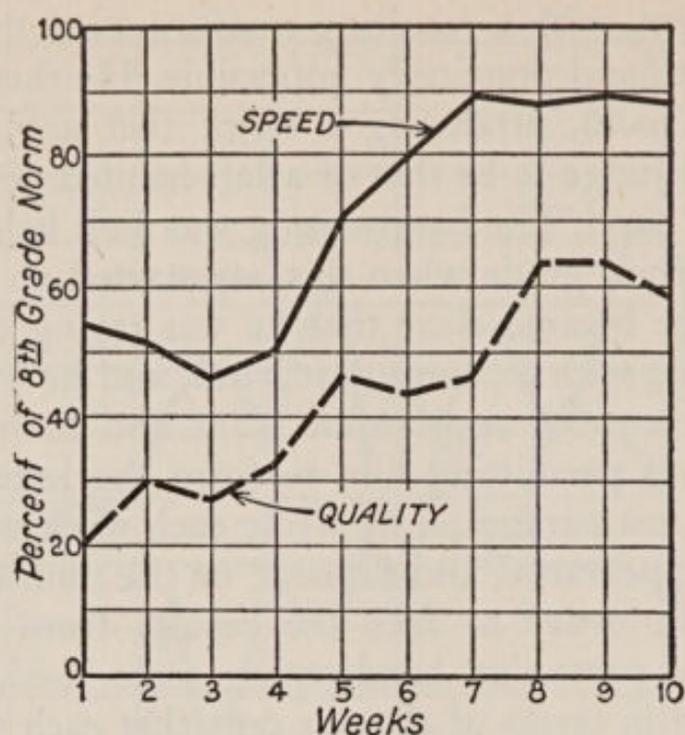


CHART 26.—Reeducation in handwriting of a handicapped student (Pressey).

her, although she knew her score. This girl, the same student mentioned in Chapter III, is completely deaf for certain sounds and has a blurring of sounds generally. During the long initial period of no progress, from the first to the fourteenth week, she was learning to read lips for the missing sounds and to drill herself on looking hard at words as a compensation for not hearing them clearly. Her efforts did not bring immediate improvement because there were so many elementary things to be learned before she was ready to make progress. Eventually, however, she mastered the lip reading, and then came a rapid gain, which continued, with one minor relapse, until she finally got 18 of the 20 test words correct. In spite of small variations, this girl remained on a plateau for fourteen long weeks. Then, as she put it, she “got the hang” of how to go about the mastery of her particular spelling difficulties.

Since the tests on which these curves are based were given at fairly frequent intervals, they show some fluctua-

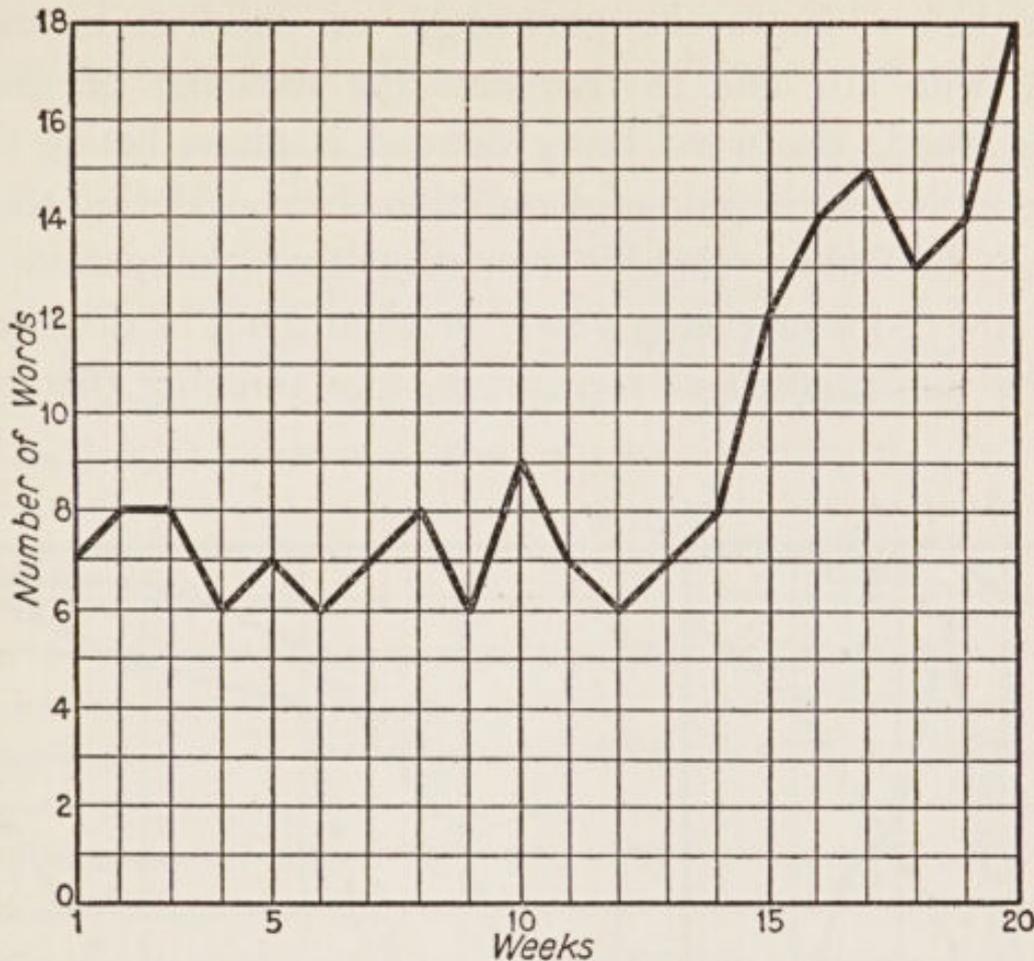


CHART 27.—Reeducation in spelling of a partially deaf girl—gain in number of words spelled correctly, on a weekly test, during a training period of 20 weeks (Pressey).

tion in the results from week to week—more than in the case of curves based on yearly testing, but much less than in those based on daily tests.

The Learning of Specific Items.—The learning of single concepts has been studied by recent investigations into the acquisition, by school children, of the technical vocabulary in mathematics and history. The growth in understanding of such words in mathematics as “fraction,” “denominator,” “square root,” and “coefficient,” and of “sedition,” “executive,” “premier,” and “cabinet,” for history has been traced from the fourth through the twelfth grades (14). Each

curve below shows the percentage of children in each grade who are able to recognize the meaning of some single word; the word being defined is given beside the curve indicating its rate of acquisition. In considering these curves the reader should remember that the period of time covered is nine long years; he should not be deceived, by the condensation of the curves, into thinking that the

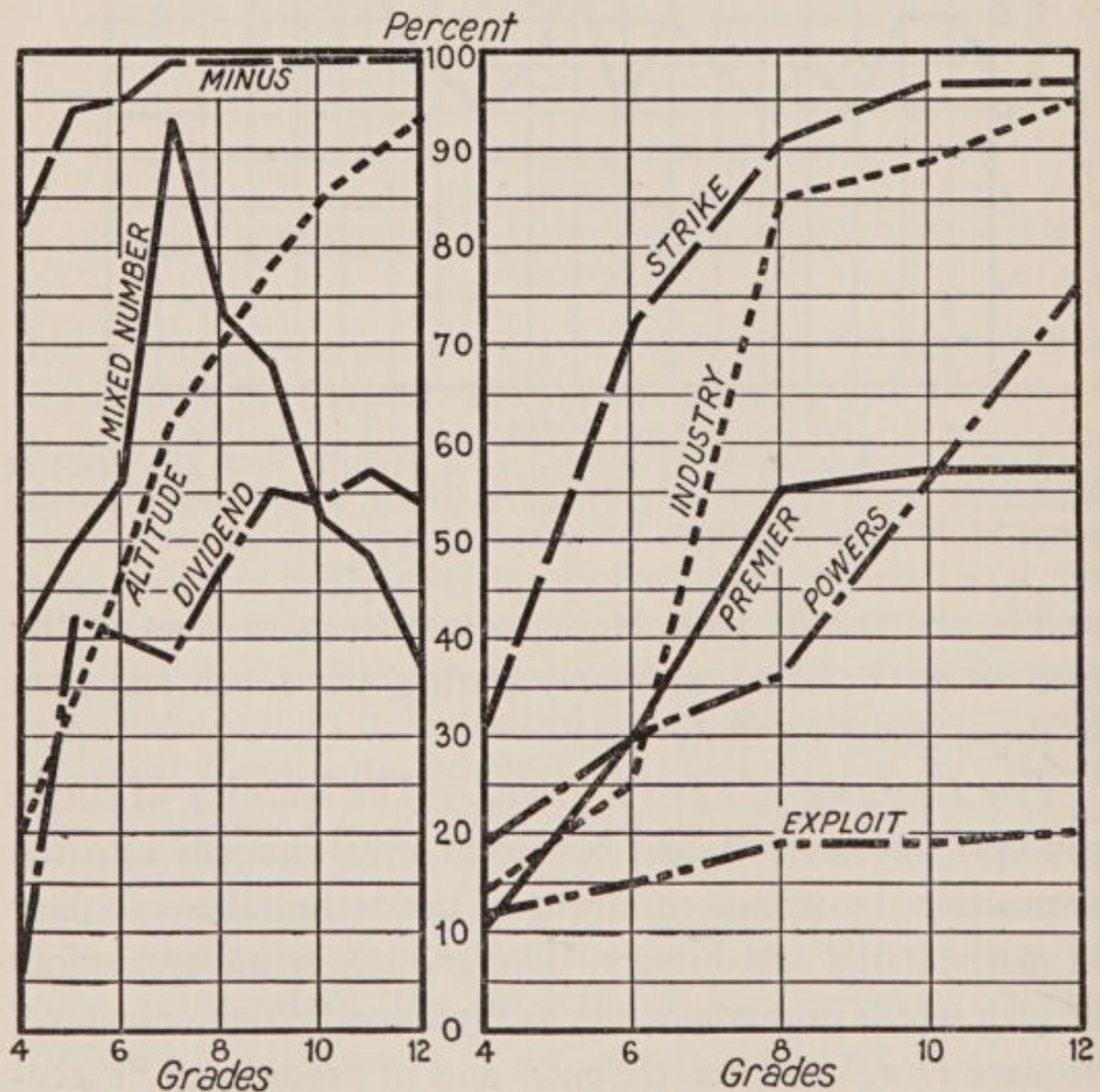


CHART 28.—The percentages of pupils in grades 4 through 12 recognizing the meaning of four concepts in mathematics (first chart) and five concepts in social science (second chart) (Pressey [14]).

learning was rapid. Obviously, learning may proceed at various rates, depending upon a number of circumstances.

The word "altitude" above shows a steady gain throughout the school years. "Premier" shows a long period of no progress—this plateau extends over five years. A surprising form of curve is revealed by the word "minus"; here is evidently only the top part of a curve, the lower end extending down into the grades below the fourth. (The reader should be warned of the fact that, from a given investigation one may obtain only a piece of a curve.) Probably the total shape of this curve is similar to that given later for "strike." Then there is the curve for "mixed number"—a curve that should be a lesson to anyone. Here is a concept that is drummed into the children's heads until most of them know it, but which is so utterly lacking in usefulness that the labors of the hard-working teachers have gone for naught, even before the duller pupils have left school. The word "powers" makes slow progress at first, probably because it is simply too difficult for children in the early grades. The next word, "strike," shows an early and rapid progress; knowledge of this word is reinforced by experience outside of school. Still another shape of curve is revealed by the learning of the word "industry," which shows a slight rise in the early grades, then a marked progress in the year in which it was specifically taught, followed by a slow gain in subsequent years. "Dividend" shows a rise in the grade in which it is taught and some improvement thereafter; it is not, however, a word used outside of class, and its gain is slow. There were some words that showed practically no learning—as exemplified by the results for "exploit." In all probability these words occurred so rarely that they were never really grasped.

The curves for the acquisition of single concepts show all sorts of shapes, and indicate that the learning of specific items depends upon such a complex of factors as to

be determinable only by research. In a later chapter it will be shown that the forgetting of specific items is quite as individual as the learning.

The reader will find it profitable to review his own school experiences in the light of the curves presented in this section. He will perhaps remember some course in which he had great trouble getting started, another which "started off with a bang." All too often, after such a good start, there doubtless was a time when little progress seemed to be made. Most students in foreign language courses seem to end at a pseudo-limit when they can translate but cannot really read French or German or Latin. And if a student has the patience, he will find it worth while to keep a daily record of his progress in some subject for a month (such as the time required to translate fifteen lines) and to make an actual curve showing his educational ups and downs in his work in this subject.

FACTORS INVOLVED IN CURVES OF LEARNING

From a survey of all the curves presented above, the following features might be selected as characterizing one or more of them: (a) Progress sometimes takes place with great rapidity from the start, and sometimes only slowly. (b) Periods of no progress, sometimes lasting for years, may appear in a learning curve at any point throughout its length. (c) Sudden spurts of learning may appear. (d) Almost inevitably learning is irregular, the detailed curves being characterized by many short-time fluctuations. Finally, (e) in some fields, limits of improvement are enforced upon the learner by the nature of the performance concerned.

Learning curves thus show a great variety of shapes—no generalized type curve seems possible. The shape of the curve for any given task and for any given child will

differ according to a variety of factors. A teacher should be informed about the more important of these factors so that she may be able to follow a pupil's progress and interpret any evidences of difficulty. Such records of progress can also be kept by the pupils themselves, so that they may see what they are accomplishing; they can also learn something as to how to interpret the major features of such curves. It is, therefore, desirable next to consider systematically the explanations of the various characteristics of learning curves as exemplified above.

The Initial Phase of Learning Curves.—Some curves start off with a brisk rise. Such a rise is sometimes due merely to enthusiasm and interest in something new, with resulting extra motivation and effort. More frequently it is due to a transfer of skills or ideas previously acquired. The boy who has played football, basketball, and baseball makes more rapid progress in learning tennis than the boy for whom tennis is the first game. The former has learned to hit a ball, to aim a ball at a particular spot, and to put his weight behind his stroke—and his muscles are strong. He has, therefore, already acquired many of the elementary skills that the untrained boy must learn before his progress in tennis is marked. Similar situations arise in school work. The child who has done well in grade school arithmetic makes a rapid start in algebra because he can transfer many well developed skills to this new subject; the pupil who has had much trouble with his arithmetic has little to transfer. We may, then, expect rapid progress from pupils who are well prepared to begin work on a subject, especially if the teacher assists by pointing out the

transferable skills instead of leaving the youngster to discover them for himself.

A slow initial rise can of course be explained partly by the converse of the above. The pupil is for some reason poorly prepared for the learning in question, or he may find himself without any method of attack on his problem and unable to get going. For example, he may not know what a division sign means in a problem like $176 \div 23$ and consequently be unable to make a beginning. If such difficulties occur often, he may become completely frustrated, and the plateau may stretch out almost indefinitely. One further explanation needs to be kept in mind, especially when dealing with children, for they may be simply too young for the learning required of them. The writer has seen more than one child in the first grade struggling with handwriting but making no progress; two years later, when his muscular and nervous systems are better developed, this same child would have shown a learning curve with a rapid initial rise. The curve shown above for the child who was not yet "ready" to talk is a case in point. When a child's learning does not begin the teacher should consider the possibility of the material being above the child's present maturity or ability.

Plateaux.—The periods of no progress are the crisis points in learning. When students drop any undertaking it is often because they are on a plateau; they do not have the patience to learn the keyboard for touch typewriting, fail to habituate themselves to phrase writing in shorthand, or do not get the idea of exponents in algebra, and finally give up in disgust. Causes of plateaux thus need to be particularly considered; and when a pupil seems to be

on a plateau—when he seems to have come to a standstill—the teacher obviously should analyze the situation and try to get things going again.

Plateaux may appear for any of a number of reasons, of which the following are the most important. They may be caused at any point by sheer discouragement or lack of interest. If this is the case, better coordination with the pupil's interests, or an added incentive, should end the matter. However, lack of interest is usually secondary to some other factor—a student may be at a standstill in algebra because he does not know how to handle exponents, feels that he is making no progress, and becomes discouraged or disinterested in consequence. Merely to give a "pep talk" will do the unhappy youngster little good; what he needs is to have exponents made clear to him. Therefore, a teacher should usually regard loss of interest as a symptom rather than a cause, and should seek the fundamental cause in some of the further possible factors now to be considered.

An obvious possible cause for a plateau is increased difficulty of subject matter. A student may start off rapidly in his acquisition of French, but presently find himself in trouble because assignments have been increased too rapidly, or because a new literary masterpiece, which has been begun, has a somewhat different vocabulary and sentence structure from what he has previously been reading. Many plateaux could be avoided if subject matter could be given in more even doses.

Plateaux may be caused by some bad habit which interferes with progress. A child may have developed in the early grades a habit of counting on his fingers instead of

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Still other plateaux are due to difficulties in getting habits organized in larger units. When a person learns to typewrite, for instance, there may be considerable periods of little apparent progress between the time that he can strike the correct key in response to each letter and the time that he can run off whole words automatically without consciously spelling them out. There seems to be going forward a process of consolidation of letter into word habits; meanwhile, there is little obvious improvement. Plateaux of this sort may occasionally be necessary, but they can usually be avoided by the simple expedient of beginning with the more complex habits in the first place.

Thus in the old days children began reading by learning the alphabet, painfully spelled out words for a while (they were then on a plateau), and only gradually learned to recognize words as wholes. Now they begin reading with words and even simple sentences, and the plateau is avoided; a word is recognized by its complete outline somewhat as a Chinese word picture is recognized as a unit. In typewriting the learner should practice simple words from the start. In beginning a foreign language a student should not first laboriously work out the meaning of a sentence by analyzing the grammatical structure, and later learn to read directly for meaning as he does in reading English; he should "read" the foreign language from the beginning, and fall back on grammatical analysis only as a last resort.

Plateaux due to difficulty in consolidating "higher order" habits should therefore (like all other plateaux) be considered preventable; the pupil should have been taught to begin with more complex units. When such plateaux are found, they may be regarded as evidence that the pupil did not thus begin. Or—a very common fault—just as the pupil

is getting under way with the more complex units, too many of them are put before him; thus he is given too many different words to practice on the typewriter, or too difficult matter in French or German. That is, the difficulty is of the second type mentioned above ("dosage"); the lessons are not well graded. More practice on fewer words in typewriting, or more reading of easy French or German, will take care of the trouble.

A teacher should, then, keep closely enough in touch with the learning progress of her pupils so that she will know when a plateau occurs. She should recognize a plateau as a time when her help is needed; and she should know enough about their possible causes to be able to diagnose the trouble and give the right kind of help.

Is little Margaret in the third grade on a plateau in her ability to add columns of figures because she has lost her interest, because she has developed a bad habit (such as skipping around in a column looking for combinations that will make 10), because the dosage of subject matter is too large for her ability, because she has missed some fundamental idea (such as how to carry), or because she is still so busy with the necessary simple additions that she cannot handle the more complex situation of several consecutive additions? The teacher can either say, "The Lord's will be done," and leave it up to time to remedy Margaret's troubles, or she can study both Margaret and the subject matter until she has found the source of the particular plateau and then proceed with such remedial measures as are indicated. Not only can a teacher find the cause of plateaux, but she can do much to prevent them. If she develops a situation in which the children are interested, if she starts children with good habits, if she suits the amount of new material to the children's abilities, if she makes sure that fundamental and (to her) obvious points are not overlooked,

and if she gives children understanding and encouragement, she can do much to prevent these discouraging periods.

Sudden Increases.—This situation appears so often in everyday life as to be sometimes overlooked. For instance, a man practices a golf swing, with what patience he may, for months; then suddenly the swing “clicks.” He has found the exact combination of grip, stance, back swing, and timing needed. The same thing happens in mental work. A pupil may struggle an hour with a problem such as, “The length of a field is twice its width. The perimeter is 42 rods. What are the dimensions?” Then, of a sudden, the correct equation comes to him; he “sees through” the problem. A second-grade child may plod wearily along, reading the pages of a book word for word; suddenly he gets engrossed in the story, his speed increases, and he is really “reading.” These spurts of improvement frequently come at the end of a plateau, during which elementary habits have been gradually acquired—and sometimes after the learner has completely given up hope.

Short-time Fluctuations.—This characteristic of learning is universal. The organism, the dose of material to be learned, and the total situation change from day to day. If the learner is sick, distracted, bored, or in any way different from his usual self, his learning efficiency will vary. He would have to live in an environmental vacuum if he were not to vary in his attitudes, moods, and health, and in the total of distractions or facilitations which influence him. Furthermore, the work on different days is not likely to be equally hard to learn.

Even if the learner is working at the same general task, such as learning to typewrite, he is faced by different minor

problems every day; on Monday he hits "q" for "a" and "r" for "t" continually; on Tuesday he hits the letters accurately but his spacing is wrong; on Wednesday all goes serenely; on Thursday he thinks he can now go faster, with the result that his errors mount with every moment of practice; on Friday he is too discouraged to try much, although he makes fewer errors than on the day before; then on Saturday the emotional flurry is over and his only trouble seems to be that he hits "m" for "n" and cannot remember where the "q" is.

Short-time fluctuations should always be expected. The reasons for many of them are so obvious and so simple that their explanation to children is feasible and would save many a period of discouragement; for children are likely to suppose that these ups and downs are due to their own stupidity, not realizing that they are the natural concomitants of all learning and consequently, nothing to worry about.

Limits of Improvement.—In most school subjects and for individuals of average ability, the problem of limits is not practically important because progress consists chiefly in the organizing or reorganizing of ideas. One does not reach a real limit in history or science because there are always more things to learn and more ways of organizing larger and larger masses of data or obtaining new insights into familiar material. To be sure, most people do reach a period of no further progress in any field, but the absence of this gain is due to inattention to the field, and not to a lack of things to be learned or the impossibility of a better understanding of them.

Two types of limit *are* of importance educationally, however. As has been brought out, a child may be too young ade-

quately to understand some material which the school puts before him, although a couple of years later he can grasp it without trouble. Thus, certain topics in arithmetic may be put too low in the grades; similarly, research has indicated that some grade school history is too difficult for the children in these grades. Dull pupils may find much of the regular school work too hard for them. But the limits reached in such subjects by the average pupil in the average school are pseudo-limits, which the better schools have demonstrated can be greatly exceeded by better methods and better coordination with pupil interests.

Wherever physical skill is involved in the performance of a learned act, there is a "physiological" limit imposed by the body mechanism involved. Typewriter keys cannot be struck any faster than fingers can move, or a race run any faster than legs can carry the runner. The world's records for men in various track events are close to being physiological limits. It is only a matter of time until a man with the maximal equipment in the way of leg development, lung power, heart action, muscle coordination, nervous control, and competitive disposition will be trained by the best possible methods and will run 100 yards in the shortest time humanly possible; when this point is reached the record will be unbreakable. The most rapid readers in the world may have reached a physiological limit; their eyes can cover a line no faster—at least under present reading methods. Even in such skills, however, the average person remains far below his limits. We could write or read more rapidly than we do, but our present skill satisfies us, and it may be good enough for ordinary emergencies. A few weeks of intensive practice would teach us to run much faster, but we so rarely need to run

that we do not trouble to improve. The limit is there, but the chance of our reaching it is about as small as the chance of our exceeding it. In most cases one must, for practical reasons, stop work in one line to have time for effort along another. Thus we learn to write well enough for the practical needs of life, and then we turn our energies to something else rather than go on to acquire further skill in writing. The teacher should keep the total economy of life in mind when she considers objectives and limits.

THE LEARNING CURVES OF THE FUTURE

The curves presented in the first section of this chapter give evidence as to how learning is at present going forward in the schools. The question now is as to whether it may not be possible to cause learning to progress more rapidly—make the curves rise more sharply, with fewer discouraging plateaux and with higher levels of ultimate performance. This has already been touched upon, but evidence on the matter must be briefly reviewed.

Suggestions from the Study of Present Learning Curves.—It should first be noted that the learning curves presented in this chapter suggest many possibilities for the greater facilitation of learning. For example, the curve showing the growth in the small child's vocabulary indicated almost no learning for the first few months of the investigation; and it was pointed out that schools often seemed to make the mistake of presenting subject matter to certain children before they were intellectually mature enough to learn it. If subject matter were better graded so that children were not asked to undertake a particular kind of work before they were capable of doing so, much waste

effort on the part of both teacher and child would presumably be avoided. The slightly deaf girl had been on a plateau for years, but it was quickly ended as soon as she was given certain special methods for studying words. An early diagnosis of her trouble, followed by suggestions as to method, would probably have largely avoided this long discouraging time of repeated failure and lifted her comparatively early in her educational career to a level of satisfactory accomplishment. The curves of the progress of the two boys in arithmetic were so different as to indicate clearly the need for recognition of individual differences in learning; and the graph for progress in Spanish vocabulary, with its indications of the extraordinary range of knowledge in every class, showed how insistent these problems of individual differences are. The great daily variations in the curve for learning Russian should suggest the better grading of subject matter from lesson to lesson. The increase in punctuation errors in the last years of high school and in college raises the disagreeable question as to whether circumstances may occasionally arise in the school which actually put education into reverse, so to speak—which not merely interfere with educational progress but actually destroy previous educational gain. Undoubtedly there is evidence, in the curves describing learning as it now progresses in the schools, to suggest that it might go forward much more effectively.

Evidence from General Observations.—General observation of the work of the school gives multiple support to such a conclusion. The figures showing school failure are striking in this connection. Many children fail to pass the first grade of the average school, and a large group in

high school usually fail first-year algebra. Of a thousand students who enter the first grade, it is estimated that only 768 reach the eighth grade; only 43 per cent of those who enter high school graduate, and only 37 per cent of those who enter college ever obtain a degree (25). Some of this educational mortality is, of course, due to poor intelligence; furthermore, various extra-educational factors, such as lack of money, cause some high school and college students to drop out before completing the course. Nevertheless, a large proportion of this mortality must be attributed to educational inefficiency.

Striking also is the contrast between the usual learning in school and the progress which a youngster may make on a hobby in which he is very much interested. A boy may take a year dawdling through a course in general science, but in a short time master intricacies of radio sets or airplanes which are much more difficult than any material the science course puts before him. For a debate he will read in two weeks twice as much on a current governmental problem as he covers in a year of American history. A girl may spend a month on *Ivanhoe* in school, and in the meantime gallop through three other Waverley novels with much more enjoyment and understanding.

The boredom and dissatisfaction common among high school and college students are also significant. Such attitudes are partly due to the out-of-date and irrelevant curricula of the average high school and college, which require alert and modern-minded young people to take Latin or ancient history or Shakespeare when they should be studying economics or current events or modern American literature. But the dissatisfaction is also due in no small measure

to perfunctory teaching, to textbooks which hinder rather than further learning, and to the feeling that much of the time spent in school is little more than educational busy work. Not to be dismissed lightly are the chronic student complaints in both high school and college, and the student "protest literature" (the critical, abusive, or satirical material chronic in student papers and magazines).⁴

Finally, the astounding ignorance of graduates of our high schools and colleges constitutes a sweeping indictment of the ineffectiveness of much of modern education. An astounding proportion of such "educated" individuals cannot read with effective understanding, have no appreciation of modern literature, and approach modern economic and social problems with gross prejudice instead of informed comprehension. Surely effective teaching would not permit such conditions.

The Evidence of Experimentation Regarding Possible Improvement in Learning.—The above statements have been general. The crucial question is this: What experimental evidence is there that, when the available knowledge regarding the learning process is applied, learning will go forward more effectively than under the usual school procedure? The following two graphs are of interest in this connection. The first shows progress in handwriting (a) under a conventional method of instruction, and (b) under an individualized, self-instructional procedure permitting

⁴The typical recent novel of college life, such as Percy Marks' *Which Way Parnassus* and Miss Lapsley's *The Parable of the Virgins*, is a significant phenomenon in this connection and is to be contrasted with the mild good-natured humor of the college stories of a generation ago, such as *When Patty Went to College* or the tales of "Good Old Siwash." And the unhappily defunct *New Student* contained much of educational significance in spite of the animosities evident behind much of the material.

each student to progress at his own rate, to measure his progress, and to obtain aid in the diagnosis of his difficulties (6). The superiority of the more modern method is obvious.

Even more striking is the second graph (13), which shows the increase in speed of reading in terms of the

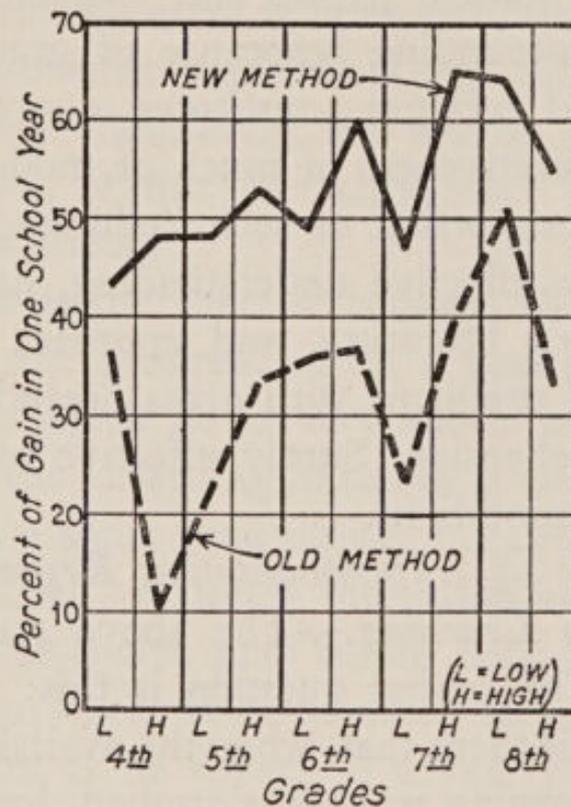


CHART 29.—Showing the gains made by classes of children (a) under conventional types of teaching in handwriting, and (b) with the use of the Courtis practice exercises (Courtis [6] by courtesy of the World Book Company).

number of words read per minute over a total of 28 days. The method used was simple. There was great emphasis on rapid reading, and records were kept and curves made so that students could see their gain and be stimulated thereby. There was also stress on the elimination of "whispering to oneself" so that lip and tongue movement and inner pronunciation would not slow down true silent read-

ing. The graph shows sample results from a total of 19 pupils in grade six. Evidently the limits reached by the average pupil in the average school, as regards speed of reading, are pseudo-limits; and with proper training they can be easily exceeded.

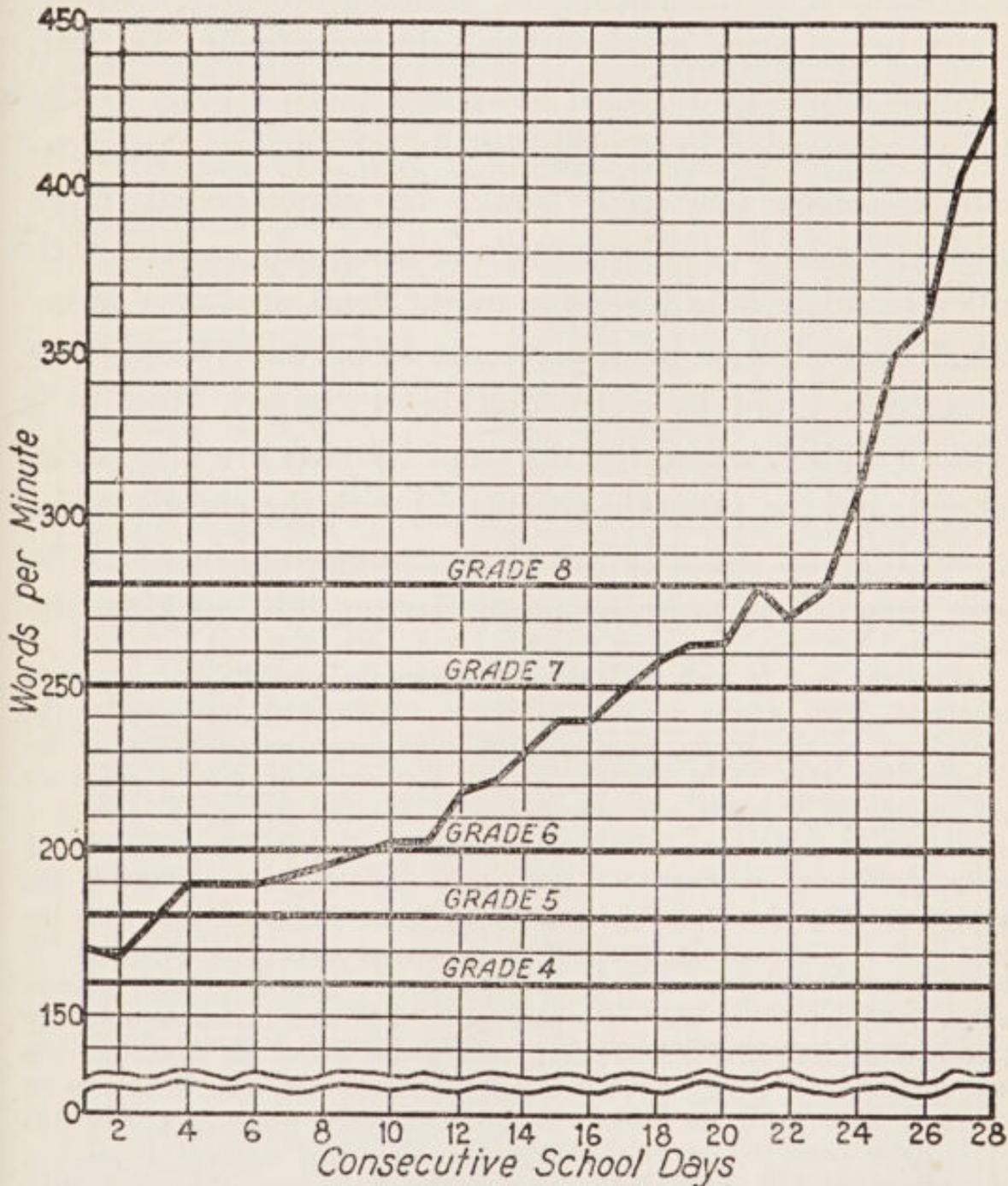


CHART 30.—Improvement in silent reading during 28 days of training. Cross lines show norms for grades 4-8 (O'Brien [13]).

The above two curves show progress in skills, and thus involve physiological limits—as of coordination of hand movements in writing, and quickness of eye movement in reading—which might beyond a certain area retard gain.⁵ It seems reasonable to assume that in subjects not involving such factors, as in history or science, modern methods might bring even more striking improvement. In fact, learning might go forward more and more rapidly as the student proceeded in the subject. As information was accumulated, each new fact would be apprehended more quickly, for he would have more facts already in hand with which to relate it; knowledge might “roll up like a snowball.” As each new principle came to be understood, new knowledge could be more quickly organized. And in a modern school, where the different subjects are also inter-related, and the program articulated with the child’s extra-school life and the activities of the community in which he lives, marvelous progress might be possible, making the

⁵ However, even in such skills there is always the possibility of improved techniques. Two studies of illegibilities in handwriting made under the supervision of the writer suggested not only improved methods of instruction but also slight changes in the formation of certain numerals and letters which might not only improve legibility but make writing a bit easier. And the above findings in reading suggest the possibility of better methods of reading than those now commonly in use. After all, in reading, why should it be necessary to “pace off” each line with the eyes, as is now commonly assumed? It is not necessary thus systematically to look over a picture in order to apprehend it; a few quick glances suffice. Why cannot the sense of a paragraph of printed matter be similarly apprehended? Very rapid readers apparently do “skim” in somewhat this fashion. And why should not gradual improvements in such techniques be expected? Such gains are evident in sports. Modern tennis is a very different game from the tennis of thirty years ago; new methods of serving, of stroking the ball, and of handling returns have been discovered. Why not improved techniques in reading? Why not improved methods of work? Why not even improved techniques in thinking?

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CHAPTER X

THE NATURE AND CONTROL OF THE LEARNING PROCESS

TO DATE, learning has been considered merely as an objective phenomenon. Findings regarding the progress of learning have been presented, and factors influencing progress have been indicated. But the nature of the learning process has not yet been specifically and systematically considered. This chapter attempts a systematic analysis of these exceedingly important and subtle phenomena, and attempts on the basis of this analysis to offer suggestions for the furthering of learning.

The relation of learning to the processes of development described in Part One of this volume must first be understood. It must be emphasized that learning is not something apart from development; it would be more true to say that learning *is* the process of the development of behavior. More specifically learning is, so to speak, the frontier of development or, to change the figure, the skirmish line of developmental advance. It follows that learning must be considered with reference to the total development to date, and seen in the perspective of the total developmental situation. The distinctive feature of the treatment of the subject given in this chapter might well be said to be the emphasis upon this fact.

A "FIELD STUDY" OF LEARNING

In beginning the consideration of a difficult matter, it is often helpful to start by the case method, so to speak—by

an actual example having all the concreteness and color of reality. What is first needed is some understanding of how learning goes on naturally; there should be a "field study" of learning, for in the average school the learning process is often so devitalized and special in character and without many of its natural features, that there is difficulty in recognizing the total process for what it is. Learning will therefore be first considered by observing children not working but at play, not in school but at home, not taught but learning among themselves how to solve a problem.¹

A father recently brought home to his ten-year-old daughter a picture puzzle. Two friends of the girl were with her when the father came in and gave her the mysterious package. There was much curiosity as to what it might contain. The daughter was proud that her father had brought her a gift and that she had something to show her friends; the friends were eager to see what this new thing might be.

It was discovered that the box was labeled "The Puzzle Shop," and below there was the title of this particular puzzle, "A Scene in Venice." One little girl had never seen such a puzzle before. And when the box was opened, displaying the many queer-shaped little blocks with colored paper pasted on one side, she picked up two of the pieces, put one of them on the table face down, and regarded them with a bewildered expression, quite evidently not knowing what to do.

The daughter had dealt with puzzles before, however. She dumped out the blocks on the table, quickly turned them all face up, then scanned them over with an experienced eye. "Oh," she said suddenly, "I see part of a window to a house. Let's see if we can find the rest of the window." When several

¹ The reader is urged to make field studies of his own, noting, for instance, how children work at hobbies. The efficiency of this learning as compared with work in school, and the perfunctory character of much of the school work, will usually be strikingly evident.

pieces centering around this window had been put together, there was a pause. Finally, one of the other girls spoke up. "I've seen pictures of Venice with gondolas," she said, "and this part looks like the top of one. And here is another part." As a result, another aggregate of pieces was put together. With joyous squeals one girl or another contributed a part. It was next discovered that one of the sections already assembled included part of the straight side of the picture; it was then possible to look for other blocks with one side straight.

Soon the picture was completed, and with a gusty sigh of satisfaction the three sat back. "Let's see how quickly we can put it together again," one of them remarked. The picture was forthwith pulled apart, and reassembled. The reassembling was not done in quite the same way as before. It began in a different place, and proceeded in somewhat different fashion. The girls worked more rapidly, and there was an air of assurance which was different from the procedure of the initial trial. "Now," one of the girls remarked, "I know what to look for."

The above household episode is commonplace. But every bit of it has an important significance for teaching—a significance in many cases neglected; in consequence, certain features of this humble little story must be examined in more detail.

The Learners in Relation to the Learning Problem.—First the obvious fact must be pointed out that the children would not have attacked this problem vigorously and effectively if it had not been, in various respects, suitable to them. A trio of four-year-olds would have found the puzzle neither interesting nor possible of solution. A sick child would not have had the vitality to see it through. A miserably unhappy youngster would have been too distracted to keep his attention upon it. If instead of a puzzle the father

had brought home a toy pistol and target, these conventional little girls might have scorned the gift as inappropriate; but solving jig-saw puzzles was a proper thing for girls to do, and "A Scene in Venice" had a certain romantic appeal, even to these ten-year-olds.

The Learning Situation.—Furthermore, the total situation was favorable for this undertaking. The day was rainy and the girls could not play outdoors; if there had been a picnic or some other more active diversion, the puzzle might possibly have been put aside. The daughter had had experience with such puzzles before, and knew that one could find interesting pictures if one put them together. The activity was backed by a favorable total social situation. One little girl had not seen such a puzzle; in consequence the daughter had the pleasure of showing her playmate something new, *and* demonstrating her own skill in puzzle solving. With her other friend who had worked puzzles, there was the companionable pleasure of joint activity in the solution. It was a social situation having in it somewhat diverse and entirely agreeable elements. In an earlier discussion the desirability of such complex motivation for effective learning was emphasized.

The interest aroused by the gift continued and even grew as work upon the problem went forward. The children knew clearly that progress was being made. Every little while there was the thrill of a minor success. It must be emphasized that learning feeds upon success. If the problem had been so difficult that the little girls made no headway, they probably would have soon dropped the work.

The Search for Solutions.—It is next important to observe how progress was made. The methods of attack were very important. The sophisticated little owner of the gift began with the essential first step of turning all the blocks picture side up—something which the girl who had never before seen such a puzzle did not think to do. And once the blocks were thus turned, the first effort made by the girl who “knew how” was to find some identifiable piece around which other pieces related to it could be grouped. Another procedure was to locate an edge of the picture and build along that. Relevant information was important; one girl was able to help because she had seen pictures of Venice and knew what a gondola looked like.

Furthermore, there was cooperation in the work. One little girl found a window, another the gondola; from time to time each one of the three discovered a combination that the others had not seen. It must be emphasized that they did not progress by making mistakes. Progress was not a matter merely of avoiding errors; but a positive matter of discovering successful combinations. Neither was progress aided by emphasizing failure or by criticism. In fact, quite the opposite happened at one point in the proceedings, for the little girl who was a stranger to puzzles made several very foolish suggestions. “Why don’t you think before you move?” the other visitor said sharply. The reprovéd child subsided noticeably, making only half-hearted and purely tentative efforts thereafter. Moreover, progress was made, fundamentally, by trying things. Occasionally the little workers stepped back for a moment and regarded their efforts in silence; but for the most part, they proceeded bus-

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child is usually either too worn out or too feverishly restless to be an effective learner; nevertheless, there are many ailing children in school. The first step which a teacher should take toward improving the work of her pupils might well be a health survey. A miserably unhappy child cannot do school work effectively; therefore the second step might be a quiet and unobtrusive "mental hygiene" survey of the class. A child who does not have the intelligence necessary for the grade or subject cannot learn it; a third step toward adjusting pupils to their tasks might be a survey of their intelligence. A pupil can hardly attack a subject effectively if he is grossly unprepared for the work; and consequently a fourth step might be a survey of the student's essential preparation for the work in hand. In short, it is a prerequisite for effective learning that the learner be not ill or emotionally upset and that in ability and preparation he be capable of the task before him.

One special issue may well be mentioned here. The pupil should not, so to speak, be overprepared—already know what is to be taught, for there are few things more wearisome than to be taught what one already knows. Yet time and again a child who has learned to read at home is put through the grind of first-grade reading; a boy "quick at figures" must write out interminable arithmetic problems which he can do in his head; a young man who has had excellent grounding in American history from high school courses and reading for high school debates, must nevertheless take American history as a college freshman. Thousands of intellectually superior youngsters have been bored to mediocrity, classroom misdemeanors, truancy, or the abandonment of any further educational career by such stupid programming. The present reaction against the rapid advancement of bright children fre-

quently results in just this sort of thing; and schemes of "enrichment" which are little more than educational "busy work" only make the situation worse—these bright youngsters soon see through such schemes. The reader will find it worth while to review situations of these types which he may have observed or experienced.

It is further necessary that the work be so congruent with the pupil's experience to date, the life of his community, and his felt needs and future plans, that it has an appeal to him. In the chapter on interests it was pointed out that there is a gradual development in the nature of children's interests from the active and the dramatic to the more social, complex, and intellectual; and that there are differences in the interests of girls and boys. It was also emphasized that the interests of children are influenced by the adult activities with which they come in contact. In the secondary school many students become acutely conscious of their vocational problems. Throughout the school years pupils are much influenced by the attitudes and conventions toward their work of the groups with which they associate.

All these factors have important bearings on the effectiveness of a pupil's learning. The school tasks, and the manner of approach to them, should be considered with reference to the stage of development which the child has reached. The elementary school has realized this; but the conventional high school and college freshman programs—with their mathematics, composition, beginning language, and the emphasis upon drill—are grossly out of relation to the interests and modes of thinking of the alert, modern-minded, intellectually impatient adolescent groups in-

volved.² Sex differences are rarely recognized as much as they should be; girls are given problems in arithmetic and high school curricula involving algebra, geometry, science, which are derived from masculine needs in business or preparation for the professions. School programs now make more contacts with community life than they once did, but these contacts are still usually episodic and incidental rather than integral. Conservative school men deprecate rather than utilize vocational interests. Attitudes of the student group operate in various ways—there may be the convention that “C” is the “gentleman’s grade,” or the attitude, in a group of grade school boys, that to join in the singing lesson is sissified. The reader should review and make notes upon his own school experiences with reference to these points. The aggregate of such malcoordination between the learner and his task will probably be considerable.

The curriculum is certainly an exceedingly important determinant of the effectiveness of learning; yet from the point of view of the psychology of learning, it has received relatively little research attention. Very interesting research might be done. One segment of subject matter might be chosen which was excellently adapted to the class in question in the various ways above mentioned, and the material taught so as to bring out all the relations to pupil interests and community life. Another section of subject matter might be selected which was initially equally little known, but was relatively isolated from

² Apropos here is a bit of verse of the “Cheerful Cherub” syndicated newspaper series, which the writer has often quoted as descriptive of a distressingly great part of conventional education:

I long to know a lot of things,
With curiosity I’m cursed;
But teacher tells me that I must
Complete my education first.

the pupils' interests and community experience. The first task would undoubtedly be learned both more easily and more adequately, and the teacher's work would be much easier. For one thing, the pupils' extra-school experiences and the whole community would be helping her. As will be mentioned in the next chapter, extra-school review is probably a very important (perhaps *the* most important) factor in the permanency of learning.

THE LEARNING SITUATION

When one analyzes the learning situation described in the first section of this chapter, four characteristics appear outstanding. The children were in a social environment and worked cooperatively, they were active, they were successful, and they knew what the goal was and where they stood in relation to it. Work in a conventional school often lacks all these characteristics. All four should be present for effective learning, and each therefore needs further consideration.

The Importance of the Socialization of School Work.—In the best modern schools, the work is a cooperative, social affair. The children work together, discuss together the task upon which they are engaged, help one another, and find a common satisfaction in achievement. Under such circumstances, they learn much more than the subject matter involved: they learn how to work together and to find themselves socially, and they enjoy the work as they would not otherwise do. Furthermore, if the work is properly organized and guided by the teacher, they also make more progress in the subject.

The following experiment is of interest here (14). In a certain school (the "experimental" school) the work was

socialized.³ In two other (control) schools the same work was taught in a conventional way. The experiment extended over four years, at the beginning and end of which tests were given in the important school subjects, and various other data gathered. The table shows that the chil-

TABLE 8: SUPERIORITY IN ACHIEVEMENT OF A CERTAIN EXPERIMENTAL SCHOOL OVER:

Grades	(a) The Control or Non-socialized Schools	(b) The National Norms
First.....	72%	28%
Second.....	36%	12%
Third.....	18%	11%
Fourth.....	60%	21%
Fifth.....	40%	7%
Sixth.....	29%	9%
Seventh.....	20%	99%
Eighth.....	30%	2%
Average.....	38%	11%

dren in the experimental school made an average gain on all tests of 38 per cent over the control schools and 11 per cent over the norms. Achievement in the formal school subjects was evidently not sacrificed. And certain other important gains were made. The pupils' daily attendance increased 93 per cent, as compared with 6 per cent in the control schools. In the experimental school 86 per cent went on to high school, as compared with 8 per cent in the

³The socialization reached beyond the school itself to the homes of the pupils and the community, as a result of undertakings which took the class to visit the local farms and industries, and brought the community to visit the school. The work was thus not only socialized in a very broad sense; it was also organized in projects, and sweeping changes were made in the entire program and procedure of the school. Presumably all these factors contributed to the superiority of the experimental school. This investigation, like several other practical experiments reported in this chapter, tried several innovations at once—a procedure not clean-cut scientifically but abundantly justified practically.

control schools. The number of parents visiting the experimental school increased 90 per cent as compared with 5 per cent for the control school. The experimental school gained 43 per cent in the number of children reading magazines, 66 per cent in the number saving \$10 or more, and 100 per cent in the number participating in certain community activities; it cut down illness 10 per cent.

The reader will find it worth while in this connection to contrast what he remembers from some conventional class with his recollection of some high school club to which he belonged. The writer still has a vivid recollection of a high school "Literary Society" to which he belonged. Most vivid is the memory of a banquet at the old "Kaiserhof," and sundry informal meetings when teachers and students mingled without the restraints of the classroom—experiences exceedingly worth while, though outside the strictly academic. But he remembers much more of certain topics debated and discussed in this group than of similar topics covered in a history course taken that same year.⁴

The Need for Activity in Effective Training.—In real life, learning is an actual trial of various ways of doing a thing—it is a dynamic process. And it is by such trial that the learner finds the significance of what he is learning, proves its worth, and makes it his own. If he merely reads about or listens to the expounding of a matter, it remains

⁴This should be added, however: much effective learning is not social. The writer also well remembers long afternoons in his father's library, poring over the Encyclopedia Britannica's article on bridges, and the resulting suspension bridge made of grocer's twine—strong enough to support the youthful engineer and a friend, with a pail of lemonade between them. Children, as well as adults, need and want time to be alone, and to do and think without distraction; the capacity of many children for self-education might well be called a great undeveloped educational resource, needing much more consideration and investigation than it has yet received.

something apart from his experience. Any form of activity toward the work in hand, any projecting of the pupil's efforts into that work, will result in a higher degree of learning than is achieved by the youngster who merely sits quietly, passively "drinking in" what the teacher or the textbook says.

The principle works out in any number of ways. The child who goes to market for his mother learns to make change faster than one who only does arithmetic problems in school. The boy who assembles a radio set learns more about electricity than if he simply reads what the physics text says on the subject. The girl who goes to the library and hunts up the material she needs on a topic writes a better paper than the girl who merely reproduces what was told her in class. The child who writes thoughtfully, three or four times, the word he has misspelled is much more likely to learn it than his neighbor who listens to other children spelling in chorus. The extrovert in the front row who talks continually learns more French than the shy boy in the back seat who recites only rarely. The geometry student who successfully demonstrates a proposition at the board learns something, but the listeners may be little better off at the end than at the beginning.

Of interest in this connection is an experiment in the teaching of elementary psychology (45). A large class (71 students) spent three days each week in informal laboratory work. A great variety of simple projects were provided, all calling for experimentation, observation, or application. There were simple experiments in color mixing, the location of touch spots, memorizing, the observation of the family cat, or in the trial of some special method of study. Some of these projects could be done by one person, but most of them involved two or more. These groups

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the number of times the series was exposed. The next part of the experiment consisted in asking for a recall after the first two exposures of a given series and again at the end. The number of exposures was therefore the same, but an extra recall was added. This simple feature resulted in an average of 14 per cent more words being learned.

If teachers would train students to close their books at the end of every few pages and recite to themselves what they have just read, learning would be more rapid. Moreover, as will be shown in the next chapter, retention would be better. A teacher should always try to find things that pupils can *do* in connection with their learning, even if what they do is relatively academic and formal in nature.

The Importance of Successes.—The chapter on interests and incentives, and the first section of this chapter, emphasized that success experiences are exceedingly important for the maintenance of interest and the furthering of effective work upon a problem. The chapter on emotional strain was one long development of the theme that continued failure was the major hazard to mental efficiency and to mental health. It must be reiterated that learning feeds upon successes. Later on in this chapter the obvious but neglected fact will be pointed out that learning simply cannot go forward without successes. A major function of the guidance program of a school should be to see that pupils do not attempt work in which they cannot succeed; and the major function of a teacher is to bring it about that her pupils are successful. The topic need not be further developed here, but it can hardly be too strongly emphasized.

The Importance of the Knowledge of the Goal and of Progress.—The aimlessness of many college students is a matter of lasting wonderment to the writer. Many of them

have no vocational or educational aim—they are sent to college or they go because it seems to be the thing to do. If a course is required they take it without thought as to why—as to the function it is supposed to serve. Their reasons for taking an elective may be nothing more than the convenience of the hour or the desire to be with a friend. High school students are quite as aimless. In the conventional classroom the work does not seem to have a destination—it simply goes on. Such purposelessness is bound to make the work inane, flat, and perfunctory.

The reader will do well to examine his or her educational history in this connection, and review some recent choices of courses. A review of his thinking in connection with his choices may not be very flattering to himself. But the blame might well be passed on to the catalog or the faculty; after all, it is true that neither of them usually offers any real guidance in program building.

The value of a larger aim or purpose was touched on in the chapter on interests and incentives—Yale men appear to do better in courses they recognize as related to their vocational aim. Both in that chapter and at the end of the previous chapter it was shown that gains were greater with some knowledge of progress. It remains here to emphasize that if the subject matter is so organized that there are definite and recognized things to be done or portions of work to be accomplished, greater gains will be made.

In a certain school system the work in English composition was organized by the simple expedient of giving the pupils the odd-numbered chapters of a story, each of which ended with the characters in some kind of a problem situation. The entire work in English for the year was the writing of the in-

tervening chapters, each one being the child's solution of the situation with which the previous chapter ended. Each pupil thus had to think up a solution, plan the writing of it, compose it, criticize both his own and other pupils' chapters, correct his own, rewrite it, copy it—and finally bind together the entire book of printed and written chapters. Certain practical results of this method of procedure were investigated by the use of a series of English tests given the seventh-grade children, who had had three consecutive years of training in writing "books." In capitalizing, they averaged above college freshmen; in grammar, above the tenth grade; in sentence structure, above the ninth; and in punctuation, above the eleventh. Their speed of reading was above the twelfth grade, and their comprehension above the ninth. Their intelligence scores, however, showed them slightly above the eighth-grade norms.

As was mentioned in both the chapter on incentives and the chapter just preceding, graphic methods for presenting progress (and also for indicating the goal, where this is possible) are of demonstrable value. The two charts below are of interest in this connection. They show two simple and vivid schemes for showing the goal and the progress in handwriting.

For effective learning, then, there must be a total situation favorable for learning. It must be such as to encourage a social and active attack upon the work in hand. It must provide for the achievement of recognized successes. It must be so organized that the learner is constantly guided and stimulated by recognized progress toward the goal. But with typical perverseness, the conventional school ignores all these prerequisites for effective learning. It regards a cooperative, social, active attack upon a problem as unethical. It appears to prefer the plodder who is willing to drudge stupidly at a daily stint in spite of failure, and to be impatient of the alert youngster who is eager for success;

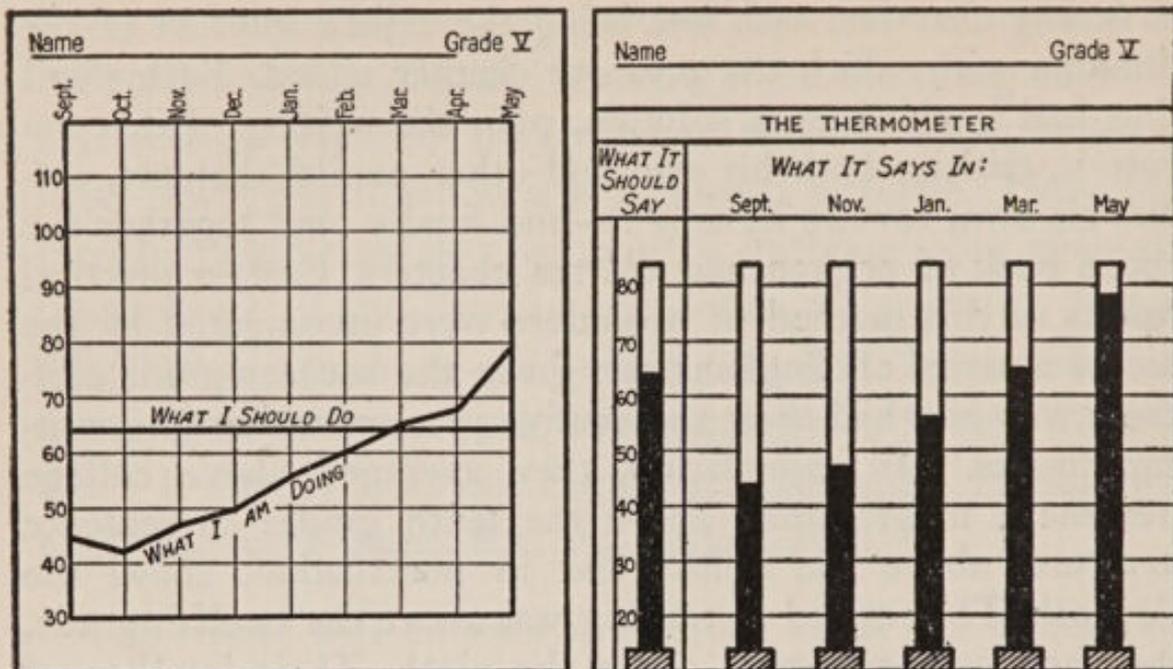


CHART 32.—Two types of chart for recording progress in handwriting (Paulu, *Diagnostic Testing and Remedial Teaching*. Reprinted by special permission of D. C. Heath and Company.).

interested in his progress, and looking forward to specific accomplishments. If a teacher will only provide school-room situations which are favorable for learning, half her problems will take care of themselves.

HELPING PUPILS IN THEIR SEARCH FOR CORRECT PROGRESS

The little girls mentioned in the first section of this chapter were greatly helped in putting their puzzle together by certain methods of attack: for instance, they found an edge to the puzzle and built along that, and they found some recognizable part of the picture and assembled pieces around it. Similarly, in all school work certain methods are of great help. To teach pupils effective methods for attacking a problem is in many respects the most important part of a teacher's work. Certain of these methods, which are of great general usefulness both in school and out, are

so important that they are reserved for later treatment in the chapter on problems of general training. Here certain methods by which the teacher may attack *her* problem—helping her pupils most effectively—will be dealt with.

The Importance of the Recognition of Individual Differences.—The writer recently gave to a class in educational psychology an examination consisting of seven general or “essay-type” questions. The answers to each question were graded on a scale of ten. The class showed variations from 0 to 10 on each question, and the total scores varied from 21 to 58. The percentages of acceptable answers (8 or above) on each question were 72, 59, 81, 42, 68, 75, 84. There was no topic adequately understood by everyone, and none on which no one did well. Any further teaching which assumed adequate knowledge of the material covered would not have been appropriate to 28 per cent of the class; while a complete review, on the assumption that many in the class knew nothing of this topic, would presumably have been a gross waste of time for almost all the students, since only one made a score of 0 and only four others scored less than 5. Such a situation is so universal that it is taken for granted, but it exemplifies one of the most difficult and baffling of all educational problems. Ways must be found to adjust somehow to individual differences, and still keep the advantages and the economies of class instruction.

The problem is set forth still more clearly in the table below, showing the results with objective tests for a large class in educational psychology, taught in several sections. The pre-test was an extensive objective examination, covering the entire course, and given at the beginning of the

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TABLE 9: DISTRIBUTIONS OF THE PRE- AND END-TEST SCORES FOR THE EXPERIMENTAL AND CONTROL SECTIONS ON THE ENTIRE TEST. WINTER QUARTER

Score	<i>Pre-Test</i>		<i>End-Test</i>	
	Exp. f	Con. f	Exp. f	Con. f
280-289.....			2	
270-279.....			2	2
260-269.....			5	5
250-259.....			6	6 ← (90 percentile)
240-249.....			8	10
230-239.....			16	13
220-229.....			13	10 ← (Med.)
210-219.....		1	11	7
200-209.....			7	9
190-199.....	1		5	8
180-189.....	1			6
170-179.....	2	2	1	4 ← (10 percentile)
160-169.....	3	2		3
150-159.....	3 ← (90 percentile)	10 ← (90 percentile)		1
140-149.....	2	4		2
130-139.....	6	10		1
120-129.....	17 ← (Med.)	15 ← (Med.)		1
110-119.....	11	9		
100-109.....	9	8		
90- 99.....	3	8		
80- 89.....	7	9		
70- 79.....	6 ← (10 percentile)	4 ← (10 percentile)		
60- 69.....	3	4		
50- 59.....				
40- 49.....	1			
30- 39.....	1	2		
Total.....	76	88	76	88

	<i>Pre-Test</i>		<i>End-Test</i>	
	Exp.	Con.	Exp.	Con.
90 percentile..	158.	156.2	262.8	257.
Median.....	117.3	120.	230.6	222.
10 percentile..	74.3	77.	202.3	172.

an opportunity for him to obtain help on the review from the instructor. The last distribution, the end-test results for the experimental sections, shows the effect of the scheme. Most noticeable is the lifting of the lower end of the distribution—the poor students were very evidently helped. However, the entire distribution of the scores of the experimental sections is higher, and there are more very high scores. This is presumably due to the fact that all the students were kept informed of their progress, and the good students had the incentive of earning a Monday holiday. The good students in the experimental section, with fewer days in class, thus did better work than the good students in the control sections.

Practically without exception, experiments have shown individualization of instruction to result in better work. For instance, an elementary school arithmetic class of 21 pupils whose work was completely individualized increased the mastery of the skills thus covered nearly 50 per cent over that of 21 other children of the same age, grade, intelligence, and initial knowledge of arithmetic who spent the same amount of time on the subject but were taught by purely group methods.

An intensive investigation of three children in the same elementary school class who could not learn to read shows strikingly how individual educational problems are. All three seemed unable to learn to read. It might be assumed that their difficulties were similar, and that they needed the same sort of help. Conceivably they might be simply put back in the beginning reading class, to review the "fundamentals." The investigation showed, however, that each child was suffering from a different type of difficulty, and needed a different kind of help. The first child had to be trained to take the words in

their right order; she had missed this basic idea altogether and had developed a habit of skipping here and there around the page, reading some of the words, and using her imagination to weave a plausible tale out of them. The second child had to be given an interest in reading and an appreciation of its value; he was already a clever young artist and thought he had plenty of ideas for drawing—the only use he saw for ideas—without bothering to read. The third child merely needed vocabulary drill; for some reason (not entirely clear) she had simply stopped learning new words after having acquired about 100—enough to show she could learn. Obviously there is not a thing to be done for these three children as a group. Doubtless intensive investigation of the other 28 young hopefuls in this teacher's room would have shown that each had (even if in less degree) his own peculiar problems, and needed some special help.

The Importance of Educational Diagnosis.—As suggested by the above example, study of the work of the individual pupil leads naturally to diagnosis. That is, it leads to the attempt to find just what is wrong with each pupil's work, and set him right. Here the teacher finally comes in direct and immediate contact with the specific learning problem.

A concrete example will make clear how much can be done once diagnosis has been made, and how ineffectual practice is without diagnosis. A certain college freshman was having great difficulty with her English composition, and was finally sent to a special laboratory course for failing students to see whether something might be done for her there. In the laboratory the first step was to obtain a number of the papers which the student had written for the course in Freshman English. These papers were all graded

D or E with comments in the margin such as "very poorly expressed," "poor sentence structure," "awkward," "incoherent." These comments left the student completely bewildered as to what she should do in order to improve her work. A careful analysis of her writing was therefore made to find more specifically just what her trouble might be; and this showed that about two-thirds of her mistakes were due to a vagueness in pronoun reference—for example she would write, "A girl at college makes many friends which is good for them." A majority of the remaining errors were due to her failure to get corresponding ideas into corresponding construction; thus, she wrote, "The object of this course is diagnosing students, to give them help in their studies, and so as to get them off probation." Attention was therefore directed specifically and solely to these two errors. The girl was told to go over each composition she wrote and check all the pronouns, then to go back through the paper and be sure that each pronoun had a definite, specific antecedent. She was also told to go through her sentences and locate all the ideas which were parallel, then see to it that these parallel ideas were expressed by parallel structure. She was given exercises which consisted of sample wrong sentences in which these two types of errors appeared; these sentences she reconstructed as best she could and then turned to a key which showed her how they should be rephrased. With persistent practice on these two difficulties about 90 per cent of her errors in English vanished. A curious fact about this girl's troubles was that she thought she made innumerable types of errors because her papers were returned to her with so many red marks and

such diverse comments. But never, throughout her grade school and high school career, had the specific nature of her two common errors been discovered.

The evidence of educational experiment is universally in favor of the diagnostic attack upon teaching problems. For instance, analysis of error, and remedial work based on the analysis, was found to improve greatly the mastery of algebra (69). A similar technique brought about unusual gains in spelling (76). In another experiment, individualization and diagnosis caused great improvement, as shown by actual performance, in the mastery of vocational agriculture (52). In a fourth instance, pupils who were required to solve arithmetic problems aloud, while the teacher made a diagnosis of their errors in both thinking and computing, made great gains over pupils of similar ability not so diagnosed (9). Finally (6) may be mentioned results with four individual pupils whose gains in arithmetic over a six-week period of personal attention and diagnosis of error are shown in Table 10. These children gained in six weeks (using only the usual amount of class time) as much as is ordinarily gained in from $1\frac{1}{2}$ to $2\frac{1}{2}$ years, as shown by norms based on work done under usual school conditions.

TABLE 10: SCORES ON DUPLICATE FORMS OF THE SAME ARITHMETIC TEST BEFORE AND AFTER SIX WEEKS OF DIAGNOSTIC TEACHING

Pupil	I.Q.	C.A.	Problems Right		Gain in Years
			Before Training	After Training	
No. 1.	86	10-4	11	22	$2\frac{1}{2}$
No. 2.	102	9-4	10	19	2
No. 3.	122	9-6	15	20	$1\frac{1}{4}$
No. 4.	141	7-0	6	9	$1\frac{1}{3}$

Effective teaching thus requires the recognition of the individual pupil, and the study of the individual pupil leads to the investigation of his specific difficulties—or educational diagnosis. But to be a good diagnostician requires that the teacher be informed about educational ills, and be equipped with instruments for diagnosis. These instruments will be dealt with in the chapter on the appraisal and direction of learning. Here it remains to bring out the importance of such a knowledge of research findings as will give a teacher skill and judgment in the diagnosis of educational problems and the guidance of learning.

The Utilization of the Results of Research.—In general, it may be said that research information is needed on the importance of topics, their difficulty, and the causes of error; and the more specific such information is, the better. With reference to the first two points, the following simple table, summarizing two investigations in English composition, is of interest. The first three columns show the frequency with which capitals are used for various purposes in magazines, newspapers, and business letters. Here stand out the frequency of capitals at beginning of sentence, in the names of persons and places; their use in commercial trade names in the business letters is also prominent. The second four columns, showing error, make clear that certain common usages are well known by secondary pupils, and that others are not. Thus because of problems of sentence structure issues of the capitalization of the beginning of a sentence continue throughout. Names of persons give no trouble, nor does the capitalization of the pronoun *I*. In the seventh and eighth grades there is considerable trouble

with the capital at the beginning of a quotation and the capitalization of titles of books or articles.

TABLE 11: FREQUENCY OF USE OF CAPITALS, AND OF MISTAKES IN CAPITALIZATION (43)

Use	Use of Capitals per 10,000 Words in				Mistakes in Capitalization per 10,000 Words in Grades			
	Magazines	Newspapers	Letters	Average	VII-VIII	IX-X	XI-XII	Average
Beginning of sentence	400	345	358	368	41	26	15	27
Beginning of quotation	42	10	5	19	13	4	0	6
Name of person	118	134	42	98	1			
Initials	3	16	36	18				
Title with name	48	118	35	67	2			1
Title as proper name	11	3	7	7				
Name of place	107	215	47	123	6	4	2	4
Nationality, race, language	41	55		32			1	
Name of organization	46	56	81	61	1	3	4	3
Title of book, heading	33	6	7	15	11	10	2	8
Commercial trade name	1	5	121	42	2	1		1
Date	17	41	61	40	2	2	1	2
Reference to deity, government	36	37	2	25				
I	65	2	65	44				
Miscellaneous	14	7	34	18	10	16	13	13
Total	982	1050	901	977	89	66	38	65

Even in the simple topic of capitalization such data are useful in suggesting to the teacher what is important and where to look for trouble, and they are even more helpful for more extensive topics. In spelling, for example, counts of the frequency with which different words are used in letters and other writing have shown that only some 3000 words are common enough to be considered essential, and

studies of spelling errors have resulted in lists of "spelling demons." Frequency counts for foreign languages have located those words most frequently met in reading (lists of "reading demons" are much needed). In technical vocabularies it has been found that though a book in English composition, for example, may include 200 odd technical words and phrases in grammar, only about 30 are of major importance. Studies have been made of the background information and skill necessary for freshman college courses—the grammar needed for foreign language study, the elements of arithmetic and algebra frequently used in college science, geography needed in college history, and so on. Further investigation has been made to determine what elements of this essential background college freshmen frequently do not know; and the resulting lists are of great service in helping to locate the causes of a student's difficulties in college. The above illustrations deal with elements of information and skill. But research should also aim to locate essential insight and understanding and specific "key difficulties" in thinking. Such data would be of great value to a teacher in her efforts to "train pupils to think."

A teacher should also be familiar with research on the causes of error. If she teaches arithmetic she should know that children may be slow or inaccurate in adding because they count instead of learning the combinations. She should know that reading may be slow because the pupil whispers to himself what he reads, or lacks rhythm in eye movements. She should appreciate the confusion in which pupils find themselves in capitalizing, because certain words, such as *street, river, captain, professor*, may be capitalized or

not, depending on whether they are part of a name. She should know something of the confusion which may arise in children's minds about the meaning of such general terms as *democracy* or *justice*. Research *should* make available to her some knowledge as to the causes of faulty thinking. In short, to be a good diagnostician a teacher should know something of the "psychology of the school subjects."⁶

THE DIFFERENTIATION AND ESTABLISHMENT OF THE RIGHT RESPONSE

It remains to illustrate briefly certain ways in which correct responses may be located and established. The last phase—the establishment of the right response, understanding, and attitude—overlaps the next chapter, which deals with the permanence of learning.

The Use of Research Findings, Diagnostic Techniques, and Methods of Individualization.—Educational diagnosis, by locating and finding the causes of wrong responses, presumably differentiates the right responses. But, more specifically and concretely, how does all this go forward? A brief résumé of an experiment in remedial instruction in handwriting may be illuminating in this connection, as showing how the three methods mentioned in the previous

⁶ This will, the writer would argue, be even more true in the schools which are reorganized on the basis of an "activity program" than in a conventional school. Despite the shortcomings of the conventional approach to arithmetic, for example, such an approach does at least systematically expose the pupils to the desired elements of the subject, and the conventional recitation permits the systematic appraisal of progress. When the learning of arithmetic is incidental to a project, large gaps in the subject, or serious faults of method, may be overlooked. From time to time a systematic survey of each child's standing, and a diagnosis of any difficulties, are thus very necessary. One interesting conclusion from all this is that standard tests may be even more needed in a progressive than in a conventional classroom.

section (individualization, diagnosis, and utilization of research) operate in a practical situation (46).

The work was based on an extensive research study of illegibilities in children's handwriting. Readers went over samples of handwriting from the third grade through college, checking every place where they had any difficulty in making out the writing. Certain illegibilities, such as "a" written like "u" and "r" like "i," were found to be common, and a chart was made for facilitating their analyses. The teaching experiment was an attempt to determine how helpful such research data might be in attempting to improve handwriting.

The experimental class consisted of 23 4B children; the control group was composed of 19 other 4B children in the same school. Before the experiment started both groups wrote a timed handwriting exercise and a composition. From the exercise a speed score and a quality score were obtained, by comparison with the Ayres Gettysburg scale. The handwriting in the composition was also rated as to quality; and a legibility score was obtained by having each of three readers time himself on his reading of each composition, and expressing the results in terms of the average number of letters read per minute. By all these measures, the two groups were similar at the beginning of the experiment.

During the next nine weeks the usual group handwriting instruction was continued with the control group. Intensive analyses were then made of the handwriting of the experimental group. The analyses of the first composition written by this class showed 14 different illegibilities to be common. However, by no means did this warrant class

instruction on these 14 items. The average number of different illegibilities frequently made by any one pupil was 2; class instruction on the 14 items would thus teach the average pupil 7 times as much as he needed. There was no illegibility common to more than 11 pupils. The total number of different illegibilities on a composition varied from 42 to 0.

Evidently the work needed to be individualized, and the following procedure was therefore adopted. Every Thursday, each child was presented with a card on which were tabulated the specific errors he had made on a sample of writing produced on Wednesday. For instance, on the first Thursday, Henry received the following statement:

d	made like	cl	—9	times
n	“	“	u—4	“
s	“	“	r—2	“
m	“	“	n—once	
t	uncrossed		—once	
i	with no dot		—once	

The teacher gave such a card to each child and talked a moment with each one to make sure he understood; she also showed each pupil how he might correct his common illegibilities. To show the practical need for legibility, she sometimes wrote at the bottom of the card such statements as: If you make “d” like “cl” you will write “clown” when you mean “down.” The children spent the time allowed for handwriting on Friday, Monday, and Tuesday in trying to correct the malformations they had made the week before. Each child practiced the letters he made incorrectly and was given words to copy which involved those letters; and each one also practiced pairs of words (such as “cat—cut”) which might be confused because of some

illegibility he made frequently. On Wednesday they wrote another test, which was analyzed as before. During the first seven weeks no attention was paid to matters of slant, spacing, or alignment; during the last two, these points also were taken up with such children as needed help.

At the end of the nine weeks, both classes again wrote an exercise and a composition, and these were rated as before. The same readers were able to read 10 more letters per second of the writing of the experimental group than before, but 3 words less of the writing of the control group. In the nine weeks the experimental group gained more in quality of handwriting than the average class does in half a year, while the control group made no gain. In speed (which was never mentioned to the children) the gain of the experimental group was equal to the usual increase of a year and a half, while the control group gained about half a year. Evidently the use of research data, the diagnosis, and the individualization were highly profitable educationally.

The Value of Getting Material Organized in Large Units.—In solving their puzzle, the little girls mentioned in the first section of this chapter were helped by knowing that the picture was of a scene in Venice, and they put it together more rapidly a second time because they “knew what to look for.” In school work, whatever a teacher can do to make her pupils see what they are learning as a meaningful and organized whole will result in better achievement. The value of organizing in study has been variously demonstrated experimentally. One investigation has shown that pupils trained to outline a text in history, thus organizing the ideas presented there, learned more

effectively than students of equal ability who did not thus organize (59). In another experiment a group of junior high school pupils were required, after reading a nine-page passage, to write a summary of it. Another group of equal reading ability spent the same amount of time in the study of the passage, but simply read it over and over. Objective tests on the material showed that the group which wrote summaries averaged 10 per cent better than the group which simply reread (23).

The same general principle applies to rote learning. A poem is usually learned most effectively as a whole rather than when broken up into stanzas, each of which is learned separately (34). If the memorizer breaks the poem up into small pieces he kills the meaning, for the poet wrote a poem, not a half-dozen mutilated bits of rhythm. This topic will be returned to in the chapter on *The Results of Schooling*.

The Value of Learning Material in its Context and as It Will Be Used.—Research has repeatedly shown that material is most effectively learned in its context and, as far as possible, as it will be used. Thus if shorthand is taught by using sentences as drill material, the results are better than if the pupils are drilled on isolated words (13). If the words in a spelling lesson are presented in sentences so as to give them meaning, learning is more effective than if the lesson consists simply of lists of words (76).

The writer once came across an excellent example of teaching with an almost complete disregard of this principle. A test was about to be given to some first-grade children near the end of the school year, when it was found that they could not write their names. The teacher apparently felt some implied criticism, and explained the situation. It seems that she had

first drilled the innocent children on the small letters, taken in alphabetic order; after polishing off the small "z" she had started through the alphabet again with the capitals and had reached "U." In a couple of weeks more she thought the children would be ready to write their names. These youngsters had labored daily on forms of whose usefulness they had not the slightest notion. As far as they knew from anything the teacher had told them, they would be required to go on and on and on for the rest of their school lives drilling on single letters. Such painful situations are not confined to the elementary school. The writer's first semester of Latin, confined almost entirely to memorizing conjugations and declensions, was hardly less stupid.

Many textbooks and many teachers are still proceeding on the assumption that the learning of a rule will result in correct usage and application, and that one problem is as good as another in getting children to think and reason. Neither of these assumptions is true, and neither is favorable to the best learning. Moreover, since the school presentation of problems and usages does not coincide with the experience of actual life, the former is not reinforced by the latter, and the learning is consequently slower. Children trained in the repetition of specific correct grammatical forms, in contrast to the wrong ones, for 15 minutes a day for three weeks have been shown to make such progress in the mastery of correct usage as is generally achieved in three years of teaching by grammatical rules (64). Children gain a greater ability to solve problems in arithmetic if they practice on problems telling a story and setting up a situation such as occurs in real life, than they do by working on problems unrelated to life's activities.

There is unquestionably some doubt as to the value of such a problem as: "If a 5-inch nail was driven through a board in such a way as to stick out 1.6 inches on one side and 2.3 on the other, how thick is the board?" As a technique for measuring the thickness of the board it would be hard to devise anything more idiotic. Then there are the unending problems concerning trains that overtake each other; only for train dispatchers would this material seem of any conceivable use. The practical answer to the following problem: "If a room is 14 feet long and 10 feet wide, what size rug would you buy if you wished to have a space exactly a foot wide all the way around?" is that one would either buy no rug or have one made to order, because stores do not sell rugs 12 by 8. To get the question in the form in which it is usable—and might be reinforced by actual experience—it should read: "If you had a room 14' x 10', which of the standard sized rugs would look best in it?" To take another subject, one does not accost a clerk in a Parisian store with the words: "je veux, tu veux, il veut, nous voulons, vous voulez, ils veulent." No indeed; one says: "Je veux à acheter un chapeau."

Teachers often seem to neglect the fact that children go right on living and learning outside of school hours. If what they do or see others do is related to what they are taught in school, there is more interest, and more rapid learning because of this reinforcement; but if the two experiences are of a different *genre*, we need not be surprised if interest lags and learning is slow. A teacher should try constantly to relate the school work to the pupils' extra-school life, and to get the children to bring out-of-school experiences into the class discussion. Such interrelation and application will bring manifold values, for interest is stimulated, the pupils think more about both their school work and their other experiences (they get into the habit of car-

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Suppose a child is learning the addition table and is trying to master the fact that six plus five make eleven. This is not merely a problem in rote memory, as if he were learning to say, parrot-like, *sig plus ump make squig*. If the child is really learning this combination, he learns it as the immediate recognition of a fact he knows to be true. He has had much experience with groups of objects, and knows from counting and from seeing "number pictures" (dots or other units so arranged that the number of them can be readily glanced) what five means and how many objects six means. From counting, and from seeing the groups of fives and sixes, he comes to understand that five plus six really do make eleven.⁸ Or suppose the subject is American history, and the question is as to the causes of the Civil War. From reading, discussion, and the consideration of concrete episodes he has come to see that this and this and this other influence have been involved. And finally he sees that certain explanations best fit all these facts. Or, in physics, suppose the question is as to the way in which light is refracted. Again from reading, from experiments, and from observation of what light does when it shines through a window or a windshield, or through water, he has obtained an idea as to what happens, and he sees that the explanation in the text fits these phenomena.

Evidently the pupil can be brought by various means to see that such and such an answer does fit. His attention can

preliminary are really an integral part of the total process and determine what is the "right answer" under the total circumstances. To find the blocks which fitted together to make the picture was to find "right" answers, because that was what the girls were interested in doing. Since interests and incentives are almost always in part social, a "right" response is a response which wins social approval. In learning social adjustments, this is the sole criterion of "fitness"; and it is almost always an important part of other learning.

⁸ After that he may need to gain facility in dealing with the bare abstract symbols $6 + 5 = ?$ so that he may promptly respond with 11. But this facility is a derived type of learning which, if it is to have any significance or value, depends on the prior concrete apprehension of number facts.

be directed to this or that significant phenomenon. He can obtain clues directly from the teacher—various means may be used by which he can recognize the fitness of an explanation or answer. Some of these, such as the arbitrary statement of the teacher that an answer is right, really contribute very little to his sense of the fitness of the answer. The purpose of the teaching is to bring out as clearly as possible (and without undue blundering and waste of time by the pupil) the evidence that certain general statements summarize the phenomena in question.

And why (the second question), after the right or fit answer has been discovered, is this answer more readily found again if the problem is reviewed? Quite clearly because all the various interrelations have been more adequately sensed—merely running over the question and answer again and again in mechanical review will help little. Such review or drill is valuable only as it gives the opportunity for the further and more immediate appreciation of the adequacy of the right solution.⁹ The right response is thus more and more completely integrated with the pupil's total system of thinking—it becomes part of the total process of intellectual development which is true learning.

SUGGESTIONS FOR TEACHING

What, of this elaborate discussion, are the most useful suggestions to a teacher, that she may best further the learning of her pupils? The following points seem most important:

- (1) Always consider carefully the interests of a pupil with reference to any work you ask him to do. If the problem does not relate to his interests, it will not be significant to him.

⁹ As mentioned in the note above, this involves a further appreciation of the relevance of the solution to the interests and incentives originally involved, and the social situation; there is thus increased reinforcement by these interests and incentives.

- (2) Remember that learning is naturally an active and a social process. Try always to set up such situations for learning.
- (3) Remember that your special task is to guide the pupil to the finding of the right answer. Every general method you can develop which will systematize the search for it will be helpful to you and to the pupil. In particular, remember that pupils differ greatly and that problems of learning are often highly individual.
- (4) Try to make yourself an expert educational diagnostician. If you can find the pupil's key difficulties and can bring it about that the circumstances reveal the right answer to him, you will have solved his learning problem.
- (5) Remember that drill by itself is useless. Going over and over a thing is of value only if it brings about a better and more immediate recognition of the fitness and correctness of the right answer which you wish to establish.

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CHAPTER XI

THE RESULTS OF SCHOOLING

THIRTY million children and young people attending the schools and colleges of this country, taught by a million teachers at an annual expense of three billion dollars—surely there should be some considerable systematic knowledge of the results of such a stupendous enterprise. But actually the knowledge is so slight and so incidental as to make one gasp. There is something to suggest that the effects of schooling upon physical development often balance on the red side of the ledger; the stress of beginning school may actually slow growth a bit, and the sedentary character of conventional education may interfere with the development of the finest physical vigor. As mentioned in Chapter III, teachers may do the wrong thing for visual handicaps, the school may be a center for the spread of contagious disease, or the athletic ambitions of a school may burn out the health of its finest young people.

It was also mentioned in Chapters IV and V that what little is known regarding the effect of the school on the growth of personality and character and the flowering of interest is also not as encouraging as might be hoped. Teachers tend to favor passivity and to repress the vigorous personality. Bright children become bored, and slow children discouraged. The school tends to narrow interests to the verbal and academic; and all too often the general tone as regards intellectual interests is either dilettante or per-

functory. The school morale may foster cooperativeness, but more often it operates in the opposite direction. There is some evidence that moving pictures may develop attitudes and prejudices of some permanence, but there has hardly been an attempt at experimental investigation of the effects of the usual schooling upon prejudice, attitude, and interests. It may almost be said that a systematic educational accounting which would attempt the appraisal of the effects of the usual educational procedures upon personality and interest has not even progressed to the point of discussion among educators.

It may well be argued that the above two paragraphs neglect the favorable evidence, and are unfair to a host of modern-minded school administrators and teachers who have these problems very much at heart. It is true that in the better schools there are splendid programs for the safeguarding of health and for physical education, that the school lunch is often the best meal a child has, and that a child is often much better off both physically and morally in school than at home or on the streets. And it is true that educational leaders are acutely conscious of all these problems. But the average school is not the better school. To be better than a slum tenement or a city street is no adequate justification for a school's program for either health or character training. Even modern-minded educators often approach many of these issues more from a sentimental than a scientific viewpoint. For the average teacher and teacher-in-training, these matters are unquestionably of such importance as to warrant emphasis with even a certain possible exaggeration.

However, the traditional school has not regarded problems of health and emotional development as the center of its responsibilities. Presumably it would study the extent

to which, as a result of its efforts, there was established a knowledge of arithmetic or history, or skill in reading, or insight into the scientific world. As a matter of fact, there are, here, scattered bits of tentative, inadequate experimentation. But it is a strange anomaly that more is known about the effects produced by a memorizing of nonsense syllables than by a study of reading or history; and it is typical of the tendency of psychology to shun the practical, and of education to avoid the experimental, that it was thirty-five years after the first systematic work on the permanence of the learning of nonsense syllables before there was systematic work on the permanence of the learning of subject matter in school.

The above statements are general; the reader should pause a moment to give them concrete significance by an evaluation of the effects of his own education. How much (he should ask himself) do you remember of your college or high school courses? Can you get the meaning of *Æquam memento rebus in arduis servare mentem*, or *Il est bon d'être habile, mais non pas de le paraître*, or *Gesetz ist mächtig, mächtiger ist die Not*—the question will not be asked as to whether you can give the second person singular imperfect of *mitto*, *können* or *rendre*. Or can you prove, as you probably could once, that if two angles and the included side of a triangle are equal to two angles and the included side of another triangle, the two triangles are identical? Can you extract the square root of 2861, summarize the plot of *As You Like It*? Do you know when, between whom, and about what the Thirty Years' War was fought, or what the causes were of the panic of 1893? Who were the Vandals, the Whigs, the Jacobites, the Roundheads, the Carpet-baggers, the Populists?

The reply may be that the important values obtained were not such items of knowledge, but appreciations, understand-

ings. Well—what leisure reading have you actually done during the past two months, and does it really show an elevation of taste, or do detective and “true-story” magazines appear on that list? How much has what you learned in your history courses actually contributed to your thinking about the economic depression or political conditions in Europe? You reply that the personal influence of your teachers was the important contribution of your education. But how many of your former teachers can you now name? There were gains in friendship with fellow students; however, there would have been friendships if you had not gone to high school or college—furthermore, do alumni gatherings after football games suggest continuing intellectual companionships of the highest order? What has your schooling contributed to your physical well-being? . . . None of this is meant to be cynical. But there are too many Pollyannas in education, and too many who dodge the issue of educational outcomes by stressing vague, undeterminable, transcendent values. A systematic attempt at an appraisal of the results of schooling *will* show many gains over the education of a generation ago—but it will also everywhere show stimulating opportunities for further advancement.

THE PERMANENCE OF LEARNING IN THE SCHOOL SUBJECTS

The usual method of investigating this problem has consisted merely of giving a second final examination or test a few months after a course was completed, and noting how much the students have forgotten since the examination given immediately at the end of the course.

The Retention of Knowledge of a School or College Course.—The following table will exhibit fairly well the present findings regarding the permanence of school learning over a considerable period of time. In general, these students showed a knowledge of about three-quarters of

TABLE 12: RETENTION OF VARIOUS SCHOOL SUBJECTS AT END OF COURSE AND AFTER ONE OR TWO YEARS

(Figures are in each case the per cent of perfect score on the test or examination used.)

	End of Course	After 12 Months	After 24 Months
Botany (27) (college) ^a	68	21	16
Zoology (23) (college) ^a	78	39	30
Psychology (23) (college) ^a	70	24	19
Algebra (31) (high school) ^b	87	56	..
Latin (29) (high school) ^a	82	60	..
Chemistry (39) (high school) ^a	63	47	33
History (4) (eighth grade) ^c	71	56	..
	—	—	—
Average.....	74	43	24

^a Results based on objective tests of one type or another.^b Results based on Regents' examinations.^c Results based on essay-type questions.

the material covered in the test at the end of the course, less than half after one year, and about one-quarter after two years. The differences between various subjects are probably of relatively little significance, and are presumably due to differences in the diffuseness of the subject matter or the amount of intensive drill, or to differences in the difficulty of the test used and the extent to which it reached out into somewhat incidental subject matter. The gross fact which stands out is that the million teachers and the billions of dollars spent in education seem to be operating with most distressing inefficiency—an inefficiency which is challenging.

It may be argued that not all subject matter is supposed to be remembered over a period of time. Quite true. Hence it is necessary to consider separately different types of material.

The Retention of "Minimum Essentials."—First of all, it is to be noted that there is certain material which should be remembered—there are a few "minimum essentials"

which ought really to be mastered. There has recently been accumulated a considerable amount of information regarding the extent to which this mastery is achieved, and the findings are hardly flattering to educational pride. There have been, for instance, numerous studies of the persistence of errors in English composition (40). It has repeatedly been found that simple usages (such as the apostrophe to show possession), which are taught from the third grade through the college freshman year, are still not known by college students. There is little change in errors in English, either as to type or as to number, from the freshman year of high school to the freshman year of college, in spite of four consecutive years of English (45). A recent study of the writing of college students has shown an average of 207 errors per 10,000 words in the mechanics of composition¹—although the grading was most liberal. Ten per cent of a group of college students were unable, on a 20-problem test in long division, to get a single problem right (1); 18 per cent failed to multiply a single problem in common fractions correctly (1); and 20 per cent were unable to do a single one of twenty problems in the division of decimal fractions (1). When a group of 126 college students were asked to define, in any way they could, the twenty most common units of measure (such as mile, gallon, peck, or millimeter), it was found that on an average 58 per cent of these students showed a lack of any knowledge of the unit (24), even though grading was liberal.² And it should

¹ From unpublished research by the writer.

² The following sample errors will make clear the grossness of ignorance: *acre* was defined as one square mile, $2\frac{1}{2}$ square miles; *mile* as 352 feet, 11,500 feet; *degree*, as a measure of weakness or strength, the smallest unit of distance measurement; *meter*, as an English measure of distance

be appreciated that these students had had most, if not all, of these units taught them in the elementary schools, had used some of them in every day purchasing, or met them in reading; almost half had had high school physics and had probably used most of these units in that subject. A study of 1576 college freshmen as to their knowledge of the 24 most common and important technical terms in grammar (40), showed that only 53 per cent of them could locate the object of a verb in a simple sentence, only 53 per cent could find a subordinate clause, 73 per cent could find three nouns in a sentence, and 69 per cent could locate the pronouns in a sentence. Moreover, it must be remembered in connection with these college data that college students are on the whole a superior group intellectually, who in high school have had incidental if not direct training and review on such grammar school material. Doubtless grammar school students not going on through high school and college would remember still less of all this material which their English teachers earnestly put before them. An extensive study of the knowledge of technical terms in history³ showed at the end of the twelfth grade the following percentages (of about a thousand cases) able to recognize

with reference to our mile, a tiny unit in an inch, 27 inches, about three miles.

³The results are on the basis of objective type questions aiming to get at practical meanings in a simple colloquial way and inevitably offering a certain chance for guessing. Sample questions are as follows: What is the title of a member of the higher branch of the Congress of the United States: (a) representative, (b) senator, (c) delegate, (d) judge? What is the purpose of diplomacy: (a) to carry on affairs within a country, (b) to elect governmental officers, (c) to conduct relations between countries, (d) to increase industrial output? When is an injunction most often used: (a) during a strike, (b) during a battle, (c) during an expiration, (d) during a voyage?

the meaning of certain representative terms: senator, 79; annex, 75; repudiate, 55; policy, 62; referendum, 54; caucus, 53; inflation, 26; injunction, 69; indemnity, 82; corporation, 53.

Although too much should not be made of a high school or college student's difficulties in arithmetic or technical vocabularies, the total evidence would undoubtedly suggest a distressing ignorance of important skills and knowledge which, it is hoped, would continue to be the student's possession.

Retention of General Understanding and Points of View.—It may be argued that although detailed information is not remembered, a fund of general information and understanding, and points of view are retained. It is first necessary to note that all too often such general understanding is not obtained in the first place, and so can hardly be remembered. For example, research has made strikingly clear that pupils often gain practically no understanding of the concepts employed in history (34), or basic generalizations in either history (3) or literature (25). It is a general though understandable weakness of teachers that they overestimate the extent to which pupils profit by their teaching. However, even where there is the presumption of such understanding, the permanence often appears to be slight. Thus it should be noted that the tests used in the investigations summarized in the first table of this chapter included more or less of the material having to do with a general understanding of the principles involved in the subject matter concerned. Incidental observation gives support to the conclusion that students do not recall general principles much better than they do facts.

When students transferring from another institution are sent to the writer for decision as to whether they should receive credit for courses in educational psychology they have taken at the previous school, he is often astounded at their total lack of recollection of any of the materials included in that course; the textbook was either blue or brown—the student does not remember which—and there was something in it about learning and about instincts—but beyond that he cannot go. Without doubt, transfer students from the writer's college show the same phenomenon.

Retention of General Training.—It may be argued, nevertheless, that although important information may not be remembered, or more general understanding either, still, as a result of this and that course or all of them together, there are developed certain general abilities as in methods of work or skills in thinking, which are of great and permanent benefit to the students. But again there is the unfortunate fact that many of these abilities seem never to be acquired in the first place. Research on study methods used by college students would suggest that even if originally gained, efficient methods of work are usually not so well established that they are the permanent equipment of the student (42). It need hardly be added that much the same conclusion holds as regards the development of general attitudes, appreciations, and character traits. That they are developed when the teacher assumes they are is questionable; and about their permanency, once developed, almost nothing is known, although something is known concerning the permanency of the attitudes developed through the movies.

The End-products of Education in Adult Life.—Especially unfortunate is the lack of any systematic knowledge

about that most practical problem of all, the retention of school learning in adult life—not to mention the lack of research as to means for increasing retention beyond the school years. A French observer has reported that rather dull army recruits may be unable to read, although upon leaving school they were literate; however, during the intervening years of manual toil with few opportunities and little interest in reading, they forgot how. Almost all adults can add, but many cannot do long division. The reason is clear—long division is little used in adult life. An interesting method of curricular evaluation is here suggested; data on the comparative permanence, in adult life, of various elements of the curriculum should be a nice measure of their comparative utility. It is the writer's guess that permanence over long periods of time is chiefly a product of recurring use; and the slight permanence of much school learning is therefore an indictment of the curriculum.

Study of adult end-products of schooling may, in fact, be variously illuminating on educational issues. For instance, a patient investigator, finding, after some forty years, samples of handwriting exhibited at the Philadelphia exposition of 1875, sought out the adults who had as children produced those prize bits of penmanship, and had them again write the same passage. Quality had markedly deteriorated, evidently under the adult pressure for speed (9). A handwriting method which should train for a reasonable quality maintainable under pressure for speed is obviously suggested.

Such observations as the above have to do chiefly with adult retention of specific content. About the effects of schooling on the adult grasp of the evolutionary point of view, on ability to think, or broad-mindedness, there is

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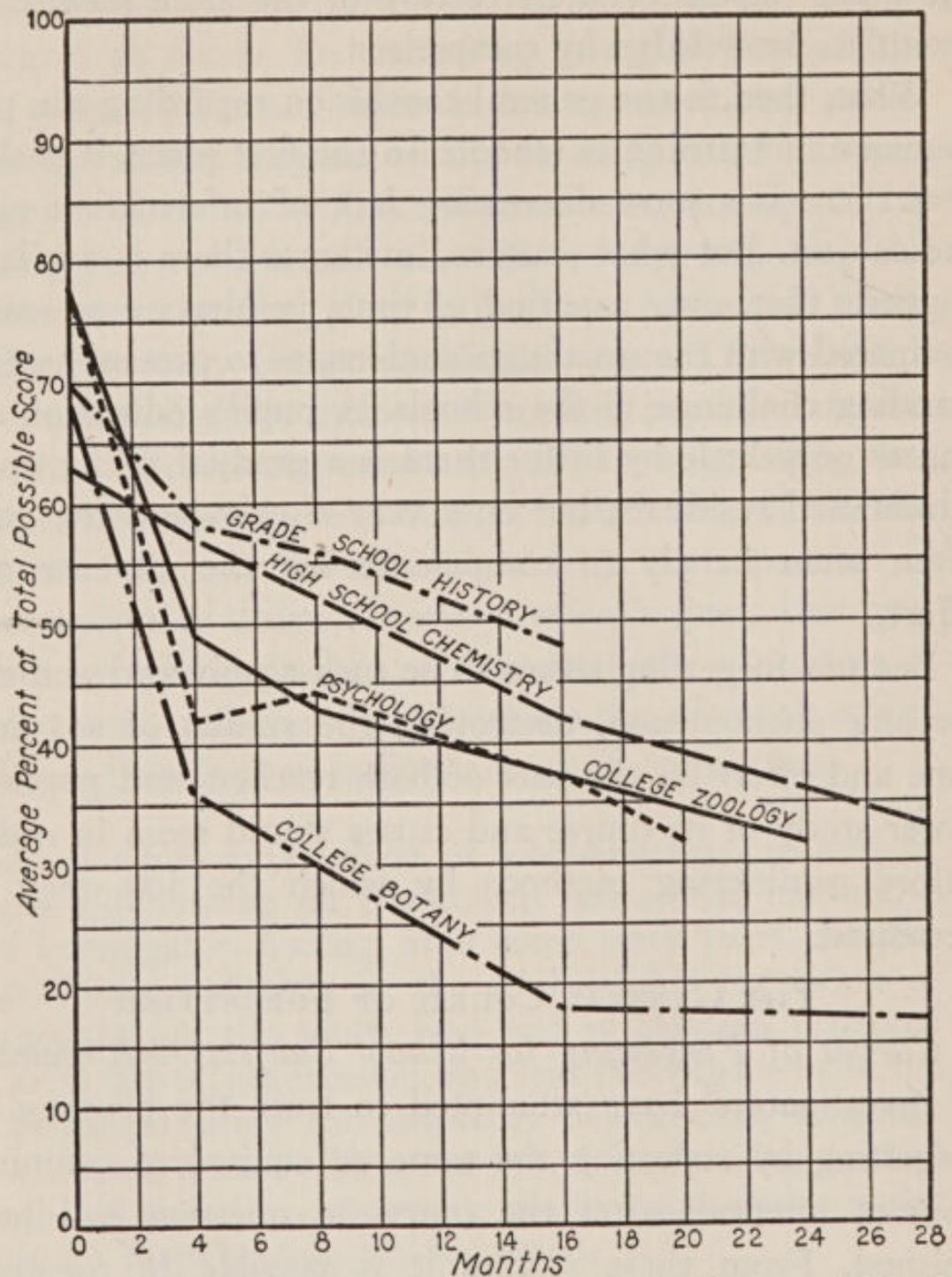


CHART 33.—Retention of one elementary school subject, one high school subject, and three college subjects for 16 to 28 months after the end of the course (after Bassett [4], Greene [23], Powers [39], and Johnson [27]).

another are probably of little significance, being due to the type of test used or to the particular selection of students.

Certain general factors should be kept in mind in connection with such results. The students included in these experiments are usually those who go on into advanced classes in the same department where they are convenient for retesting. Since the failures in the original course are not allowed to continue, and most of the poor students do not, the forgetting shown is that of students whose original mastery was, for their group, above the worst. Moreover, the students going on are those most interested in the subject. Finally, where students have taken a second or third test, each testing probably acts in part as a bit of practice and review. For these reasons the curves presumably do not show the entire loss for the average of all those taking the course originally, but the general shape and character of the curves do not seem questionable.

In general, the curves drop more rapidly at first, then flatten out to a nearly level area which would appear to represent a comparatively permanent educational residue. The original mastery at the end of these courses varied from 64 to 78 per cent. The final figures for each subject, after 16 to 28 months, show between 16 to 48 per cent still retained.

Certain material on forgetting over a short time remains to be mentioned, and is of special significance. To determine the effects of the summer vacation, various studies (26) have investigated the changes shown by elementary school children between May and September in intelligence, reading, spelling, arithmetic reasoning, arithmetic computation, handwriting rate, handwriting quality, and history.

Wherever intelligence has been measured, there has

been a slight increase, as would be expected during a four-month interval. In reading also there is usually an increase. But in spelling, arithmetic, and history, there is a loss. The important factor appears to be this: Throughout the summer there is continuing practice in reading—of books, magazines, or at least signboards and other incidental material—in other words, reading skills are *used* by the children. But much of the material in other subjects is not used, and so is quickly forgotten. This factor—extra-school use—is doubtless a very important element in permanency; such use also implies that the interval is meaningful to the pupil. The point has already been mentioned in connection with the problem of adult retention, and is so important that it will be returned to later.

In one investigation, attention was paid to the amount of time necessary for the pupils to recover their standing of the previous May. From two to fifteen weeks of the new school year were required before the pupils had regained the loss over the summer vacation. This finding well illustrates the “two steps forward and one step back” process by which most children learn, and revives the argument that a number of short vacations in place of the long summer holiday would be preferable.

The Rate of Forgetting a Single Lesson.—The highest two curves in Chart 34 show rate of forgetting material largely comparable to the usual lesson, and hence are somewhat indicative of what probably happens to the daily work in school. One curve shows the retention of a single reading of a short passage (only 170 words) by 2789 children in grades 7 through 12 (13). Recalls of the material were

requested at the end of 1 day, 15 days, 30 days, and 100 days. The other curve (28) shows the retention, over periods of 7, 14, and 56 days, of the material presented in a single lecture and not subsequently reviewed. These curves differ from those in the previous chart, especially in that they show a more rapid early decline; they also show a lower initial mastery, and lower end results. The average original standing on the five courses is 70 per cent, and 60

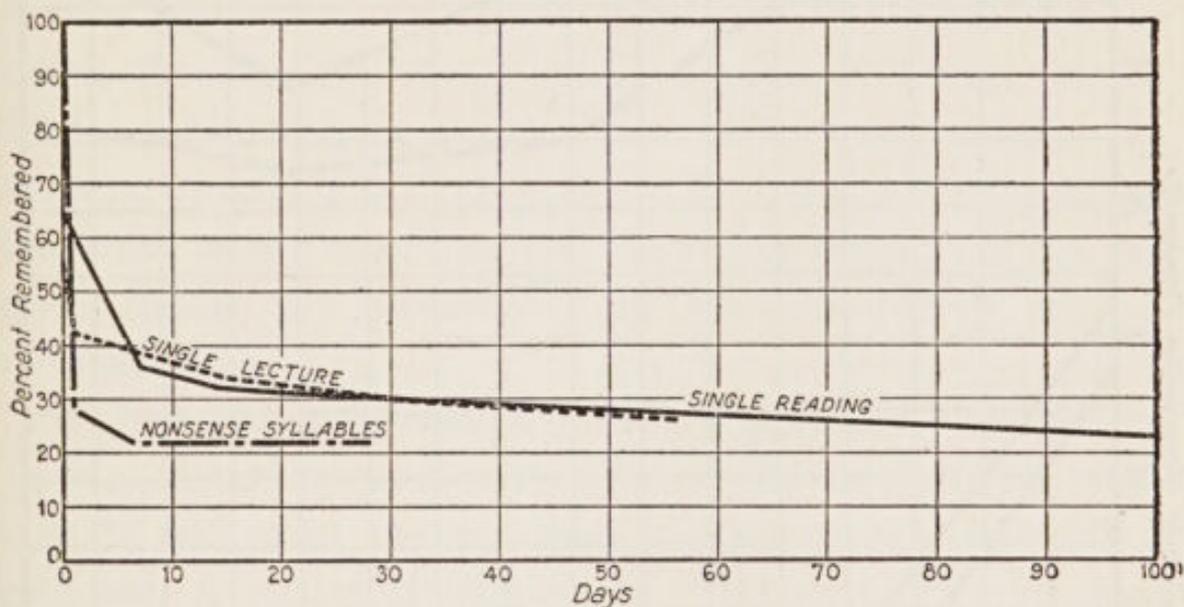


CHART 34.—Retention of (a) nonsense syllables (16), (b) material covered in a lecture (27), and (c) ideas in a passage read once (12) for a period of 28 to 100 days.

per cent on these two curves, while the curve for the single reading of a passage indicates the retention of only 23 per cent at the end of 100 days (approximately 3 months), as compared with the 54 per cent average standing of the five courses at the end of that time.

Variations in Permanency of Different Items of Knowledge.—One further investigation (4) shows what happens to particular questions of an examination when a series of retests are given. Sixty-four seventh-grade pupils were

given a number of history questions at intervals of 4, 8, 12, and 16 months after the original examination. The percentage getting each of four sample questions correct is as follows:

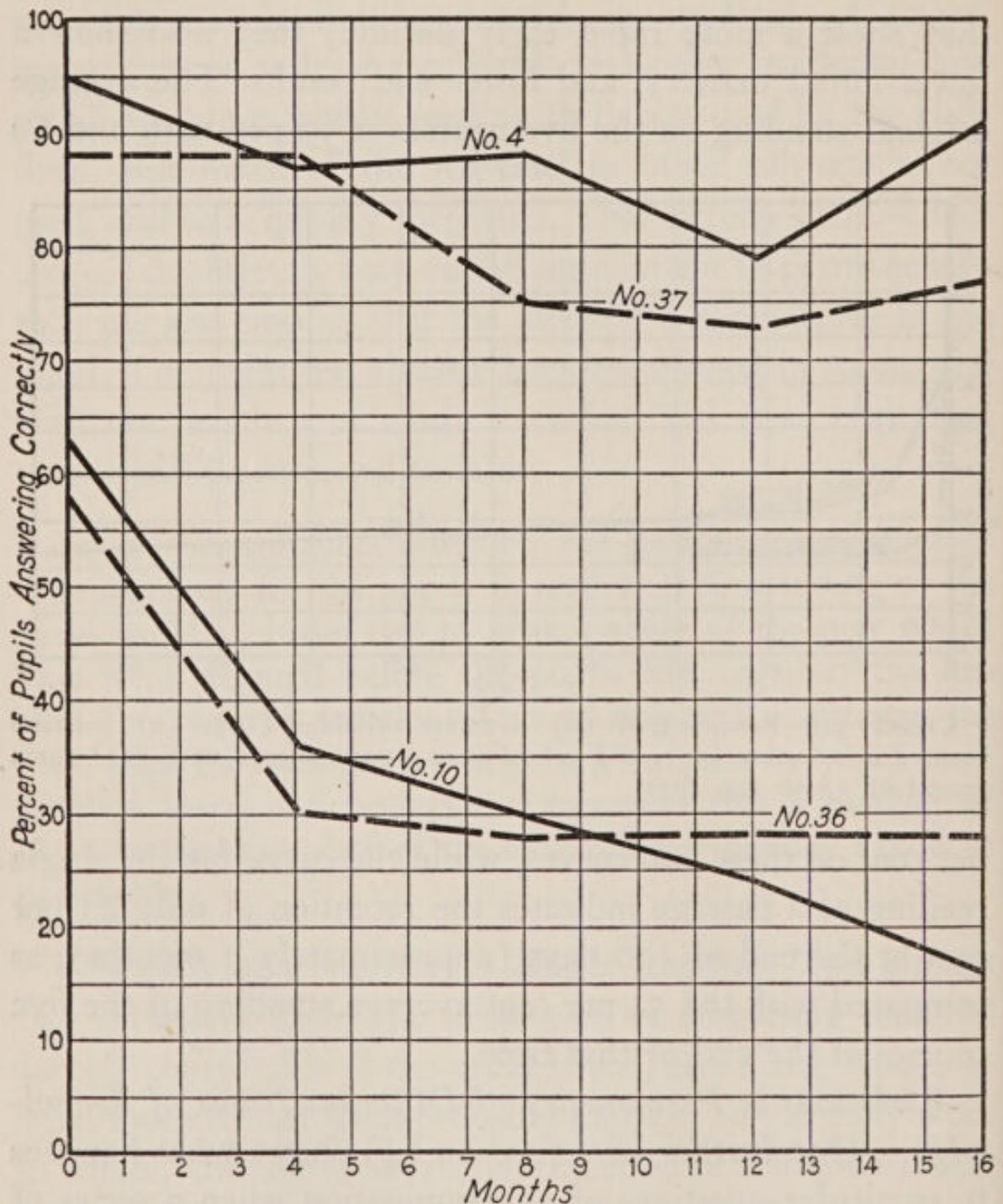


CHART 35.—The forgetting of items having different degrees of mastery on the original learning (after Bassett [4]).

Question No. 4 shows a slight loss in the first four months, a steady retention, then a gain; Item 37 shows no loss during the first four months, then a loss followed by retention at this second level. Item 36 shows its entire loss during the first four months, while No. 10 shows a steady loss, but in decreasing amounts, throughout the period of testing. It is probable that specific bits of information behave in these and other different ways, depending on incidental review and a variety of other factors. It should also be noted that the two items showing good retention on the first examination lose relatively little subsequently—an average of only 7 per cent—while the two questions poorly mastered at the start lose far more—an average of 39 per cent. Again, the advisability of learning things well is demonstrated.

Differences in Permanency with Different Types of Material.—Another type of experiment shows that the more specific and exact the response, the better the material is retained. A group of fifth-grade children (12) were first given drill in addition and multiplication problems, reading of passages, and writing of opposites for lists of words. Three months later, without intervening practice so far as known, two retests were given on successive days, with results as shown below:

TABLE 13: COMPARATIVE PERMANENCE OF FOUR SKILLS OF DIFFERENT DEGREES OF SPECIFICITY, OVER A THREE-MONTHS' INTERVAL (12)

	Addition	Multipli- cation	Reading	Writing Opposites
Average score, last day of drill.....	17.2	127.2	27.5	35.9
Average score, first retest.....	14.4	125.9	12.6	26.6
Average score, second retest.....	16.1	133.4	18.4	31.3
Average per cent recalled first retest	84	99	46	74
Average per cent recalled second re- test.....	94	105	67	87

Two trends are noticeable here. The two somewhat mechanical and specific operations of arithmetic are remembered better than the two more general tasks of reading and writing opposites; and the practice given by the first retest was sufficient to reestablish the first two operations at nearly or more than their former mastery, but did not bring the other two up to this level. Extremely important as affecting permanency is the degree to which the material is meaningful. Nonsense syllables require more time to learn and are forgotten faster than sensible material. In general, the more sensible material is, the easier it is to learn and to recall. This point may be illustrated by comparing results from two curves already shown (Chart 34) for the memory of sensible material, with a curve for remembering nonsense syllables (16) (also shown in Chart 34). In this experiment nonsense syllables were learned to a single correct repetition. This curve shows a great loss within the first day, and thereafter levels off to a retention of approximately 20 per cent. The curves with which it is compared are for sensible material which, it should be kept in mind, was never learned to even a single correct repetition; the original performance was only 60 per cent of the total possible score, but the falling off with time is much less.

Even more striking are the following curves⁵ showing the retention of a passage read, the subjects being required to recognize the correctness or incorrectness of a statement when (a) it is phrased exactly in the words of the original,

⁵ From an unpublished doctor's thesis by C. D. Killian; the investigation is one of a series, under the direction of Dr. H. B. English, regarding the effects of meaning on learning and recall.

or (b) involves only the meaning expressed in radically changed phraseology. The "meaning" curve is so very different from the curve for the forgetting of mere rote material as to suggest the possibility of a largely different

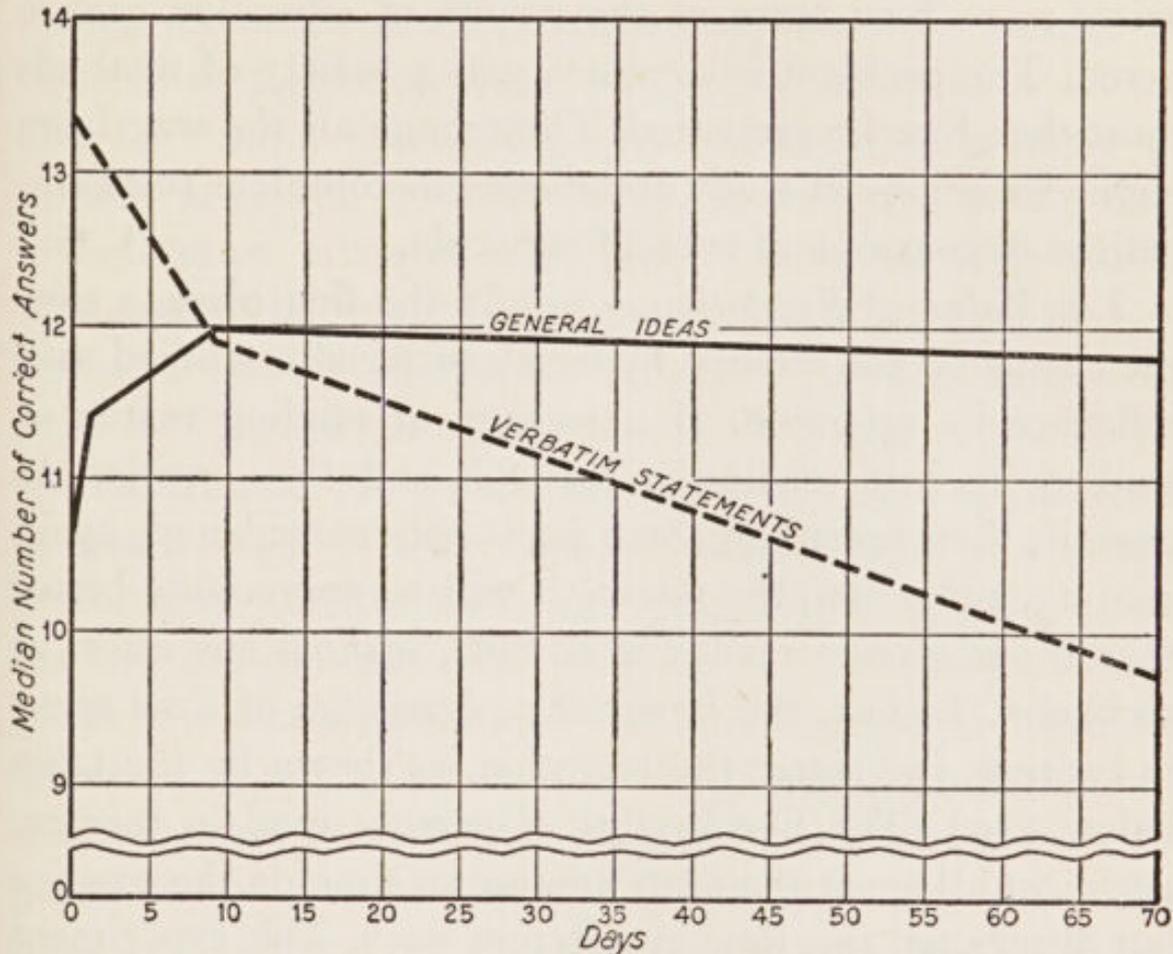


CHART 36.—Permanence of learning as shown by (a) recognition of statements taken directly from the text studied, and (b) recognition in altered terms of the general ideas of the text, over a period of 70 days during which four tests were given (modified from unpublished doctor's thesis by C. D. Killian).

process. The moral of these comparisons for school work should be obvious. Other things being equal, material will be remembered in proportion as it is meaningful, and it is the meaningful element in any given unit of subject matter which is best remembered. Learning will last in proportion as it is made significant to the learner. That a great deal of

subject matter is so rapidly forgotten is thus a tart comment on its value to the pupil.

METHODS OF CHECKING FORGETTING

The exceedingly practical and important question now arises as to how more of the results of education can be saved. The problem is complex, and a variety of methods must therefore be presented. They range all the way from slight variations in study techniques to complete reorganizations of courses and even of curricula.

The Value of Recitation.—(1) In the first place, a simple change in the method by which material is studied may influence its retention. If a passage of reading matter is studied by first reading it through and then reciting to oneself, then rereading those parts not remembered, again reciting, and so on, the retention will be appreciably better than if one merely reads and rereads, without any effort at recitation. In fact, the larger the percentage of time spent in reciting, the better the retention, as shown by the table below (19). The five groups of persons used in this experiment all spent the same amount of time on the passage but distributed this time in different ways. This experiment

TABLE 14: PER CENT OF A SHORT PASSAGE STUDIED BY FIVE DIFFERENT TECHNIQUES AND RECALLED BOTH AT ONCE AND FOUR HOURS LATER (19)

	Immediate Recall	4 Hours Later
All time devoted to reading.....	35	15
1/5 time devoted to recitation.....	50	26
2/5 time devoted to recitation.....	54	28
3/5 time devoted to recitation.....	57	37
4/5 time devoted to recitation.....	74	48

suggests strongly that a teacher may, by the simple technique of training children to recite to themselves, considerably increase retention.

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cult subject matter, however, distributed shorter periods of work are almost certainly better than cramming.

The "Whole" versus the "Part" Method.—(3) A third technique found to be valuable in certain types of learning is the use of the "whole" method for material that is to be used as a "whole"; under this method the learner reads a whole selection through over and over again instead of breaking it up into small sections and learning each part separately. Obviously, if the material to be learned is discrete information to be used later separately, such as the multiplication table, there is no advantage in imbedding these facts in a series so that a child may be forced to go back to the beginning of the table every time he wants to use any combination in it. However, in memorizing consecutive selections of poetry, the whole method showed a saving of time which increased with the length of the poem, as shown in the table (43).

TABLE 15: SAVING OF TIME IN THE USE OF THE WHOLE OVER THE PART METHOD IN MEMORIZING (43)

Lines in Poem	Saving of Time
20.....	1' 55"
30.....	3' 30"
40.....	3' 28"
50.....	4' 38"
60.....	17' 32"
120.....	29' 20"
240.....	83' 20"

The whole method also shows advantages in retention after a long time. Thus poetry learned by this method was recalled 53 per cent better at the end of a week, and 160 per cent better at the end of two years, than that learned by the part method (11).

Modern educational methods decry the use of memorizing, and it may seem as if the method here suggested were limited to purely memoriter material. However, there may be largely unrecognized applications to the studying of the usual reading assignment. All manuals on study methods advise the student to make a general survey of a chapter—noting the introduction, headings, and summary—before studying it in detail, in order that a survey of the entire treatment may be obtained. This process of actually seeing the entire chapter as a whole, gives not only a better understanding but also a better recollection of the material. Thus, in one experiment, skimming a selection before reading it resulted in a better retention, although the reading required less time (21), and in another instance (14), recognition of the outline structure of a passage increased comprehension appreciably. The experimentation along these lines has been very inadequate to date; but what there is, plus observation, suggests that the whole method, if the concept be enlarged to include considering any unit of subject matter as a whole, is superior in almost all fields to the part method.

If the reader will observe fellow students who are known to be either unusually good or unusually poor in their work, he will probably discover that the “good” students use one method or another to see sections of subject matter as “wholes,” whereas the “poor” student often spends his time exclusively on the details or on small units—that is, he uses a “part” method of work—and never gets a grasp of the interrelationships of the various ideas.

The Value of Overlearning.—(4) It is fairly obvious that one may hope to improve retention by overlearning,

in direct proportion to the degree of the overlearning. One experiment (30), although admittedly not dealing with the subject matter learned in school, shows an increased retention for all degrees of overlearning at all times from 1 to 14 days after the original achievement. Especially important practically are what may be called strategic overlearning and strategic review; the learner concentrates on those parts of the material with which he has trouble. In fact, review and overlearning should always be selective, and a major characteristic of the good learner is his shrewdness in selecting his weak points for strengthening.

The Strategic Spacing of Reviews.—(5) An examination of the curves of forgetting, especially those presented in Chart 34, suggests that, since the worst loss is within the first day, an immediate review might check forgetting; and this inference seems to be justified by experimentation (28). Thus, when a lecture was given and never reviewed, the class recall averaged only 24 per cent after eight weeks. But if a lecture was immediately followed by a five-minute review test, the recall after eight weeks was 50 per cent better. Not only is immediate review desirable, but reviews interspersed at later times will also help stem the tide; and short, intensive reviews at increasingly long intervals will serve to keep a function at a usable level of proficiency. Reviews spaced in an "ideal" fashion should probably be distributed in some such manner as that indicated in the following chart (48).

However, only material of undoubted value presumably should receive such treatment, for undoubtedly many items now included in practically any course might as well be forgotten.

It is curious that although Jones' striking work (28) was done ten years ago, almost no follow-up research has since appeared, and there has been almost no effect whatever in educational practice. Much more in education than in fields such as hygiene and sanitation there is a lag of practice behind knowledge.

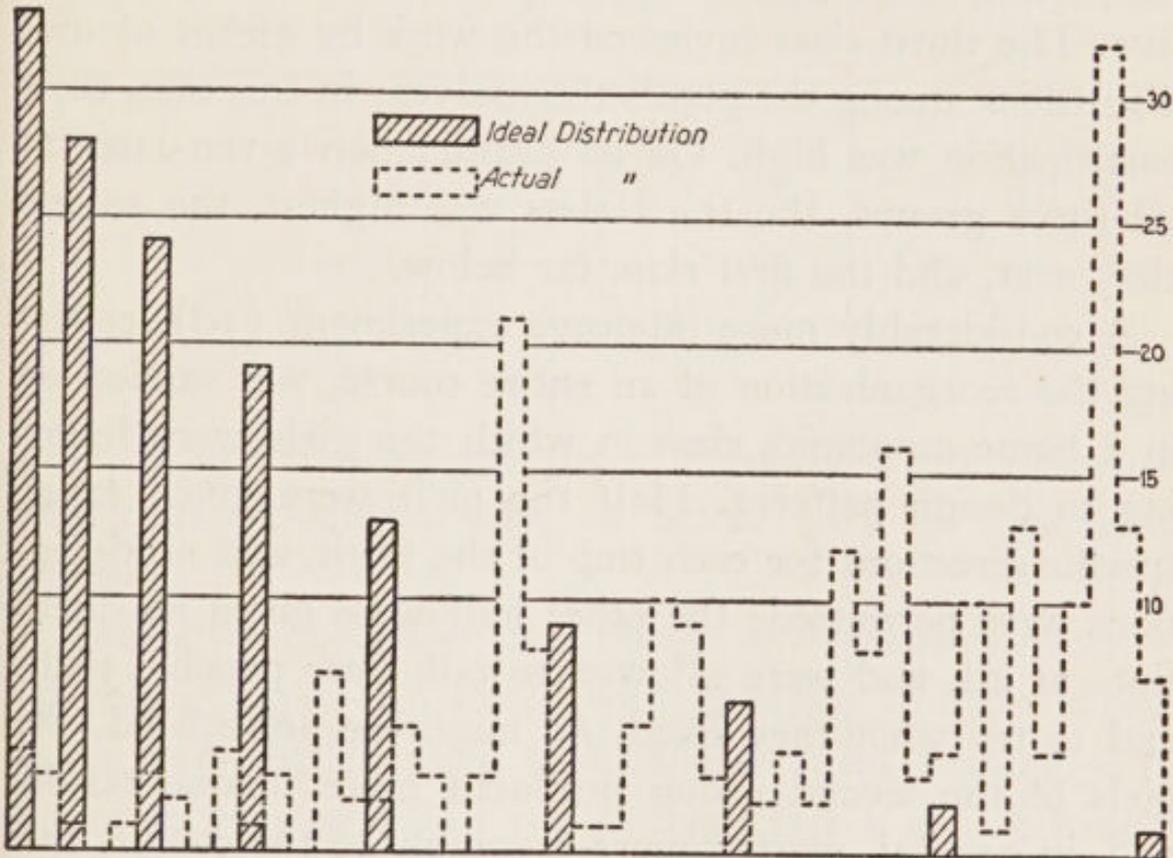


CHART 37.—Showing (a) the actual distribution of practice in a given book for 5 times 5, and (b) the "ideal" distribution of practice in learning (Thorndike [48]).

The Effect of Social Participation upon Retention.—
 (6) From various sources comes the conviction that active social participation by the pupil in classroom work is desirable. The following two experiments are of great interest in this connection. The first (15) dealt merely with three different methods of reviewing geography. The classes used were equated for grade, age, and ability; the

geography lessons taught were identical. In one class each child was asked to write a composition on the subject matter covered; this technique was, of course, purely individual and unsocial. The second class was given a review lesson by the teacher; the children participated slightly in this lesson, although their rôle was for the most part passive. The third class reviewed the work by means of oral discussions among the pupils themselves; in this case, their participation was high. On an examination given later to all three groups, the third class was highest, the second class next, and the first class far below.

A considerably more intensive experiment (10), covering the reorganization of an entire course, was carried on in a home economics class in which the girls were learning to design patterns. Half the girls were given exact, specific directions for each step of the work, and no deviations were permitted; the other half were given no directions at all, and were allowed to talk over possible plans and to try what they liked. As might be anticipated, the girls of the second group produced more unique results and, in general, reacted more favorably to the course. But the major question here is: Which group had the higher actual attainment at the end of the course, and which retained more of this achievement a year later? Again the results favor the students who participated more in their own training. The detailed facts are shown below. Special attention should be paid to the distinctly higher retention at the end of a year for those who planned and managed details for themselves. There were no very high or low scores in either group.

These results indicate rather clearly that a teacher may

TABLE 16: SHOWING THE PERCENTAGE OF STUDENTS TAUGHT BY (A) A DETAILED DIRECTION METHOD AND (B) A PROBLEM METHOD, MAKING VARIOUS GRADES ON A FINAL EXAMINATION (1) AT THE CLOSE OF THE COURSE AND (2) ONE YEAR LATER (10)

Grade on Examination	Close of Course		One Year Later	
	Direction Group	Problem Group	Direction Group	Problem Group
95-100.....	6	13	—	17
90-94.....	12	25	20	25
85-89.....	13	37	30	33
80-84.....	63	19	40	25
75-79.....	6	6	10	—

hope to improve the retention of pupils in proportion as she allows them to take an active part in their own training.

Intent to Remember as a Factor in Permanency (7).— Merely going over material without trying to learn it produces very little result as compared with reading with intent to remember. In one college class a list of twenty words was put on the blackboard and the students were asked to copy it without knowing that recall would be asked for. The same list was similarly copied by a second class but this class was told that recall would be demanded (the amount of practice in copying being the same for the two groups). On immediate recall the second class was 30 per cent better than the first, and on delayed recall over 50 per cent better. In another experiment the results differed according as the learners were told to attempt to remember for a short time only, or to try to retain per-

manently. In this last case, retention over a period was distinctly greater.

In the usual school the interest is only in retaining until the final examination. A major purpose of the general comprehensive examinations being introduced into many schools is to create more of an intent to permanent retention. Investigation is needed as to whether such results do follow, and here is one of the innumerable research projects which crowd upon the educational investigator. There should also be an investigation as to whether learning is greater in vocational or professional subjects because of the student's expectation of later using such material "on the job." Contrariwise is this question: how much does the feeling held by the average student, that much that the curriculum puts before them is worthless, contribute to its forgetting?

THE PRESENT STATUS OF "EDUCATIONAL ECONOMICS"

As pointed out at the beginning of this chapter, education may well be considered the "biggest business" in this country; and this chapter has summarized the available evidence as to what this largest national undertaking is actually accomplishing. The evidence has been found meager, and its implications not flattering. There remains the task of bringing the discussion to a head by reference to possible steps toward remedy of a total situation which from a "business" point of view can hardly be described as less than scandalous.

The Evidence Regarding the Results of Schooling.—The present situation may be briefly reviewed as follows: The available evidence regarding the retention of school learning shows a heavy loss as regards content one or two

years after a subject is studied, and even minimum essentials are often forgotten. Almost nothing is known about the permanence of larger understandings, points of view, and insight, which might be obtained in a course; in fact, there is practically no evidence as to whether the average student in the average class ever really does gain any such understanding or insight and so has any such values to forget. The same two conclusions were reached as regards possible elements of general mental training. And as to the end products of education in adult life, there was found such an almost complete ignorance as to suggest that educational investigators had either not really recognized the problem or lacked the courage for an attack upon it.

The above paragraph may seem caustic. It may be argued in particular that many products of education are below the threshold of recall or recognition but facilitate relearning; for example, the college student may have forgotten how to extract a square root, but he can quickly relearn if it is necessary for use in a physics course, because he originally learned it in the elementary school. Such results of drill and rote learning may last over long periods.⁶ But surely, in any considered educational economy, such values must be regarded with some suspicion. It may be possible to learn a thing, put it "on ice" and gradually revive it years later when and if needed; however, learning when needed would be more economical of total time and effort, and much more effective as regards motivation. The extent to which the less specific "logical" learning of the upper grades and high school may thus remain potential is not clear, nor is the degree to which there might be a transfer

⁶ Interesting here is the clever experiment of Dr. H. E. Burr (8), who read certain Greek passages to his small son, beginning when the youngster was only fifteen months old, and found that 90 hearings of a passage at this tender age reduced by about one-quarter the number of repetitions necessary to learn the passage when the subject was 8½.

of such potentialities, so that, for instance, Latin learned in the ninth grade and then forgotten might help with the French learned for a graduate school examination. Without denying the possibilities here, one may nevertheless be unwilling to be educationally complacent on the basis of them. A school may conceivably serve in still more subtle ways as an environment furthering intellectual development. But such possibilities demand further explication—and again must not operate as a basis for educational complacency.

Methods of Decreasing Educational "Depreciation."—The final question is as to what may be done in general to reduce the educational losses described above. The following suggestions are offered.

In the first place, in all these findings there are implications regarding the curriculum which have already been touched upon but which need emphasis. The average course may have too much material in it; especially it may have too great a load of detail. Its content may have so little relation to the student's extra-school experience as to obtain no support from this source. It may have so little relation to the student's felt needs as to stimulate little effort or interest in him to remember it. The writer believes the aggregate of these factors so important that he would put the major responsibility for the findings reported in this chapter upon the curriculum, and would consider curricular revision more important than improvements in methods of instruction.

In the second place, various improvements in methods of instruction are undoubtedly suggested. The emphasis of modern education upon pupil activity, socialization, and integration with pupil experience is clearly vindicated by research on the permanence of learning. Improved prac-

tice with reference to the distribution of learning, reviews, and methods of study should accomplish much.

Finally, there must be an "educational economics"—a considered and systematic effort to find out what the results of schooling really are—especially the long-time results. Until there is more educational accounting there will not be the information necessary for determining the means of improvement. In fact, the question of means for the appraisal of the results of education becomes so insistent that it will be discussed in the next chapter.

PRACTICAL SUGGESTIONS FOR TEACHING

The following suggestions are offered for helping pupils to remember their school work better.

- (1) Always try to present what is to be learned in such a way that it is sensible and as meaningful as possible to the learner.
- (2) Try to discriminate between essential and less essential things in the subject you are teaching. Once you have isolated certain essentials, try to have them considerably overlearned. Remember that underlearning is not worth while. Do not, on the other hand, attempt to bring about an overlearning of everything.
- (3) As you teach various subjects, teach efficient ways of studying in order that the material learned may be retained as well as possible. If you train children to recite their lessons to themselves, to avoid cramming and to spread their learning over a considerable amount of time, to use a "whole" method of attack in cases where such an attack seems warranted, and to review systematically and selectively, you will be building up resistance against the oncoming tide of forgetfulness.
- (4) Always try to organize knowledge so that children may see sections of the subject matter as being composed of related units. The better you and the children can organize what is to be learned, the better will be the resulting retention.
- (5) Let children participate in their own education in so far as they are able to do so. They are more likely to remember the solution of problems they originally thought out for themselves than those

that were solved for them. Self-activity is an aid not only to learning but to remembering.

- (6) Do not expect a 100 per cent retention! Rare indeed is the course of study in which there is not much worthless material. If the children you are teaching seem to be forgetting too much, examine the course of study before blaming either them or yourself. The human animal is too intelligent to remember what is utterly without significance to it.

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CHAPTER XII

METHODS FOR THE APPRAISAL AND DIRECTION OF LEARNING

THE previous chapter and Chapter IX on the progress of learning are based chiefly on results of "tests." In these two chapters and also in Chapter X on the control of learning, it was emphasized again and again that if the work of a class is to be efficiently directed—in fact, if it is to be directed at all—and if a pupil is to proceed intelligently in his own work, there must be information as to progress. When a student is in difficulty, it is essential that the means for locating the causes of his difficulty be available, and used. In the discussion of incentives it was reiterated that if an intelligent learner is to be adequately motivated, he must know where he is in his work, have some idea as to where he should go, and know his position in his progress toward such a goal. Every consideration, therefore, emphasizes the importance of a means for the appraisal and direction of learning, if learning is to be effective; and this means must now be considered.

In fact, it could almost be said that this volume is based upon the results of measurement. This should not seem strange if one considers that textbooks in physics or chemistry consist almost entirely of the results of measurements; without such results, texts in these subjects would almost be inconceivable. That either educational research or educational practice can proceed without having measurement as a core is an indication

of the relatively undeveloped state of educational theory and method.

In considering the material of this chapter, the reader should be conscious of its outstanding importance. He should also realize that work in measurement, being relatively new, still has many faults, includes much that is poor, and is therefore open to criticism. And he must not be misled by the weaknesses of much of the present work in the field, and the entirely valid character of much of the criticism, into the assumption that the whole subject is unimportant, or its potentialities slight. In fact, one might almost say that the amount of criticism is a good indication of the importance of the whole problem. And if he is to be contented in his thinking to deal only with what is generally accepted, he must be a slow conservative who is ten years behind the times, and runs the risk—as happened to conservative physicists when the relativity theory appeared—of finding that he does not know what everything is about.

Two general methods of appraising and directing learning must be recognized. The first section of this chapter will deal with various methods of inquiry developed by the teacher—the essay-type examination, the teacher-made objective or “new-type examination,” the oral quiz, and the individual interview. The second section will deal with efforts based on research to devise more adequate methods of appraisal and analysis than any one teacher could well produce—it will deal with that much-discussed topic, the so-called standard test. A third section is concerned with tests of interests and attitudes. The final section will aim

to review briefly the services which these various types of material may render in furthering the work of the school.

TEACHER-MADE METHODS OF APPRAISAL AND DIRECTION

Familiar to everyone are the first and third types to be considered in this section: the essay-type examination and the oral quiz; the teacher-made objective test is rapidly coming into use, and a few teachers make systematic use of the interview. All four methods of inquiry have the advantage that, since they are carried through by the teacher, they can be made to cover just the subject matter, and stress just the items of information or points of view, that she has developed in her teaching or wishes to investigate. Obviously, all are limited by her own limitations; the selection of material, the ways in which the questions are put, and the ways in which they are appraised, can be only as good as her knowledge and available time permit her to make them. These considerations must be kept in mind throughout this section, and will be returned to.

The Essay-type Examination.—This type of quiz, which is familiar enough, consists of a short list of questions to which the student writes out his answers. These questions may be challenging and thought-provoking—as instanced by an examination in American history which still sticks in the writer's memory even after the passage of years.

1. Give evidence to prove that the Civil War had purely political causes.
2. Give evidence to prove that the Civil War had purely economic causes.

That was all, for a three-hour examination. The advantages are easy to see. These questions required a spon-

taneous organization of large amounts of subject matter; everything read or discussed in class for an entire year had to be reviewed mentally, the items relevant to each question selected, and then coordinated into a sufficiently coherent presentation to "prove" a given point of view. It need hardly be stated that such a review and reorganization has merits, as do questions such as the following:

1. Trace the development of the court fool as a comic character in English drama.
2. Compare the embryonic development of the cat and the human being.
3. Discuss the outstanding problems of reading in the light of modern research.
4. How could you make practical use, in your daily life, of your knowledge of the law of diminishing returns?

The proponent of the essay-type examination argues that such questions make the student think, and organize his information. No one would have serious objection to this statement—except in its implications that questions of any other type require no thought at all. But the teacher using such an examination is beset by difficulties. She can ask only a few questions because so much time must be spent in writing out answers; her sampling of the total material taught is therefore likely to be small, and the evaluation of the pupils' answers is almost sure to be extremely difficult. The teacher may be in somewhat the position of the professor who asked the two questions above on the Civil War; as another professor said, the questions were excellent, if they could only be answered! In any case, the teacher is faced with the necessity of reading and grading the productions of her pupils.

Various bits of research have been undertaken to find out how reliable the grading of essay questions is. For instance, a paper in geometry was sent out to 116 geometry teachers (37) with the request that they grade it, on a per cent basis, as they would if it were an examination in one of their own classes. The grades varied from 28 to 91. A final examination in high school freshman English (35) was graded from 50 to 95 by 142 English teachers; an examination in American history (36) received marks ranging from 42 to 90. A college freshman English examination (34) was marked 20 by one instructor and 68 by another in the same department; another paper was marked 72 by one instructor and 91 by another. Many such investigations have been made, and with similar results. One might perhaps think that the same instructor would at least agree with himself, but even this is not so. When instructors regrade papers after a lapse of time, their second series of marks is practically certain to change the standing of many of the pupils. The greatest weakness of the essay-type examination lies in the impossibility of deriving from it a reliable score.

The essay-type examination not only yields scores that vary tremendously from teacher to teacher, or from time to time for the same teacher, but also involves various factors not intended to influence the score, or at least not in the way they often do. The following episode is of interest in this connection.

Two college freshmen reviewed together a course in European history. Alice quite evidently had studied well during the term and had a large assortment of facts; Dorothy's knowledge was distinctly sketchy, and she finished the reviewing in

a depressed frame of mind because of her own shortcomings. The next day the two girls took an essay-type examination, which consisted of five quotations from famous authors concerning the period covered. The class was supposed to show how these quotations applied to the period, and to come to some judgment as to the adequacy of each as a characterization. On this examination Dorothy made an A, but Alice failed. Why? To begin with, Dorothy had a clear, legible handwriting, whereas Alice's scrawl tested everyone's patience. Moreover, Dorothy was quick to adjust herself to the unexpected, while Alice tended to be thrown into a panic—and questions of the type asked were not at all what the two girls thought they would meet. Then, too, Dorothy wrote easily and fluently (largely as a result of her father's training, in that he required some bit of written work every day throughout her childhood and early adolescence), but Alice composed slowly and with awkwardness. Dorothy had a further actual advantage in answering the type of question presented because she knew so little that systematization of what she knew was easy. Alice knew so much that the task of selecting appropriate items for each question, and of organizing them into a coherent answer, was difficult and time-consuming. A final difference in success lay in the standards of work shown by the two girls. Alice was an able and conscientious student, considered all sides of a proposition before coming to a conclusion, and held herself to unusually high standards of work. Dorothy was content with an approximation of accuracy, was far from industrious, rarely hesitated between two points of view because she so rarely knew there were two, and had a keen sense for dramatic incidents. The reasons for her success are, then, as follows: she wrote legibly, she had an alert but not profound mind, she had been given a long and strenuous training in written presentation, she knew so little that systematization was relatively easy, she used dramatic incidents instead of a serious discussion of historical developments, she was untroubled by the hesitations that come with real understanding,

and her standards of work were low. Poor Alice knew too much, understood too deeply, and was too serious-minded.

All too often the scoring of the essay-type examination is influenced by such factors as presented in the above. Almost inevitably the ability of the student to compose is an important element—and woe betide the pupil who writes slowly, with effort, and with many an error! It is a rare teacher who can remain unimpressed by a fluent presentation—although skill at composition should presumably not be allowed to gain a student substantial extra credit in geography, science, or history.

The examples of essay-type questions given at the beginning of this section were of the thought-provoking type. But all too often such questions call merely for information—and that of an unimportant character. The student is asked to name five important battles of the Civil War, or give the provisions of the Missouri Compromise, or “regurgitate” the causes of the War of 1812 exactly as given in the text. Such questions obviously do not involve the distinctive merit of the essay-type question—its thought-stimulating potentiality—and have little justification from any larger educational point of view.

The essay-type examination, then, has these advantages: (a) It can be made to exhibit the student's capacity for organizing material and for thinking independently, and (b) it gives him an opportunity to show what skill he may possess as regards clearness and effectiveness in the expression of his ideas. Moreover, (c) if the teacher will carefully study a pupil's answers, she will often obtain valuable insight into his methods of thinking and his personality. However, even at its best, it has the following faults:

(a) Various irrelevant factors, such as speed and quality of handwriting and ability in English composition, almost always influence the teacher's appraisal of the pupil's grasp of the subject matter in question. (b) Even though the above-mentioned factors be allowed for, nevertheless the great variations in answers from different pupils, and the lack of definiteness as to what may be considered satisfactory or inadequate, make a definite appraisal of the merit of any answer almost impossible. Furthermore, (c) in proportion as the topics dealt with are such as to call for effective organization and fineness of expression, they must be such that only a few questions can be asked; the examination is therefore likely to be limited in its scope.

The essay-type examination can obviously be improved in two general ways. In the first place, the teacher should carefully consider just what she desires the students to obtain from her work, giving special attention to objectives as regards organized understanding and points of view, and she should phrase her questions very carefully so that they may yield information about her students of the type she desires. And in the second place, she should with equal care plan her grading of the papers so that her appraisal will be less casual and more systematic than is ordinarily the case. When she formulates her questions, she should jot down what she wants as answers, listing the points she thinks should be covered and the insight she hopes that the pupils will display. When she begins grading, she should first sample the papers to obtain some perspective as to what the students actually have done, and to discover any misconceptions which her questions may have aroused. If she will take these precautions, she will find the essay-

type examination distinctly useful in yielding the special types of information mentioned above. And if she will have patience to annotate the pupils' answers carefully and to discuss the papers with the class, the examination can be made highly educative, as will be emphasized later, and can serve as an excellent basis for review in the selection and knitting together of essential facts, and as an evaluation of thinking.

It is unfortunate that the preoccupation of educational investigators with objective tests has diverted attention from the constructive potentialities of the essay-type examination (33). Procedures for the improvement both of the questions and of their grading, along such lines as suggested above, could be developed, and standard series of essay-type questions,¹ with systematized methods for evaluating answers, could be developed. With these series, valuable research regarding larger outcomes of education as to development of ability to think and organize would be possible. Wanting such series, a teacher will find it worth while to build up a card index of good essay-type questions, putting a question on each card, with notations as to answers. Over a period of years, a valuable set of questions could be accumulated, which would progressively improve her examinations as well as save time and trouble, once a good beginning had been made.

The Teacher-made Objective Test.—The outstanding fault of the essay-type examination is the unreliability of the grading; also serious are the undue influence of a pupil's ability in handwriting and English composition, and the relatively limited scope because of the small number of questions which can be covered. As a means of avoiding

¹ The old Hahn geography scale, with questions arranged as to difficulty, after the fashion of the Ayres spelling scale, is suggestive in this connection.

such faults—and gaining certain advantages not yet mentioned—the so-called objective tests have in recent years received a great deal of attention (29). Most common are true-false and multiple-choice questions. The following examples show the directions and first four items from two such tests.

DIRECTIONS: Read the statements below. If you think a statement is true, put a T in the parenthesis in front of it; if you think a statement is false, put an F into the parenthesis.

- () 1. An individual test is one that can be given to an entire class of pupils at the same time by one person.
- () 2. I.Q. is the abbreviation for intelligence quotient.
- () 3. Many serious problems of juvenile delinquency are caused by the character of our present school system.
- () 4. The grade system of annual or semi-annual promotions has failed to produce homogeneous groupings in the public schools.

DIRECTIONS: After each of the following questions there are five answers. You are to copy into the parenthesis before each question the letter of the answer you think is *best*.

- () 1. What does a plateau in the learning curve represent? (a) a great increase in improvement, (b) a gradual increase in improvement, (c) a period of no evident improvement, (d) an ascent to the physiological limit, (e) a period of marked loss of skill.
- () 2. If five children made the I.Q.'s listed below, which would you classify as "dull"? (a) 100, (b) 55, (c) 89, (d) 120, (e) 78.
- () 3. What would you consider the best adjustment for a brilliant child? (a) to let him progress through school as fast as he conveniently can, (b) to keep him in the normal grade for his age and give him the regular amount of work, (c) to let him use his spare

time to teach other children in his room who are having trouble with their work, (d) to provide an enriched curriculum and slight acceleration, (e) to give him twice as many problems of each type as are required from the child of average ability.

- () 4. Which of the following would you think the best way to bring about improvement among all the pupils of a class? (a) to promise a prize to the three children who show the most improvement each month, (b) to tell children the successful ones would be promoted and the unsuccessful demoted, (c) to reprimand those children who do not seem to be trying, (d) to promise a prize to the pupil who stands highest at the end of the year, (e) to remind the pupils every day that those who do poorly will be punished.

It will be noted that these questions are so arranged that the answers appear in the left-hand margin, thus putting them all in a column where they can be easily scored by comparison with a strip of paper on which the correct answers are indicated. It will also be noticed that although the first two questions in each case are informational in character, the second two examples call more for judgment.

Such questions can evidently be graded definitely as right or wrong (the grading is "objective," as compared with the "subjective" grading of the essay-type examination). Writing is eliminated, and consequently the factors of speed and quality in handwriting and ability in English composition are not involved. Finally, a pupil can answer a larger number of such questions in a short time—often as many as 200 in 50 minutes—and in consequence the test can cover a much wider range of material than an essay-type examination. There are further advantages. Such ques-

tions are obviously much easier to grade than an essay-type examination. Because the grading is highly objective, a teacher can compare different classes, or a principal can give the same test throughout his school and make comparisons. Moreover, such tests have definite advantages from the point of view of teaching. If, after the test has been graded, the teacher returns the papers to the class, the objectivity of the test permits each pupil to find exactly where he made his mistakes and to discuss specifically any point about which he is not clear. Here is a very important, though often neglected, pedagogical value; a low grade on an essay-type question usually leaves a pupil in the dark as to what was wrong with his answers, whereas with the objective test he knows exactly where he and the teacher differ.²

The true-false and multiple-choice forms exemplified above are most common. However, various other forms may be used. Closest to the essay-type examination in general character is the single-word-answer question, such as "By whom was America discovered?" Related to this is the completion test, consisting of such items as "The effect of the high tariff is to prices and trade." Evidently these questions are somewhat harder to score, since they involve writing and since there is sometimes doubt as to whether the answer the pupil gives is correct. Other objective forms may be used according as the subject matter lends itself conveniently. Thus a grammar test may be in the follow-

² It should be realized in this connection that the definiteness of the objective test cuts both ways—if a teacher makes errors in grading, the pupils can catch her; and if a question is ambiguous or her "right" answer not really a good answer, they can easily raise the issue with her. Essay-type examinations permit her to "get away with" poorly framed questions and careless marking because she can hide behind vagueness and generalities.

ing form, the pupil being told either to underline the right word or to cross out the wrong: "The doctor arrived (to too two) late to save the man's life." Various cross-out forms may be used, as the following: "Which thing does not belong with the others? Ohm Volt Erg Ampere." For certain purposes a matching test as illustrated in the excerpt below³ may be valuable.

In the space before the title of each piece of literature, write the number of its author as given in the list to the right.

..... Tam O'Shanter	1. Browning
..... Don Juan	2. Bulwer-Lytton
..... Ode to Duty	11. Stevenson
..... Travels with a Donkey	12. Wordsworth

Not only information and judgment but even such qualities as æsthetic sensitivity may be investigated by objective tests, as will be illustrated in Chapter XV.

Objective examinations are most commonly mimeographed, and the blanks given to the pupils to mark. However, separate answer sheets or cards are now coming rapidly into use. Various printed slips have been designed for this purpose, carrying numbered answer boxes so that the pupil need only write "T" or "F" (or the number of the answer he thinks right for a multiple-choice question) in the appropriate box, to indicate his answer.⁴ Such answer

³ Adapted from Ruch, R. M., and Rice, E. A., *Specimen Objective Examinations*, Scott, Foresman and Company, 1930, 324.

⁴ A discussion of these and other labor-saving devices in education will be found in reference 21. As pointed out in references 21 and 28, it is entirely possible both to give and score tests, and to do certain types of teaching by machines. Labor-saving devices may soon become as common in schools as they now are in banks; much educational drudgery (such as paper-grading) may thus be eliminated, and educational efficiency decidedly increased. There may even be something of an "industrial revolution" in education. The topic is potentially so important that it will be returned to in the last chapter.

units permit a mimeographed or printed test sheet to be used over and over again because the papers are not marked—all information being put on the cards; or the questions can be written on the board, or even read to the class, the pupils recording their answers on the cards. Furthermore, the answer slip is more easily filed for record and future reference than the entire mimeographed test blank.

In making objective tests, the usual procedure is for the teacher to go through the chapters or other material to be covered, jotting down such items as seem important to her and can be thrown into some objective test form. After a rough draft is made—a considerably larger number of questions being put in the preliminary form than are desired for the final tests—the whole series is carefully gone over for phrasing and worth-whileness, and doubtful items are thrown out. The formulation of objective questions will be found difficult at first, but with practice a teacher will develop skill in it. However, it is not necessary that she formulate all the questions herself, for she will find it both educative to the pupils and helpful to herself to require them occasionally to construct a few objective questions on the class work. After a little practice, many pupils learn to make excellent questions of this type, and they enjoy the work. Furthermore, a much greater variety of questions and phraseology will be obtained than when one person—the teacher—makes up the entire examination. Every good question should be kept on a 3 x 5 card, and a file of objective questions thus built up.

In making such questions certain common mistakes must be carefully guarded against. Questions must not be made so obvious that they can be answered by anyone with common

sense or shrewdness. Particularly there must be the effort to formulate judgment questions, not simply questions on bits of unimportant information. In making multiple-choice questions, adventitious cues such as making the right answer longest must be avoided, and wrong answers must not be so absurd that no sensible child would check them.

The teacher-made objective examination has the following advantages: (a) Grading is objective. (b) Such factors as ability in handwriting and English composition are eliminated. (c) A large number of questions can be covered in a relatively short time. (d) Grading is easy. (e) Because of the objective grading, comparisons between different classes, grades, or schools are possible. (f) Because of the objectivity of the material, specific errors in the work of the pupils (or the teacher) can be readily determined. The method is evidently valuable, and with the gradual development of improved techniques and of files of good test items, it will be increasingly used.

Two misconceptions regarding objective tests remain to be disposed of. It is often said that these tests are artificial and somewhat beside the point, since they call only for the discrimination of the right answer and not for recall. But in everyday life such discriminations are very common; somebody makes a statement, and one must decide whether or not it is true; or several possible alternatives are being considered, and one must decide which is best. The objective test is really not so artificial after all. Much less common in everyday life—in fact, almost never occurring outside the schoolroom—are such questions as “List the five most important causes of the Civil War,” or “Discuss the character of Benedict Arnold.”

It is also sometimes declared to be dangerous pedagogy to put a wrong statement before a pupil. This would appear to be true only in case a wrong statement is presented under such

circumstances that it will be considered right. In a test this is not done; instead, the question is raised for each statement as to whether or not it is wrong. And if the papers are returned to the children, especially if they are gone over and discussed with the class, no educational harm would seem to be done. In fact, there is some evidence (29) that if a pupil makes a mistake on an objective question and has it corrected, he is more likely to remember the right answer than if he marks the right answer in the first place.

The Oral Quiz.—Most common of all methods of appraising a student's progress in a subject is oral questioning. In this a teacher presumably also has other purposes—she tries to stimulate discussion, to “make the student think,” to arouse interest. But, more or less explicitly, she usually has in mind this purpose, that she aims to give the student something of a brief oral examination to find out how well he understands his work. The issue then is as to the adequacy of oral questioning and answering for such purposes.

It should be obvious that if the questions of an essay-type examination are often carelessly framed and subject to misunderstanding, the more off-hand questions of an oral quiz are likely to have these faults to an even greater extent. And similarly, if appraisal of the written answers of an essay-type examination is difficult, that of oral answers will be even more rough and ready, inexact, and subject to error or the possibility of false impression. Since speech is more rapid than writing, more ground can be covered in a given amount of time. But the quizzing of any student is usually so brief as to more than offset this advantage. There is the further adventitious factor that differences between pupils in readiness or embarrassment when speaking before a

group all too often play an important part in determining the adequacy of the reply.

It is unfortunate that there has been almost no research regarding the adequacy of the oral quiz. However, an investigation of the trustworthiness of oral examinations, such as are often given in a graduate school or in connection with undergraduate programs for honors, is suggestive in this connection. In this bit of research (23), a graduate student was given four separate fifty-minute oral examinations on the same topic (the content of a brief master's thesis) by four different faculty committees, each consisting of two members. Two stenographers concealed in adjoining rooms kept a verbatim record of all the questions. The great variety of questions which may be asked by different teachers in dealing with the same topics was exhibited by the fact that only two questions were common to as many as three of the four examinations. And the extremely different conclusions regarding a student's knowledge which may be reached by different examiners was dramatically shown by the fact that the grades given this student by individual committee members ranged from 40 to 95; even after the two members of each committee had carefully discussed the examination, the committee reports varied from 50 to 90. Two committees passed the candidate and two failed her.

In another investigation (24), six different graduate students were each given a forty-five minute oral examination on a college course on the Psychology of Adolescence by three different examining committees, each made up of four other graduate students. Again there was great variation in the ratings given by the different judges; one put a "candidate" at

the bottom of the scale, while another put him next to the top. And the carefully considered committee ratings differed almost as greatly. A student might be considered excellent by one committee and very poor by another—the different committee ratings correlated only .30 with each other, and the correlation of these committee ratings with the grade in the course was only .47.

This strangely neglected problem of the reliability of the oral quiz should, therefore, be kept in mind by the teacher. She should realize that it is easy to form a false impression from an oral quiz or recitation, and she should try to frame her questions carefully and be very cautious in marking on the basis of oral recitation. She should always avoid sarcasm and try to keep such a spirit in the classroom as will permit ready expression on the part of the student.

The Intensive Individual Interview.—One last exceedingly valuable and much neglected method of investigating a student's understanding of a subject remains for brief discussion. If, when a pupil is having difficulty with some phase of a subject, a teacher will have the patience and persistence to inquire intensively, in a friendly, private interview with the youngster, about this work, endeavoring to get the student to "think out loud," exceedingly valuable insight may often be obtained. For example, a child may be having trouble in arithmetic, in adding. If he is asked to work out loud, it may be found that when he attempts to add he searches for pairs of numbers which will combine to make 10, rather than figuring straight up the column; or he may surreptitiously count on his fingers. An investigation under the writer's direction employed this

procedure in trying to find out the causes of pupils' errors in capitalization (22). It was found, for instance, that one girl wrote "A tale of two cities is a very interesting story," because she thought that the title was a part of the sentence and therefore called for no further capitals. A boy wrote "God Bless us," because he thought that if God should be capitalized, so also should things God does. One girl put in many capitals because she thought them prettier than small letters. A boy whose name commenced with Q always began words starting with Q with a capital because he was so used to writing the capital Q. Even in the ninth grade a few children were found who failed to use certain capitals because the capital letter called for was unusual and they did not know how to write it.

It may be said, then, that such a method of intensive individual interview can be exceedingly illuminating as regards pupil difficulty, and should be more often used, in attempting to locate these difficulties, than is ordinarily the case.

THE STANDARD TEST

The previous section has discussed teacher-made methods for the appraisal and direction of learning. The question now arises as to what educational research and ingenuity have been able to accomplish in devising improved instruments for purposes of such measurement. There have been marvelous developments in the past twenty years—developments so remarkable that they have changed the whole course of educational thinking, made possible scientific education, and put in the hands of the teacher instruments of great value and convenience for facilitating and improving

her work. What are the distinctive characteristics of these "standard" tests?

Characteristics of Standard Tests.—The most important and distinctive characteristic of a good standard test is this, that the material is carefully selected on the basis of curricular research, with reference to objectives in teaching the subject. For instance, spelling scales are made up on the basis of elaborate counts of the frequency of the use of different words in the actual writing of both children and adults; and only those words are included which are used often enough so that the average individual's need to know how to spell them seems unquestionable. Tests of grammar include only those mistakes which analyses of thousands of children's compositions have shown to be common—and also only the mistakes which authorities on grammar and philology consider serious. Arithmetic tests cover only such calculations as are actually frequently made in daily life. History tests aim to cover only such topics as the analyses of newspapers, magazines, and books discussing current problems show to be important. Tests in French include only the words shown to be common by elaborate counts of words occurring in French periodicals and literature. A teacher has only her judgment to aid her in selecting the questions she uses in her own tests, but the good standard tests are based on years of research, and they aim to find those items which are most significant and important in the subject concerned.

A great variety of problems must often be investigated. In making a spelling test, the question must be answered as to whether derived forms, such as *playing* and *played*, must be tested separately or whether only the word *play* need be in-

cluded. In making a grammar test it is not enough to know that children make mistakes on the principal parts of verbs; the maker of the test should know which verbs and which forms of those verbs cause trouble. In an arithmetic "reasoning" test the problems must be practical problems which are met in everyday life, and the vocabulary used must also be simple and practical. History tests must not only use important historical facts but must use them as bearing on important historical or social issues. Every bit of every item must be significant. Thus, in making a multiple-choice question, the wrong answers should be mistakes which pupils often do make.

Moreover, a standard test must be arranged with great care so that the directions are clear and unambiguous, each question is properly phrased, and the scoring so objective and simple that error cannot easily arise. As a result, the test can be given by different teachers so that results from different classes, cities, or parts of the country can be compared, and norms or averages showing the performance of children in general can be obtained. Entire school systems can thus be "surveyed," and elaborate educational experiments can be carried on.

Norms, showing the results for thousands of children in representative schools, are usually, though not always, given. A teacher can thus see how her class compares with similar classes elsewhere. There may be separate norms for fast, average, and slow sections. Standards may also be included—statements, in terms of the test, of what *should be* attained. For example, by measuring the quality of handwriting required of clerks in business houses, it was found that "quality 60" on the Ayres Gettysburg Handwriting Scale was adequate for all practical purposes; "quality 60" thus becomes a goal which pupils should reach, but beyond which it is hardly profitable to go. Such standards are evidently highly desirable

wherever they are possible. Within a school, standards for admission to a "fast" section may be worked out. A college student may be given credit for freshman English if he reaches a certain standard on a series of English tests; or passing all the items of a test in minimum essentials in English grammar may be made prerequisite to full admission to a beginning course in French.

Finally, such tests are carefully planned in order to save the teacher time and trouble and be a convenience to her. The fact that the questions are already prepared and printed is in itself obviously a great help. Directions to the pupils are printed on the test blank—directions which have been carefully tried out to make certain that they are adequate. Every detail of the test is planned so as to make its use easy. Scoring keys are so printed as to reduce eye work in grading, and methods by which the pupils can grade their own papers may be included. The blanks are of a convenient size for handling. Special record sheets are provided so that results can be easily and accurately tabulated. There are tables of norms, and other interpretive material, so that it is easy to interpret the results.

Thus, tests of two or three hundred questions may be taken by a class in forty minutes,⁵ a paper scored in three minutes, and results tabulated in ten minutes. The findings of a survey of an entire school system can be assembled in a few days of simple clerical labor. Such convenience was undreamed of thirty years ago.

Types of Standard Tests.—Somewhere around fourteen hundred standard tests have thus far been built. There are tests in almost every school subject from the first grade

⁵The writer's X-O Test, Form A, consists of 600 items, and can be covered by a high school student in thirty minutes.

through college. Almost every conceivable size and shape of blank has been tried. Great ingenuity has been shown in devising different ways for presenting problems, scoring, and handling and interpreting results. Tests have been devised for a great variety of purposes. The whole field is in a confusing state of stimulating, vigorous, multifarious development.

An extensive collection of tests in the writer's laboratory ranges from simple little reading tests for use in the first grade to elaborate examinations in university physics, psychology, and foreign languages. There are tests in shorthand, the use of dress patterns and the making of button holes, and the operation of machine tools, in agriculture, in music, in art, and in appreciation of poetry. In the "museum" are tests in Sanskrit, in French, Spanish, and German, in Chinese, and in Braille (the raised type for the blind).

And besides tests in the school subjects, there are (as will be described in the next section) tests for investigating interests, attitudes, prejudices, and emotional traits, for measuring honesty, persistence, and cooperativeness, and for studying emotional characteristics. Numerous trade tests have been devised for use in the business world. And, as mentioned in an earlier chapter, there are a great variety of tests of general ability, for use from infancy to adulthood, as well as tests of special ability in language, or mathematics. Tests may be of the pencil and paper type, or may involve actually doing things—putting together mechanical devices, or using certain tools.

In spite of the great variety, however, tests in the school subjects may be roughly classified as of three general types, with reference to the uses they may serve. These types are general, diagnostic, and practice.⁶

⁶The only way for a student to gain an understanding of the nature of tests is for him to look over actual samples; excerpts reprinted in a

What, then, are general tests? They aim to cover in a general way (somewhat after the fashion of a final examination) a whole subject or section of a subject. Thus the Compass Survey Test in arithmetic includes some exercises in addition, subtraction, multiplication, and division of whole numbers, and common and decimal fractions, also some work with denominate numbers, and some problems. Not enough work on any one of these topics, such as division, is included to give an adequate and reliable indication of the extent of a pupil's knowledge of that topic—much less to make it possible to diagnose any special difficulty which he might have. But there is enough for the total score to give a reasonably good measure of his total ability in arithmetic.

Such a test is useful to a superintendent who wants to know how the pupils in his elementary schools are progressing in arithmetic as compared to the norms for the test. It is useful also to the supervisor who wishes to compare the teaching technique used in one class with that used in another, because she is interested in the standing of the classes as wholes, rather than in the ratings of each child within the groups. The teacher also may find use for a general test at the beginning and end of a semester's work. Suppose she teaches the fourth grade, and that on the

text are of comparatively little value. The instructor is therefore urged to have sample copies of various representative tests, such as are mentioned in the following pages, available for examination by the class. He should have himself put on the mailing lists of such publishers of tests as the World Book Company (Yonkers, New York), the Public School Publishing Company (Bloomington, Illinois), and the Teachers College Bureau of Publications, Columbia University, New York City. Two or three of the unusual tests, such as a test from abroad or a test in Braille, might well be included for their interest value.

opening day of school she finds 38 more or less eager children awaiting her instruction. The best start she can make is to find out what they already know, so that she can tell where to begin her work. She therefore gives general tests in reading, handwriting, spelling, and arithmetic, and finds that her group does well enough in arithmetic and spelling but that their reading is very poor, while their handwriting varies all the way from complete illegibility to a quality well above the standards of adult need mentioned in the previous section. From this preliminary survey she finds those children who are in need of individual attention in each subject, and those who are already so advanced that they will require special assignments to keep them from being utterly bored; and she also finds out in which subjects more detailed testing is needed. In the instance above it is clear that she especially needs to know more about the children's inabilities in reading.

Usually the first tests in a field are of the general type; there are in consequence general tests in almost all the school subjects. All too often such tests are based on text-book analyses rather than more fundamental curricular research, but in any case the material is better selected, and more carefully arranged, than any test which the teacher could make. Several general tests should be looked over (most of the tests on high school subjects are of this type); also such instruments as the Ayres Gettysburg Handwriting Scale and the Lewis or Willing Scale in English Composition.

Although a general test is useful to a teacher in the above ways, it is particularly useful to the superintendent, principal, or supervisor. The "teacher's test" is the diagnostic test. These tests are highly analytical; they aim espe-

cially to "diagnose" a pupil's difficulties so that his teacher will know how to remedy them. James may be having trouble in addition in arithmetic because he does not know how to "carry." The addition tests of the Compass Diagnostic Series include a subtest dealing especially with carrying; and if this test is given to the class, the teacher can readily locate all the youngsters who do not know how to carry. If James' difficulty with addition continues even after he is given help in carrying, she may use the Buswell-John Individual Diagnostic Test. This consists of a series of examples carefully chosen so as to reveal any obscure misunderstandings or faulty procedures which may be hampering a pupil. The teacher then keeps James after school for a few minutes and has him "work out loud" the problems in addition. She may find that he knows only a few of the addition combinations, and most of the time counts on his fingers instead of really adding. She then knows that she must go back and teach him the addition combinations he does not know. Without the tests she might not discover his difficulties at all, or at least not until well into the semester's work; meanwhile James has been habituating himself in these bad habits, which he probably does not recognize as such, and is becoming more and more discouraged. With the tests, she can find out during the first two weeks of school just what is wrong, and set about at once to deal with the trouble. Good diagnostic tests are the prime means by which a teacher can solve her instructional problems.

Since to make a good diagnostic test requires extensive analytical research regarding pupil difficulties in a subject, there are unfortunately as yet relatively few such instruments.

In handwriting the writer's chart for analyzing illegibilities may be mentioned, and the Newland Chart for analyzing illegibilities in writing arabic numerals. In reading may be mentioned the writer's and the Gates Diagnostic Tests, the Pressey test of fundamental reading habits is an individual diagnostic scheme somewhat analogous to the Buswell-John Arithmetic Test. In the high school subjects little of this sort has as yet been done, though such tests are much needed. The American Council Alpha and Beta Tests in the Modern Languages permit a rough diagnosis.

If the diagnostic tests are called the teacher's tests, the practice tests may be called the tests of special significance for the pupils. They are an attempt to use the test method so as to provide maximal opportunity for pupil self-direction—to provide each pupil with means for systematic self-diagnosis and self-instruction. Historically important and largely representative of these are the Curtis Practice Tests in Arithmetic. The series is begun by having the class take a test covering the first twelve lessons. Those pupils who get this work correct skip these first twelve lessons. The pupils who do not "pass" must work on each lesson until they can do it correctly in the time allotted; if after four days' trial they still do not pass, they are to ask the teacher to find out their trouble.

Such materials evidently provide that each pupil shall work on that portion of the subject matter with which he has difficulty. Certain practice series begin with a diagnostic test keyed to the practice exercises so that a pupil can turn at once to those exercises involving topics on which he made errors in this initial test. Each pupil progresses at his own rate; each one knows his progress and knows what he has yet to do; some series require that each pupil keep a graph

of his progress. In fact, the good practice test outfits might in many respects be called the finest fruit of the testing movement, for they make available *to the pupil*, in compact and maximally usable form, the values of tests and the results of research on the curriculum and the learning process.

Also well worth study are the Courtis-Smith materials for teaching primary reading, the Gates reading materials, the Guiler and the Chicago practice pads in English composition. Cousins of the systematic practice test systems are the "work books" now having a vogue. (Here may be mentioned the arithmetic work books of the Compass series, the "My Progress" booklets in various subjects issued by the American Education Press, and the writer's booklet on "How to Handle Test Scores.") Also related are such series of tests as the Glenn-Welton booklet on high school chemistry. If such materials are arranged so that there are the separate answer units mentioned in the section on the teacher-made objective test, they are very useful and also great savers of both time and expense.

The teacher should appreciate how necessary and inevitable materials of this type become, once she has come to an understanding of the nature of learning and the extraordinary individuality of instructional problems as revealed by the study of each child and a diagnosis of his difficulties. It will perhaps seem as though she must teach each child individually and be in several places at once. The good "practice test" system brings order—even leisure—out of this chaos, for after the pupils become familiar with the procedure, they largely look after themselves. They score their own practice sheets, and obtain from the file the materials they need next. Only when they are "stuck" do they call upon the teacher; she has leisure to help them;

she instructs each pupil only in that in which he needs help. When a pupil feels that he has a certain section of subject matter in hand, or at certain stated intervals, she gives a test surveying that section to find out what progress has been made; each child has his progress certified and can go on if his competency has been demonstrated. The pupil learns self-direction and system in work, and has the thrill of known progress and a definite goal. The good practice test system might be described as a making over of educational procedures in the light of educational science. Practice materials have thus far been developed almost exclusively in the "drill" subjects. But there appears to be no good reason why analogous materials should not be developed in all subjects, with provision for socialization and the other features desired in progressive schools.

The standard tests therefore have most of the advantages of the methods of appraisal mentioned in the previous section, and more besides. They are an attempt to put into convenient, usable instruments the best relevant knowledge made available by psychology and experimental education. At present, the lack of good tests in many fields will make necessary the use of the teacher-made tests and examinations primarily; and such examinations will probably always be needed to supplement the standard tests, especially with reference to the special elements of content and method which every good teacher will introduce to meet the special needs and interests of each class and each community. But good standard tests should have the central place among the tools in the educational "workshop."

It is often assumed that objective tests deal primarily with facts. But the expert builder of standard tests recognizes *no*

such limitation. There are objective tests of judgment, application, ability to organize subject matter, thinking, and even tests of appreciation of literature or art. The reader will in this connection find it fascinating to look over such material as the Van Wagenen Tests in History, the Hill Test in Civics, the Trilling Test in Comprehension of Patterns, the McClusky-Dolch Test in Outlining, the Abbott-Trabue and Logasa-McCoy Tests in Appreciation of Poetry, and the Meier-Seashore Test in Art. It might almost be said that there is no limitation to the objective test technique.

THE MEASUREMENT OF ATTITUDES, CHARACTER TRAITS, AND SOCIAL ADJUSTMENT

Throughout Part One of this volume the idea was stressed that the school should feel itself responsible not only for a pupil's knowledge of arithmetic or French but also for his interests, his attitudes toward social problems, his social and emotional adjustment, his character traits. The chief reason why schools have not generally recognized this responsibility is, the writer believes, that the means for determining such characteristics have not been generally available, and consequently the fact that the schools *can* educate in these respects also has not yet generally been recognized.⁷ This last matter will be returned to later. The question here is as to the present status of measurement in this whole field. Work on the problem is still in its beginnings. But the need for tests is so great,

⁷ However, educational leaders have sensed this fact. For example, in 1914 Thorndike remarked that "morality is more susceptible than intellect to environmental influence. Moral traits are more often matters of the direction of capacities and the creation of desires and aversions. Over these education has greater sway, though school education, because of the peculiar narrowness of the life of the schoolroom, has so far done little for any save the semi-intellectual virtues." *Educational Psychology*, vol. 3, 313.

and the work done thus far so promising, that every teacher should know about it. Before many years the schools may well be measuring progress in broad-mindedness, honesty, and social adjustment almost as accurately as they now measure gains in arithmetic or French vocabulary, and, rightly, with greater concern.

Measurement of Interests.—Various interest questionnaires have been developed. These usually consist of long lists of games and amusements, the pupil being asked to check those he likes or has indulged in. The pupil may also be asked to check those of a list of books he has read. Movies which have been seen and liked may be indicated. Or various types or characteristics of books and movies may be listed, and the pupil asked to check those he prefers. Lists of vocations may be presented for checking as to preference.⁸ The chapter on interests was based largely on material obtained by such methods. Instead of depending upon the frankness of the pupil in checking, interest may be determined by knowledge. Thus a Sports-Information Test (26) developed in the writer's laboratory covered technical knowledge of various games and amusements from football to poker and embroidery; it was inferred that people liked to do those things they knew much about; moreover, certain interesting relationships to scholarship were found. All such instruments are still in the experimental stage. But if one purpose of the school should be the development of desirable interests, the means for determining the effectiveness of educational efforts in this direction are much needed.

⁸For tests of this character, see Fryer, D., *Measurement of interests*, Henry Holt and Company, Inc., 1931, 488 pp.

The Measurement of Specific Attitudes.—Considerable scattered work has been done on this problem, but perhaps best known are the series of scales recently developed by Thurstone (6). Each one consists of a sheet on which are printed brief statements of various attitudes toward some important issue. Thus a scale on prohibition includes various statements, from very “wet” to very “dry.” The person taking the test checks those statements which indicate his attitude, and from his marking a score is derived, which is a measure of his “wetness” or “dryness.”

Such scales are essentially simple and straightforward in character, and have already been found very useful for experimental purposes. For example, a group of high school students were asked to mark such a scale dealing with attitudes toward war. Half of them were then shown a war film, and a little later they were asked to check the scale again. The attitude of those who saw the film was found to have been appreciably altered, and the effect persisted over a period of several months (6).

Evidently studies of this sort are badly needed. What, for instance, are the effects of reading historical novels, or of history as now commonly taught, upon such attitudes? As soon as scales for measurement along these lines are sufficiently developed, the schools should make use of them. The problem will be returned to in Chapter XV.

Tests of Social Adjustment.—In this field, various tests consisting of such questions as “Are you embarrassed if you have greeted a stranger whom you have mistaken for an acquaintance? Very much; somewhat; not at all” have been developed. The subjects may be asked to check things they like to do, the issue being as to the extent of their social

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circumstances that he sees no possible means of detection, and yield evidence as to whether he takes advantage of his opportunity. The tests for cooperativeness and self-control are similar in that they are performance tests, although the activities requested are of course different. Further discussion of the results from these particular tests and their significance is reserved for a later chapter.

Efforts at a General Appraisal of Emotional Development.—Several efforts have been made to combine tests along the lines mentioned above into a multi-test examination for the general appraisal of development. In such traits there should presumably be a consistent development from childhood into adult life. From the small boy who is afraid of the dark, becomes enraged when spanked, really loves only his mother, likes to play tag, thinks "talking back" and "playing truant" are the worst things one can do, and wants to be a fireman, to the adult who is worried about the stock market, is angered by a topped drive at golf, loves his wife, likes to watch sports, regards most sins with toleration, and hopes to be manager of the local office of his company, there is presumably an unbroken series of developments and modifications. Among pupils of a given age in school, some are evidently further advanced than others in their attitudes, interests, and moral concepts. The purpose of the combination tests is to compare pupils in these respects, and to see the findings in the total perspective of development mentioned above.

A recent examination of this type (the Pressey Interest-Attitude Tests) consists of four tests of 90 items each (25), all the items having been carefully selected as differential of older as compared with younger children, in such traits. The first

test lists various borderland "sins," such as sneaking, cheating, "necking," and the pupils are told to check those they think wrong and to double-check those they think very wrong. The second test consists of a similar list of possible causes of worry—fires, girls, clothes, money; the third test lists things possibly liked, such as cards, swimming, bridge; the last test lists types of individuals possibly admired—such as alert, generous, lovely, conscientious. In each test the pupils are to check or double-check things worried about, liked, or admired.

The chief use of tests of the character described in this section is presumably the investigation of attitudes and interests on the part of individual children, as a step toward bringing about a better reconciliation between a child and his world. However, group comparisons are not without interest (25).

During the past two years the writer has been concerned with an investigation into the differences in emotional attitudes between Indian children, and white children living either on the reservations with the Indians or else near the reservations. The white children were carefully selected as being rural and as far as possible of the same general social and economic level as the Indians. The tests described above were given to about 4000 white children in Grades 6 through 12, and to about 2000 Indian children in the same grades. Below are given two charts, the first of which shows the total scores of the boys of the two races. Particularly to be noted is the widening difference between the two groups. The Indians appear not to make the shift from childish to adult attitudes as do the whites. On the second chart are results for particular words, and here the most characteristic differences in attitude appear. The Indian thinks "prison" is wrong but is not nearly as concerned as the white child over "bribery." The childish dread of "fire" persists among the Indians, but their worry over "money" does not even approximate the concern shown by the whites. The

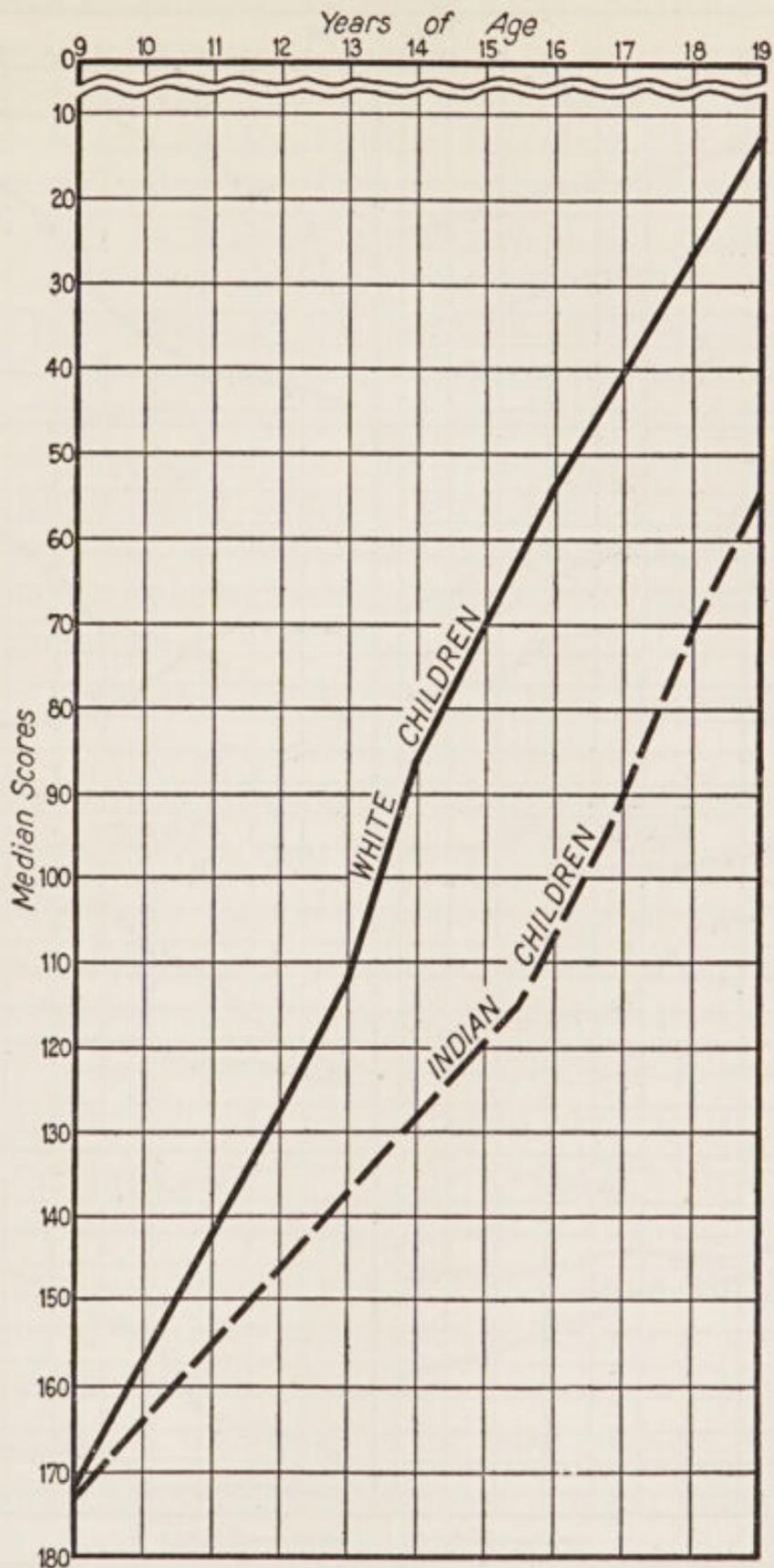


CHART 38.—Showing the median score per age for white and Indian children on a test of emotional attitudes and interests (Pressey).

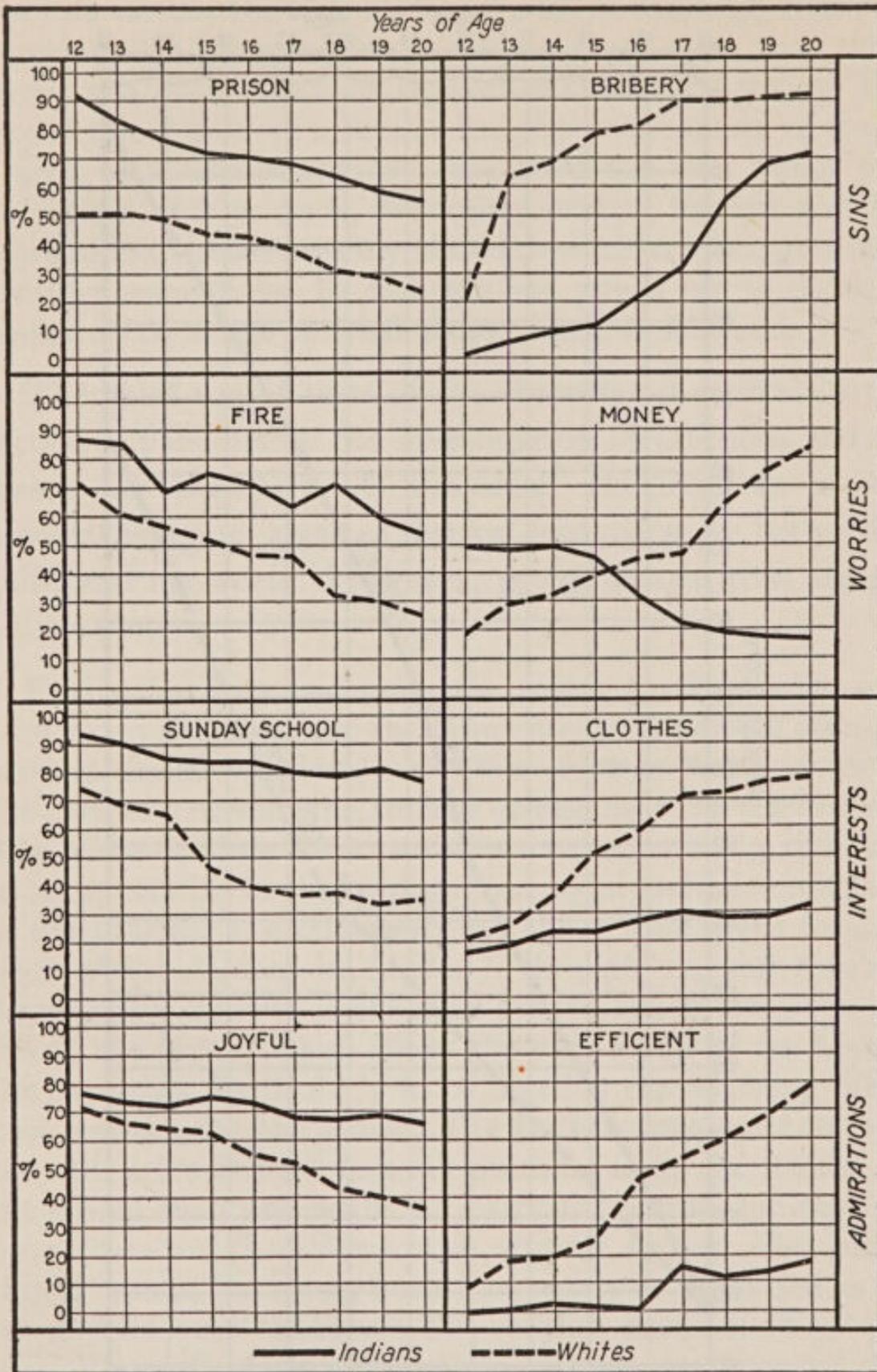


CHART 39.—Showing the percentage of white and Indian children marking each of eight words on a test (Pressey).

Indian shows a continuing interest in "Sunday School" but can get up no enthusiasm over "clothes." The Indian likes people who are "joyful," but the white man's ideal of "efficiency" means little to him. Such detailed results show that the Indian cannot be dismissed as merely less "mature" emotionally than the white man; he is different—chiefly, if not entirely, as a result of the different cultures and total physical, social, and economic environments of the two races. Investigation of the attitudes of the older members of one tribe reveals the men and the women who are over fifty—and hence grew up in relative isolation from white influences—as far more naïve and different in their attitudes than Indians now in their twenties, thirties, or forties—whose education was gained under white teachers and whose contacts with white men are far more numerous.

USE OF METHODS OF APPRAISAL AND DIAGNOSIS IN IMPROVING LEARNING

Tests seem to be regarded by some enthusiasts as having some peculiar potency such that the mere giving of them, without any carefully planned use of the results, produces some vague but substantial educational good. The grading of examinations is regarded by most teachers as among the most disagreeable of educational chores; questions are often carelessly phrased, and grading is perfunctory, or not really done at all. As a result, both tests and examinations have come into bad repute in many quarters. By now it should be clear that in this volume the point of view is far otherwise; such instruments are regarded as essential educational tools, vital to effective teaching. The specific question now arises as to the outstanding educational services which these instruments may render. Various uses have been mentioned, but three points deserve further emphasis here.

Tests and Examinations as Statements of Objectives.—First of all, tests and examinations often operate both to stimulate pupil effort and to serve as immediate objectives. To “prepare for an examination” is a common student activity. The quality of the tests and examinations used in a class consequently has no small influence on the quality of the work of that class. Examinations should put before one’s pupils, in pointed fashion, major issues in the subject; the tests used should be based as far as possible on curricular research, and should express in concrete form the objectives of the subject dealt with. If it is desired that students should not merely memorize facts but acquire skill in judgment and thinking with reference to the subject matter concerned, the examinations and tests should consist of questions harmonious with this objective. It is sometimes said that students should aim at the mastery of a subject and not think of examinations. But as a matter of fact, the probable nature of the examinations does influence a student greatly, and if the examinations are of the right sort, this influence will be healthy. In the “Chicago Plan,” and in the graduate schools, this influence is frankly recognized.⁹

If, as is usually desirable but all too rarely the case, an examination is followed by a “make-up” so that the student may use the results of his test or examination as a basis for better directed study for the second effort, the first test specifically directs his further learning. Moreover, if the teacher will keep in mind this possible use of her questions, she will

⁹If, on the basis of research and a considered educational philosophy, desirable interests, attitudes, and character traits can be determined and embodied in good tests, thus making specific such hitherto vague objectives, this might cause them to function better.

formulate them more carefully, and discuss results more adequately, with reference to this influence.

Examinations and Tests as a Means for the Orientation of Both Teacher and Pupil.—As was emphasized in the chapter on the control of learning, it is essential that both teacher and pupils be informed as to progress and goal. Only as the teacher is informed can she adequately guide learning, and only in proportion as a pupil is informed, will he be adequately motivated and able to work intelligently. Where any pupil is in difficulty in his work, the test or examination should serve to explicate the nature of that difficulty and suggest a means for its remedy. Diagnostic tools are as necessary to the teacher as diagnostic methods are to the physician. The teacher should regard diagnosis as one of her major functions, and should consider herself skilled largely in proportion as she is an expert diagnostician.

It follows that, within reasonable limits, the more tests and examinations, the more efficient the learning. It also follows that test and examination papers should always be returned to the pupils, the results carefully explained, and individual questions so explicitly graded that the students can locate and understand their mistakes. For intelligent learning, the informing the pupils regarding their work is essential.¹⁰

Tests and Examinations as Educational Experiences.—It was said above that tests and examinations should never

¹⁰ If such tests as were mentioned in the last section could be brought to the point where both teacher and pupil could be informed about progress in the development of desirable interests, social adjustments, and attitudes—that would be splendid. Perhaps there might be devised tests for diagnosing the causes of unfortunate moral traits.

be given merely for the purpose of giving them. That statement must be qualified to this extent: a good test or examination should in itself be a profitable educational experience. A systematic series of information questions of the objective type may force the pupil to an inventory of his knowledge—a profitable procedure. A finely conceived essay-type examination may set him on an entirely new line of thought which had not occurred to him before. A good thought question of the objective type may present to him in pointed fashion various alternatives among which he must choose, and the choice may stimulate profitable thinking. A student may “learn more” in a stimulating, challenging examination than in a week of class work.¹¹

SUGGESTIONS FOR TEACHING

It remains to bring the materials of this chapter together with reference to their bearings on the everyday work of the teacher. The following suggestions are offered:

- (1) Regard tests and examinations not primarily as a means for gathering information on which to base marks, but rather as methods for directing learning more effectively.
- (2) Remember that students not only study a subject, they prepare for examinations. The tests and examinations you give should therefore be such as you wish them to study for; make your questions express the objectives you think the pupils should aim for.
- (3) Build up a file of good questions. You will thus progressively improve your quizzes, and save yourself time and trouble.
- (4) Use your quizzes to help your pupils. This means that the papers, carefully checked, should be returned to the class, and fully discussed with them. To motivate the pupils in this connection, make-up tests and quizzes are highly desirable, as is also an objective record of progress.
- (5) Standard tests are not mysterious affairs for educational research, unrelated to everyday classroom exigencies, but given occasionally

¹¹ There are already tests presenting sample moral situations which would seem in themselves profitably thought-provoking.

as a concession to psychologists; they are efforts to develop instruments maximally useful to a teacher. Use them wherever possible, and study them for suggestions as to ways for improving your work.

- (6) Keep in touch with recent work on the measurement of such traits as were mentioned in the third section of this chapter. You will find this work fascinating, and you may also find an opportunity to experiment with such tests in a very interesting way.

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needed is rather some change in the condition or nature of the school work, or in certain background circumstances.

Eye Strain and Fatigue.—Naturally first in any list of factors causing fatigue in school is eye strain, which is often not recognized for what it is, but is felt rather as a general tiredness and discomfort. Schools all too often have poor lighting; the writer has seen a junior high school study hall in which reading was impossible in the center of the room on a cloudy day. Frequently the seats farthest away from the windows receive a very different amount of light at different times of the day. There may be a fatiguing flicker due to wind in a tree too close by, or the movement of a curtain on an open window; or the windows may be so poorly placed that as a child writes the shadow of his own hand falls across his work.² In some rooms the walls are painted with a glaring finish that is irritating to the eyes. As pointed out in the third chapter, all too often the eyes of certain children need the attention of an oculist.

Muscular Strain Involved in Writing and Similar Tasks.—Only toward the end of a final examination or similar ordeal are most college students in a condition to have any

² Teachers should keep in mind the special problems presented by the left-handed child who is forced to work in a "right-handed" environment. The left-handed child should have the light come over his right shoulder, not his left, or he will find a shadow in the way when he writes. Moreover, the teacher should appreciate that there is nothing sacred about any particular slant or method in handwriting and should carefully avoid forcing the "south-paw" into techniques devised for right-handers. To avoid possible serious strain (visual, manual, or postural), it is usually best to allow these children to experiment with methods in writing until they find something that is comfortable and legible. Forcing a child to change hands often not only disturbs his muscular adjustments but subjects him to such continued strain that serious nervous conditions may develop—he may begin to stutter, be awkward, or feel peculiar and inferior. The teacher should give careful thought to the problems presented by a left-handed child.

real appreciation of the strain often put upon school children by certain school tasks, such as learning to write, especially writing with ink and using one of the abominable scratchy steel pens usually supplied by schools. Drawing, map-making, and handicraft may also be very tiring, if the periods are too long and if either the teacher or the pupil himself has too high standards. Copying material from the board is likewise fatiguing. Large-muscle activity is the natural and healthy thing for children; the fine coordinations of small-muscle groups involved in such work as the above are very difficult. Eye strain may also be involved, and postural fatigue which will be mentioned shortly. Many teachers have little appreciation of the total discomfort involved in such work and attribute to natural perverseness the restlessness and irritability which the pupils often develop. Teachers sometimes make cruelly unnecessary requirements which greatly aggravate these difficulties; they may impose unnecessary standards of neatness and have compositions copied over and over, or insist upon some very special form in written work.

When a friend of the writer was in the fifth grade, she had a teacher who always required the children to make out and rule off the arithmetic papers very exactly and neatly in a very special form. Across the top, two single lines and then a double line were drawn exactly one-half inch apart, with one-sixteenth of an inch between the double lines. On these lines the pupils were required to write their full name, the date, the name of the school, the address of the school, the name of the city, and the state. Next a margin three-quarters of an inch wide at the left and one-half inch wide at the right was measured and ruled off, but the margin lines must not cross the double lines. Two lines one-half inch apart were

then ruled across the paper between the margins, and on these the pupil was supposed to write a statement of what was to be found in the first problem; however, the first of these two lines could not be drawn all the way to the left margin, since a space must be left for the number of the problem. Next the figures for the first problem were copied from the board; each figure had to be labeled as to what it stood for. When the problem was completed another double line (one-sixteenth of an inch between the lines) was drawn. Lines were then drawn for the statement of the second problem—and the process repeated for each one of the six problems which regularly constituted the assignment. Presumably all this was intended as training in neatness and orderliness.

This particular child was good in arithmetic, and could usually solve the problems in her head. But she was nervous and excitable; never during the half-hour period did she finish beyond the second problem because she always spoiled several sheets of paper by ruling them wrong, and became confused and emotionally disturbed.

At the end of the arithmetic period, this teacher always used a characteristically neat and systematic method of reward and punishment. There were, providentially, six aisles in the room. Those pupils who had all six problems right she had go to the sixth aisle and stand there, those with five right went to the fifth aisle, and so on down to the last aisle of those who had none correct. This last aisle regularly included three youngsters: a fifteen-year-old feeble-minded girl who had no idea of what the lesson was all about; an obstinate, brilliant boy who absolutely refused to go through the absurd routine, but did the problems in his head and jotted down the answers (he was always right but he received no credit because the required form had not been followed); and this very bewildered nervous girl, who stood day after day in the "failing" row and wondered why her problems were never "right" although she usually knew the answers by the time the teacher had finished writing the assignment on the board.

In a few weeks, despair settled upon the three chronic incumbents of the "failing" row. The feeble-minded girl stared at her paper in dull resentment, and often tore it into little pieces. The nervous little girl cried throughout the period, thus adding a confusion of blots to an already messy paper. The boy had to be sent almost daily to the principal's office for discipline. No comments seem necessary. In the future, it may be possible for parents to sue for educational malpractice against procedures so educationally vicious.

Problems of Postural Fatigue.—The sedentary character of the work of the average school presents multiple problems of health and of fatigue. For an active youngster to sit still for any length of time requires a fatiguing effort. To maintain a sitting posture involves the continuous use of certain muscles which in a child become easily fatigued; minor spinal curvatures or other unfortunate results may follow. If his desk or chair is not the right size for him, these difficulties will be multiplied. A teacher will be well repaid by the decrease of restlessness and irritability in her class if she will help each child to find a comfortable posture for his work. If the seats are not adjustable she may have very short children sit on a cushion to avoid any strain on chest and back muscles in working at the desks. If a child is "over-size" for the equipment, a table may be put on blocks of wood so as to be better adjusted to him.³

Work requiring the pupil to sit very still and carefully coordinate eye, hand, and total position, as in drawing or writing, intensifies all these problems; vivid evidence of

³ This problem is by no means confined to elementary schools. The seats provided in most high schools are of uniform size and unadjustable, despite the fact that in the 7th to 10th grades the range in the size of pupils is great. No thought seems to be taken for the pupils' comfort, and only the frequent change of classes saves the situation.

this is seen in the twisting and squirming of children who are learning to write. Furthermore, whenever children work hard there are diffuse muscular tensions which tend to increase with the difficulty of the task, especially if there is some uncertainty as to what is to be done, or some emotional element present. The restlessness is most conspicuous at the beginning of a period of work, and it gradually diminishes if progress is made; but if there is no progress, the tensions usually increase.

Conditions in the Classroom Causing Fatigue.—Emphasis has been put upon the importance of adequate lighting and satisfactory seating if school work is to go forward satisfactorily. But other conditions are important. A hot and stuffy room makes pupils restless and irritable, or sleepy. The writer remembers visiting, one May morning, a room in a new school building with an elaborate ventilating system which “would not work unless the windows were kept closed.” The school had no baths, but there was a good gymnasium, from which the pupils had just come, hot and sweaty. The thermometer registered 84. The teacher complained wearily that she could not keep the children interested in their work.

Strangely enough, country schools often show inexcusably bad conditions. The writer well remembers visiting an old one-room country school in southern Indiana, on a stimulating, windy, bright day in March, years ago. The big sheet-iron stove in the middle of the room had done its work all too well, the pupils had just finished the morning singing lesson, the windows and doors were all tightly closed; and the room seemed unbearably hot and stuffy. The teacher, a young farmer who taught school during the winter, was asked if a little fresh air might not be desirable. He looked surprised,

then said to one of the big boys, "Ezekiel, take down the geography!" The old-fashioned windows had many small panes of glass; one of these had been broken, and the geography was being used to cover the hole. The book was removed, and both teacher and pupils seemed to feel that every requirement of ventilation had been satisfied.

Undue noise is fatiguing (14). It is strange how many city schools are at street-car intersections. The writer has visited crowded schools where two rooms have been made out of one by the simple expedient of running a six-foot partition down the middle; on either side a recitation was going on. The pupils may seem to adjust to such conditions, but there is good reason to believe that it is at the cost of an extra expenditure of energy, that more errors are made, and that irritability is increased. When confusion is added to noise, the situation is still worse.

Physical Condition and Fatigability.—The general physical condition may obviously be expected to affect an individual's capacity for consistent work in school. The underweight and malnourished child or the pupil suffering from a focal infection is far more susceptible to fatigue than a child with greater vitality. As was mentioned in the third chapter, one of the outstanding characteristics of ill-health is a quick fatigability which may show itself in a general collapse of efficiency as the day wears on, in misbehavior of practically any kind, or in daydreaming and inattention. These manifestations are more likely than not to be merely the efforts of a young and unsophisticated organism to say that it is tired. The pupil who works outside of school hours, or comes from a crowded home where he is overstimulated and does not get enough sleep, is likely to start the school

day not only already somewhat weary but with a mind disturbed by the pressure of non-school duties, interests, or difficulties. In high school the round of outside activities, whether work or play, may sap an adolescent's energy and make him indifferent, easily distracted, or irritable in class. Thus, both physical conditions in the classroom and the physical condition of the pupil are important factors in fatigue.

BOREDOM, EMOTIONAL STRAIN, AND FATIGUE

The previous section has discussed certain causes of fatigue which may be roughly classified as physical. Certain factors which may be called psychological (using this term also in a very loose sense) must now be turned to.

Out-of-date Curricula and Methods of Instruction as Causes of "Fatigue."—First to be stressed here is the obvious but often neglected fact, that courses of study which do not make contact with pupil interests, and perfunctory methods of instruction, cause weariness and restlessness in a class. Absurdly impractical problems in arithmetic, interminable factorings in algebra, the intrigues of long-dead politicians, and the intricacies of the Latin subjunctive tire pupils not chiefly because of the difficulty of these tasks, but because they lack vital significance. Conservative and stupid curricula are a prime cause of "fatigue" in school.

It perhaps need hardly be mentioned that what is uninteresting and meaningless to one pupil may have much appeal to another. A good guidance program has this, among other values: it tends to prevent such fatigue as was mentioned in the above paragraph, by seeing to it that students do not take work which is thus wearying. Furthermore, by guiding pupils away from work in which they will not succeed it also operates

to prevent another cause of "fatigue" in school which will be mentioned again shortly—repeated failure.

Stupid teaching is also a cause of "fatigue." An alert, vigorous teacher can vivify almost any subject; a routine, colorless teacher will make it lifeless. But the problem is fundamentally much larger than the mere details of classroom manner and approach. From all that has been said earlier about child nature and the learning process, it should be clear that conventional classroom procedures are in many respects essentially wrong, and that pupil weariness and restlessness are due in no small part to such methods. "Fatigue" is caused by the conflict between the sedentary life imposed by the conventional school and the healthy youngster's urge to activity, and also by the further conflict between the anti-social code of the conventional schoolroom and the normal child's sociability. Anyone observing children at play is quite as impressed by their unflagging energy as he is by their early fatigue and restlessness in school. When a youngster plays he is doing something significant to him, usually with other children. The school imposes upon an active, social organism a sedentary, largely non-social program. This point should not need further elaboration.

Emotional Strain and Fatigue.—As has been mentioned elsewhere, the differences in emotional tone and atmosphere between different classrooms are often striking. In some rooms things proceed in easy, friendly fashion; in others there is tenseness or hostility. Severe discipline based on fear—of explicit punishment, of sarcasm, of poor marks—causes a certain emotional tension which is fatiguing. The writer has seen schoolrooms in which normal activity was

“frozen” because the teacher aroused terror. Moreover, any method of control which involves tension leads to a reaction of some sort somewhere—if not in school, then on the playground or at home.⁴

A high school teacher noticed that students coming to her classes who had been with a certain other teacher the previous hour were noisy, restless, inattentive, irritable, and apparently unable to do consistent work. Inquiry revealed that this other teacher had a simple and special technique for maintaining attention and discipline in class. She spoke in such a low voice that absolute quiet and rigid attention were necessary to hear her; and she was both a hard marker and bitingly sarcastic, so that the students did not dare miss anything she said. She achieved the traditional goal of a quiet, apparently spellbound class. But after being in her class for an hour, the students felt that they simply had to move about, “blow off steam,” relax; and little could be done with them for the next twenty minutes or so, until they had had a chance to recuperate.

The effects of class atmosphere deserve experimental study. Research has shown that in factories there are more accidents under irritable than under affable foremen. Do pupils make more mistakes under a sarcastic teacher? What is the effect on the next hour's work? Systematic investigation of such a problem should not be really difficult, and it is suggested to school administrators and supervisors as a practical problem for field investigation—perhaps one which would make a good thesis!

Two further points have been sufficiently emphasized elsewhere that only mention is needed here. Repeated failure can make a pupil listless and lifeless, irritable and frac-

⁴The reader may recall the psychologically sound series of cartoons by Goldberg entitled “Then he went home and took it out on his wife.” Children may take out on the school or the teacher tensions generated at home, and *vice versa*.

tious, or emotionally worn out. Furthermore, acute emotional distress, often due to circumstances in the pupil's home or in his social relations about which the teacher knows nothing, may cause fatigue phenomena varying all the way from chronic weariness and distractibility or irritability to complete physical prostration.

THE EFFECTS OF CONTINUED MENTAL WORK UPON EFFICIENCY

This chapter is concerned with factors tending to interfere with effective continued school work. The first section showed that certain factors which may be roughly classified as physical might operate in this way, such as poor lighting or injudicious school tasks causing eye strain, excessive work involving difficult small-muscle coordinations, poor seating or ventilation causing physical discomfort, and poor health. The second section pointed out that various other factors roughly classifiable as psychological, such as curricula and methods with little appeal to pupils, or emotional strain, might have this effect. There remains the question as to whether, apart from or in addition to these factors, continued *mental* work reduces intellectual efficiency, that is, whether continued functioning causes fatigue of the central nervous system.

Continued Work and Efficiency.—The problem is evidently susceptible of experimental investigation. The chart below summarizes one study of it. Five adults worked four hours reading and grading English compositions. The two top curves show the extent to which speed and accuracy were maintained throughout this four-hour period. There is a slight falling off in accuracy, but it is only 8 per cent. Evi-

dently the continuance of this work affected efficiency in performing it very little. There was, however, a steady de-

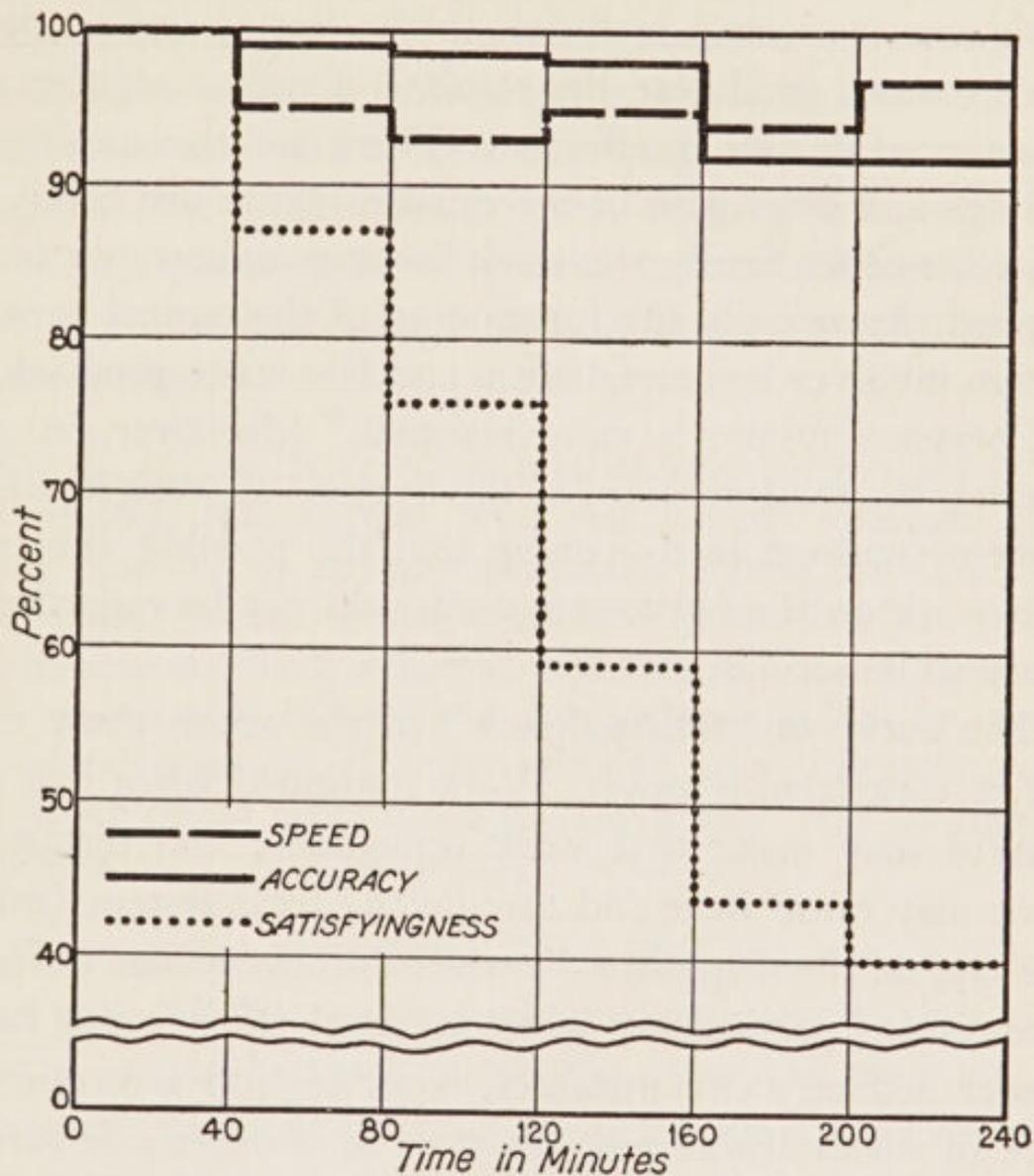


CHART 40.—Curves of accuracy, speed, and satisfyingness during four hours of mental work (Thorndike [28]).

crease in the interest or “satisfyingness” of the work; and toward the end, it was decidedly distasteful (28).

The above results are typical of numerous studies. Several hours of continuous work, with maximum effort, cause a decrease of usually less than 10 per cent in the amount

and quality of work done; speed may increase. And these effects are temporary—they disappear after a rest of an hour or less. It is well known that continued muscular work uses up certain materials in the tissues and produces certain waste products; the result is a rather regular and pronounced decline in efficiency. There are also unpleasant feelings and even pain in the muscles which are being exercised, so that finally the work becomes unbearable and is stopped. Apparently the functioning of the central nervous system involves less metabolism and less waste products, or the nervous system is more resistant.⁵ Moreover, in considering the total problem of the hygiene of work in school it seems reasonable to assume that the possible effects of such work on the nervous system need not be regarded as likely to be serious.

The curve of “satisfyingness” in the above chart must not be forgotten, however. Work continued when it is distasteful may make that work repugnant; and distasteful work may cause wear and tear on the total system (might one say, on the disposition?) which brings various unfortunate results, particularly when maximal effort is put forth. Under ordinary circumstances, work beyond a certain degree of distastefulness is likely to be dropped, or carried forward only fitfully and inefficiently. The curve of satisfyingness and interest, however, may probably be considered in large part a product of the factors of physical strain and

⁵ In one striking and well known experiment a graduate student worked continuously twelve hours a day, for four days, doing mental multiplication of four-place by four-place numbers, such as 2618 times 7269. The last four examples on each day took over twice as long to do as the first four. But the work *was* continued throughout the twelve uninterrupted hours; and the work of the fourth day was better than that of the first day of the series.

interest mentioned in the first sections of this chapter. The conclusion therefore seems reasonable that, *if* these factors are taken care of, consistent work over any reasonable period of time may be considered not harmful (on the assumption, it should perhaps be added, that there is no such excessive motivation as would cause a later reaction). As a matter of fact, children at play, and children working in a progressive school upon some interesting project, may spend the better part of a morning in absorbed and happy devotion to some undertaking.

On set routine tasks it has been shown, both in school and in industry, that regular brief rest periods (perhaps every thirty minutes or so) are beneficial. The conclusion seems reasonable that the factors mentioned in the first two sections are largely involved here, and that such rest periods are much less necessary if the work is interesting and has in itself a considerable variety. Children working on an interesting project would resent being made to drop it and "rest" at frequent intervals.

Time of Day and Efficiency.—The assumption is common that children work better at certain times of the day than at others; and accordingly the more difficult work, like arithmetic, is put in the morning, drawing in the afternoon, and so on. However, experimental work is in accord with the above chart in showing very little variation in efficiency. The following table presents typical findings. It summarizes the results of tests of addition, multiplication, memory for digits, recognition of nonsense syllables, and completion of sentences, given to 240 fifth- and sixth-grade children at different hours of the day. The results are expressed as percentages of the record for the first (9-10)

hour. Every other hour is better, the 11-12 hour being best. But the most important fact is that efficiency is about the same throughout the school day (7). Of course, these also are results with high motivation. Under ordinary school conditions there may be restlessness toward the end of the day, and lessened interest. Research in industry suggests such factors.

TABLE 17: VARIATIONS IN EFFICIENCY DURING THE DAY: AVERAGE SCORE ON TESTS IN ADDITION, MULTIPLICATION, MEMORY FOR DIGITS, RECOGNITION OF NONSENSE SYLLABLES, AND COMPLETION OF SENTENCES, MADE BY 240 PUPILS IN GRADES 5-6. RESULTS EXPRESSED AS PER CENT WHICH SCORE MADE EACH SUCCEEDING HOUR WAS OF SCORE MADE DURING THE 9-10 HOUR (7)

	9-10 A.M.	10-11 A.M.	11-12 M.	12-1 P.M.	1-2 P.M.	2-3 P.M.
Per cent.....	100	104	107		101	104

Adequate evidence is lacking regarding variations through the school week, and at different times in the school year. Research in industry would suggest the best work on Tuesday and Wednesday, and the poorest on Saturday, Friday and Monday in the order named. Production, and accident rates, vary somewhat at different times of the year. But such a great variety of factors, presumably classifiable under the first two topics of the chapter, are involved that hardly any inferences with reference to school practice seem possible.

THE PRACTICAL APPROACH TO PROBLEMS OF FATIGUE IN SCHOOL

The reader may by now have sensed that the order of topics in this chapter is intended to indicate a suggested order of procedure which may well be used in any attack upon problems of fatigue in school. It is possible that a class or an individual pupil may be overworked—though even in such a case the real nucleus of the difficulty may probably best be considered a matter more of emotional

strain than of nervous exhaustion. But under ordinary circumstances there is no real overwork. In any case, attempts at a diagnosis of the situation should first consider other causes. Never should it be assumed, without consideration of the possible operation of these other causes, that the situation can be dealt with simply by lessening the amount of work or requiring rest.

First to be checked off is the possibility that physical conditions in the school may be causing strain or physical discomfort. The lighting may be poor, the desks uncomfortable, the ventilation inadequate. In the case of the tired child there should be careful investigation as to whether ill health, work outside of school, or conditions at home may be causing such physical strain as to interfere with school work. Certain educational and psychological factors must next be considered. Curricula may be so out of date and the teaching methods so inept as to weary the pupils. The problems of interest and incentive discussed in the previous chapter come again to the fore at this point. Emotional strain of various sorts may cause various fatigue symptoms. Causes may vary from tenseness or sarcasm on the part of the teacher to family dissension or social ostracism; and results may vary all the way from mild indifference or irritability to mental abnormality or physical collapse.

As has been previously pointed out, to handle cases of emotional distress on the supposition that they simply need rest, may often only aggravate the situation by giving more opportunity for worry or brooding. Instead, the underlying problem should be located and, if possible, solved. Where the underlying causes are educational, the situation must

not be dealt with superficially. Extraneous motivations to "pep up" the student, or adjustments of the amount of work to make it easier, dodge the fundamental problems. The fundamental soundness of curricula and methods must be courageously examined. Problems of educational and vocational guidance are evidently involved here in various ways. Pupils should not be allowed to take work which is too difficult for them or which has no significance and interest for them.

That school work will cause fatigue in the sense that nervous tissue will be exhausted need not be a cause for anxiety. Healthy children, in a properly arranged and equipped schoolroom, doing work significant to them in psychologically sound ways, and reasonably adjusted emotionally, will find school work exhilarating rather than wearying. Fatigue may be classed with emotional strain as a symptom of something physically, educationally, or socially wrong.

PRACTICAL SUGGESTIONS FOR TEACHING

Certain very practical suggestions follow from the consideration of this chapter.

- (1) Never regard fatigue as due merely to overwork, and to be handled by assigning less work, or by rest. Fatigue is a complex phenomenon, requiring careful study and the location of its specific causes. A decrease in the amount of work, or rest, may be among the worst things that can be done.
- (2) In analyzing a fatigue problem, first of all determine whether physical conditions in the classroom may be causing muscular strain or physical discomfort. A periodic evaluation of a classroom in this respect is always desirable.
- (3) Next consider whether physical ill health, lack of sleep, strain due to work outside of school, athletics, or conditions at home may be the important factors.

- (4) Carefully consider whether the subject matter of the curriculum is significant and the methods of instruction psychologically sound. Children may be weary because of wearisome tasks. In the case of a particular child, consider also whether he may be doing work inappropriate to him.
- (5) Finally, make careful inquiry as to whether conditions causing emotional strain may be at the root of the trouble.

If problems of fatigue are thus approached analytically, it will be found that most of them may be understood in terms of one or more of the items above mentioned, and dealt with successfully. It is hoped, further, that in the schools of the future the fatigue problem will be essentially non-existent.

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TRANSFER OF TRAINING

THE problem of transfer of training may well be said to furnish the outstanding example thus far of the central importance of psychological research for educational theory and practice. The problem is basic, and educationally all-pervasive. Moreover, partly because of educational conservatism and partly because of the greater development of destructive rather than constructive research, there is no place in education where the gap between educational science and educational practice, both curricular and methodological, is greater. Work in this field is therefore of great interest, both psychologically and educationally.

THE NATURE AND RANGE OF THE PROBLEM

For an adequate appreciation of the total situation, the great variety of forms under which the problem presents itself must be realized, for the issue is often conceived too narrowly. Furthermore, neither the present educational situation with respect to the problem nor the present very interesting status of experimentation in the field can be understood without historical perspective. What, then, are the range and the history of the entire problem?

The Manifold and Ubiquitous Character of the Transfer Problem.—The problem of transfer may be put thus: To what extent and in what way will the acquirement of skill, understanding, and attitude in one subject or topic or

in one type of situation influence skill, knowledge, understanding, and attitude in another subject or topic or in a very different situation? And—an aspect of the problem until recently comparatively neglected—what *constructive* contributions to this exceedingly important issue can be made by psychological experimentation?

First of all, what is the total range of this problem? Most extreme is the belief that some general mental training results from the study of certain disciplinary subjects such as Latin or mathematics. The question is: Do these subjects have a peculiar potency for developing in a pupil habits of attention, acuity in discrimination, and consistency of thinking, so that as a result of the study of these disciplines the individual will deal with any intellectual problem more efficiently than if he had spent his time on other subjects in the curriculum?

Narrower in range, but still involving the issue of the comparative extrinsic value of school subjects, is this problem: To what extent does the acquirement of skill, information, understanding, or attitude in one subject affect achievement in related subjects? For instance, to what extent does the study of Latin increase English vocabulary, facilitate the learning of French grammar, or foster interest in ancient history? And is Latin a peculiarly fruitful subject in this respect? To what extent does the study of geometry facilitate an understanding of the laws of mechanics in physics or make one more sensitive to balance and design in art? To what extent *does* a course in educational psychology contribute to a better understanding of a course on the teaching of arithmetic or history? A huge total of educational ex-

penditure and effort is based on these two assumptions that there are large general or at least inter-subject values.

A recent bulletin of the United States Bureau of Education shows 25 per cent of all the students in public and private high schools taking Latin. Presumably almost all these students (except as they were taking the subject simply because of college entrance requirements or other educational circumstances) were studying this "dead" language on the assumption that such values as were mentioned above were large. Of all secondary school students, 37 per cent took algebra and 20 per cent took geometry, and the same conclusion would probably hold in large part for these two subjects. The freshman curriculum of the conventional college is founded essentially upon disciplinary concepts. The reader will do well to look back and see whether these concepts may not have pervasively influenced his own educational program. Parents and school advisors usually seem to assume such values unquestioningly; and apparently students usually feel that these disciplinary subjects somehow amount to more and do one more good (perhaps partly because they are harder) than others. Both students and faculty somehow come to assume without question that geometry and algebra are necessary in a college preparatory program.

Numerous problems of transfer appear within a given subject. To what extent does training in addition help ability in subtraction? If the first semester of a course in Latin is devoted largely to the formal learning of conjugations and declensions, will this help or hinder the acquirement of skill in reading Latin as Latin, for meaning? Do laboratory experiments in physics really help in the general understanding of physical phenomena, or do they sometimes leave the student confused by experimental techniques? Have

the numerous requests in this volume that the reader relate the topic under discussion to his own experience, furthered his personal understanding of it? All these questions are important, although largely neglected.

Finally to be mentioned is what may be called applicational transfer. Does the usual high school course in chemistry contribute to the average girl's understanding of cooking or household arts? Does a course in American history or community civics make the student shrewder in his appraisal of local government or wiser in voting? Does a course in psychology help him in dealing with his own problems of emotional distress or inefficiency at work or, during that crucial first year of teaching, lead to a more objective and intelligent handling of difficult disciplinary situations?

These very practical problems of applicational transfer have by no means received the attention they deserve. (In this connection, it is interesting that James' first experimental work on transfer was occasioned by the extravagant advertising blurb of a "memory expert.") The frequent extraordinary lack of applicational transfer must be stressed. The writer has been told of a girl who was doing better than average work as a college major in physics but was unable to use a hammer and chisel to pry off the top of a wooden box; however, while this was being done for her she stood by and explained lucidly which class of lever was being used. Since she knew the box contained a gift of ten pounds of candy, there was surely no lack of motivation. At the suggestion of the writer, a graduate student who was working his way in the university by serving as clerk in the "trouble department" of the local electric light company kept a record of the nature of the difficulties reported, with the idea that this record might have interesting suggestions for applicational physics. One night this clerk received a call from a room-

ing house occupied by students in electrical engineering. These coming engineers could not find what was wrong with the lights, but a repair man who had never finished elementary school fixed them in five minutes.

The problem of transfer may then be considered almost educationally all-pervasive. It might almost be said that if there is to be education there must be transfer, for the purpose of education is to prepare for meeting situations which must inevitably differ in many respects from the educational situation in which the preparation was acquired. It must also be emphasized that there is involved in the total problem not merely the question of possible educational advantage but also the serious (and largely neglected) problem of educational interference or damage. The study of Latin may have unfortunate effects upon a pupil's ability in English composition—it may develop "translation English," for example. The study of a foreign language, at least by certain methods, may make the reading of English slower. In fact, the total problem of educational facilitation *or* interference is in certain respects the most difficult and complex of all the issues treated in this volume.

The History of the Problem of Transfer.—A word remains to be said about the history of the transfer problem. It has often been pointed out that the subjects thought of as disciplinary were first put into the curriculum primarily for practical reasons. Latin was taught because it was the language of scholarship and the common medium of intellectual exchange. Mathematics was related to surveying and navigation. Only as conditions changed so that certain elements in the relatively static curriculum no longer had an

obvious usefulness, did the concept of mental training as a vindication of these subjects become prominent.¹

The earlier experimental work, essentially critical in character, was a sharp reaction to the extreme theoretical vindications of a conservative educational program. Learning was the acquiring of a huge number of specific and largely independent associations, and the possibility of general training was minimized, or practically denied altogether.

Within the past few years, however, the tone of the research seems to have changed somewhat from the critical to the more constructive. Granted that curricula should be based on intrinsic values, the importance of developing interrelations between subject matter, and habits and attitudes of some general applicability, is being recognized. The re-

¹ How prominent this concept was in the educational thinking of thirty years ago is startlingly disclosed by such quotations as the following (given by Thorndike, *Educational Psychology*, vol. 2, pp. 360-363):

"It is as a means of training the faculties of perception and generalization that the study of such a language as Latin in comparison with English is so valuable." (C. L. Morgan, *Psychology for Teachers*, p. 186.)

"Arithmetic, if judiciously taught, forms in the pupil habits of mental attention, argumentative sequence, absolute accuracy, and satisfaction in truth as a result, that do not seem to spring equally from the study of any other subject suitable to this elementary state of instruction." (Joseph Payne, *Lectures on Education*, vol. 1, p. 260.)

The value of the study of German "lies in the scientific study of the language itself, in the consequent training of the reason, of the powers of observation, comparison and synthesis; in short, in the upbuilding and strengthening of the scientific intellect." (Calvin Thomas, *Methods of Teaching Modern Languages*, p. 27.)

"We speak of the 'disciplinary' studies, . . . having in our thought the mathematics of arithmetic, elementary algebra and geometry, the Greek-Latin texts and grammars, the elements of English and of French or German. . . . The mind takes fiber, facility, strength, adaptability, certainty of touch from handling them, when the teacher knows his art and their power. The college . . . should give . . . elasticity of faculty and breadth of vision, so that they shall have a surplus of mind to expend. . . ." (Woodrow Wilson, *Science*, November 7, 1902.)

search question then is as to how this interrelating may be furthered, and general habits be developed and made to function widely. The treatment given the subject in this chapter will aim especially to stress this constructive problem, and it will be further developed in the following chapter on general training.

EXPERIMENTAL PROCEDURE FOR THE INVESTIGATION OF TRANSFER OF TRAINING

How can this exceedingly complex topic be investigated experimentally? The procedure may best be made clear by a concrete example. How, for example, can the effect of the study of Latin upon the size of English vocabulary be determined? An excellent study of the matter involved the following steps:

The Experimental Set-up.—The problem was put very concretely: Do high school freshmen who are studying Latin gain more in English vocabulary during their first year than freshmen not studying Latin? (37) The first step was to give an English vocabulary test, during the first few days of school, to a large number of freshmen who were just beginning the study of Latin and to another large group of freshmen who were not taking Latin. In the table below the first row of figures shows the average score of these two groups on this “pre-test.”

During the year, the freshmen Latin students undoubtedly had whatever advantages might come from the study of Latin, whereas the non-Latin students did not. At the end of the year another form of the English vocabulary test was given. The second row of figures in the table shows the score on the second or end-test, and the third row shows

TABLE 18: SCORE ON ENGLISH VOCABULARY TEST, AT BEGINNING AND END OF YEAR, OF 717 HIGH SCHOOL FRESHMEN WHO WERE TAKING LATIN, AND OF 677 WHO WERE NOT (37)

	Latin	Non-Latin
Pre-test.....	21.6	16.8
End-test.....	28.3	20.2
Gain.....	6.7	3.4
Net gain of Latin over non-Latin students, 3.3		

the difference between the scores on the initial test and the final test. As will be observed, both groups made a gain, but the Latin group gained more than the non-Latin group. The difference between the two gains, 3.3, may be considered to indicate the net effect of the study of Latin upon English vocabulary.

The Important Elements of Technique in Experiments Regarding Transfer.—The above experimental attack seems simple and straightforward. However, each feature is important and the technique has been only gradually developed; moreover, as will be seen later, still further refinements are necessary for the most adequate investigation. But what is the special purpose of each feature in the experiment outlined above? Why, in the first place, was the control group necessary; why might one not simply give a group about to take Latin an English vocabulary test at the beginning and end of the year, and assume that any gains made were due to the study of Latin? This would be quite obviously incorrect, because some gains would be expected in any case from the pupils' total experience during the year, in school and out; and the control group shows

how much may be expected as the result of such factors. Therefore, only by finding the difference between the gain of the Latin group and the control group can one obtain some indication as to the special contribution of the study of Latin.

And why not merely give the two groups a test at the end of the year, and see whether the Latin group had scored higher than the other? For one thing, it is desirable to know how much gain is made over a given period of time (in this case, one school year). But there is another reason, often very important. It will be noted that, on the beginning test, the Latin group averaged higher than the non-Latin—they scored higher at the beginning of the year than the non-Latin group did at the end; in other words, the Latin students knew more English words *before* studying Latin. This was doubtless due to various factors. They may have been more interested in language and literature and in consequence have acquired a large English vocabulary. They may have averaged a bit higher in intelligence; the more intelligent group would presumably have already learned more English. As a matter of fact, most investigations have shown students who take Latin to average slightly higher in intelligence than those who do not.² Clearly the results

² This appears to be due to a variety of selective factors. The Latin students are more often planning to go to college; they take Latin sometimes because it is required by the college of their choice, sometimes because it is the academic thing to do, sometimes because they believe that the subject is of value in various ways shortly to be summarized; moreover, high school students planning to go to college average slightly higher in intelligence than those who do not plan to go. Intelligent students more often have a parent who is a college graduate, who took Latin as a matter of course in the restricted curriculum of his day, and consequently assumes that his child should take Latin.

on the final test cannot be adequately interpreted without the results on the beginning test.

Many misconceptions have resulted from the neglect of such selective factors. Thus a higher percentage of classical than of non-classical students take honors or make Phi Beta Kappa. But these facts may be the result of a higher intelligence in the classical group, or of other factors independent of the classical training. A comparison of the grades of classical and non-classical students in the last years of elementary school, before any Latin was taken, may show about the same average superiority of the one group over the other. In connection with this problem the following graphs are of interest. They show the median grades each year in high school English for students taking Latin as compared with pupils taking German, and of students taking two, three, or four years of Latin (31). The superiority of the Latin students is in each instance substantially the same at the beginning as at the end.

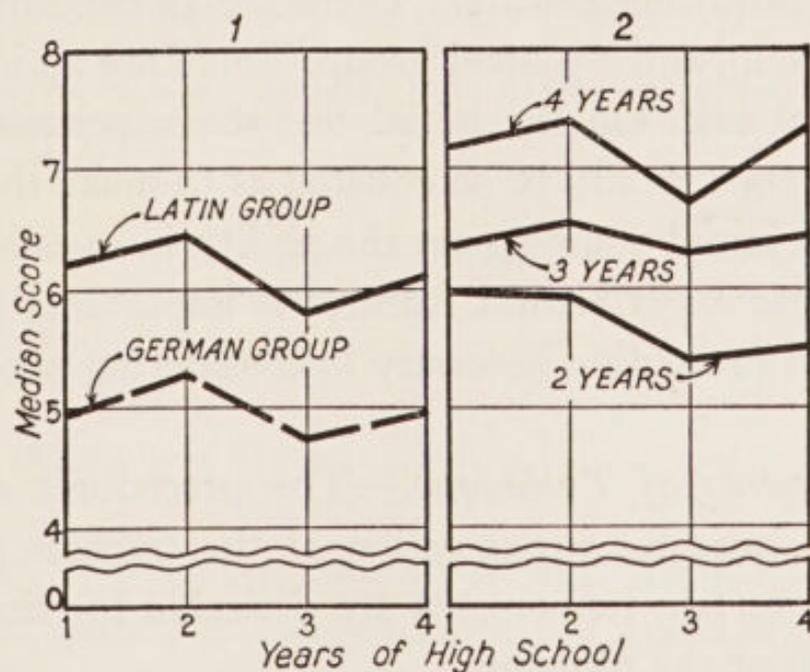


CHART 41.—Median grades in English in the four high school years of students taking Latin or German (first chart), and of students who had 4, 3, or 2 years of Latin (second chart). (After Wilcox, from Starch, *Educational Psychology*, by permission of The Macmillan Company, publishers.)

Because of these selective factors which make the entire experimental and control groups not wholly comparable, it is often best to make the final comparisons only between cases in the experimental and the control group who scored the same on the initial test. That is, in handling the final results, a Latin student who made an initial score of 17 is paired with a non-Latin student who also made an initial score of 17, and so on. Thus the gains are compared of students who started from the same point.³

It is often desirable, where the number of cases is sufficient, to pair not only by initial score, but also as regards intelligence, sex, age, average previous school work, or other possibly significant factors. The more factors thus equated, the more clearly can the influence of the special training in question be determined.

The typical experiment in transfer of training involves, then, the following features: There are an experimental or trained group, and a control group. There are an initial test and a final test. On the initial test the experimental and control groups should be so equated as to make them comparable in initial standing on the ability in question. Each one of these experimental features is important; each one expresses a precaution necessary in considering problems of transfer.

Refinements of Technique.—The procedures described above are basic for investigation of the transfer problem. However, certain refinements are desirable for the further elucidation of the problem.

³In the study of the effect of Latin on English vocabulary referred to above, the results were handled by a pairing method as well as by the simpler technique used as illustration—but with little change in the findings.

First of all, what is the range of the transfer? Does the study of Latin, for example, cause a general increase in English vocabulary, or only an increase in the knowledge of words of Latin origin? The investigation used above as illustration permitted a neat analysis of this point. The English vocabulary tests used consisted of 25 words derived from Latin words frequently met in the usual high school Latin course, and 25 words derived from Anglo-Saxon or Greek. It was therefore necessary only to keep separate results on the Latin and non-Latin derivatives, to get evidence on this question. The following table shows the results of this analysis. The gain is on the Latin derivatives. Evidently the effect of the study of Latin is not to develop some mysterious "language sense" but to acquaint the students with certain Latin roots which they recognize when seen in English words.

TABLE 19: GAINS FROM BEGINNING TO END OF FRESHMAN YEAR OF 717 LATIN PUPILS AND 677 NON-LATIN PUPILS (A) ON 25 WORDS DERIVED FROM LATIN, AND (B) ON 25 WORDS OF ANGLO-SAXON OR GREEK DERIVATION (37)

	Latin Derivatives	Non-Latin Derivatives
Latins.....	5.5	1.2
Non-Latins.....	2.0	1.4
Superiority of Latins.....	3.5	-0.2

A second special technique concerns a practical consideration which naturally follows from the findings just mentioned. If transfer from Latin to English vocabulary is a matter of seeing that certain roots are common to the two languages, then it would seem reasonable to suppose that

if a teacher of Latin made a special effort to call the attention of her pupils to Latin words which had English derivatives, to mention these derivatives and show the relation between the Latin and the English words, the transfer might be appreciably increased. The following table summarizes an experiment with reference to this question. It shows the gains, over a period of a year, in English vocabulary as determined by the same test used in the experiments described above (the Carr Test), containing 25 English words derived from Latin and 25 from Anglo-Saxon or Greek. In the second group one-fifth of the time each day was devoted to teaching the derivation and history of words. There were 118 pupils in each group, paired according to score on the Terman group test of Intelligence (15).

TABLE 20: YEAR GAIN IN ENGLISH VOCABULARY (A) IN LATIN CLASSES TAUGHT BY CONVENTIONAL METHODS, AND (B) IN LATIN CLASSES TAUGHT WITH EMPHASIS UPON THE RELATIONS BETWEEN LATIN AND ENGLISH (15)

	Latin Derivatives	Non-Latin Derivatives
Conventional Latin.....	4.05	2.77
Latin with Word Study.....	8.12	3.49
Difference.....	4.07	.72

The method of teaching is evidently a very important factor in transfer; if there is "teaching for transfer" the amount of transfer can be markedly increased. However, the transfer is almost exclusively on words derived from Latin.

Such an experimental procedure can be extended so as to compare directly several teaching methods. It might be inferred, for example, that if, in English classes, special attention

were devoted to word study, greater gains in English vocabulary would be made than would be the case in the conventional English class. The total experiment question might be as to which of four methods (conventional English class, English with word study, conventional Latin class, Latin with word study) produced the greatest gains in English vocabulary. The following table summarizes such an experiment; a total of about 500 pupils were involved, the groups being roughly equated on the basis of the Terman group test of Intelligence. Apparently English classes with word study are better for the purpose in question than conventional English classes, but the Latin classes with word study were most effective. However, another investigation showed the greatest gain for classes in English with word study.

TABLE 21: COMPARATIVE GAINS IN ENGLISH VOCABULARY
IN ONE SCHOOL YEAR ACHIEVED BY FOUR DIFFERENT
METHODS (15)

(Modified from a table given by Symonds and Penny [32])

	Gain
Conventional English classes.....	6.0
English with word study.....	8.5
Conventional Latin classes.....	6.7
Latin with study of derivatives.....	10.7

Evidently such special techniques as are described in this section are of great constructive value educationally in showing factors involved in transfer, and in evaluating various methods of instruction. These studies are excellent examples of the constructive approach to transfer problems which was mentioned at the close of the first section of this chapter as characteristic of the newer work in this field.

EXPERIMENTAL FINDINGS REGARDING TRANSFER OF TRAINING IN THE SCHOOL SUBJECTS

What, now, are the experimental findings regarding transfer of training in different school subjects? A great

variety of topics have been investigated in this connection; however, the most adequate work has been done in foreign languages.

Transfer of Training in Languages.—Data have already been presented to show that the study of Latin tends to increase the size of English vocabulary, that the increase is almost wholly on words derived from Latin, and that the amount of the increase depends in large part upon the method of instruction used. A parallel investigation has been made of the effect of the study of French upon English vocabulary (47). The test used was similar to the one just described for Latin—half the English words were derived from French, and half were non-French derivatives. In the schools covered in this investigation there were three groups of pupils: those who took no language, those who took beginning Latin, and those who studied beginning French. The experiment was very carefully carried through. The results, however, were most disconcerting. They are summarized in the table below. For all three groups, the gain was negligible on the English words not derived from French. On the French-derived English words, the greatest gain was made by those who took no language! Doubtless in all three groups greater gains in English vocabulary could have been made if there had been a special attempt to bring in English word study. But when these results are considered along with those of the Latin investigation, we are forced to the conclusion that gains in English vocabulary do not necessarily follow from the study of a related foreign language.

Another investigation dealt with the transfer obtained from the study of a modern foreign language to speed and

TABLE 22: AVERAGE GAIN MADE ON FRENCH AND NON-FRENCH DERIVATIVES BY THREE GROUPS OF HIGH SCHOOL PUPILS (47)

Students Studying	French Derivatives	Non-French Derivatives
No language.....	2.44	.63
Beginning French.....	1.32	-.46
Beginning Latin.....	2.03	.34

comprehension in reading English, and understanding of English punctuation, sentence structure, grammar (rules governing various usages), and language (location and correction of grammatical error) (40). The results are reported separately for students with high I.Q., those of average ability, and those below average in general ability. The table below shows that students with a low I.Q. who did not take a foreign language tended in general to gain more than those who did; this result might be explained on the hypothesis that the study of a foreign language tended to confuse these students with regard to their own language. For the students with an average I.Q. the results are indeterminate. The intellectually superior students appear to have obtained appreciable transfer value from their foreign language. This greater transfer on the part of the superior students is a finding of much importance and will be found in other investigations to be reported shortly.

It was mentioned in the introductory section of this chapter that in some instances transfer effects might be not beneficial but deleterious—the study of one subject might interfere with work in another subject. This appears to be the effect of Latin upon English composition. The following chart summarizes an analysis of 150 college entrance

TABLE 23: DIFFERENCE IN GAIN MADE ON SIX TESTS OF READING AND ENGLISH BY PUPILS (A) STUDYING A MODERN FOREIGN LANGUAGE, AND (B) NOT STUDYING ANY LANGUAGE (40)

	Difference in Scores ^a		
	Pupils with Low I.Q.	Pupils with Average I.Q.	Pupils with High I.Q.
Reading—speed			
High school sophomores.....	-14.6	-18.4	+19.8
High school juniors.....	- 7.9	+ 2.8	+ 4.6
Reading—comprehension			
High school sophomores.....	+ 3.1	+ 1.7	+ 8.9
Punctuation			
High school juniors.....	- 1.8	- 0.1	- 0.1
Sentence structure			
High school pupils.....	- 1.1	- 0.2	- 0.6
Grammar			
High school pupils.....	- 1.2	- 1.5	+ 3.0
Language usage			
High school juniors.....	- 4.8	- 1.4	+ 3.7

^a Plus differences are in favor of the pupils studying a modern language; negative differences are in favor of the non-language students.

examinations (50 each receiving highest, average, and lowest grades) as regards the quality of the English used in the translation of a Latin passage (45). In this connection it must be remembered that these students had had four years of Latin. The proportion of "translation English,"⁴ and English with no meaning is distressingly high. How much such awkwardness may carry over into English composition other than translation is not known.

Certain further findings regarding Latin remain for brief mention. Latin appears to improve the ability to read in English for detail (35). It improves ability to spell certain English

⁴ Such statements as, "So much did I accomplish when you were repulsed by the consul as an exile you are able to ruin the republic and to vex the consul and that this crime committed by you should be called piracy rather than war."

words derived from Latin—such as words having Latin plurals, like *alumni*—but not words derived from other sources

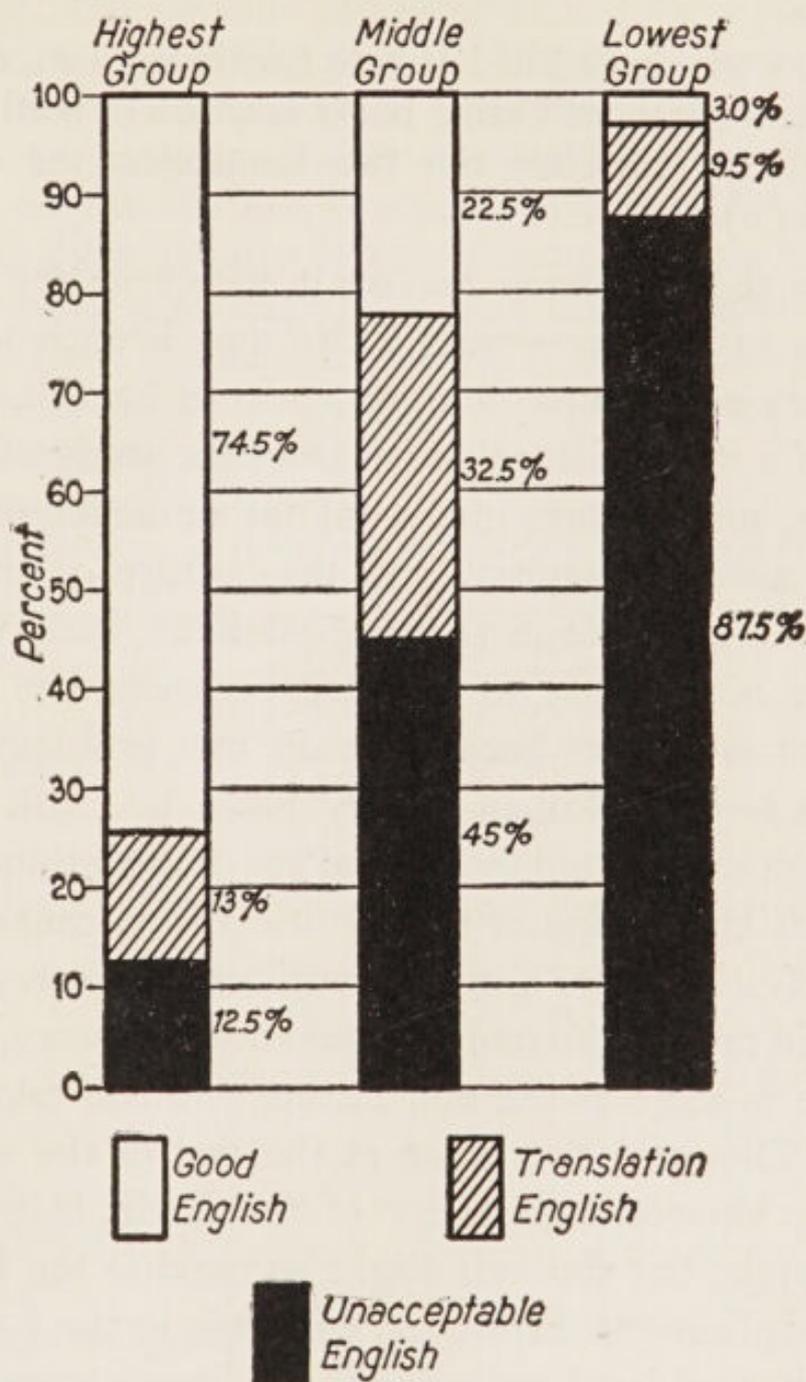


CHART 42.—Percentage of the 50 best, the 50 average, and the 50 poorest college entrance examinations (in fourth-year Latin), classified according to the use of (a) good English, (b) translation English, and (c) unacceptable English, in the translations (Woodring [45]).

than Latin. When special attention was given in the Latin classes to the spelling of Latin-derived English words, greater

improvement was obtained (8). However, such training sometimes confused pupils about the spelling of words not derived from Latin.

Students who have had Latin do hardly any better in French than students without Latin; but if teachers in both Latin and French try to correlate the two languages, the transfer is increased (8).

So far the discussion has dealt with transfer from one language to another—from Latin and French to English vocabulary and composition, or Latin to French. Are there values of a more cultural sort? Does the study of a foreign language, for instance, give a unique understanding of the history, customs, country, and the culture of the race or nation whose language is being studied? Such values are evidently not so easy to get at experimentally. But some significant work has been done on this problem. For example, a test on Roman history given to Latin and non-Latin high school juniors showed the Latin group superior, as regards knowledge of the historical facts connected with Cæsar's Gallic Wars and the orations of Cicero, over the non-Latin group who had not had ancient history, but about the same in score as the non-Latins who had taken ancient history. The same test given at the end of the sophomore year also showed superiority of the Latin over the non-Latin pupils, but this was slight as regards the larger historical implications. However, emphasis in the Latin classes upon historical implications brought larger gains (8).

On a test on classical references and allusions, Latin pupils gained less than non-Latins until the end of the sophomore year, but after that gained more. This result was presumably due to the bareness of the first two years of Latin as regards material fruitful in this respect (8).

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From all these findings, conclusions regarding transfer values in the study of foreign language appear to be somewhat as follows (the essentially negative findings regarding distinctive contributions to general training in reasoning and judgment will be discussed later). As regards the modern foreign languages the situation seems fairly clear. As they are taught at present, such values are too slight to give these languages any great educational vindication; they must find their justification in their own intrinsic worth. French and German and Spanish must be taught because they are useful languages, not because they increase English vocabulary or make similar contributions outside of themselves. Fortunately, modern research suggests that the efficiency of instruction in these languages may be so increased as to make teaching them for their own worth much more justifiable than was the case in the past. As mentioned in the Chapter X, there should be adequate adaptation to individual differences; the work should provide systematically, on the basis of vocabulary research, for the progressive mastery of a fundamental vocabulary; there should be stress on reading objectives, and an escape from the bondage of a formal grammar.⁵ Thus, three years' study may give such fine facility in the reading of a modern language and its use as a tool, that transfer values need not be invoked for the major defense of the subject.⁶

⁵ The writer believes that for formal grammar there should be substituted a functional grammar *for reading* which would be determined by systematic noting and analysis of difficulties in reading, and formulation of explanations for the meeting of these difficulties. Such a grammar would be very different from formal grammar, and much less extensive. Dr. Henmon in conversation has expressed agreement with this idea.

⁶ The material read should, of course, be chosen for its literary or informational value, and be intrinsically vindicable on this basis, *if* the

Stress on teaching for transfer would increase transfer; consequently, relationships to other languages should be pointed out. A minimum amount of etymology is interesting in its own right, and is probably a vehicle for transfer. Furthermore, it speeds up learning of the foreign tongue by assisting a transfer from English. But it may well be questioned whether, taken beyond a certain point, this would not divert attention from the major purpose of mastering the language as a tool.

And the significance of the findings regarding Latin? Even the Classical Investigation admits that ability to read Latin is not to be acquired as a tool (8). However, the Investigation (perhaps not entirely unbiased) has found numerous transfer values—gains in English vocabulary, rate of reading English, and knowledge of grammar and of Latin words and phrases occurring in English. Various historical, literary, and other cultural values are not so generally obtained. All these values may be secured in much larger measure by teaching for transfer. However, it seems not unreasonable to argue that such instruction tends to make the Latin class also a class in English word study, mythology, and ancient history. There is surely a question as to whether such values cannot be obtained more directly and much more economically,⁷ without the burden of the

language has been sufficiently mastered so that the students can see through to these values.

⁷ As will be emphasized in discussing transfer experiments in mathematics, a measure of gain in the practice series is always desirable so that one can obtain some impression as to the proportion of gain which was transferred. In the above-mentioned investigations, such results were unfortunately not obtained. For instance, it would be very desirable to know how many Latin words the average pupil in the average Latin class learns, in adding a hundred words to his English vocabulary by the transfer-from-Latin method. Such a roundabout method of increasing English vocabulary is surely ex-

complicated Latin grammar and syntax. Interesting here is the recent development of courses in "general language."⁸ At least such a possible ultimate metamorphosis of the course in Latin is worth considering.

Transfer Problems in English Grammar and Composition.—Of interest in connection with the above results, and of great practical significance in themselves, are the findings regarding the value of formal English grammar (a) in improving ability to write correct and effective English, and (b) as preparation for the study of a foreign language. A study of the correlations shown by 200 high school pupils between a test of English grammar, a test on interpretation of an English classic (Gray's *Elegy*), and ability in English composition showed that they were so low as to indicate little relation between these three abilities (31). A similar study of college freshmen gave similar findings (31).

English grammar is of much more value as preparation for the study of a foreign language. For example, an investigation of first- and second-year French and Latin pupils showed that those with a poor knowledge of English grammar had only a 50 per cent chance of passing, while those with a good grammatical knowledge had an 80 per cent chance (23). In college, those testing high in a foreign language tested high in English grammar (23). At the writer's institution, study laboratories for probation students

pensive educationally. Studying Roman history by reading Cæsar and Cicero is surely uneconomical as regards time, effort, and pupil interest. It is hard to believe that any total of transfer values can vindicate a subject on the educational balance sheet.

⁸The clever text in this subject by the late Dr. S. A. Leonard and R. F. Cox (Rand, McNally Company, 1925) is well worth examining in this connection.

have shown the most common cause of failure in a foreign language to be ignorance of the fundamentals of English grammar, and the most effective remedial means to be the teaching of that grammar. An investigation of the relation between years of foreign language study and scores on (a) a test of knowledge of English grammar, and (b) a test of ability to distinguish a correct from an incorrect expression in English showed that the study of a foreign language increased the knowledge of grammar markedly, but the recognition of correct English usage only slightly. For instance, high school pupils with three years of foreign language scored 37 per cent better in English grammar than students with only eight weeks of foreign language, but only 11 per cent better in English usage (31). Such results are presumably a back transfer due to the use of a formal grammatical method in the foreign language.⁹

Must we accept the anomalous conclusion that English grammar is of little value for English, but should be taught as a prerequisite for foreign language? Two suggestions are here offered. In the first place, there should be less formal English grammar, and more functional grammar directed specifically to guidance in correct English and based on analyses of errors in English. Many such studies have been made; and from them it is clear that the content of this functional grammar would be minimal, stressing only the means for avoiding the relatively few errors which are frequent. It would probably also be more specific than formal grammar, calling attention to the specific sentence

⁹ The findings in this paragraph might possibly not hold for a foreign language taught entirely by a conversational or a reading method. But all investigations to date are in agreement with the above statements.

situations tending to cause error.¹⁰ In connection with a functional grammar there should be an earnest effort to assure transfer to written English, not only in English classes, but also to the English used in other classes such as history. An experiment (23) is relevant here which shows that eight weeks of a cooperative campaign for better English in all classes of a junior high school resulted in a 25 per cent improvement in the quality of English throughout the school.¹¹

Problems of Transfer in Mathematics.—It is a matter of common observation that knowledge of arithmetic is relatively specific in character. Thus, 5 plus 9 is harder than 9 plus 5, and 39 plus 5 is still more difficult. Typical of the experimentation in this field is an investigation to determine the spread of practice in the mental multiplication of a three-place by a one-place number (50 problems a day for 14 days) to other arithmetical processes, such as adding three-place numbers, adding fractions, subtracting, multiplying four-place numbers, and dividing three-place numbers (31). The gain of the trained group was 29 per cent greater than that of the control group. An important additional result was this: in the practice series itself, the practice

¹⁰ Thus, in the case of pronouns, the student would be specifically warned of the danger of using the wrong case in such phrases as "between you and me," where the pronoun is separated from the word governing it. In this connection a little *Guide to Correctness in Written Work*, issued by the writer and Professor F. R. Conkling, may be of interest. On the basis of extensive error analyses and the consideration of such specific situations as are mentioned above, it appeared that the essential functional grammar could be given on two pages.

¹¹ Further significant for the evaluation of grammar, though somewhat aside from the consideration here, is an early experiment regarding the possible effects of the study of grammar upon improvement in thinking. No such effects were found; the results were negative throughout (4).

group gained 112 per cent from the first to the fourteenth day! The transferred gains were thus only 26 per cent of the gains in the material specifically practiced. Quite obviously, the economical way to master any skill in arithmetic is to practice that skill consistently, *not* to practice some other skill and hope for transfer.

Drill in arithmetic computation appears not to transfer to problem-solving in arithmetic. For instance, in one experiment 72 boys averaging 10 years of age were divided into two equivalent groups on the basis of a pre-test in "arithmetic reasoning." One of these groups practiced computation thirty minutes a day for ten days, while the other group practiced drawing. At the end of this period end-tests in arithmetic reasoning showed the two groups to average almost exactly the same; moreover, four such series of experiments agreed in this conclusion (44).

On the other hand, where some specific procedure is involved, transfer may take place to some extent in any case, and it is much helped by specific instruction pointing out this procedure. The following table summarizes an experiment with reference to this point (25). Four groups, each of 112 second-grade pupils (the groups being carefully matched as to sex, mental age, teacher's estimate of ability, and score on preliminary tests), practiced simple addition of (a) two two-place numbers (such as $45 + 23$), (b) three two-place numbers (such as $52 + 32 + 13$), and (c) two two-place numbers plus a one-place number (such as $24 + 23 + 2$, in this order). The first group, A, was only shown how to do such additions. Group B received help in formulating general methods of procedure, and these generalizations were constantly emphasized; for example, it was stressed

that the numbers must always be written in such a way as to keep the right-hand column straight. In Group C reasons and principles were discussed (that one's can only be added to one's and ten's to ten's), but the formulation of general rules of procedure (that the right-hand column should be kept straight) was avoided as much as possible. In the fourth group, D, reasons and principles were discussed *and* rules of procedure were formulated. The end-test, which was dictated to the pupils, consisted of the addition of such numbers as 54 plus 322 plus 2. As will be seen, those groups which were specifically led to the recognition and use of general procedures (such as putting down the numbers so as to keep the right-hand column straight) made a much greater gain.

TABLE 25: PERCENTAGE OF TRANSFER PRODUCED BY EACH OF FOUR METHODS OF INSTRUCTION IN THE ADDITION OF TWO-PLACE NUMBERS, TO ADDITION EXAMPLES WITH A DIFFERENT NUMBER OF DIGITS (25)

Method	Percentage of Transfer	Increase over Method A
Demonstration.....	46.6	
Generalization.....	67.6	45.1
Rationalization.....	53.8	15.5
Generalization and rationalization.....	63.8	36.9

A total of 112 quartets of second-grade pupils, matched as to sex, mental age, teacher's estimate of ability, and score on preliminary test.

In algebra it has been found that relatively simple changes in an example affect difficulty (33). Thus 6 per cent of a group of graduate students failed to square $x + y$ correctly, but 28 per cent failed on squaring $b_1 + b_2$. Presumably teaching which emphasized general principles and procedures might have prevented some of this unfortunate dependence upon the usual modes of algebraic expres-

sion. One experiment has shown that certain large "cultural" values may be obtained in algebra, if the teaching stresses these values (23). In geometry (17), the careful teaching of techniques for dealing with original problems markedly increased the ability to deal with "originals."¹²

In mathematics also, learning appears to be relatively specific. Transfer takes place in proportion as the material is similar, and it is increased if there is teaching for transfer. Two additional points have been brought out: (a) Where possible, gain in the practice series should be determined, and then compared with the transfer gains; gains from transfer are usually much smaller than the gains from direct practice. (b) If general rules and procedures are involved, and the teaching for transfer develops these procedures and rules and shows the range of their applicability, transfer is greatly furthered.

It should be noticed that there is a painful lack, in mathematics, of research on transfer to other subjects, or even from one branch of mathematics to another. For instance, how much does arithmetic transfer to algebra? One important cause of "special disability" in algebra appears to be a failure to transfer to algebra procedures for handling common fractions in arithmetic. (All too often fractions in arithmetic never were understood!) How about transfer of work on equations in algebra, to physics? Superficial differences, as in the letters used, often seem greatly to hinder such transfer. And what *is* the value of plane geometry—does the major portion of its subject matter contribute to any other subject?¹³ The larger transfer problems in mathematics are as yet not investigated.

¹² Whether there is any great educational value in learning to work the average "original" in geometry is of course another question.

¹³ Analysis by one of the writer's students of a widely used text in mechanical drawing showed two constructions and twelve terms (such as angle, square) to be the total essential geometry background involved.

Transfer of Training in Science.—Does work in science improve general ability to observe, to think scientifically? Does it develop a general scientific attitude? Here the experimental material is all too meager. One investigator has determined the transfer of practice during ten days in describing such materials as a lilac blossom, a box-elder leaf, and a mustard flower, to ability to describe a syringa blossom, forsythia leaves, certain geometrical figures, and ten syllables (16). The subjects were 74 high school freshmen in a course in botany. While the practice group was trained in observation and description, the control group answered questions from books on the lessons of the ten days. Some of the end-tests were evidently so similar to the training series as to be almost the same thing—the description of the lilac and the syringa, for example. The end-tests were classified as similar or biological, and non-biological. The transfer increase on the biological tests was 34 per cent, and on the non-biological, 5 per cent. Again there is transfer in proportion as the material is similar.

Very significant was an English experiment in a secondary school science course (21). Three classes, each of 20 boys, were first asked to define 20 words not dealing with science; and these definitions were carefully graded as to merit. All three groups then had three lessons consisting of experiments on magnetism. The control group merely answered questions about the experiments. The practice group discussed the results and tried to arrive at satisfactory definitions of the various phenomena they had observed. The “trained” group not only thus discussed the results, but in defining the observed phenomena they were carefully led to develop criteria and methods for a good definition. After

the three days' experimentation, all three groups were asked to define another 20 terms, and these definitions were similarly graded as to merit. The control group was 10 per cent poorer and the practice group 14 per cent poorer, but the trained group was 29 per cent better. The considered development of methods of definition in the science course had had a definite valuable transfer effect.

Another experiment aimed to develop in pupils scientific attitudes of avoidance of superstition and narrow-mindedness, and the tendency to hasty inference. Four months after this training, the trained group, on a test of scientific attitudes, showed a definite superiority (9). Such work is very significant. In teaching science there should presumably be a special effort to develop and generalize an understanding of scientific methods, and to develop a broad scientific attitude. The indifference, skepticism or hostility of many teachers of the natural sciences toward scientific work in education is a curious commentary on the extent to which even scientists lack this attitude and understanding. Certain problems concerned with the development of attitudes will be returned to in the next chapter.

It should be evident that transfer problems in science have as yet been hardly touched by research. Furthermore, there is the problem of transfer from one subject to another—as from chemistry to home economics, as well as from chemistry to physics. Science has its important relations to current events and to modern history. The research on transfer in the languages should be suggestive of some of the projects which might well be undertaken here.

Relative Value of Various Subjects in Training to Think.
—There remains the fundamental question as to whether

various subjects have different values in training pupils to think and to reason. The most extensive and careful investigation of this problem used as end-tests materials of the type used in tests of intelligence—analogies, absurdities, and problems in arithmetic reasoning and in spatial relations (5). The question was as to whether different types of subjects, such as those listed in the table below, caused significantly different gains, over a period of one year, in scores on a battery of fourteen such tests. The table summarizes the results.

TABLE 26: RELATIVE INFLUENCE OF A YEAR'S TRAINING IN VARIOUS HIGH SCHOOL SUBJECTS, IN INCREASING ABILITY IN THINKING (5)

Group of Subjects	Relative Influence
1. Algebra, geometry, trigonometry, etc.....	+3.0
2. Civics, economics, psychology, sociology.....	+2.9
3. Chemistry, physics, general science.....	+2.7
4. Arithmetic and bookkeeping.....	+2.6
5. Physical training, athletics.....	+0.8
6. Latin, French.....	+0.8
7. Business, drawing, English, history, music, shop, Spanish.....	0.0
8. Cooking, sewing, stenography.....	-0.1
9. Biology, zoology, botany, physiology, etc.....	-0.2
10. Dramatic art.....	-0.5

The investigator, Thorndike, concluded that "the differences are so small and the unreliabilities are relatively so large that the influence of the subject studied seemed unimportant." Certain further findings in connection with this investigation are also of great importance. The 1 per cent of pupils who scored highest on the initial test made almost 14 times as much gain during the year as the pupils scoring initially in the lowest 1 per cent. The latter gained only 1.5

points, whereas the former gained 20.5 points; the difference between the poorest school subjects and the best was only 3.5 points. Evidently the important factor in the development of ability to think is not the subject studied but the original ability of the pupil. Moreover, where a given group of subjects seemed to produce a large gain, it was because for some reason more of the bright pupils took these subjects. "The chief reason why good thinkers seem superficially to have been made such by having taken certain school studies, is that good thinkers have taken such studies, becoming better by the inherent tendency of the good to gain more than the poor from any study. When the good thinkers studied Latin and Greek, these studies seemed to make good thinking. Now that the good thinkers study physics and trigonometry, these seem to make good thinkers. If the abler pupils should all study physical education and dramatic art, these subjects would seem to make good thinkers. These were, indeed, a large fraction of the program of studies for the best thinkers the world has produced, the Athenian Greeks" (34).

Applicational Transfer.—There remains for brief discussion an exceedingly important, relatively little investigated question—the question of the extent to which information gained in school transfers so that it is acted upon in everyday life. To be mentioned in this connection, although not carrying the issue through to actual classroom practices, is an investigation by Watson regarding the extent to which students in educational psychology make application of what they have learned in analyzing teaching problems (39). Before and after discussion of certain "laws of learning" the students were asked to analyze certain concrete teaching

situations briefly described to them, in which these laws were operative. There was almost no gain, from the instruction, in the understanding of these situations.

In contrast is the investigation summarized in the table below (14). In certain high school classes in vocational agriculture, emphasis was given to the desirability of putting more land into legume crops. The question then was as to whether this actually was done on the farms of the students attending these classes; and the efficiency of the instruction was measured by the extent to which it actually changed the farming practices in these communities. The table shows that the instruction was effective. In fact, it reached beyond those attending the classes to their neighbors, as is shown by the smaller but nevertheless definite increase of acres in legumes on the farms of the control group (which were in these same communities), whereas in the state as a whole there was a slight decline of acreage in legumes. Presumably two special factors were important here. There was a definite motivation for application, due to the serious vocational interest of these students; and the close personal contact between the teacher of agriculture and the community meant that the instruction was almost literally carried to the farms.

TABLE 27: PERCENTAGE OF TILLABLE LAND IN LEGUMES BEFORE AND AFTER INSTRUCTION OF ONE GROUP, AND AT THE SAME TIME INTERVALS FOR THE OTHER
[HAMLIN (14)]

	Instructed Group	Uninstructed Group
First survey	11.0	6.7
Second survey	16.4	8.1
Increase	5.4	1.4
Net superiority of instructed group, 4.0		

Analogous evidence has been obtained of the application of instruction given in home economics classes (11). The

instruction was concrete and practical; as special problems the students planned the decoration of their rooms or meals for their own homes, and the teachers often visited the homes of their pupils. Both the testimony of the pupils and the teachers' observation on these visits showed that the teaching was actually affecting the daily life of the students and their families. This carrying of instruction into application, and a check of the extent to which the application is made, should become general. For instance, it should be part of every program in educational psychology. There should be an investigation of the applicational transfer of high school science to everyday life, and of history and civics to an understanding of current community and national problems. Such work should have an extremely salutary effect on curricula.

THE THEORETICAL EXPLANATION OF THE EXPERIMENTAL FINDINGS REGARDING TRANSFER

The question now is as to whether the experimental findings regarding this total problem can be brought together in any useful theory. The findings may be briefly summarized as follows: (a) Transfer from one subject to another takes place in proportion as the two subjects are similar; thus, the study of Latin increases the knowledge of English words derived from Latin but not of words derived from other languages. (b) Knowledge of a topic is obtained indirectly by transfer from the study of another subject much less economically than by the direct study of the topic in question; thus it was seen that an improvement of 112 per cent in multiplying brought a gain of only 29 per cent in other processes in arithmetic. (c) Transfer is obtained in pro-

portion as there is teaching for transfer; if a Latin teacher brings out the relations between Latin and English words whenever possible, the gain in English vocabulary is increased. (d) Transfer is most effective where the training develops certain methods, attitudes, and understandings of some general applicability, and where these methods or understandings are generalized and their range of applicability shown.

What theory regarding transfer may be inferred from these and other experimental results? Most profitable practically may be considered the theory of identical elements. The study of Latin increases English vocabulary because there are common roots; for example, it is noted that the letters *urb* are common to the Latin *urbs* and the English *urban*. Such a theory would seem to explain the range of transfer and to be very suggestive regarding methods of teaching for transfer.

Transfer from Latin to English vocabulary because of common word roots is transfer because of common elements of content. But there may be common elements of method. Thus, the pupils in the English school who learned methods of definition gained markedly in their ability to define various types of words, whereas those who had only practiced defining gained not at all. Transfer of this type—involving the development and extension of the range of applicability of useful methods—is the important type of transfer, and has great potentialities.

Most striking evidence of this great potentiality is furnished by an investigation, similar in method to the research just referred to, regarding training in memorizing. Three groups of individuals were worked with, the groups being equivalent in

initial ability to memorize, as shown by tests in learning poetry, prose, facts, dates, and vocabulary. The control group was given no training in memorizing, and the "practice" group spent eight periods averaging 22 minutes each in memorizing poetry and nonsense syllables. The "educated" group had the same total amount of time (177 minutes) but only 101 minutes went to practice, the remaining 76 minutes being spent in consideration of methods of memorizing (the value of rhythm in memorizing, of recitation instead of only rereading, and of the "whole method"). The following table shows the results on the end-tests. The "educated" group gained ten times as much as the practice group (46).

TABLE 28: GAINS OF (A) PRACTICE, AND (B) EDUCATED, GROUPS OVER CONTROL GROUP, IN MEMORIZING (46)

	Practice Group	Educated Group
Learning poetry.....	0.3	6.1
Learning prose.....	0.8	7.5
Learning facts.....	0.2	7.2
Learning dates.....	1.3	8.8
Learning vocabulary.....	1.0	10.9
Average gain.....	0.75	8.5

In the above experiment the general elements which transferred had to do with methods of work. But such elements may also be attitudes or points of view, as was mentioned in another of the experiments, on transfer in science. There may be a spread of emotional attitudes and stresses. Furthermore, all such general elements as methods of work, attitude toward superiors, willingness to "try again," or feelings of confidence or diffidence, may have very wide applicability. Here, evidently, are the important problems of transfer—and, in the large, the important problems of

a true education. Such elements must be identified—and that not alone in general fashion, but so specifically, by research, that their nature is known. Means for developing them, and for studying their range of application, must be worked out by controlled experiments. In proportion as such elements are general, and wide applicability is desired, the research must be extensive and must include much work on applicational transfer, as instanced in the previous section. Educational programs must also be broadened, and must have multiple relationships with extra-school experience.

APPLICATIONS OF MODERN WORK ON TRANSFER TO EDUCATIONAL PRACTICE

There remains the final task of bringing together the discussion of this chapter into a general statement of the applications to educational practice. Here it is natural to consider separately applications to curricula and to methods, although, as will be emphasized shortly, applications to method are clearly dependent upon specific curricular analysis with reference to this problem.

Curricular Problems in the Light of Research on Transfer.—First of all, general training in methods of work, attack upon a problem, and thinking, can be attained in almost any subject—and in proportion as teaching is intelligently directed to this end. It is not true that certain subjects have some mysterious, peculiar effectiveness in this respect. All subjects can be made to serve this general educational purpose, and all of them can be made so to serve much more than at present. As will be brought out later, general training is a matter of method, not subject matter.

Furthermore, the findings presented in this chapter have directly or indirectly reiterated this theme, that the way to get an educational value is to drive straight for it. If the desire is to increase English vocabulary, the teaching must be directed to that end. If a pupil is to be habituated in correct grammatical forms, not grammatical rules but a repeated consideration of the correct forms is necessary. If he is to learn problem-solving in arithmetic, he must be taught to solve problems instead of being given further work on the number combinations. If there is to be transfer, there must be teaching for transfer. Where "transfer" has been most effective—for example, in the increasing of English vocabulary by using such a method in Latin as emphasizes the relation of Latin to English—there has been such a taking over of the content of the related subjects into the content of the training subject as almost to amalgamate the two subjects, in the respect in question.

Curricula must, then, be constructed with direct reference to the objectives to be attained; subjects can legitimately be kept in the curriculum only for their intrinsic, not for the disciplinary or indirect, value. Though there is transfer, and it can be much increased, such values must be found within subjects intrinsically worth while. No amount of increase in efficiency of training for transfer can legitimately lead to a neglect of this fact. Moreover, this fact should be looked straight in the face and acted upon; that it is not, constitutes the worst single fault of secondary and junior college curricula. Recognition of the newer findings regarding the possibilities of transfer should not, as it sometimes seems to be doing, divert curriculum builders from this fact.

Applications to Educational Methods.—First to be men-

tioned here is a fact which has already been brought out. To obtain transfer, there must be training for transfer. If one wishes to increase the size of his English vocabulary through the study of a foreign language, he must make a specific attempt to bring about this increase. If he wishes to improve his ability to memorize, he must try specifically to develop better methods for memorizing and to show their range of applicability. In particular, there should be efforts to make applicational transfer; the material must be specifically related to as many "use" situations as possible.

In connection with the above paragraph there is a corollary which has been all too much neglected. If there is to be training for transfer, then the common elements must be identified, so that the teacher will know what elements she should seek to transfer. If she wishes to increase English vocabulary through a study of Latin, she must know when she meets a Latin word having English derivatives, and she must know what these derivatives are. If she wishes to increase the knowledge of French life and customs from reading in French, she must be alert to such elements in the reading, and she must know how to develop them. If she desires to improve ability to memorize by practice on certain tasks of memorizing, she must know what elements of method are common to various types of memorizing, and stress those elements and their general applicability. If she hopes to improve methods of thinking in any subject, she must have specific and research-determined (not merely *a priori* and theoretical) knowledge as to what those methods are. The great need in dealing with the transfer problem is for research which aims specifically at the identification of such elements of both content and method;

the preeminent need is for the specific identification of important elements of method and the determination of their range of applicability. Such work has great possibilities. If one is to improve methods of thinking, the all-important research need is for the identification of actual methods in such specific form that they can readily be pointed out as they appear in a given situation, and applications to other situations can be specifically indicated. Here opens up an immensely important new field for educational research, which will be emphasized in the following chapter.

Finally to be stressed is a third point, also largely neglected. With a given opportunity for transfer, the amount obtained in the case of a particular pupil will depend in large measure upon that pupil's general ability. This is perhaps the most important bearing of research on differences in intelligence: a child's I.Q. is most significant with reference to his capacity for general training. With recognition of this fact, and with the identification of common elements of method and emphasis upon training for transfer, there may well be a new general training which will make education many times more fruitful for the bright pupil than it is at present.

SUGGESTIONS FOR TEACHING WITH REFERENCE TO PROBLEMS OF TRANSFER

In the light of the above discussion, the following suggestions are offered with reference to teaching.

- (1) If an educational value is to be obtained, go straight for it. Better written and oral English can be obtained only by patient and consistent efforts to improve English expression, and not by the study of formal grammar. Better methods of work and of thinking can be obtained only by making clear to the pupils what those methods are, and having them use those methods in various situations where they are applicable; students will not automatically learn such

methods merely from the study of Latin or mathematics, or any other subject.

- (2) It follows that if transfer is desired, there must be teaching for transfer. A teacher of Latin will increase English vocabulary in proportion as she shows specifically and concretely and repeatedly the relationships between the two languages.
- (3) It further follows that if she is to bring about transfer she must know the common elements involved. To increase English vocabulary by the study of Latin, she must know what Latin words have what English derivatives, and she must point out these relationships.
- (4) Moreover, to bring about development and transfer of methods and attitudes she must know specifically what these attitudes and methods are, she must specifically develop them in the "training" subject, she must specifically apply them to related subjects, and generalize them. If, for example, she systematically trains her students in the adequate definition of phenomena in one topic, formulates these methods in general terms, and shows how they may be applied to various types of phenomena, she may hope for large transfer; merely practicing making definitions will accomplish little. Only in proportion as she explicitly and systematically proceeds in this way, will she give her students "general mental training." If she proceeds thus, she may hope to make large contributions to the intellectual development of her pupils.
- (5) To bring it about that pupils apply what they learn, there must be specific training for application. If, for instance, a course in home economics is to be maximally valuable to a girl, it must be specifically related to her home or her present or future work; the teacher will do well to visit the home and study these problems of application directly. Every opportunity should be seized upon to relate each pupil's school work to that pupil's total experience.

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CHAPTER XV

PROBLEMS OF GENERAL TRAINING

AT THE close of the last chapter experimental evidence was produced to show the possibility of "educating" an individual in methods of memorizing so that he would be able to memorize various types of material more effectively than he could before. Presumably it is such training of some general applicability that the school aims especially to give. Indeed, the most important purpose of education might well be stated as the development of more effective methods of intellectual work, greater capacity for thinking, wiser judgment and more admirable attitudes regarding such issues as may come within one's life, better habits and ideals of conduct, and finer sensitivities to the best in the world of art and literature. This chapter briefly surveys certain attempts to investigate these difficult and exceedingly important topics.

THE DEVELOPMENT OF EFFECTIVE METHODS OF WORK AND STUDY

First to be considered is a topic which is anathema to many psychologists and educators because of much superficial research and still more superficial efforts at formal training in the field: methods of work and study. It is true that some of the research upon this problem has been far from satisfactory. But it is also true, as was pointed out at the beginning of the chapter on the development of mental

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students. However, the average student is frequently behind in his work, his notes are hastily taken, he often does not know what his assignments are, and he chronically misplaces his books and papers. Inefficiency is not limited to the pupils. All too many teachers find themselves hurried and harried by their work. They do not get things done with that carefulness or calmness they had planned. As a matter of fact, even in the business world there is a considerable group of business men who have to be prodded if one wants results, who cannot find previous correspondence when needed, who fail to remember conferences, and who, even after repeated reminders, neglect to make a needed improvement. The exceedingly important topic of this first section might be put in this way: How can American children be made businesslike in their studies, and be so trained in habits of work that they will become efficient American adults?

The reader will do well to review carefully his own experiences relevant to this topic. He will find it illuminating, as previously suggested in Chapter VII, to spend a few minutes in a library or study room, noting the business-like methods (or the lack of them) of students in dealing with their assignments. A simple procedure is suggested: A group of ten students might be watched and a count made of the number of times each looks up in a period of 20 minutes, and the number of times he speaks to a neighbor or moves about. Several notebooks might be glanced at to see how many are in systematic form, and a count made of the number of students who do not have their notebooks with them, and are taking notes on odds and ends of paper—such as the back of an envelope. Or the students might be asked how many know the next assignment in each one of their courses, and how many of them have been forehanded enough in the preparation of a term paper so that

it can be completed without frantic effort on the last day. Perhaps the observer might note the number of instructors who give back graded examinations promptly, and who are always on time for class. And he might run over in his mind any business offices he has known, making mental note of their efficiency.

Technique for Investigating Methods of Work.—The first question concerns the research techniques by which one can investigate this rather obvious but nevertheless difficult topic of methods making for personal efficiency. He can find out how students study by asking them in some detail how they go about their work, by inspecting their notebooks or other papers, by watching them when studying, by intensive individual observation of students in a "study laboratory," and by frequent conferences with students in which they are persuaded to reveal in great detail how their thinking is going forward. All these methods are clearly needed, and all of them have been used.

The next question is to determine from all these data which methods are most effective, and which are to be avoided. In some cases, as in the matter of promptness, the desirable procedure or characteristic would seem obvious. But special methods of study, of procedures in attack upon an assignment, of techniques for reviewing, cannot be evaluated offhand. The most feasible procedure is to locate one group of students who make excellent marks, and a second group whose academic standing is very poor. Both groups are then carefully investigated by such procedures as indicated above. The percentages of the good and poor students who use each method are then determined and the two figures compared; those methods used by a large percentage

of the excellent students and a small percentage of failing students are considered the significantly superior methods.

This research technique is inadequate in that when teachers give marks they are all too often biased in favor of the docile as compared with the intellectually original and vigorous student, and know little concerning the effectiveness of a student outside the somewhat narrow situation of the schoolroom. In dealing with this whole problem, information is greatly needed with regard to successful as compared with unsuccessful methods of work in adult life. There is need for a sedulous Boswell with psychological training who would stay constantly with men like Henry Ford and Owen D. Young, to note what they did and how they did it. These same investigators should also study the methods used by men who go bankrupt, so as to make contrasts between adult failures and adult successes. Such study would presumably yield information of much general interest and of great significance to education as a guide in making school training more effective and more in harmony with the needs of adult living.

Findings Regarding Efficient Methods of Work.—The following table is typical of the results obtained from using such methods as outlined above. It summarizes the results of an inquiry form regarding methods of work filled out by 200 college students, and shows the distinctive characteristics of the inefficient students—the methods to avoid. The inquiry form included 125 questions; only the 18 points given in the table appeared differentially significant (17).

Such an inquiry form filled out by students of course needs supplementation by other means of investigation such as have been mentioned above—actual observation of students' methods of work, inspection of notebooks, and trial of various methods in study laboratories. The considerable

TABLE 29: SHOWING THE PERCENTAGE OF FAILING STUDENTS ANSWERING EACH QUESTION IN EXCESS OF THE PERCENTAGE OF SUPERIOR STUDENTS (17)

	<i>Answer</i>	<i>Per Cent</i>
A. Study Environment and General Routine of Study		
1. Do you usually study every day in the same place?	No	36
2. Do you have a daily plan of work?.....	No	24
B. Reading		
1. Do you frequently skip the graphs or tables in your textbooks?.....	Yes	40
2. Do you frequently make simple charts or diagrams to represent points in your reading?.....	No	40
3. When you find a word in your reading that you do not know, do you usually look it up in the dictionary?.....	No	32
4. Do you usually skim over a chapter before reading it in detail?.....	No	28
5. Do you usually have trouble in getting the meaning of a chart or table?.....	Yes	28
C. Note Taking		
1. Do you keep your notes from one subject together?	No	32
2. Do you usually take your notes in class just as rapidly as you can write?.....	Yes	32
3. Do you usually take your notes in lecture in outline form?.....	No	28
4. Do you usually take your notes on reading in outline form?.....	No	28
D. Self-expression		
1. Do you usually have difficulty in expressing yourself in written work?.....	Yes	56
2. Do your teachers frequently complain that you do not make sentences when you write?.....	Yes	28
E. Examinations and Reviews		
1. Do you sit up late the night before an exam studying?.....	Yes	40
2. Do you often write the answer to a question, only to find that it is the answer to some other question on the examination?.....	Yes	32
3. In preparing for an examination do you try to memorize the text?.....	Yes	28
F. General Attitudes		
1. Do you frequently try to analyze your work and try to find out just where you are weak?.....	No	36
2. Do you frequently use the facts learned in one course to help you in the work of some other course?...	No	28

number of investigations on this total problem seem substantially agreed on the following points as important for efficient study. To make these conclusions more valuable to a student, they are given in the form of simple rules for effective work.¹

- (1) For effective work, certain prerequisite conditions are important.²
 - (a) Failing students frequently show physical handicaps or poor health; guard your health and keep in good physical condition if you would work efficiently.
 - (b) Do not attempt a full load of school work and in addition try to spend much time during the school year earning your way; many students fail because of such a burden.
 - (c) Emotional strain is often a basic cause of failing work; try so to order your existence that problems of emotional adjustment are not critical.
 - (d) Try to find a quiet place for work free from distractions and interruptions. Lack of a place where consistent work can be done often seems to be a cause of failure in school.
- (2) Businesslike methods in use of time are very important for efficiency.
 - (a) Learn to plan or budget your time. If possible, have a regular daily schedule for work. At least plan ahead so that you use your time effectively.
 - (b) When you sit down to work, do not fiddle or procrastinate; begin at once. Many inefficient workers

¹References 14 and 15 will be found of further help in this connection, and the case studies in reference 16 will make the general points concrete and vividly real.

²The reader may notice that these rules are in close agreement with the earlier discussion of health, emotional strain, control of learning, and the hygiene of work. To a certain extent they are a statement of the main points of these chapters in the form of rules for the guidance of the student.

show as a major characteristic inability to settle down to work.

- (c) Plan so that when you are about to do a piece of work, you have the materials necessary. Have a notebook, and form the habit of keeping it with you. Plan ahead sufficiently so that any books you may need are with you when you need them. Failing students are characteristically irresponsible in such matters.
 - (d) Plan ahead so that you do not have to exhaust yourself in last-minute preparation for some examination or other task. Under such circumstances, poor students frequently sit up late at night, eat irregularly or miss meals, and neglect recreation. All this is poor economy. Whenever additional demands are made upon one, additional precautions in health should be taken.
- (3) Skill in "selective reading" is exceedingly useful and time saving, both in school work and in adult life.
- (a) Always make a preliminary survey of any material before reading it, to find the general organization and main points. Make use, for this purpose, of tables of contents, topic headings, summaries, and similar aids. *Never* read through any material before making such a preliminary survey.
 - (b) Be sure you understand graphs, drawings, tables, formulæ, and similar means used to summarize data; a common fault of poor students is neglect of such material.
 - (c) Do not skip technical terms; look them up. They are an essential to an understanding of the subject.
 - (d) Stop reading every few minutes, and think over what you have read, trying to distinguish the most important points, making applications to what you already know, and reciting to yourself.
- (4) Methods of making and keeping records are an important

element in efficiency in almost every form of mental work.

- (a) Take notes, on both reading and lectures, in brief, systematic outline form. Poor students characteristically try to take down everything the instructor says, and their notes are simply one thing after another, without any distinction as to comparative importance or organization.
 - (b) Take notes in your own words, with any comments which may occur to you; do not try to record verbatim the lecture or reading.
 - (c) Keep your notes on one subject together, and assignments and notes in such order that you can readily find what you need when you need it. Notes which cannot be found readily are hardly any better than no notes at all.
 - (d) In looking up references for a report or topic, use cards, and the usual library form of giving reference, so that your material can be easily added to or rearranged.
- (5) In any undertaking, a periodic review and appraisal of what has thus far been accomplished is necessary for efficiency.
- (a) Regularly spend some time on a review of your work.
 - (b) Review *selectively*. Poor students read frantically over all their material (if they review at all). Good students think over their work, and review only those points in which they are weak. They thus save time *and* accomplish more.
 - (c) In reviewing, relate the material to your own experiences and to work in other courses, and apply it.
- (6) Good students are distinguished by the systematic way in which they write examinations and reports.
- (a) Always outline a report or an answer to an essay-type examination.
 - (b) Always allow time for reading over a report or ex-

amination before turning it in. You will thus catch mistakes and poor expressions which would otherwise escape you.

- (c) Always read over all the questions of an examination before beginning to write, so that you can plan your time and coordinate your answers.

Training in Methods of Work.—On the basis of such data as have been mentioned, there have been developed in many institutions programs designed specifically for training students in efficient methods of work. It early became clear that merely lecturing students about such methods did little good. Classes of a laboratory type are necessary (17). Attendance in the class is usually required of students on probation, and the class is also open to other students who may be referred to it by college secretaries or deans; it is also elective, upon consultation with the person in charge, to students who may wish this help. The methods used in such a course may be inferred in considerable degree from the discussion above. The first effort is naturally to find the causes of each student's difficulties.

At the beginning of the course the instructor has an individual interview with each student, in which the total circumstances are sympathetically inquired into. To this interview the student may bring a blank which he has filled out, regarding his physical health; and the interviewer pursues this inquiry further, to find whether chronic illness or physical handicap may be a factor in the situation. If necessary, a physical examination may be arranged for, through the student health service. Something is found out also regarding any emotional problems with which the student may be wrestling: there may be some trouble in relations with the home, some incompatibility in the rooming house or fraternity, some unhappiness in connection with social isolation from campus affairs. As has been

previously emphasized, all such factors influence mental efficiency; they are still more important in a broader educational program which considers the student's total welfare.

Inquiry is next made regarding the nature and origin of the student's immediate academic difficulties. The student is asked for his own interpretation of his troubles in the courses he has failed, and inquiry is also made of the instructors concerned. Tests may be given in various background preparatory subjects. For example, if the student is having trouble with science, tests in arithmetic may be given to see whether deficiency in this subject may be a factor. If the trouble is with a foreign language, inquiry is made regarding grammatical background. Questions are asked regarding the secondary school training. The student's notebooks are looked over. In short, every effort is made to obtain an understanding of the total academic problem.

Once such information has been obtained, the remedial program is begun. Obviously most difficulties are so individual that the remedial work must also be highly individualized. If health is a factor, attempts are made to improve it. A sympathetic effort is made to adjust or solve emotional problems. If deficiencies in the tool subjects, such as arithmetic, are a factor, practice materials are provided.

Inefficient methods of work and study are usually a factor. In this connection, the student is asked to make out a time budget or schedule of work. He is shown how to outline, how to attack a reading assignment, how to take notes. For practice on these points he brings to the laboratory the textbooks in the subjects with which he is having difficulty; and the instructor sees to it that he settles down to work quickly, applies himself steadily, makes use of topic headings, and takes notes in satisfactory form. The instructor does little in the way of classroom teaching, beyond explaining from

time to time how notes and other routine procedures should be handled. Most of the time he moves about the room, talking with this or that student, looking over his work, and helping individually in every way he can.

The Results of Efforts to Train Students in Methods of Work and Study.—What are the results of such efforts individually and specifically to give students help in dealing with their problems? The following sample data are of interest in this connection (17). They compare the academic record of a class of 31 students who were given such training, with the record of a control group of 31 other students who were also in academic difficulty; each one of the control students was paired with one of the students receiving help, as to intelligence, academic record previous to the probation quarter, age, and sex. The practical question then is, how much better did those students do who were taking the study laboratory, during the quarter when they were in this laboratory, and also subsequently? The following brief table tells part of the story; it shows the percentage of the total work taken by the students in each group, on which they made either A (very good), B (good), or C (average). Whereas the control group gained only 7 per cent during the probation quarter in proportion of work

TABLE 30: PERCENTAGE OF COLLEGE WORK OF TWO SIMILAR COLLEGE GROUPS WHICH WAS A, B, OR C THE QUARTER BEFORE GOING ON PROBATION AND THE PROBATION QUARTER, THE EXPERIMENTAL GROUP BEING GIVEN HELP IN A "STUDY LABORATORY" DURING THE PROBATION QUARTER, AND THE CONTROL GROUP BEING GIVEN NO SPECIAL HELP (17)

	Failing Quarter	Probation Quarter	Gain
Experimental.....	25	70	45
Control.....	27	34	7

which was average or above, the group in the "how to study" laboratory gained 45 per cent. It would seem clear that the students who were given this help did actually profit by it.

Of further significance is the following table summarizing the situation for the two groups at the end of the quarter

TABLE 31: DIFFERENCES BETWEEN A GROUP OF STUDENTS GIVEN HELP IN A STUDY LABORATORY AND A CONTROL GROUP, THE QUARTER FOLLOWING THE PROBATION QUARTER (17)

	Experimental Group	Control Group
Still in college.....	22	14
Number "out under rules".....	3	11
Number back on probation.....	4 ^a	6 ^a
Number "out" for other reasons.....	6	6
Average number of hours taken.....	14	13.4
Average point-hour ratio.....	1.74	1.43

^a These students are included in the number "still in college."

following the one in which the help was given (17). Evidently a considerably larger proportion of the students in the experimental (or helped) group were "saved" academically. Almost twice as many of the control group left college as did the experimental group; over three times as many were eliminated because of unsatisfactory work. And in spite of the fact that more of the very incapable students in the control group had left school (all remaining in the control group were above the 30th percentile on the intelligence test, whereas seven of the experimental group were below that ranking), more in the control group were back on probation, and the point-hour ratio was lower.³ The

³ Points are determined by calling A four points, B three, C two, D one and E zero, and multiplying the number of points made in each course by

How to Study course apparently continued to help these students beyond the time when it was taken.

It must be further emphasized that the special course helped the students who took it in various ways not here brought out. They had been helped in their health problems, and in their problems of emotional adjustment. They had been given a new courage. It therefore seems not unreasonable to conclude that the total outlook on life of some of these young people had been bettered. Such attempts, not merely to teach arithmetic or algebra, but to help the student in every possible way to be a healthier, happier, and more efficient individual, may well be extremely significant for the education of the future.

PROBLEMS IN "TRAINING TO THINK"

It is a curious fact that little direct research on thinking about real problems in real situations, has thus far been done. What is needed, the writer believes, is such a pragmatic research procedure as was described above under Techniques for Investigating Methods of Work, with special emphasis upon the methods of thinking and problem-solving used by outstandingly able adults. There are fascinating possibilities for research in this field. Presumably, methods of work and study and methods of thinking are closely related; the work on study methods has been stressed because the writer believes it to be, on the whole, the most significant line of approach to the practical problems of training to think. Moreover, Chapter X treated primarily learning of the problem-solving type. Under

the number of hours. The point-hour ratio is the number of points divided by the number of hours.

these circumstances, any considerable separate discussion here of "thinking" seems unnecessary.

However, in supplement to what has been said elsewhere on the subject, certain points do deserve brief mention. In the first place, real effective thinking of the problem-solving type presupposes information regarding the topic under consideration—and information mastered to the point where there is facility in its use. One cannot really begin to play chess, for instance, until he has thoroughly learned the moves of the various pieces and knows something of the various openings. This should be obvious. But current emphasis on "training to think" has tended to neglect this fact, with a resultant superficiality both in public school teaching and in teacher training.⁴

In the second place, original thinking actually proceeds by a process of trying and *doing*; it is an active and not a contemplative process. The way to work out a problem in chess is to play it through in various ways, and not merely "study" it. Theorizing is a cheap substitute for real thinking; really effective thinking might be described as intelligent experimenting. Thinking is best furthered in school by an activity program.

In the third place, thinking is no mysterious unanalyzable process. It should be possible to make job analyses of thinking. Furthermore, such analyses should be quite as valuable in locating bad techniques and hidden sources of error, and in improving training to think, as analyses of the way children do arithmetic have been illuminating and helpful in improving the teaching of that subject. The

⁴ It may well be that there should be somewhat less emphasis on "thinking" and more on being well informed.

greatest immediate need is for empirical and practical analytical studies of thinking.

The culmination of any process of original thinking is the "insight," the sudden discovery of the key to the problem. In part, this insight may be considered simply the culmination of the total process, and coming as a result of that process. But everyone who has attempted original work or invention knows that there are times of heightened intellectual activity when for some reason an insight is gained which seems impossible under ordinary circumstances. Such moments are the most exhilarating of all intellectual experiences. What are the circumstances and conditions which bring about these episodes of unusual mental effectiveness? In part the causes are undoubtedly physiological, and in part they are matters of motivation. Special circumstances, such as distraction or the freedom from it, may play a part. The whole subject is obscure. But if the causes of such moments of exceptional mental clarity and originality *could* be found, they might offer fascinating suggestions for the furtherance of intellectual effectiveness.

PROBLEMS IN THE DEVELOPMENT OF ATTITUDES AND CHARACTER TRAITS

In the first part of this book the importance of the development of desirable attitudes and traits was emphasized, and in the chapter on measurements reference was made to tests for investigating such traits. Something remains to be said here regarding significant findings by means of such instruments. As is the case throughout this chapter, no attempt will be made to survey the field systematically; instead, certain sample studies will be mentioned, in order to

give some idea of the exceedingly interesting potentialities both for further research and for application to educational problems.

The Long-time Development of Attitudes.—In the first place, what is the general course of the development of attitudes, interests, ideals—does it parallel the development of general intelligence? Or does it perhaps show a greater susceptibility to influence by social factors? The following graph, of interest in this connection (17), shows results with the *X-O Test Form B*, a simple but extensive test or inquiry form for investigating attitudes on various borderland moral problems, possible topics of anxiety, and interests.

The directions for the first test, and the first five lines of that test, are as follows:

Read through the twenty-five lists of words given just below and cross out **EVERYTHING THAT YOU THINK IS WRONG**—everything that you think a person is to be blamed for. You may cross out as many or as few words as you like; in some lists you may not wish to cross out any words. Just be sure that you cross out everything you think is wrong.

1. begging smoking flirting spitting giggling
2. fear anger suspicion laziness contempt
3. dullness weakness ignorance meekness stinginess
4. fussiness recklessness silliness nagging fibbing
5. extravagance sportiness boasting deformity talking-back

The second test asks the pupils in similar fashion to cross out things they have worried about. The first five lines are as follows:

1. loneliness work forgetfulness school blues
2. sin headache fault-finding sneer depression

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so rapidly that the co-eds finally appear to be more sophisticated than the men. The natural explanation would seem to be that during the high school years the girls are more under the influence of the home and conventional codes of behavior. But in college, especially if the girl goes away from home, there is a reaction against such restraints, and a rapid change in points of view. The conclusion is clearly suggested that attitudes are essentially a product of the social influences which play upon the individual. Fascinating possibilities are opened up for the measurement of the growth of personality, and the influence of various types of educational environment upon its growth.

The Measurement of Particular Attitudes.—The previous investigation dealt with the general problem of the development of attitudes over a long period of time. Much interesting work, of great significance for education, is now being done on the development of specific attitudes and the influence of specific factors upon this development. For example, a test for determining attitudes toward crime has been constructed, the directions and the first few items of which are as follows (the entire test includes a total of 78 such comparisons of the seriousness of 13 different crimes) (52):

This is a study of attitudes toward crime. You are asked to underline the one crime of each pair that you think should be punished more severely. For example, the first pair is:

speeder—pickpocket

If, in general, you think a speeder should be punished more severely than a pickpocket, underline *speeder*. If you think a pickpocket should be punished more severely than a speeder,

underline *pickpocket*. If you find it difficult to decide for any pair, be sure to underline one of them, even if you have to guess.

speeder—pickpocket
 gambler—bootlegger
 drunkard—beggar
 gangster—tramp

bank robber—gambler
 pickpocket—drunkard
 quack doctor—bootlegger
 beggar—gangster

This test was given to 240 high school pupils eleven days before seeing a moving picture, "The Street of Chance," which depicts the life of a gambler. It was also given the day after seeing the film, and again five months later. The graph below shows the shift in attitude toward the gambler as a result of seeing the film; the film evidently made the pupils feel that gambling is more serious than they considered it at first. The third scale shows that, even five months later, something of this attitude remained.

Somewhat different in method is a scale for the study of attitudes toward the Chinese (52). This consists of a series of statements indicating different attitudes toward this race; the statements run from great admiration to great dislike, and were carefully chosen as expressing various degrees, favorable or unfavorable, from one extreme to the other. The directions and first five items of this "Schedule" are as follows:

This is a study of attitudes toward the Chinese. On the other side of this page you will find a number of statements expressing different attitudes toward the Chinese.

Put a check mark if you agree with the statement.

Put a cross if you disagree with the statement.

Try to indicate either agreement or disagreement for each statement. If you simply cannot decide about a statement you may mark it with a question mark.

This is not an examination. There are no right or wrong answers to these statements. This is simply a study of people's

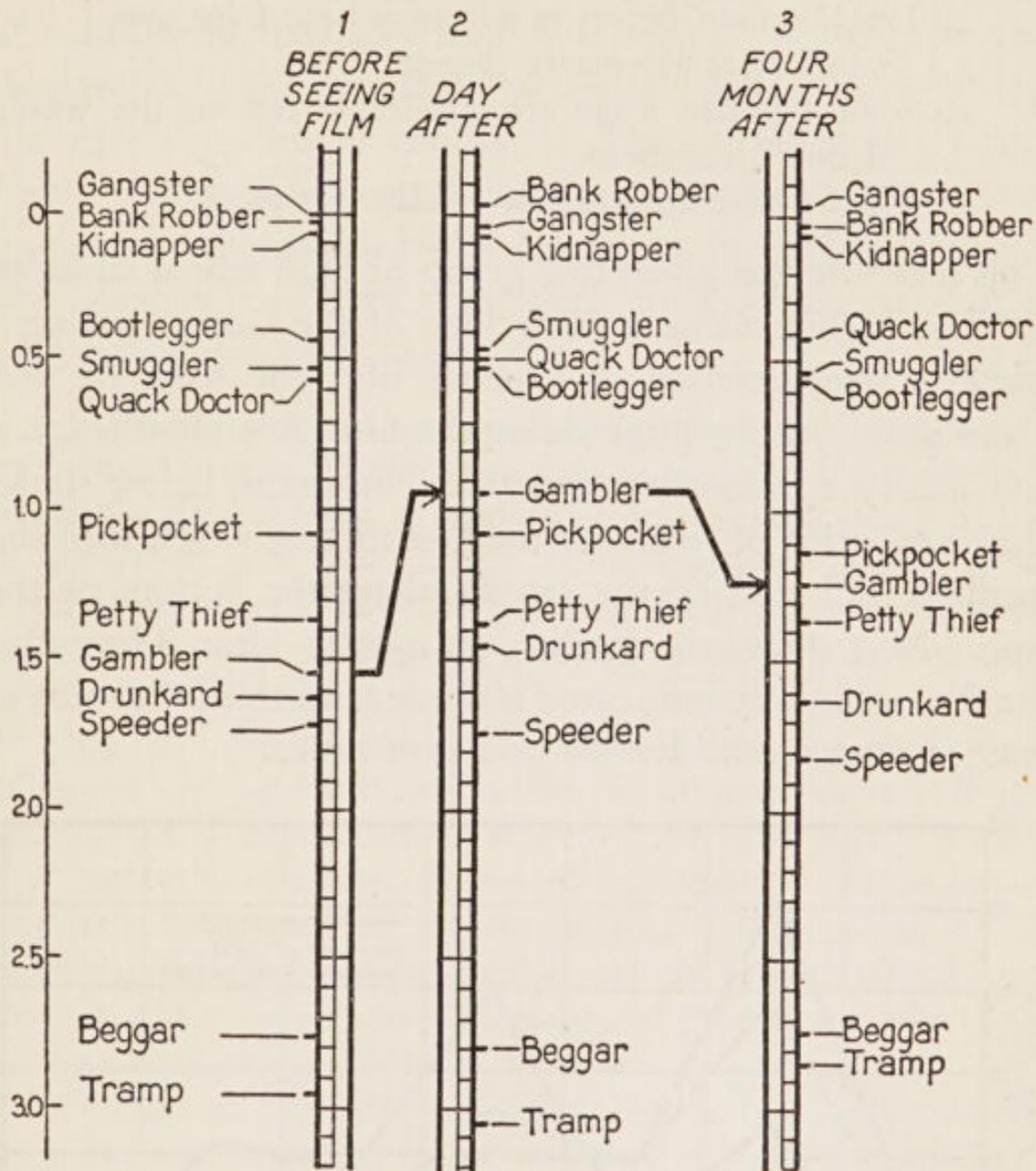


CHART 44.—Effect of the moving picture, "The Street of Chance," upon the attitude of high school pupils toward gambling (from Peterson and Thurstone [52], by the kind permission of Dr. L. L. Thurstone, and Edwards Brothers, Inc., publishers).

attitudes toward the Chinese. Please indicate your own convictions by a check mark when you agree and by a cross when you disagree.

Put a check mark if you agree with the statement.

Put a cross if you disagree with the statement.

1. I have no particular love or hate for the Chinese.
2. I dislike the Chinese more every time I see one.
3. The Chinese are pretty decent.
4. Some Chinese traits are admirable but on the whole I don't like them.
5. The Chinese are superior to all other races.

This schedule was given to a group of high school children six days before seeing a film, "Son of the Gods," giving a friendly interpretation of Chinese life; the schedule was given again the day after seeing the film, five months later, and finally 19 months afterward. The graph below shows the distribution of results of the first three givings, with the medians indicated by the arrows along the bottom of the scale; M-4 shows the median 19 months after. Here also the film definitely influenced attitude, and this influence remained after a considerable period of time.

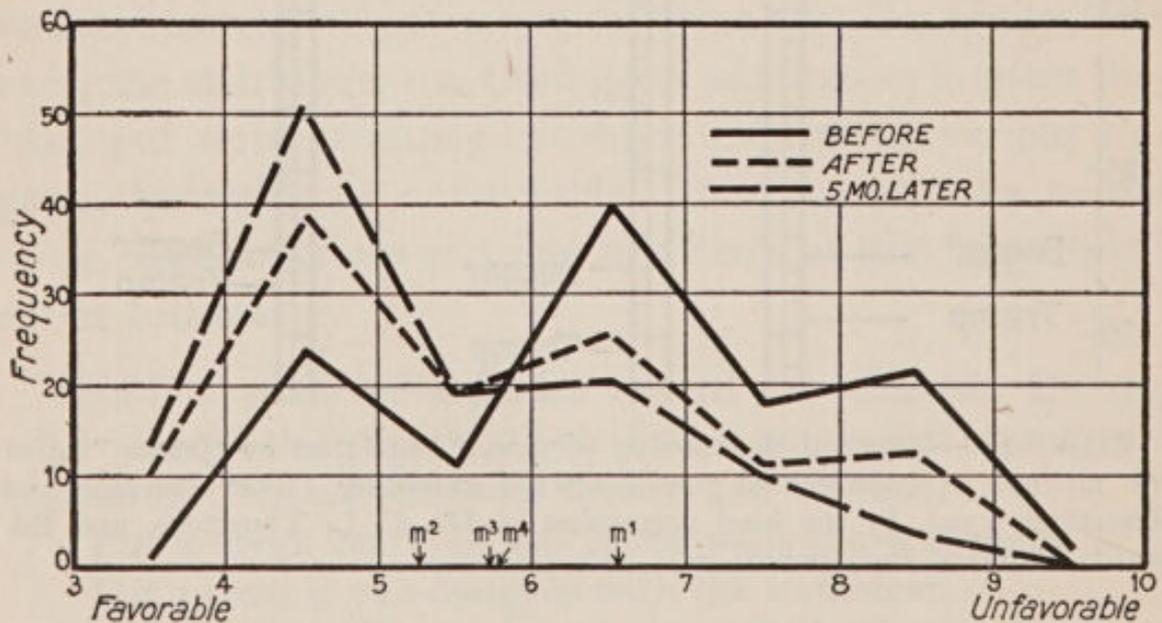


CHART 45.—Effect of the moving picture, "Son of the Gods," upon the attitude of high school pupils toward the Chinese (from Peterson and Thurstone [52], by the kind permission of Dr. L. L. Thurstone, and Edwards Brothers, Inc., publishers).

It would hardly seem necessary to emphasize the value of work along these lines. As such methods are developed it should be possible to determine, for example, the effect of a militaristic history textbook upon attitudes toward war, the growth of the scientific attitude in a course in chemistry, the extent to which courses in foreign languages really foster a desirable internationalism, or the value of the teaching of economics and sociology in furthering a liberal and humanitarian viewpoint. Such work strikes straight at vital educational problems.

Certain indirect evidence indicating the present neglect of such issues in educational practice is significant of the need for work along these lines. A study of teachers' final examinations in history showed that out of 56,504 questions appearing on 2250 examinations, over 90 per cent dealt purely with facts (51). There was not a single question relating to such matters as the development of international sympathies, the removal of prejudice, the weighing of historical evidence, or the development of any appreciation that the present might be better understood if interpreted in terms of the past. Yet it is clear that certain undesirable forms of nationalistic prejudice are regularly developed in history courses; if these attitudes are engendered by the reading done in connection with school work there would seem no adequate reason why other attitudes could not be developed by different materials and methods.

Evidence of a similarly indirect nature has been obtained from the analysis of 382 final examination questions in chemistry (43). All but 7 per cent of these dealt with purely factual material directly concerned with the science. If teachers concentrate on factual detail, any great development of more general values such as scientific attitudes can hardly be expected.

The Development of Character Traits.—An issue of major importance during the school years is presumably the

development of character traits—honesty, dependability, cooperativeness, persistence, courage, loyalty. A wealth of data has in recent years been gathered on this problem. Especially significant is the development, mentioned in the chapter on tests, of simple direct methods for investigating such traits, which involve actually putting the child in certain situations where moral decisions must be made. He may be given an opportunity to cheat in school work; for example, each pupil takes certain arithmetic tests which are scored by the teacher, then he takes another which he scores himself, thus having an opportunity to cheat in the scoring after the teacher-scored tests have indicated how well he can really do. He may be given an opportunity to cheat outside of school; for example, the old parlor game of pinning the tail on the donkey may be so carried out that the child can peek. Another experiment gives a chance to steal small sums of money (45). In testing cooperativeness, children were given small sums of money and they were allowed to devote such portion as they wished to poor children or to other altruistic purposes. Evidently all such tests as these strike very directly at problems of childhood character. The results are of great interest both theoretically and practically.

What are the especially significant findings from all this material? The following points seem to stand out:

(1) Character traits are highly specific; a child may cheat in school but not in games, or cheat in one school exercise (drawing a maze supposedly with eyes closed) and not in another somewhat similar (scoring his own arithmetic paper). Each honesty situation is specific to a large degree, and a child's behavior is a product of that situation, rather

than of any general character trait. Of a group of several hundred children, only three cheated in anything like a consistent way, and only a few more were consistently honest. Apparently one does not develop general character traits in children—rather one habituates them to desirable conduct in various situations.

That adults also are not highly consistent, and respond specifically to specific situations, is evident on close observation. The extent to which college students will cheat on an examination usually depends on a variety of circumstances—opportunity, the personality of the instructor, the classroom and school attitudes in the matter, and so on (50). Adults will cheat the street car company more readily than the corner grocer. But the total circumstances, and the people with whom one may be, are largely determining factors.

(2) Character traits are developed as products of the social situation in which the child is living. Thus children in the same classroom are likely to behave similarly with reference to a particular classroom honesty situation. The correlation of all members of a given class is .60. If two friends are in the same classroom they are likely to show the same type of honesty behavior (the correlation between friends in the same class is .73), but if they are in different classrooms they may be different (the correlation of friends in different classrooms is only .16). In one notable instance where a class was not homogeneous in its conduct, the teacher had been ill and the classroom morale had been lost. Again, it was found that children in different neighborhoods differed with respect to their honesty behavior; in the middle-class community honesty increased with age, while in the poor neighborhood it decreased. All this evidence shows

that character traits are essentially the products of complex social influences.

The importance of the total social situation and especially of the home was well shown by an investigation in which the most honest and the most deceitful children in a large group of school children were intensively and individually studied (54). In general, the honest children were well adjusted to their families and came from better neighborhoods, and the families were of good cultural and social status. The parents were of superior character, and maintained a consistent and reasonable home discipline. In contrast, the dishonest children came from homes in which there were family antagonisms, discipline was inconsistent or lacking, and parental example was not of the best. The home was likely to be in a less desirable section, and the social and economic status below average. The dishonest children averaged as somewhat less intelligent. Some of the dishonest children denied cheating when questioned later, while others confessed. These "confessors" were noticeable for their emotional maladjustment both in school and at home; they came from very poor districts. They showed a general feeling of insecurity; they cheated to make themselves good at the task, and confessed when they feared being caught.

Just which social influences are significant, and why, is often not clear. Private school pupils average as more honest than public school youngsters, and Sunday schools and clubs show no effect. The influence of summer camps is not consistent. Schemes for character training may actually produce more dishonesty than less. The whole situation should be carefully and empirically studied before faith is put in any procedure for character development.

(3) Various studies have been made of children's ideas regarding honesty and other moral concepts (40). In general, elementary school children tend to explain such concepts in concrete terms. One child says that honesty is not

copying from somebody else's paper at school; another, that honesty is bringing home the right change from the store; a third, that honesty is not taking something that belongs to someone else, that it is returning what is borrowed, keeping the right score in a game, or admitting it if one is wrong. Only in later childhood do any generalized ideas of honesty appear—presumably on the basis of such concrete ideas and experiences as were mentioned above. There is some evidence to suggest that consistent moral behavior depends upon the development of such general concepts or "organized verbal habits relative to honest behavior." Thus the 40 per cent of the children whose performance on the honesty tests was most consistent scored high in honesty, whereas the 40 per cent who were most inconsistent made many low scores (45). The dishonest children might thus be thought of as those who respond to the immediate concrete situation, and in consequence may be honest or not, depending upon the pull of circumstance, whereas the honest child has a general concept to which he can refer.

What are the important conclusions for a teacher? First to be noted is this: the morale of a classroom is a very important influence. The development of a class morale is a major teaching responsibility. A teacher *can* influence the moral behavior of her pupils; indeed, it may well be that she can mold their character more than their intellect. Secondly, since moral behavior is thus specific, she must consistently habituate them in concrete desirable social conduct—in acting in an honest way in this and this and this particular situation—rather than attempt to "teach morality directly." Thirdly, she should help them gradually to develop general concepts and ideals about conduct. But these

general concepts emerge as common elements seen in a great variety of concrete situations and so must have their origin in habits of right behavior. If the concrete experiences are of successful deceit, ideals of honesty will not develop—rather, “ideals” of successful dishonesty. A teacher who handles her class according to these conclusions can have a marked influence upon the moral development of her pupils. A principal who puts through a vigorous program along such lines can make his school a major influence for good in the community.

THE DEVELOPMENT OF ÆSTHETIC APPRECIATIONS

As was mentioned in the chapter on interest and incentives, the reading interests of adolescents and adults are not generally of a high order; all too often cheap romances are the favored reading. The average calendar, the covers of the popular magazines, the pictures on the walls of the average home, do not suggest very desirable artistic sensitivities. More admirable tastes and appreciations should undoubtedly be developed. What research data are there, bearing on these questions? In view of their importance, and the further fact that a dozen years ago investigations appeared which might well have initiated a whole series of very fruitful studies in this field, it is little less than astounding that no considerable volume of data has as yet been gathered upon this problem. To show something of the challenging nature of these problems, and the possibility of significant research upon them, three investigations will be summarized.

The Development of Artistic Appreciation and Skill.—How do artistic skill and appreciation develop in children,

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the better home influences, had their effects. (The results for the upper grades are of less significance, because the test was developed especially for use in the elementary school.) The differences between School 1 and School 3 become increasingly great. These curves (and still more the analyses by item, which cannot be gone into here) clearly suggest that artistic taste *can* be developed, and that the problem is susceptible to research attack which will greatly aid and guide such development.

Several investigators have studied the types of pictures children prefer. In general, they prefer colored prints to black and white drawings, they like subject matter with which they are familiar, they prefer to have only a few objects in a picture, they want a picture to "tell a story," and they like a realistic treatment. Children show great variability, however; although they will rate a series of half a dozen pictures roughly in order of their actual merit, every picture is practically certain to be assigned by some child in every possible rank out of six. As children grow older, this extreme variability tends to decrease because their preferences become conventionalized. This point is further developed in a study of children's spontaneous drawings; pre-school youngsters draw a great variety of things, but by the third grade the subjects have become few in number and quite conventional.

Intelligence seems to have little effect upon the development of appreciation in art, the coefficient of correlation between the two in a sample study being only .12. A further investigation reveals that in a group of 20 feeble-minded children (I.Q.'s from 64 to 75) who had had an opportunity to develop their artistic skill and appreciation, several reached or exceeded the norms (67).

These studies are, in the absence of well-defined, generally accepted objectives in art education, indicative only of what preferences children do have—not what they should achieve.

However, such knowledge is a necessary first step because it shows where instruction has to start; it is useful also as a basis for the type of illustrative material to use in children's books. Objective studies are very much needed concerning the efficiency of various teaching methods and materials, and studies to discover what environmental influences lead to the highest level of appreciation. Indeed, the study of how one learns to appreciate beautiful things has been only just begun.

The Comprehension of Literary Masterpieces by School Children.—The natural first question in considering the development of literary appreciation is this: Do public school pupils really understand the literature they are asked to read? Obviously, if they have no understanding of a masterpiece, they can hardly achieve an appreciation of it. Investigations have made clear that frequently pupils fail utterly to comprehend the literary masterpieces which the school puts before them. The point may be well made not by extensive data but by a concrete example (65). The children were asked to read Byron's "The Destruction of Sennacherib."

The Assyrian came down like the wolf on the fold;
And his cohorts were gleaming in purple and gold;
And the sheen of their spears was like stars on the sea,
When the blue wave rolls nightly on deep Galilee.

Like the leaves of the forest when summer is green,
That host with their banners at sunset were seen;
Like the leaves of the forest when autumn hath blown,
That host on the morrow lay withered and strown.

For the Angel of Death spread his wings on the blast,
And breathed in the face of the foe as he passed;

And the eyes of the sleepers waxed deadly and chill;
And their hearts but once heaved, and forever grew still.

And there lay the steed with his nostril all wide,
And through it there rolled not the breath of his pride;
And the foam of his gasping lay white on the turf,
And cold as the spray of the rock-beating surf.

And there lay the rider distorted and pale
With the dew on his brow and the rust on his mail;
And the tents were all silent, the banners alone,
The lances unlifted, the trumpet unblown.

And the widows of Ashur are loud in their wail,
And the idols are broke in the temple of Baal;
And the might of the Gentile, unsmote by the sword,
Hath melted like snow in the glance of the Lord!

The summary of this poem by a boy in the ninth grade, 14 years old, was as follows:

The Assyrians came like wolves by night, crossing the rolling waves of the sea of Galilee. And his weapons were gleaming like purple and gold; and the sharpness of their spears was like the sea of stars seen by Galileo.

They wore green uniforms in the evening and the next morning brightly colored like autumn leaves. It was a cowardly army creeping up like a pack of wolves.

The army of Galilee was defeated when the foe swept down on them, and they were scattered and strown when the death trumpet sounded like autumn winds. They met with an unexpectedly strong enemy. The blast, that is, the explosion that followed, caused many deaths and the eyes of the deadly awakened and for a moment they were frightened and then their hearts took courage.

And there lay the steed with his mouth wide open, but

through it there rolled not the breath of his pride. The foam of his grasping lay white on the surf, and cold like the spray of the imprisoned criminal beating against the stone walls.

There lay the rider all hacked to pieces with dew on his brow and rust on his letters.

Because of previous wars there were many widows, and they were crying aloud for revenge upon the Assyrians. They created such a commotion that the idols were upset in a temple in Palestine. The Assyrians destroyed the idols and the Army of Gallilee melted like snow in the lance of the Lord.

The investigation from which the above illustration is taken found that, on a test to find the main points in a brief literary passage, ninth-grade children averaged only 50 per cent, possessed only about half the background information presupposed in the passage, and knew only about 60 per cent of the important words (it has been suggested that the preparation of a lesson in Shakespeare "partakes of the nature of studying a foreign language"). Much of the material put before pupils in literature classes appears so unsuited to them that the development of literary appreciation from reading this material is inconceivable—antagonisms to "literature" might rather be expected.

The Development of Literary Discrimination.—To what extent can students discriminate literary merit? It might be argued that sensitivity to literary merit, especially in poetry, would hardly be susceptible to investigation. However, the technical problem is after all, in certain respects, simple. It is only necessary to put samples of writing of different degrees of merit before students, and ask them which is best (61). More specifically, what was done in the following investigation was to take some admirable stanza of poetry by

a well-known poet, and write three other versions, one very sentimental, one commonplace and matter-of-fact, and one in which the meter was seriously impaired. The test consisted of a series of such sets of four variant stanzas, one set on each page; the person taking the test was asked simply to mark the best and the worst stanza. The following sample page gives a stanza by Amy Lowell (Stanza B);⁵ the matter-of-fact is Form A, the sentimental is Form C, and the metrically damaged is Form D.

Read the poems, A, B, C, D, trying to think how they would sound if read aloud. Write "Best" on the dotted line above the one you like best as poetry. Write "Worst" above the one you like least.

A SEA SHELL

A (.....)

Sea Shell, please sing me a song
 Of ships and sailor-men;
 Of strange kinds of birds and trees
 On the Spanish Main:
 Of fish and seaweed in the sea,
 And whatever creature there may be,—
 Sea Shell, please sing me a song!

B (.....)

Sea Shell, Sea Shell,
 Sing me a song, Oh please!
 A song of ships and sailor men,
 Of parrots and tropical trees.
 Of islands lost in the Spanish Main
 Which no man ever may find again,
 Of fishes and coral under the waves,
 And sea-horses stabled in great green caves—

⁵ Reprinted by permission of the publishers, Houghton Mifflin Company.

Sea Shell, Sea Shell
Sing me a song, O please!

C (.....)

Tender, tender Sea Shell
Wilt thou sing me, please
Of thy happy, happy home
Neath the tropic trees?
Ah, the coral islands!
Ah, the wondrous fish!
For such a song I'd give thee, dear,
Whate'er a Shell could wish.

D (.....)

Sea Shell, I ask you will
You sing a song, please.
All about the ships and sailors
And the parrots in their tropical trees.
The islands I have read about on the Spanish Main
That no one will see again,
The fish and coral under the wave,
Sea horses that have their stables in caves;
Sea Shell, I ask you will
You sing a song, please.

The total test consisted of 13 pages. The graph below shows the rise in score (the number of "best" stanzas which were thus checked) from Grade 5 on through to a group of graduate students in English. Since there were 13 pages, each of four passages, students would average $3\frac{1}{4}$ answers right if they only guessed. It will be noticed that Grades 5 through 8 average little better than guessing. Not until the college upper classmen are reached does the score average two-thirds right. Evidently such literary discrimination develops only gradually, at least under present methods of instruction.

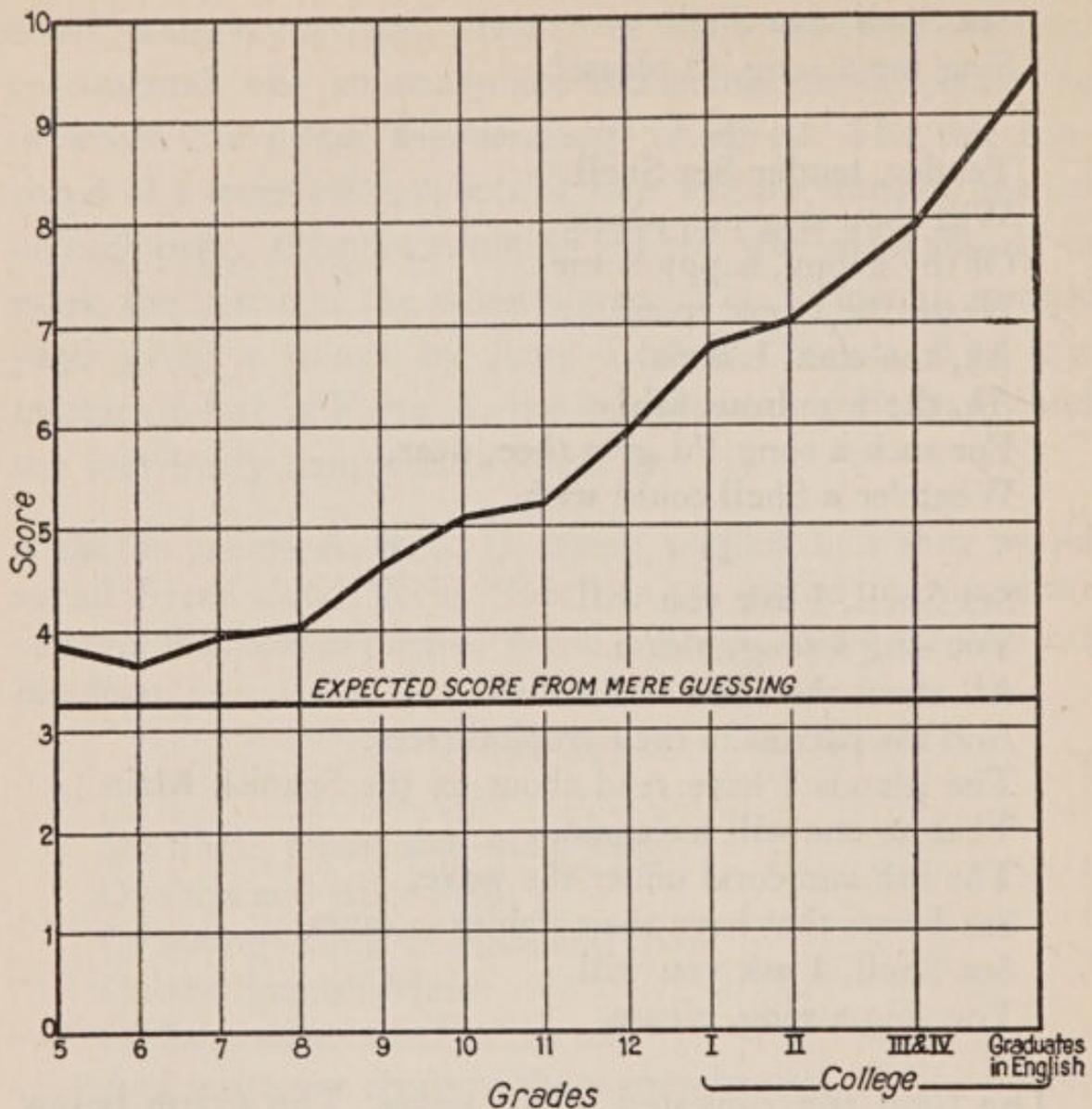


CHART 47.—Median scores by grade on the Abbott-Trabue test of discrimination of merit in poetry (61). (Score is number of the original stanzas marked as best.)

What factors are involved in the situation? The chart below serves to elucidate this question somewhat. It shows the percentage in each grade which chose as best (top graph), and worst (bottom graph), stanzas A, B, C, or D of the sample page reproduced above. It will be remembered that B is the correct passage, D the metrically damaged, and C the sentimental variant. Most consistent

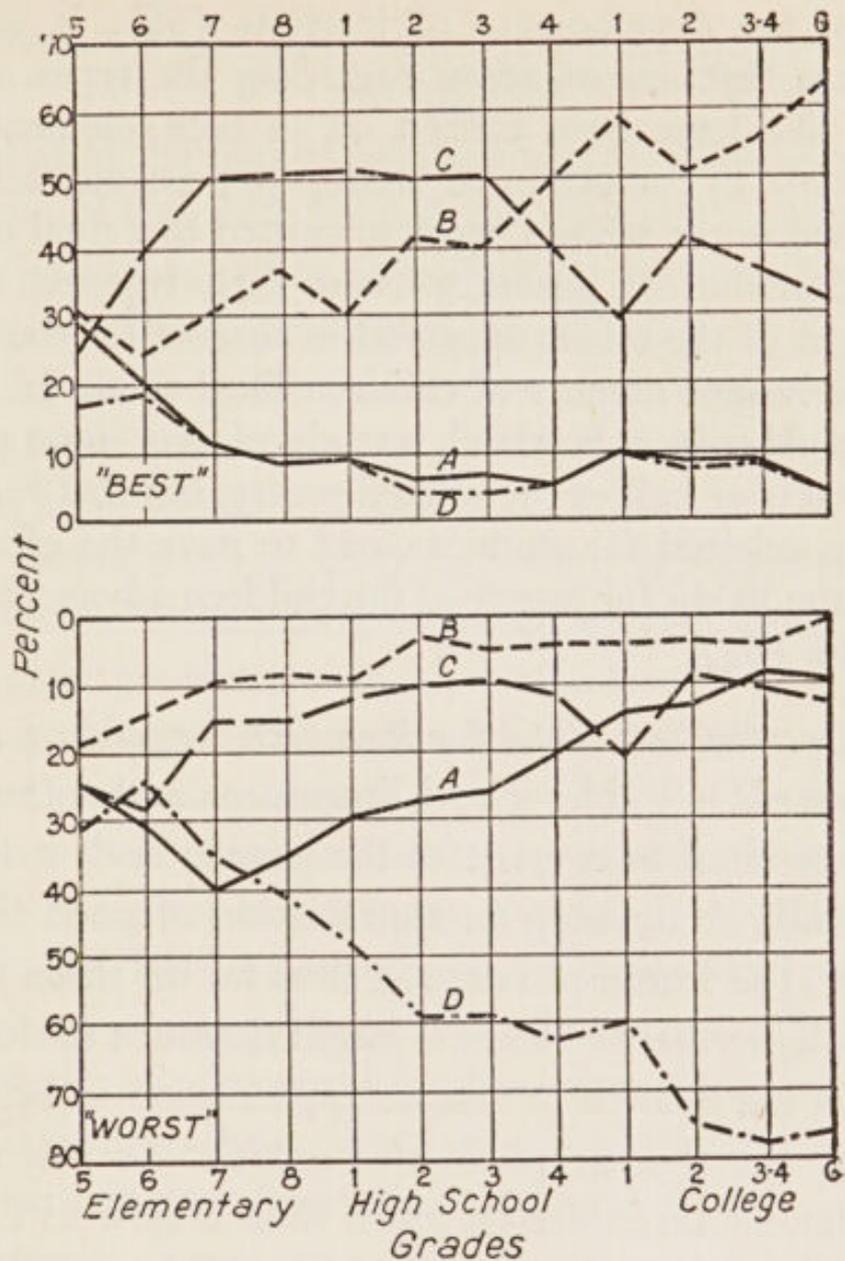


CHART 48.—Percentage of students in each grade marking variants A, B, C, or D of the stanza, "A Sea Shell," as best (top graph), and as worst (bottom graph) (61).

development is found in dislike of metrical crudeness. From Grade 7 through the third year of high school the sentimental form is preferred; and only in college do more than half the students prefer Miss Lowell's exquisite stanza.

The above-mentioned adolescent preference for the sentimental shows how all these issues are related to the total

process of the development of interests (66). It should be added here that investigations regarding the types of poetry children like have been carried on in both elementary and high school. In an extensive study, 573 poems, selected as widely used in the schools, were submitted to a total of 50,000 children. Of the 573 poems, 38 were flatly rejected, and only 39 per cent of the others appeared in readers for the grade in which the largest number of children liked them. In the high schools of Aberdeen, Scotland, a study of over 1000 pupils revealed that over half of them liked poetry, but that the particular poems selected for study seemed to have the effect of decreasing the liking for poetry as the children advanced through the grades (64).

The Outstanding Need for Research Regarding Æsthetic Development.—Public school literature courses thus appear largely unsuited in content to the pupils, and such courses fail woefully to develop an appreciation of good literature. However, the scattered research thus far on these problems gives evidence that the schools might do much in this respect—witness the growth in artistic appreciation in School 1 as shown by the first graph in this section. As was indicated in the chapter on interests, much data is now available regarding the types of reading which children do like, and much is known about reading vocabulary at various ages. Test techniques are available for the study of all these problems. It is hardly too much to claim that, if the scientific could be substituted for the usual sentimental or mystical approach to these problems, education might bring about a marvelous cultural advance during the next twenty-five years. But now the schools all too often foster artistic and literary indifference and even antagonisms.

THE PRESENT STATUS OF RESEARCH REGARDING GENERAL
TRAINING

This chapter has aimed to illustrate, by sample investigations, some of the most difficult and subtle problems in psychological and educational research. In summary, what now appears to have been discovered regarding these problems—with special reference always to the question as to what more may legitimately be hoped for? The following points seem of special significance.

Most immediate and very important is this first conclusion: Even the most subtle and baffling of educational and psychological problems—problems concerned with the development of æsthetic appreciation, attitudes, character traits, and methods of work and thinking—*can* be investigated. Such problems are neither intrinsically impossible of research attack, nor too difficult for attack by the methods now available. Rather, *because of their complexity and subtlety* research is especially needed. Even such initial studies as have here been reported make clear that exceedingly fruitful reformulations of points of view and methods of dealing with these educational problems may be expected from research.

Still more encouraging is the second conclusion. Problems of general training *can* be dealt with by education—though education may have largely to reformulate its methods for so doing, and reformulate (make much more specific) hypotheses regarding these problems. Methods of work can be improved. A classroom teacher does influence the honesty of her children. Moving pictures do affect the attitudes of children, and homes do affect the æsthetic sensitivity of those who grow up in them. In fact, the clear evidence of the

influence of a single moving picture upon the attitude of young people toward an important issue, and the apparent effects of college life upon the moral attitudes of young women, would suggest that striking results might be obtained once educators knew how to achieve them.

In the third place, most of the factors dealt with in this chapter have been found exceedingly complex in their origin. A pupil's behavior in an "honesty" situation is the complex resultant of influences at home, of the morale of his classroom, and of the attitudes of his friends—what he does is the product of an exceedingly complex total background. Artistic appreciation differs from one school to another as the result of complex educational and environmental factors. The effectiveness of a student's methods of work depends in multiple ways (which are only beginning to be understood) upon previous schooling, and the "business-likeness" or "haphazardness" of his home life—not to mention complications of emotional distress or physical ill health. So complex are the origins and so inherent in their very nature is this complexity that any considered educational method simply cannot dispute the necessity of attacking these problems *in*—not apart from—the total relevant social situation.⁶

The reader may have noticed this anomaly, that many of these problems of "general" training appear to be not general but specific; doubt is raised as to the possibility of general training. Most striking evidence to this effect was yielded by the investigation of character traits, but there is

⁶ And the formal analytical technique of the conventional psychological laboratory is essentially incapable of dealing with these problems. The writer ventures the prophecy that the really important psychological research of the next twenty-five years will be done everywhere but in the laboratory.

much to suggest that attitudes and appreciations are also thus specific. However, before concluding from the evidence of the present status that "general" training must remain largely impossible, the experiment discussed at the close of the last chapter must be returned to. It was brought out there that students who learned methods of memorizing progressed more in the ability to memorize various types of material than students who merely practiced "learning by heart." Two inferences touched upon there must be stressed here. In the first place, the students who merely practiced did not of themselves develop such methods; the methods had been determined by extensive previous research. Much the same situation appeared in the work on study methods; after twelve years of studying, a college freshman may know little about study methods, and after even more years of observing students at work a teacher may know little more. Research is necessary to discover the significant elements in these problems. Prior to the discovery through research of the significant common elements of method, rule-of-thumb educational procedures may be so largely irrelevant that there seems to be little general training. However—and this is the second inference and the final point of this chapter—once these elements are found, much more general training may be possible than would previously have seemed likely. Character traits, attitudes, and appreciations, may then be developed in a more general way; and these elements may be embodied in classroom situations and become accepted habits of educational method. General training, understood as the development of relatively concrete habits and attitudes of wide applicability so that they will function

in a great variety of situations, may then once more become the major objective of education—and be truly effective.

PRACTICAL SUGGESTIONS FOR TEACHING

Evidently the materials in this chapter, reporting as they do only the beginnings in an exceedingly complex field, permit only tentative suggestions regarding teaching methods. The following points, however, seem significant.

- (1) Efficiency in study and work depends in large part upon the extent to which an individual has become habituated in certain relatively simple and specific methods of using time, dealing with reading assignments, taking notes, and attacking a problem. A teacher can make a large contribution to a pupil's welfare by habituating him in such procedures.
- (2) Thinking is a process which can be investigated, and scientifically founded methods for training to think can be developed. As a result, there may be, in a very practical sense, an advance in general intelligence.
- (3) Attitudes and character traits are modifiable, and the general tone and atmosphere of a schoolroom are very important in this respect. A teacher should carefully consider her own attitude and classroom methods with reference to their possible effect upon the attitudes and traits of her pupils.
- (4) The school is at present strikingly inefficient in its development of æsthetic appreciation and the total æsthetic life of the pupil. A teacher should remember (a) that a child is incapable of understanding adult literature, and (b) that æsthetic influences of a type suited to him, and a real æsthetic environment in the schoolroom, may be expected to have important results.
- (5) Every teacher should make a special effort to keep in touch with experimental work in this field. Here in particular, research may be looked for which will markedly modify educational practice and improve educational efficiency.

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CHAPTER XVI

A FOREWORD TO THE EDUCATION OF THE FUTURE

THIS survey of educational psychology is now finished. However, one hazardous but fascinating task remains. It seems worth while to glance back briefly over the material so that it may be seen in perspective, and then, with that perspective, to try to obtain some glimpse of the future.

The glance backward shows that in the last few years there has been a tremendous, confusing, multifarious investigatory activity in the field. A multitude of beginnings have been made, numerous first studies and exploratory investigations. Much of this work is still too close to permit seeing above the detail, that the more significant may be distinguished from the less. However, this *is* clear, that in the scientific study of its problems lies the hope of education.

It is also clear that, meager as is the information on most topics, educational progress in the average school has lagged so far behind research as to make educational practice a thing apart from educational knowledge. Educational practices are often perverse; like the bloodletting of the medicos of 150 years ago, they sap the intellectual vitality of the pupils and develop bad habits of thinking, and bad attitudes, rather than good. To make some contribution toward bringing together scientific knowledge and educational practice has been one purpose of this book.

But what specifically may be hoped for as the outstand-

ing and distinctive advances in the educational future? The writer ventures the following prophecies.

PROBLEMS OF EMOTIONAL STRAIN, AND EDUCATION FOR HAPPINESS

First of all, he would suggest that the education of the future will have as a major purpose the fostering of mental health. In the chapter on emotional strain it was emphasized that serious emotional distress is very common in childhood and adolescence, and that such difficulties may have exceedingly unfortunate consequences, even affecting both intellect and physique. It was also pointed out that the origins of these distresses were essentially simple and understandable, and consequently could be dealt with. The writer ventures as his first prophecy that education will come to consider the furthering of child happiness not a sentimental and impossible, but a practical and obtainable, major objective. The schools will work systematically, in cooperation with other social agencies, to prevent maladjustment, and to make childhood and youth the gloriously zestful and happy periods of life they should be. A major contribution to physical health should be the result. Intellectual efficiency should be increased. A large part of adult unhappiness should be avoided. In short, the whole tone and character of existence may be changed.

EDUCATIONAL ENGINEERING AND THE NEW COMPETENCY IN EDUCATION

In considering interests and incentives it was pointed out that if a learner is kept informed of his progress and his goal, his efforts are greatly stimulated. In fact, so responsive to the total rich environment of the modern world are the

interests of an intelligent pupil that, within the limits of a reasonable curriculum, knowledge of the goal and knowledge that there is progress may suffice to maintain vigorous learning activities. If knowledge of progress is acted upon, there must be adjustment to individual differences; and with adequate knowledge, adjustment inevitably comes about in large measure. Research regarding pupil difficulties provides a ready means for the diagnosis and remedy of such difficulties. Furthermore, all these materials and methods can be organized in a form which provides largely for pupil self-direction in learning, and can be further organized for a still more effective cooperative attack upon learning problems. By such means the education of the future can be made not a perfunctory time-serving, but a series of gloriously stimulating experiences in the conquest of new knowledge and understanding. By such means, educational gains can be conserved through periodic inventories determining the permanence of desirable knowledge, and showing just where and how review efforts should be applied.

Fundamental to such educational advance is this: scientifically constructed materials for learning and for appraisal and diagnosis, in a form so as to be ready-at-hand and constantly-used conveniences for both teacher *and* pupil, should be universally available. There must be an "industrial revolution" in education, in which educational science and the ingenuity of educational technology combine to modernize the grossly inefficient and clumsy procedures of conventional education. Work in the schools of the future will be marvelously though simply organized, so as to adjust almost automatically to individual differences and the characteristics of

the learning process. There will be many labor-saving schemes and devices, and even machines—not at all for the mechanizing of education, but for the freeing of teacher and pupil from educational drudgery and incompetence. Teachers and pupils will cooperate in fascinating efforts to develop further conveniences. The future school will, in consequence, be as much more efficient than the schools of the past as modern industry is more productive than the handicraft of 200 years ago. Will all this make education an industrialized monster like some modern industries? That it can never do; the purposes of education would prevent it—and a major service of such devices would be to guide educational effort with ever increasing clearness and adequacy toward the accomplishment of those purposes.

THE NEW GENERAL TRAINING AND INTELLECTUAL PROGRESS

In the previous two chapters it has been emphasized that a new general training was emerging from the earlier critical work on transfer. Attitudes and character traits can be measured, and the factors contributing to their development investigated. Effective methods of work and of thinking can be located and, *once they have been found*, educational procedures can be so formulated as to develop such methods. Real, experimentally founded programs of character education, of æsthetic development, of growth in ideals and social understanding, and of training in thinking will be possible. There will be a splendid new mental discipline, a remaking of intelligence. And since all this will be social, education will take its rightful place as a major means for social progress.

THE HOPE FOR A NEW PSYCHOLOGY

All such developments both make for and presuppose a new psychology—dynamic, social, humanized. Educational research will presumably make very important contributions to this new psychology; it is only natural that such a development should emerge primarily from the various fields of “applied psychology,” since in those fields research comes most fully in contact with the total richness of psychological reality.

It has been remarked that psychology is still in the “pre-Darwinian” stage; it still lacks fundamental concepts which should unify, organize, and interpret the entire field. In a striking passage at the close of his *History of Experimental Psychology*, Boring has remarked that psychology has not yet had its great man. The prediction is here ventured that when this great man comes, his contribution will not lie in the discovery of some obtruse principle or complicated formula but rather in a vision which will give facts which are generally known a more comprehensive interpretation. That interpretation may be relatively simple and, once known, it may seem obvious. Its distinctive characteristic may well be that it reaches beyond conventional psychology to comprehend the fundamentals of human experience in a scientific but deeply sympathetic understanding.

If such new understanding does come, the profoundness of its total influence is incapable of exaggeration. Nor is it possible to exaggerate the importance of such a new education as has been suggested. The next generation may look back upon the education of the present as we now look back upon the medicine of a hundred years ago. What the new

education will be, and what the new psychology which will pervade it, we do not now know. But there are multiple signs which portend the beginning of a new epoch in both education and psychology.

THE NEW EDUCATION AND THE NEW TEACHER

It should be obvious that the new education will demand a new type of teacher. The teacher of the future must have a profound understanding of human nature, be conversant with a fascinating equipment of educational instruments and procedures, and have wide acquaintance with the affairs of the world, because education must touch them all. Teaching will be the most stimulating of all the professions. It must be regarded as a true profession, requiring extended preparation, continuing study, and devotion. To inspire the reader with some vision of the new education, enlist his enthusiasm in the furthering of such developments, and bring him to see teaching as *the* profession of the greatest potentialities for the future—these have throughout been the major purposes of this volume.

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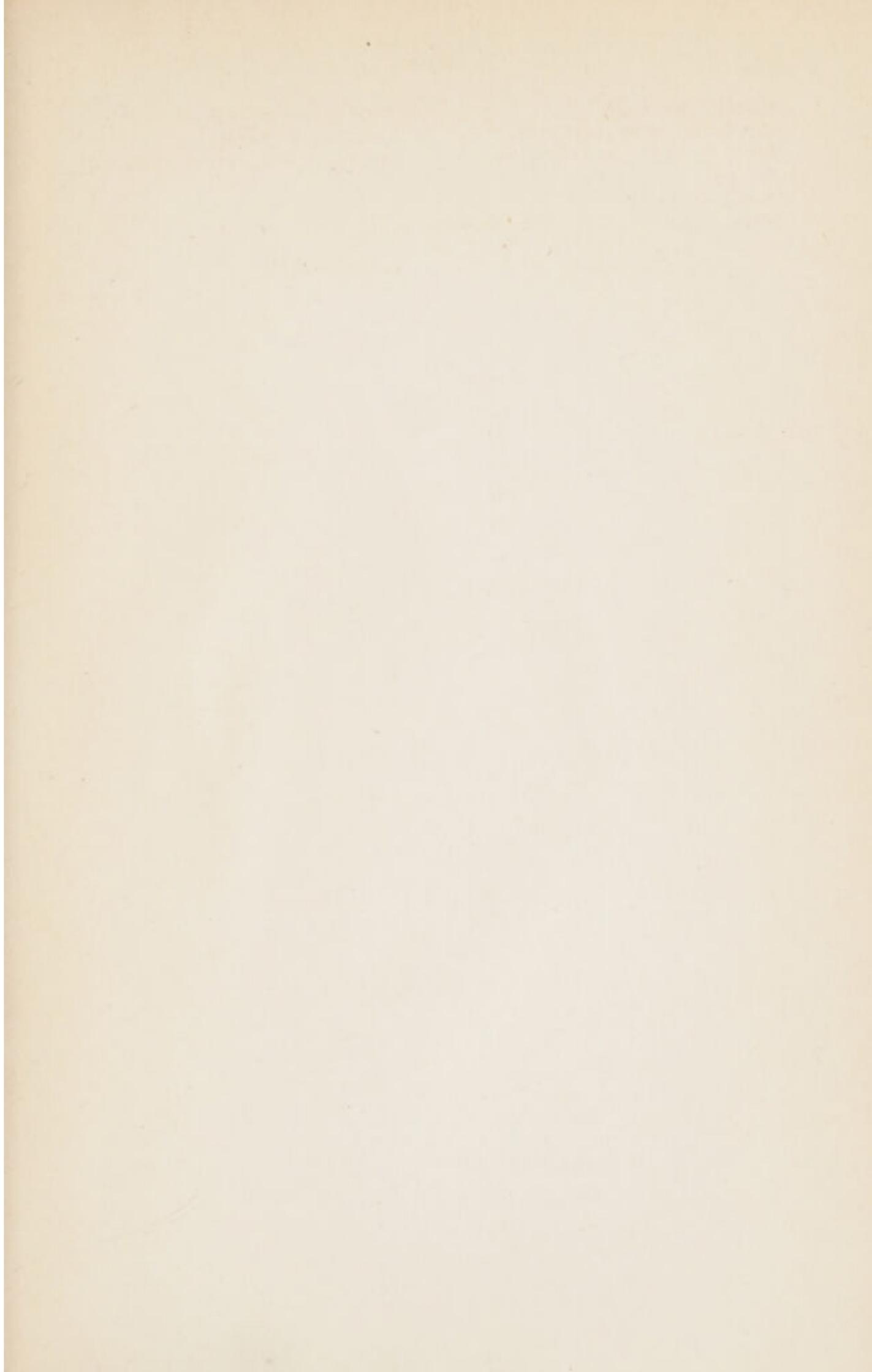
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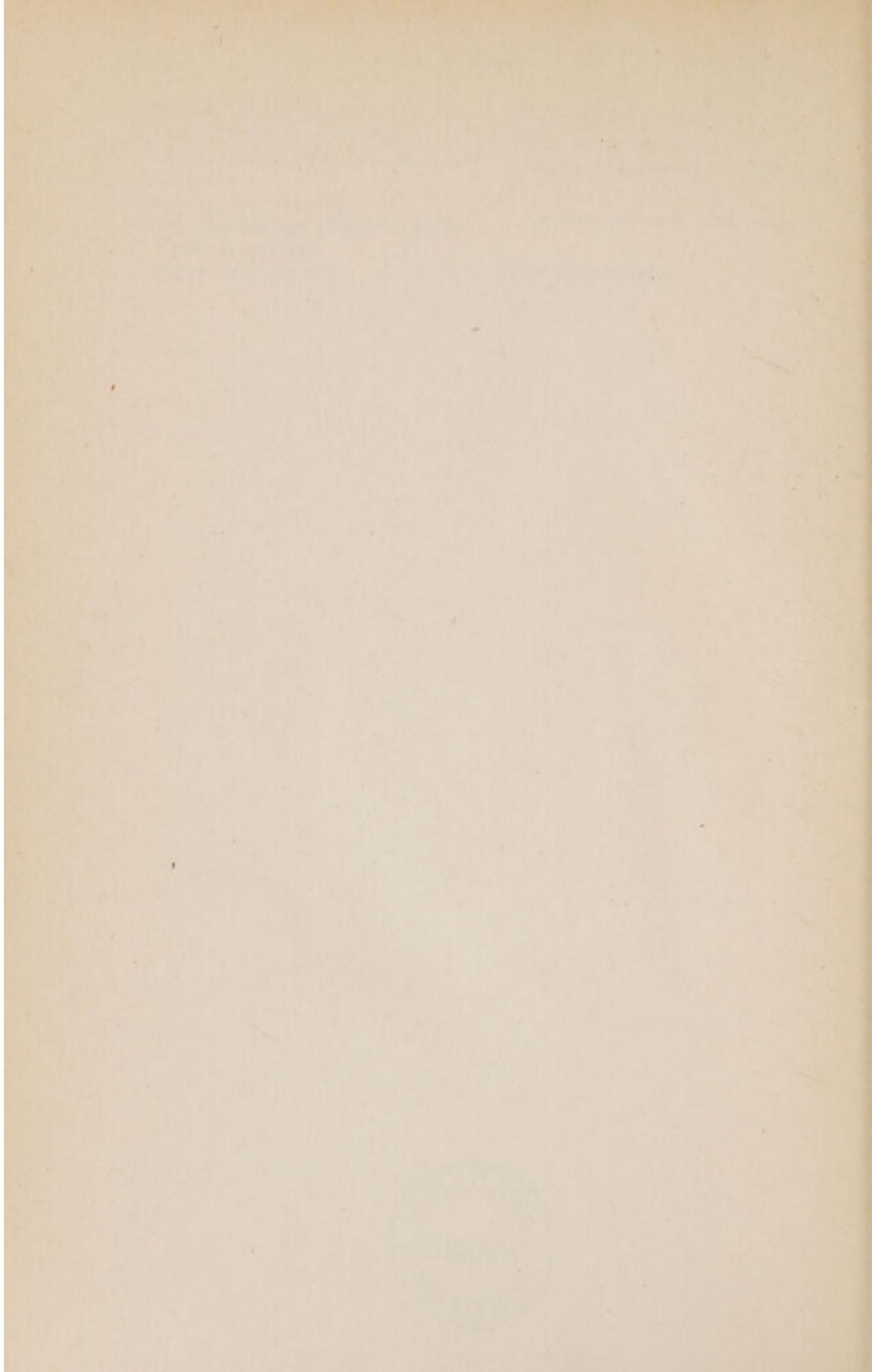
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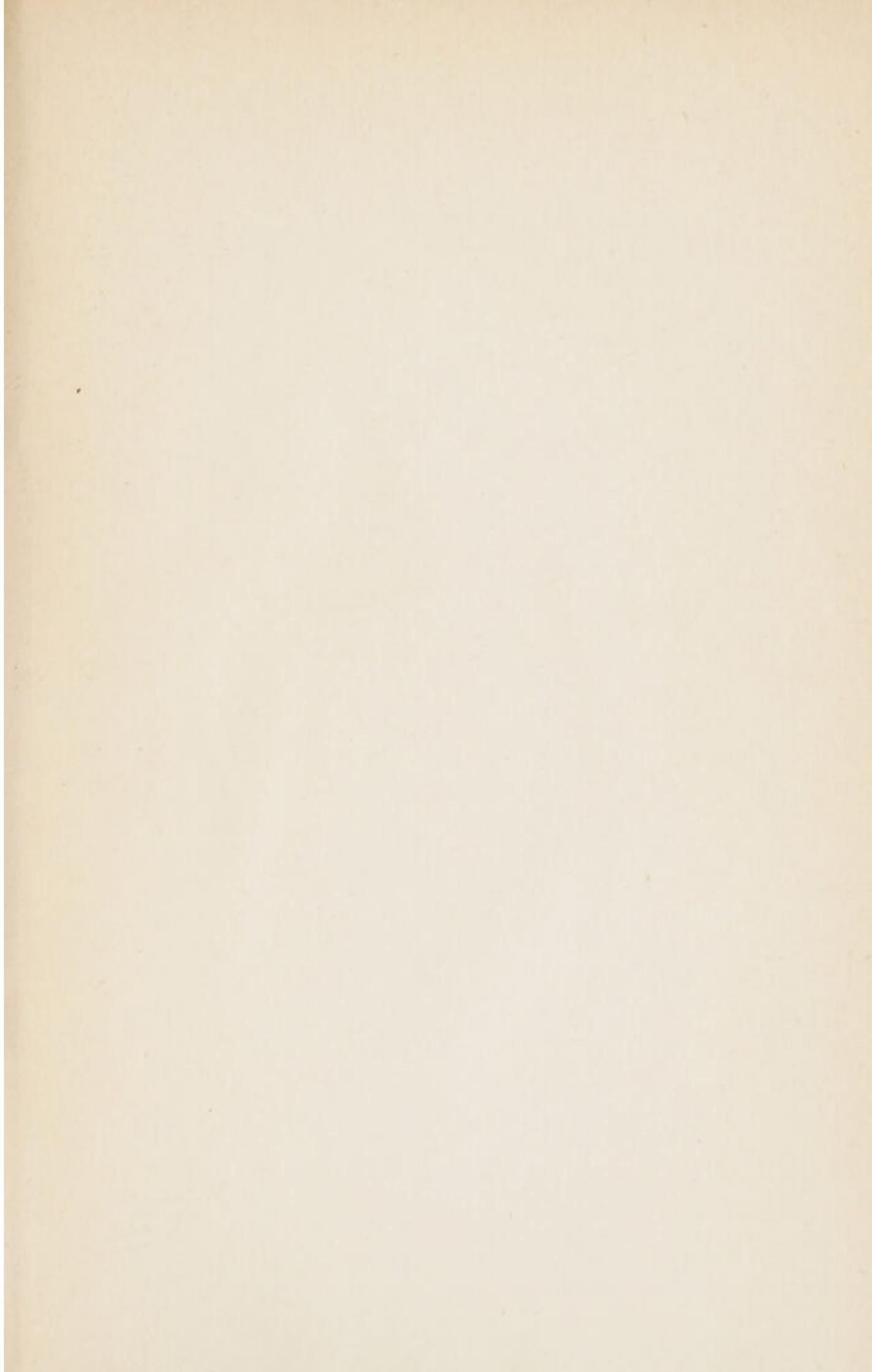
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