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GENIUS
IN THE MAKING

BY

HERBERT A. CARROLL

Formerly Assistant Professor of Educational Psychology, University of Minnesota

FIRST EDITION

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To the Memory of

PROFESSOR LETA S. HOLLINGWORTH

PREFACE

Intellect is, without doubt, the greatest single endowment of the human race. It has made possible the most prized achievements of the past and will make possible the realization of the highest hopes for the future. It is the primary source of all progress. Granting the vast importance of intellect in the affairs of man, it surely follows that it is desirable to nurture it, especially where it is found to exist in high degree. Although all men may contribute to the march of civilization, the new roads are blazed by men of genius.

During the last quarter of a century research workers have gathered considerable information concerning mentally superior individuals. Most of this factual material relates to intellectually gifted children who are not in themselves geniuses but rather geniuses in the making. *Genius*, still an indefinable term, is something more than great intellectual capacity or even the summation of certain traits that can be quantitatively evaluated. That is why it can be truthfully said that not all gifted children will become eminent men. On the other hand, it is equally true that all who achieve eminence were gifted as children.

In the following pages the author has attempted to present a picture of the intellectually gifted individual, especially as he appears in childhood. In discussing his mental, social, and physical characteristics and the educational adjustments necessary to his progress, full use is made of the results of research. However, being aware that the conclusions so far arrived at objectively do not tell the entire story, the author has not hesitated

to present a point of view, an interpretation of genius, that occasionally goes beyond statistical data.

Since this volume is primarily concerned with a psychological description and interpretation of mental superiority, it has been necessary to restrict to a relatively small amount of space the discussion of educational adjustments, important though these are. Democracy can be expected to survive only where its system of education provides for the needs of all children, the bright as well as the average and dull.

Anyone writing on the subject of intellectually gifted children today must draw heavily upon the work of two outstanding American psychologists, Prof. Lewis M. Terman and the late Prof. Leta S. Hollingworth. To them and to the many other writers in the field the author is much indebted.

H. A. CARROLL.

SOUTH BERWICK, MAINE,
May, 1940.

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EDITOR'S INTRODUCTION

In the stress and turmoil of a world which seems at times to be carrying a burden of ignorance and hatred greater than it can bear, the gifts of intelligence and good will are doubly precious. To envisage a solution of human problems in terms other than those based upon man's ability to learn and his willingness to help his fellows is to negate the principles of civilized education. To recognize outstanding ability and to develop it to its utmost is a chief task of this education.

The present volume offers valuable aid to all parents and teachers who wish to perform this crucial task well. In clear and simple, but scholarly and comprehensive, fashion the book tells how intellectually gifted children may be identified, what they are like physically, socially, and mentally, and how they may be helped in childhood and youth to develop their great potentialities most effectively.

The author is eminently qualified to perform this service. His long experience as a teacher in schools and universities, his researches in the field of special intellectual gifts, and his thorough familiarity alike with psychological studies and educational practices combine to give this book the precision of scholarship and the guidance of common sense which every good professional work needs. Behind these qualities, moreover, there is the greater quality of a generous and inquiring mind at work on a subject of absorbing interest. An appreciation of that quality may best be gained from the book itself.

HAROLD BENJAMIN.

UNIVERSITY OF MARYLAND,
June, 1940.

GENIUS IN THE MAKING

CHAPTER I

IDENTIFICATION OF INTELLECTUALLY GIFTED CHILDREN

1. What is meant by the term "intellectually gifted"?
2. What are the underlying causes of the errors made in subjective estimates of intelligence?
3. What method of identifying intellectually gifted children is the best?

It has long been customary to think of a "gift" as a specific, isolated aptitude in some artistic field—music, painting, acting, writing, sculpture. These abilities, when sufficiently marked to be important, seem easily recognizable and familiar. The gift of high intelligence, on the other hand, is at present recognized and adjusted to with somewhat greater difficulty; yet it is probably the most important single attribute of man, and those possessing it in marked degree constitute the greatest asset of the human race. Great as may be any special gift—artistic or social—it cannot go far without the gift of intellect as well. The more any man knows, the more he can do.

Through the use of objective measuring instruments, it has been definitely established that intelligence is distributed over what is termed the normal-probability curve (see Fig. 1).

At the extreme left of Fig. 1 stands the idiot, a human being whose intelligence is less than that of many animals. Directly above him is the imbecile, who is capable of simple learning but cannot master such intricate subjects as reading and arithmetic. Next in order is the

moron, who is not nearly so numerous as he is popularly supposed to be. In fact, all three of these groups, usually classified together as "feeble-minded," constitute only about 2 per cent of the total population. In terms of intelligence quotient[1] they range from 0 to 70.

Progressing upward by infinitesimal steps—for human beings differ not in kind but in degree of intelligence—through what is called for convenience the borderline and dull-normal groups, the great normal class, numbering 60 per cent of the total population, is reached. These

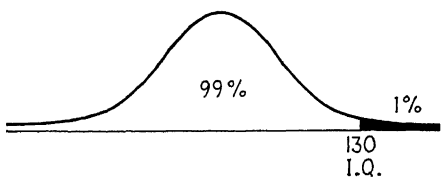

FIG. 1.—Position and frequency of intellectually gifted children in relation to the general population.

average human beings range from 90 to 110 in terms of I.Q. As children they set the pace for grade school work; as adults they control the tempo of progress. Professor H. L. Hollingworth[2] has given a revealing picture of a hypothetical average man whose meager abilities should be kept in mind for reference and comparison in considering the intellectual achievements of gifted individuals. The following passages are taken from Hollingworth's description:

[1] The intelligence quotient is arrived at by the following formula: M.A./C.A. = I.Q. M.A. stands for "mental age," which is determined by comparing the score which the child earns on an intelligence test with the test standards or norms. If his score is the same as that earned by the typical child of nine, then he is said to have a mental age of nine. If his C.A. (chronological age) is also nine, then he is of average intelligence. M.A./C.A. = 9/9 = 1.00 I.Q. (commonly expressed as 100 I.Q.).

[2] HOLLINGWORTH, H. L., "Mental Growth and Decline," pp. 276–279, D. Appleton-Century Company, Inc., New York, 1928.

Such an individual would leave school at the eighth grade, with a working knowledge of the "fundamentals," a smattering of local geography, a bit of history, and a few elementary facts of physiology, There would be no knowledge of a general kind in such fields as literature, civics, science, politics. The individual would speak only his mother tongue, and would be intellectually unable to do satisfactory high-school work of the traditional kind.

He might, if a male, through apprenticeship or after a short period of industrial training, become a plumber, a carpenter, a policeman, a mechanic. He would have a vocabulary of about 7,500 words, a little over half that of the ordinary high-school graduate. If a woman, she would be a competent housekeeper or plain nurse, or a mediocre or inferior clerical worker. . . .

He can tell how many pencils can be bought for fifty cents if two pencils cost five cents, and how much seven feet of cloth will cost at fifteen cents a yard, if allowed one minute for each problem. But if told that in a large box there are four small boxes, each containing four smaller ones, he is unable in a reasonable time to tell the total number of boxes in the collection. He can explain what a simple picture means, but is still unable to tell what more than half of the simple fables, which he is told, are supposed to teach, in a manner which suggests capacity for generalization from specific instances. . . .

In spite of these meager endowments, it is the average man and the average woman that most often marry, become parents, are the autocratic dictators of a family of children, determine the results at popular elections. That they do not originate the measures for which they vote, invent the machinery they operate, or plan the curriculums they authorize, shows that, in spite of numbers, it is the contribution of the superior endowment that determines the course, although perhaps not the pace, of social development.

If we look at the figure showing the distribution of intelligence, it will be seen that progress is continued from the normal group through the superior and very superior classes, with their steadily decreasing relative frequency, to the shaded area which represents those with intelligence quotients of 130 and above—the 1 per cent of the population called "intellectually gifted." There are approximately 250,000 such children in the United

States. It is important to keep in mind that not all children identified as possessing potentialities for genius will actually achieve on a high level when they reach adult years. Intelligence is but one of the determiners of success. A man cannot achieve eminence without possessing a great intellect, but he can possess a great intellect and yet fail to achieve eminence.

There are a number of possible ways of identifying these children. Parents' judgment, teachers' judgment, intelligence tests, age-grade status, standardized achievement tests, and school marks constitute the usual criteria for selection. No one of these is completely valid, although the intelligence test is by far the best. Whenever possible, a combination of estimates should be used.

Parents' Judgments

The opinions of parents concerning the intelligence of their children, though usually biased, have some value because of parents' intimate and detailed knowledge of offspring. No teacher or psychologist can hope to have as complete a picture of a child as does his father or mother. This intimate knowledge is especially important for helping to evaluate the intelligence of preschool children. The psychologist, in testing the intelligence of the young child, frequently finds it difficult to gain his cooperation and so leans heavily upon the observations of the child's parents. If the parents themselves are equipped with psychological information, their statements may be of great value. Some of the most exact data on early mental development are contained in biographies of children written by a mother or father who reports with scientific objectivity on the activities of his child.

In general, however, parents are notoriously poor judges of the intellectual capacity of their children. Their errors come from three sources: bias, inaccurate observa-

tion, and failure to keep in mind the total child population. Obviously parents are eager that their child shall be bright—though not too bright—and naturally they see everything that he does in a favorable light and find excuses for his failures. Their pardonable prejudice so affects their observation of the child's behavior that most baby books are filled with inaccurate statements. A meaningless sound uttered by a baby in vocal play is recorded as a word, a grimace from gas on the stomach is interpreted as a social smile, and the reciting of a memorized verse is noted as reading. The confidence of his parents is of course heartening and necessary to the child, but it unquestionably affects the validity of their judgment concerning his intelligence.

A final, and perhaps equally important, source of error in the judgments of parents is their failure to keep in mind the wide intellectual differences between various socioeconomic groups. For example, a doctor and his wife, each of whom is intellectually gifted and whose friends are, in general, much superior in mentality to the population as a whole, are very likely to think of their child as "just an average boy," even though he is one in a hundred or even one in a thousand. An intellect that in a heterogeneous group would appear markedly superior in this select group shows to no advantage. In identifying gifted children, then, the opinions of parents should be used only with many reservations.

Teachers' Judgments

Any validity of the judgments of teachers concerning the intelligence of the pupils in their classes rests upon their professional training and their familiarity with the schoolwork of the child. Their opinions, in general, are of more value than those of parents even though they frequently disagree sharply among themselves. Most of

the younger teachers of the present day have had some training in psychology, and even a slight contact with this science is likely to impress upon one the fact of the wide range of human abilities and of the difficulties involved in subjectively rating them. If a teacher with such training is asked to select the brightest children in her classes, she may be expected to try conscientiously to ignore irrelevant factors and to consider intellectual behavior only.

Occasionally an experienced teacher with no knowledge at all of academic psychology can, by drawing upon the information which she has gathered through many years of work in teaching children ranging in intelligence from the moron to the genius, estimate with considerable accuracy the mental capacity of a certain child. If she takes into consideration as well the grade of schoolwork that the child has been doing, especially the scores which he may have earned on objective achievement tests, her chances of success are greatly improved.

In general, however, teachers have shown a surprising lack of ability to identify intellectually gifted children. Varner reports in a study made some years ago that teachers can select only about one-fourth of the bright children in their grade. (It is interesting to note that Varner reports in the same study that teachers are much more successful in selecting dull children, being able to identify about half of them.) Professor Leta S. Hollingworth[1] tells of an excellent teacher, with five years of experience in the elementary schools, who was asked to list the five most intelligent of the forty pupils in her class, which she had been teaching for three months. It was found later by test that two of these were bright, two average, and one dull. In the same discussion Prof.

[1] HOLLINGWORTH, L. S., "Gifted Children," pp. 46–48, The Macmillan Company, New York, 1926.

Hollingworth refers to the teacher who recommended a child as "extremely intelligent because he can play the ukelele and sing."

In 1921–1922 Prof. Lewis Terman of Leland Stanford University began the most elaborate study of gifted children that has been made. This monumental piece of research must be referred to frequently in any discussion of genius. For the present, reference will be made only to the relative success which Terman had with the several methods that he used in selecting the 1,000 gifted children whom he was to study. His criteria were four in number: (1) teachers' ratings; (2) age-grade status; (3) achievement tests; (4) intelligence tests. Teachers' ratings were found to be the least valuable of the four. Only 15.7 per cent of those nominated by 6,000 teachers, each as the most intelligent in his class, finally qualified for the gifted group. Age-grade status was found to be a more reliable criterion, yielding 19.7 per cent of the final group. As Terman[1] says, "If one would identify the brightest child in a class of thirty to fifty pupils, it is better to consult the birth records in the class, register than to ask the teacher's opinion."

The underlying causes of errors in teachers' judgments are not difficult to locate. They can be grouped under three headings: (1) the inevitable intrusion of the personal equation; (2) lack of standards as a basis for comparison; (3) failure to consider the important factor of chronological age differences.

Intrusion of Personal Equation

One of the greatest difficulties with which the scientist is constantly faced is how to keep his own prejudices, his own likes and dislikes, from influencing the results of

[1] TERMAN, L. M., "Genetic Studies of Genius," Vol. I, p. 33, 2nd ed., Stanford University Press, Stanford University, Calif., 1926.

his experiments. It is especially difficult to do this in a science such as psychology, economics, or sociology, which involves human beings. Even in the exact sciences the experimenter's desire to establish a certain postulate may influence his procedure and his conclusions unless he uses the greatest care. It is not surprising, then, that in so subjective a matter as rendering a judgment on the intelligence of a child the teacher should be influenced by such irrelevant factors as friendliness, physical beauty, willingness to work, cooperation, obedience, and loquacity. Since intelligence and curiosity are closely related traits, the truly gifted child is quite likely to ask many questions, some of them embarrassing in their difficulty. Many teachers respond antagonistically to these questions, and, since it is a human failing to belittle those disliked, tend to underrate the intelligence of the questioner. On the other hand, a friendly, cooperative child, who makes the teacher feel comfortable when he is with her, is likely to be thought brighter than he actually is. It is no wonder that the teacher, controlled as are most human beings by emotion rather than by intellect, is unable to judge clear-sightedly when asked to identify the gifted children in her classes.

Lack of Standards

A difficulty which the teacher, in common with others, faces in rating an individual on any trait whatsoever is comparing that individual not with the members of a select group, but with a large heterogeneous group which is truly representative. This difficulty lies at the source of much of the fallacious thinking concerning geniuses, young and old. For example, it is frequently maintained that certain presidents of the United States were average or even below average in intellect. The man who makes that statement overlooks the fact that in his thinking he

is concerned only with a very select group made up of presidents and perhaps a few other leading American statesmen. If he allowed himself to consider seriously the mental equipment of the truly average man he would recognize the absurdity of his statement. To give another example, a football player who weighs a mere 165 pounds is referred to in the sports columns as small. He is small when compared with the average football player, but when compared with the average college man he is considerably above the median.

With respect to intelligence the child is usually compared by his teacher with the members of his group. If he is a boy somewhat above average in intellectual capacity in a small country school attended by a group of rather dull children, he will appear to marked advantage. It is easy to see how his teacher might consider that she had a genius in her school, and that she would be very much surprised if an intelligence test indicated that he fell well below the top 1 per cent. On the other hand, a child of average intelligence in a school like the Horace Mann School in New York would appear to be dull because he would be competing with a group containing many children who were intellectually gifted. Wherever the individual is, he will inevitably be compared with those about him. The teacher, though less likely than others to err in this respect because of her greater experience with large numbers of children, is, nevertheless, affected to some extent by the great difficulty involved in attempting to keep in mind a large unselected group of children while rating a single child.

Chronological Age Factor

A third source of error in teachers' judgments concerning the intelligence of children is the factor of chronological age. If, for example, a teacher is working with a group

of ten-year-old children of average intelligence and there is in that group an eight-year-old child who is doing as well as the others, the instructor may very easily overlook the difference of two years in age—especially if the younger child happens to be as large as the others—and consider that his intelligence is about the same as that of the older children. Actually, of course, his intellectual capacity would have to be very much greater to make it possible for him to do the same kind of work that the others are doing.

An actual case was reported some time ago of two sisters, aged three and four. The father had brought them to a psychologist to have them tested, remarking that he was somewhat worried about the younger child because she did not seem to be nearly so bright as her sister. The psychologist, on testing them, found that the three-year-old girl was intellectually gifted while her four-year-old sister had a considerably lower I.Q. The father had been expecting the younger child to behave as intelligently as the older one, quite overlooking the year's difference in their chronological ages. It had been especially easy for him to do this because the two children were of almost the same size.

Intelligence Tests

The most satisfactory approach in evaluating the intelligence of a child is through an appropriate intelligence test. At the very beginning of any discussion of intelligence testing it is important to note that so far no way of measuring intellectual capacity directly has been devised and none will be until it is known what actually goes on in the nervous and glandular systems when an individual learns. A number of theories have been advanced, but in all honesty it must be admitted that concerning this important matter psychologists are as

completely ignorant as were medical men of bacteriology before the day of Pasteur. Lacking information on the physical basis of mental behavior, psychologists can only judge intelligence by obtaining ratings on observed intellectual behavior. This indirect approach results in a greater possibility of error than would be likely if a direct attack could be made. Nevertheless, it has been fruitful, resulting in evaluations which have proved to be surprisingly accurate.

In measuring the intelligence of an individual, it is obviously necessary to determine what constitutes intellectual behavior. This is no easy task. Every individual frequently passes judgment on the brightness or dullness of his fellows. The criteria which he uses are interesting and revealing. If, for example, a group of people in informal discussion were asked to name what they considered were cues to, or even absolute proof of, intellectual capacity, the following would almost certainly be mentioned: sparkling eyes, being ready with an answer, long hair (genius), wearing glasses, pale skin, learning quickly, learning slowly but always remembering, reciting long poems in infancy, walking when very young, reading at the age of three or four, large head, being physically small, being physically large, shape of hands, shape of mouth, receding chin, pugnacious chin, very beautiful (lack of intelligence), sociability, mechanical ability, ability to see through a problem quickly, ability to use what he knows, common sense, date of birth, known intelligence of brothers and sisters, nationality, sex, school marks, ability in music, ability in art, friendliness, obedience, shape of head, size of nose, and so on and on.

These criteria have been listed at random, much as they might come from such a group. No attempt has been made at order or classification, the wholly irrelevant

items being left to stand side by side with those which are relevant. The psychologist, in constructing an intelligence test, considers all such criteria and then eliminates those which previous investigations have shown to be without value in indicating intelligence. He knows, for example, that, though there is a slight positive relationship between physical size and mental capacity, such characteristics as size of head (excepting when the variation is extreme as in hydrocephalis and microcephalis), shape of mouth or nose or chin, and so on, reveal nothing concerning the intelligence of the individual. He knows that sparkling eyes are as frequently found in an institution for feeble-minded children as in an opportunity class for gifted children. Although recognizing the great importance of specialized ability in mechanics, music, or art, he knows, from the large number of studies that have been made, that superiority in one of these fields by no means guarantees superiority in intellect.

On the other hand, he considers that the ability to learn to read at the age of three or four, to see through a problem quickly, to apply knowledge, or to possess what is known as common sense indicates superior intelligence. Binet defines intelligence as "judgment or common sense, initiative, the ability to adapt oneself," Terman as "the ability to think in terms of abstract ideas," Woodrow as "an acquiring capacity," Buckingham as "the ability to learn," and Woodworth as the ability of an individual "to see the point of the problem set him, and to adapt what he has learned to this novel situation."

Validity

Having decided what constitutes intellectual behavior, the test maker devises and selects items for his test which will rate a child on these intellectual traits. Any item

which tests an unrelated ability, even in part, weakens the test. Since it is impossible, in measuring intelligence indirectly, to eliminate completely such disturbing factors as speed of handwriting, speed of reading (which may be determined by defective eyesight), and nervous tension, the score earned by a child on a mental test is not a perfect rating; it is merely the best rating that psychologists at the present time know how to secure and is, for reasons that will be pointed out later, much superior to one subjectively given.

No attempt at anything even approaching a complete analysis of test items will be made in this brief description of intelligence tests. It will be interesting, however, to note a few of the questions used, making special reference to the way in which they help the investigator to identify intellectually gifted children. For example, size of vocabulary is generally considered by psychologists as being the best single indication of intellectual capacity. This criterion is especially important in rating very young children, for the vocabulary of the intellectually inferior will always be small and that of the intellectually superior will nearly always be large. At the age of one year a child who is below average in intelligence will almost certainly be able to use no more than one word meaningfully. On the other hand, a very bright child will almost certainly have a vocabulary of several words—perhaps a dozen or more.

An interesting and valid test in the new, revised Stanford-Binet Tests—the best of the existing instruments for measuring intelligence—is the "plan of search." The psychologist presents to the child whom he is testing a drawing of a circle broken at one point only. He then tells him to imagine that the circle is a field and to show, by tracing his path with a pencil, how he would search for a purse of money lost in the field.

In order to solve this problem the child must understand the directions, see the point of the problem, bring his experience to bear in working out a solution, and carry through the plan which he has considered to be the most promising. It has been found that an intellectually average thirteen-year-old child can pass this test. A dull child of the same age is greatly puzzled by it and may respond as did the thirteen-year-old boy who merely marked the paper at random (see Fig. 2).

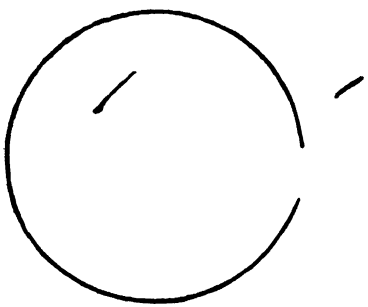

FIG. 2.—"Plan of search" of a thirteen-year-old child with an I.Q. of 65.

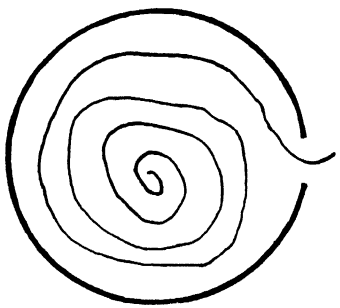

FIG. 3.—"Plan of search" of a nine-year-old child with an I.Q. of 160.

An intellectually gifted child of nine, four years younger than the boy who offered the plan shown in Fig. 2, solved the problem with insight and care in the manner shown in Fig. 3.

The application of this single criterion leaves little doubt concerning the relative intellectual levels of these two children. When it is remembered that a good intelligence test utilizes not one but a large number of valid measures and applies them with statistical care, it appears reasonable to conclude that it is successful in at least roughly differentiating children according to their mental capacity. It is important, of course, that the individual items of an intelligence test be valid; that is, that each one really sample intellectual behavior. The

psychologist, in building his instrument, applies rigid objective tests to every part of it. He discards every question or problem that shows itself to be lacking in validity, keeping only those that have proved themselves as sound measures of mental ability.

The most valid intelligence ratings for gifted children can be obtained between the ages of six and twelve. Scores earned by preschool children are frequently in error because of failure to meet one or both of the two assumptions underlying all intelligence testing: first, that the examinee cooperate fully; second, that the test items sample a body of information with which the examinee has had an opportunity to become familiar. Scores earned by older children are frequently in error because the brightest of these children reach the roof of the test; their true abilities are not being evaluated. The selection of intellectually gifted children for purposes of classification or special instruction should be made, then, during the elementary school period, preferably during the first half of that period.

Reliability

The intelligence test is not only a more valid method of rating intelligence than any other, but it is also more reliable; that is, it measures consistently what it purports to measure. One of the serious difficulties involved in making subjective evaluations of intelligence has always been the considerable disagreement among those passing judgment. Investigations, for example, have revealed the fact that it is almost impossible to obtain a consensus of opinion among teachers with respect to the mentality of the pupils in their classes. Moreover, their individual judgments differ from year to year, or even from month to month.

Intelligence-test scores also vary somewhat from time to time and from test to test, but to no such marked degree as do subjective ratings. Personal judgments of intelligence, unsupported by data objectively gathered, rarely achieve a reliability coefficient as high as .50. Intelligence tests, on the other hand, possess coefficients of reliability considerably in excess of .50—the best of these, as for example the Stanford-Binet, rate over .90. A test should have a reliability coefficient of at least .85—preferably higher—if a score earned on it is to be used as a basis for individual prophecy and guidance.

The best of the individual psychological examinations are the Stanford Revision of the Binet-Simon Scale, the Kuhlmann Revision of the Binet-Simon Scale, and the Minnesota Preschool Scale. There are a number of excellent group tests, although the coefficients of reliability for these instruments are seldom over .90. Among those used widely are the Haggerty Intelligence Examinations, the National Intelligence Test, the Terman Group Test of Mental Ability, and the Kuhlmann-Anderson Intelligence Test.

Standards

It was stated earlier in this discussion that one of the principal difficulties involved in subjectively rating intelligence is the lack of adequate standards. The individual who is passing judgment errs in his evaluation because he is forced to use as his criterion the minds of the people whom he knows. If he associates with persons of high mentality, he will think that a certain very bright child is merely average; if he associates with persons of low mentality, an average child will appear to him to be bright. The situation is similar to that which causes the rural visitor to find New York to be less spectacular than he expected; a twenty-story building in his home town

would be a skyscraper indeed, but in New York, among so many high buildings, even one of sixty stories seems small.

The intelligence test does not completely eliminate the difficulties involved in making comparisons because it is impossible to obtain perfect standardization; it does, however, greatly improve upon subjective judgment in that it is accompanied by standard scores which represent the mental ratings of a large number of unselected children. Thousands of scores earned by children ranging from the idiot to the genius constitute the standard in some of the best intelligence tests. It is a far cry from this to the little group used for comparison by the layman in estimating the intelligence of a child.

CHAPTER II

RACIAL AND FAMILY BACKGROUND

1. Do races differ in their ability to produce men of genius?
2. Does great mental capacity run in families?
3. From what occupational groups do intellectually gifted children come?

In any discussion of the importance of race or nationality as a cause of high intelligence it should be made clear at the outset that the data gathered by anthropologists, biologists, and psychologists are, for the present, inadequate to justify final conclusions. The best that can be done until more exact evidence is obtained is to point out what these data indicate to be true. The biologist H. S. Jennings[1] adopts this attitude when he says:

> The diversity of genes in different races indisputably yields race differences in physical features—in color, stature, structure, form, and the like. Among individuals belonging to the same race, diversity of genes produces differences in all these respects; and, moreover, produces differences in mentality; produces differences in power of adjustment to conditions met. It would be surprising if the same were not true for the differing genes of the differing races.

Regardless of what ought to be so, according to the laws of inheritance, or what might be so, as a result of environmental conditions, it is an observable and tested fact that certain racial and nationality groups in the United States produce a smaller number of intellectually gifted children than do certain other racial and nation-

[1] JENNINGS, H. S., "The Biological Basis of Human Nature," p. 284, W. W. Norton & Company, Inc., New York, 1930.

ality groups—this incidence of course being based upon the relative frequency of the different groups in the total population. For instance, one would be absolutely certain of finding a higher percentage of children of superior mentality among those with a Scotch-Irish ancestry than among Negroes.

The Negro

The mean I.Q. of American white children is 100. A number of surveys of the intelligence of American Negro children show average I.Q.'s in the low 80's. Occasionally an average falls somewhat lower than that, as in a study by Paterson, who found a mean of 75 for Negro children in a number of Tennessee schools. When performance rather than verbal tests are used the obtained measures of central tendency tend to run somewhat higher. Northern Negroes on the whole excel Southern Negroes in intelligence test ratings. The scores which these two groups earned on the Army Alpha and Army Beta, when they were tested at the time of the World War, is striking:

	Alpha	Beta
Native-born white draft	59	43
Foreign-born white draft	47	41
Northern Negro draft	39	33
Southern Negro draft	12	20

Frank S. Freeman,[1] after a detailed and sympathetic examination of the psychological data which have been gathered on the American Negro, concludes that the present intellectual status of the American Negro is on

[1] Freeman, F. S., "Individual Differences," p. 167, Henry Holt & Company, New York, 1934.

the whole appreciably inferior to that of the white population.

Accepting a mean of 82 as being typical of the average mentality of the Negro and assuming that this is accompanied by a standard deviation of 12, an I.Q. of 130 becomes four standard deviations above the mean. Statistically there is but one chance in 30,000 of a score falling above plus four standard deviations. In other words, a Negro child has but one chance in 30,000 of being intellectually gifted. School experience bears out the validity of this frequency. The white child, on the other hand, has 300 chances in 30,000 of being intellectually gifted. It seems that the cards of inheritance—and environment—are stacked for the white child against the Negro by a ratio of 300 to 1. In line with this statement is the experience of Terman[1] in the selection of his group of California gifted children. He reports that Negroes, representing 2 per cent of the total of the combined population of Los Angeles, San Francisco, Oakland, Alameda, and Berkeley, furnished 0.3 per cent of his gifted group; that is, two cases. Even these two cases were both part white.

The Indian

The intelligence of the American Indian has been extensively studied, especially by Garth. The data invariably indicate a relatively low level of the kind of mental ability measured by verbal intelligence tests. For instance, Garth, using national and Otis intelligence tests on 2,650 full-blooded Indians, obtained a mean I.Q. of 69. This extremely low average almost precludes the possibility of an Indian equaling in mental capacity a white child who falls within the classification "intellec-

[1] Terman, L. M., "Genetic Studies of Genius," Vol. I, p. 56, 2d ed., Stanford University Press, Stanford University, Calif., 1926.

tually gifted." The qualifying "almost" is used because once in a very great while there emerges an Indian with superior mentality.

Garth[1] offers nurture and selection as the fundamental causes of the difference in intelligence between the Indian and the white. It is possible that these factors do exert a potent influence, although it is difficult to see that there has been a more conscious attempt to breed up the white race in America than there has been to breed up the red or black races. The important question of nurture will be taken up in considerable detail in the next chapter.

Nationality Groups

The table on p. 24 compiled by Goodenough summarizes the results of a number of surveys of the mental ability of children representing various nationality groups in America.

Terman, upon investigating the racial origin of his California group of intellectually gifted children, found approximately the same pattern as that seen in the preceding table. The percentage of representation of the different nationality groups among these gifted children is in many instances, however, devoid of exact meaning because of the difficulties involved in learning their relative incidence in the total population surveyed. Nevertheless, Terman[2] feels justified in offering the following conclusion:

> Data on racial origin indicate that, in comparison with the general population of the cities concerned, our gifted show a 100 per cent excess of Jewish blood; a 25 per cent excess of parents who are of native parentage; a probable excess of Scotch ancestry; and a very great deficiency of Latin and Negro ancestry.

[1] Garth, T. R., "Race Psychology," p. 84, McGraw-Hill Book Company, Inc., New York, 1931.

[2] Terman, *op. cit.*, p. 82.

Perhaps the most striking fact in the above summary is the high frequency of Jewish children in Terman's gifted group. They appear about twice as often as would be expected, considering their known incidence in

TABLE I.—INTELLECTUAL ABILITY OF AMERICAN SCHOOL CHILDREN BY RACIAL STOCK*

Nationality or racial stock	Reported by	Mean I.Q.
White American	Dickson	106
White American	Sheldon	104
Norwegian	Brown	104
German	Brown	102
Swedish	Brown	102
Jewish	Murdock	100
Austrian	Brown	100
Chinese	Symonds	99
English	Pintner and Keller	97
French	Brown	95
Jewish	Pintner and Keller	95
German	Pintner and Keller	91
Finns	Brown	90
Hungarian	Pintner and Keller	89
Negroes (Ohio)	Pintner and Keller	88
Portuguese	Young	86
Slavic	Pintner and Keller	85
Italian	Pintner and Keller	84
Italian	Dickson	84
Portuguese	Dickson	84
Italian	Young	83
Spanish-Mexican	Dickson	75
Negroes (Tennessee)	Paterson	75
Negroes (Arkansas)	Jordan	71

* GOODENOUGH, F. L., Racial Differences in the Intelligence of School Children, *J. Exper. Psychol.*, Vol. 9, p. 389, 1926.

the total population. Terman's conclusions are borne out by the studies of Leta Hollingworth concerning intellectually gifted children in New York City and of Howard Gray in his investigation into the parentage of 154 gifted college students.

That there are wide differences in mental capacity among the racial and nationality groups in this country is an indisputable fact. The causes of these differences, however, are highly debatable, with the evidence at present emphasizing the potency of heredity.

Families of Geniuses

There is a saying that "genius is 5 per cent inspiration and 95 per cent perspiration." Even Napoleon, an exceptionally keen and objective self-analyst, gave as the most important single cause of his amazing success his ability to work hard for long hours. So convinced was he of this that instead of choosing some regal animal as his imperial symbol, he selected the busy bee. Perhaps Napoleon in common with other men was affected by an unconscious desire to believe that he became what he was by his own efforts instead of by means of an inherited capacity. The man who has done well likes to say, as does the politician whose plans have succeeded, "I did it." The man who has failed prefers to say, as does the politician whose plans have gone astray, "I am not responsible."

This human weakness, this desire to pat one's ego, lies at the root of the misconceptions concerning the role of heredity not only in genius but in mental inferiority and insanity as well. The parent of a gifted child is quite likely to point to himself with pride, asserting without too much modesty that he is the cause of his child's brilliance either through the splendid inheritance which he has given the child or through the method of training which he has used. The parent of the feebleminded child, on the other hand, is almost certain to place the blame for the child's mental inferiority on some special incident outside his control, such as injury at the time of birth; and one rarely finds a person, who, having an insane relative, does not ascribe that insanity to a blow on the

head or to a serious illness when the individual was young. There is little justification for being critical of this weakness, for human beings are in constant need of bolstering their self-respect.

The truth concerning genius appears to be the reverse of the popular saying quoted at the beginning of this chapter. Family is definitely of great importance in the creation of high mentality. It is well to be again reminded at this point that high mentality and high achievement are not synonymous terms, for the possession of great mental capacity by no means guarantees great success. A number of other influencing factors are too important for that to be true. On the other hand, great success cannot be achieved without a high degree of intelligence. Napoleon was right in emphasizing the importance of application, but wrong in underrating the importance of family stock. He was fond of saying that the Bonaparte family began on the Eighteenth Brumaire, the date of the coup d'état which made him first consul. As a matter of fact, the Bonaparte family had had a long and distinguished history as the first family of Corsica. There is, of course, a great difference between being first in Corsica and first in the world, and it is this difference that has given rise to the popular belief that Napoleon sprang from the masses.

In the United States the belief has long been cherished that practically all great Americans were born to parents of average intelligence, who lived in humble surroundings. Though this is the case in certain instances, a far larger number who have achieved distinction came from families possessing a marked strain of intelligence. Among these are Washington, whose parents were members of successful, thrifty families of property and social standing; Emerson, who was descended from a long line of ministers of energetic Puritan stock and whose father was at one time pastor of the First Church of Boston and the author

of a number of religious works; Jefferson, whose father was a colonel and a member of the Virginia House of Burgesses and whose mother came from a family which included warriors, churchmen, statesmen, and eminent scholars; and Longfellow, whose father was a man much honored for his ability in his profession of the law and for his sound good sense in public affairs.

To be sure, such a selected list as the above illustrates rather than proves the point that genius runs in families. In this instance, however, careful studies, scientifically conducted, bear out the assertion; reference to a number of these follows.

The most famous and most often-quoted study of a family of geniuses is that made by Winship and Davenport of the descendants of Richard Edwards, an eminent lawyer, and his wife, Elizabeth Tuthill, noted for an exceptional mind. Their son, one of the founders of Yale University, fathered Jonathan Edwards, who married the brilliant Sarah Pierpont. Numbered among the descendants of these two, during the somewhat more than 200 years following their marriage, are 12 college presidents, 65 college professors, 60 physicians, 100 clergymen, 75 Army officers, 60 prominent authors, 100 lawyers, 30 judges, and a large number of high public officials, including two United States Senators, and one Vice-President of the United States.

These data present an even more emphatic picture when compared with those concerning the descendants of a Revolutionary soldier, Martin Kallikak, and a feeble-minded girl. Of their 480 descendants, 143 were known to be feeble-minded, 36 illegitimate, 33 sexually immoral, 24 drunkards, and 3 criminals.

Law of Ancestral Inheritance

The pioneer in the study of the families of geniuses was the English scholar, Galton. In one of his investi-

gations he examined the biographies of 977 eminent men. He discovered that each of these had a far greater number of eminent relatives than would be expected on the basis of chance alone. In comparing the number of eminent relatives of a group of average men of similar size, he found a tremendous difference, namely 535 to 4, bringing him to the obvious conclusion that intellect does run in families.

It is interesting to note that he found that 48 per cent of the eminent men whom he studied were the sons of men who were themselves eminent. This figure is strikingly similar to those arrived at in later studies.

As a result of his extensive investigations Galton formulated a law which is called the "law of ancestral inheritance." According to his law a child inherits one-half of his mental capacity from his parents, one-fourth from his grandparents, one-eighth from his great-grandparents, one-sixteenth from his great-great-grandparents, and so on back through the generations. It is clear from this progression that the intellectual capacity of the parents has more influence upon the intellectual capacity of the child than does that of ancestors farther removed. The law, however, allows for the unexpected emergence of genius in a child whose parents and even grandparents are dull, for the trait may have been present in an ancestor several times removed.

Relatives of Gifted Children

Terman,[1] in studying the relatives of a group of intellectually gifted children, uncovered facts corroborating the findings of Galton. Again and again, from whatever angle he approached the problem, he found that mentally superior children are much more likely to possess mentally superior relatives than average children. For in-

[1] TERMAN, *op. cit.*, Chap. V.

stance, he found that 578 families were responsible for the 676 young geniuses in his group. Of these, seventy-three families yielded two subjects and nine yielded three or more. Terman points out that "the number of families with two subjects is more than 1,200 times the number chance would give." In other words, an intellectually gifted child is much more likely than an average child to have an intellectually gifted brother or sister.

Leta Hollingworth, best known to the general public for her unusual work with a selected group of gifted children at Speyer School in New York City, found, as did Galton and Terman, that the siblings (brothers and sisters) of very bright children are themselves much above average. In a study with Cobb she tested the living siblings of a group of fifty-seven children who fell within the top 0.5 per cent of the population. The average I.Q. of this very gifted group was 154. Cobb and Hollingworth found, upon testing the siblings, that they ranged in I.Q. from 96 to 173, with an average of 129, far above the typical 100.

There are two other interesting facts in connection with the relatives of the gifted children studied by Terman. It was found that of the sixty-two members of the Hall of Fame, fourteen were related to one or more children in the California group. In certain instances, the connection was close, as in the case of the two young geniuses who were in direct line from the grandparents of George Washington, the two who were directly descended from Roger Williams, and the child who was in the direct line of John Adams.

Twelve of Terman's group of gifted children had, at the time of selection, a parent or grandparent in "Who's Who in America." Of these, three were fathers, two mothers, and four grandparents. Terman points out that the chance of a man of forty-one years, the average age

of the fathers of the gifted children whom he was studying, being in "Who's Who" is about one in 2,000, yet three out of his group of 578 had been so honored. This is approximately ten times the number chance would give. The chance of a woman's being included in "Who's Who" is very much smaller, yet in this investigation it was found that two of the mothers had achieved this distinction. Numbered among the relatives of these intellectually gifted children are such well-known persons as Champ Clark, Newell Dwight Hillis, Senator Hiram Johnson, F. B. McCormack, former Chancellor of the University of Pittsburgh, Dr. Albert Michaelson, famous physicist, and James Addison Young, former Supreme Court justice.

Fathers of Eminent Men

Some years ago a study was made of the 282 most eminent men who lived during the period from 1450 to 1850. Data concerning these geniuses were gathered and analyzed with the greatest possible impartiality. The investigation was made by Catherine M. Cox under the direction of Terman. Concerning the heredity of the geniuses which she studied, Cox presents the following statistics (see Table II).

The Taussig scale referred to in the preceding table is a five-point rating system for socioeconomic standing. According to this classification, more than half of the world's most eminent men for the period from 1450 to 1850 were born to fathers who were members of the highest social class, and this despite the fact that this top class represented but a fraction of the total population —approximately 3 per cent. The fathers of over 8 per cent of these eminent men belonged to the two highest social classes, leaving only 20 per cent as members of the skilled workmen and lower business, semiskilled, and

TABLE II.—OCCUPATIONAL STATUS OF THE FATHERS AND MATERNAL GRANDFATHERS OF 282 EMINENT MEN*

Taussig rating and classification	Fathers		Maternal grandfathers		
	Frequency	Per cent	Frequency	Per cent 282	Per cent of 184 reported
1. Professional and nobility	148	52.5	77	27.3	41.8
2. Semiprofessional, higher business, and gentry	81	28.7	65	23.0	35.3
3. Skilled workmen and lower business	37	13.1	35	12.4	19.1
4. Semiskilled	11	3.9	3	1.1	1.6
5. Unskilled	3	1.1	4	1.4	2.2
No record	2	0.7	98	34.7	.....
Total	282	100.0	282	99.9	100.0

* Cox, C. M., "Genetic Studies of Genius," Vol. II, p. 37, Stanford University Press, Stanford University, Calif., 1926.

unskilled groups. It is true that Miss Cox is considering in this study only those men who actually attained eminence. Obviously, in many instances, opportunity in the guise of family and money helped them in their rise to fame. She had no way of discovering how many men of equal intellect may have been born in humble surroundings and kept from reaching the heights by an unfriendly environment.

Another study of the ancestry of a group of eminent men is that made by Cattell of 885 American men of science. His conclusions correspond closely to those arrived at by Miss Cox. He found that the professional classes, which constituted only 3 per cent of the general population, produced nearly one-half of the eminent American scientists whom he was studying. On the other hand, agriculture, which is commonly supposed by Americans to be the most fruitful source of eminence, contributed only slightly more than one-fifth of the men

studied by Cattell, even though at the time the study was made agricultural workers represented more than two-fifths of the total population. In other words, the professional classes produced sixteen times as many eminent scientists as would be expected when their relative frequency in the general population is taken into consideration, while the farming classes did only half as well as they should have done on the basis of their numbers.

An investigation by Clarke of the parentage of 666 outstanding men of letters contains statistics that are striking in their similarity to Cattell's findings concerning the ancestry of American men of science. Clarke reports that the fathers of nearly half of the eminent men he studied belonged to the professional classes, somewhat less than one-fourth to the commercial classes, a slightly smaller number to the agricultural classes, and only 7 per cent to the mechanical, clerical, and unskilled groups.

These studies are typical of the many investigations that have been made, and give weight to the statement that great men come from family lines which have already produced other men of high intelligence. However, all of them deal with the fathers of adult geniuses, and, admittedly, parental influence plays an important role in individual achievement. A somewhat different approach to the problem is to investigate the parentage of children who have been identified by tests as being intellectually gifted. In trying to determine the role of family in the production of intellect, it is as important to consider geniuses in the making at it is to consider those who have actually achieved eminence.

Fathers of Gifted Children

Terman,[1] in his detailed study of a thousand bright children in California, presents data on their ancestry.

[1] TERMAN, *op. cit.*, Vol. I, p. 64.

These children, all falling well within the top 1 per cent with respect to intellectual capacity and ranging in age from two to adolescence, were selected at random, no attention whatsoever being paid to any factor except mental ability. Data on the fathers of 560 of these gifted children were adequate to permit their grouping into the Taussig five-grade classification.

	Number	Per cent
Professional	176	31.4
Semiprofessional and business	280	50.0
Skilled labor	66	11.8
Semiskilled labor to slightly skilled	37	6.6
Common labor	1	0.2

Terman did not have the figures on the relative frequency of the different groups in the total population surveyed, but he was able to secure them for Los Angeles and San Francisco. In these two cities he found that the professional group made up but 2.9 per cent of the total; yet it was the source of almost one-third of the gifted children discovered there. In other words, fathers belonging to the professional classes—law, medicine, newspaper editors, and so on—produced somewhat more than ten times as many intellectually superior children as would be expected considering their relatively small incidence in the general population.

Concerning the contribution of the industrial group, Terman says:

> Only one man gives his occupation as *laborer*, which is 0.2 per cent of our fathers as compared with 15.0 per cent of the general population classified as laborer in the census report. Accordingly, fathers of gifted children yield only one seventy-seventh of their quota for this class. The man referred to was a farmer who had moved to

Berkeley and taken a position as laborer at the University of California in order that his children might attend college.[1]

It is a significant fact that, though the professional classes produced 31.4 per cent of the gifted children studied by Terman, the ratio is not so great as that found in the investigations of the ancestry of adult geniuses, where the figure consistently hovers around 50 per cent. This discrepancy is an indication that the mortality among promising children is much less in professional families than in the families of labor. A gifted child born to a lawyer is much more likely than a gifted child born to a laborer to have the way to later eminence made smooth for him. One of the responsibilities of a democratic educational system is to salvage its vitally important intellectual resources in the persons of these children who, though possessed of great mental ability, are kept from developing and utilizing it by insurmountable environmental obstacles.

[1] *Ibid.*, p. 63.

CHAPTER III

THE ROLE OF ENVIRONMENT

1. Does environment modify intellectual capacity?
2. Is any environment ever wholly good or bad in itself?
3. What do studies of twins indicate concerning the relative potency of heredity and environment?

In any discussion of the role of environment in the determination of the mental capacity of an individual, it should be kept in mind that the issue involved is never whether heredity *or* environment is all-powerful; the question is always one of the relative contribution of each. The forces of heredity and environment are so interwoven, so interdependent, as to make their separation as impossible as unscrambling an egg.

When a child is born into the world, heredity has determined that he shall be a human being, not a chimpanzee—an obvious fact, but one that immediately places limits upon the possibilities of environmental influences. As a normal human being, he has legs and arms, ears with which to hear, and eyes with which to see. He has inherited his sex and the color of his skin and hair. Heredity has predisposed him to be tall or short, fat or slim, strong or weak. It has equipped him with the capacity to love, to fear, and to be angry. It has marked the limits of his intellectual powers. However, born a human being, the child's body may be so twisted and warped by disease that it loses much of its human shape; inheriting arms and legs, he may lose them in an automobile accident or in a man-made war; given ears to hear with, disasters within his environment may deprive

him of his hearing; given eyes to see with, much reading and study may weaken an ability which heredity had intended to be strong; inheriting a white skin, jaundice may make it yellow, or working in the sun, brown, or illness and confinement, gray; inheriting great intellectual capacity, an unsatisfactory home life or inadequate schooling may effectively prevent him from realizing his possibilities. Heredity, in the form of the nature of the physical mechanism which he possesses, has set the limits to his capacities, but the environment in which that mechanism functions modifies the course along which, and the extent to which, those capacities will be developed.

Who can say which is more valuable: the innate ability to make sounds or the developed ability to use a language; the innate capacity to master mathematics, or the developed power to handle figures in everyday life situations. The teacher, unable to endow a child with great mental capacity, should devote her energies to teaching the child how to use whatever mental capacity he may have inherited. Giving the mind something to work with is as important as creating the mind.

A second fact to be considered in any discussion of the relative potency of heredity and environment is that environment can never be considered by itself alone but must always be interpreted in terms of its interaction with the individual concerned. It should be a truism that what is good environment for one child may be bad environment for another. If this statement is accepted, it follows that there is no such thing as a controlled environment which can be depended upon to bring positive results to all. Moreover, a particular environment is not constant, in any absolute sense, for the same individual, but affects him differently as he fluctuates in his responses.

It is, then, impossible to say what constitutes a good environment for those who are intellectually gifted. It may be that a relatively poor home would, for certain children, provide a more suitable atmosphere in which to grow toward adult eminence than would a wealthy, cultured home. There are many ways in which the poor home might furnish impetus. For instance, it might provide the economic drive which has actuated the success of many individuals; or it might provide a background of understanding of the needs of the common people—a solid foundation upon which to build a life of achievement; or it might, because of an intense hatred of it, force the individual to great effort to overcome what were for him the handicaps of childhood. Probably no one would, if he could, consciously assign gifted children to an early life of poverty, but it is, nevertheless, a fact that many children born on a low socioeconomic level owe their later eminence partly to that fact.

There have been a number of scientific investigations into the relative potency of heredity and environment. These are important, not because they succeed in proving that one or the other is the sole cause of the child's mental capacity nor because they can give the exact percentage of contribution of each, though some research workers claim to have thus neatly solved the problem. These studies are, in the main, descriptive and are important primarily for the light which they throw upon the complex interaction of heredity and environment in the production of genius.

Investigations of the hereditary and environmental sources of mental capacity have followed four lines of attack: (1) the transmission of subnormal intelligence from parent to child; (2) the transmission of high intellectual capacity from parent to child; (3) the extent of similarity in mental traits between twins; (4)

the constancy of intellectual status under changing environment.

Transmission of Mental Inferiority

It has been definitely proved that feeble-mindedness runs in families. A leading authority in this field, Tredgold, says that a defective germ plasm is responsible for 80 per cent of all feeble-minded individuals. Percentages suggested by other investigators hover about that figure. For instance, Kuhlmann sets it at 75 per cent, while Leta Hollingworth places it at 90 per cent. There is little justification for accepting these percentages as anything more than estimates.

Genealogical studies, like those of Goddard, show that the majority of subnormal children are born that way. It may be, however, that prenatal influences, which are, of course, environmental, have affected the mentality of the developing embryo. Concerning such influences little is known. There is, too, the question of the importance of the impact upon the infant of the presence in his family of other feeble-minded individuals and of the depressing effect upon him of the low socioeconomic status which is typical of the group possessing subnormal intelligence. That this low socioeconomic status could at most constitute merely a contributing cause becomes obvious when the fact is recalled that there are many feeble-minded children growing up in homes of wealth and culture.

Transmission of Mental Superiority

Data on the more important studies of the transmission of mental superiority were given in Chap. II. These data show conclusively that genius runs in families. From this it does not follow that intellectually gifted children will be found only in homes where the

parents possess superior minds. Rather it means that such children are more likely to be found in such homes. Obviously there are many exceptions.

Although it has been definitely proved that intellectually gifted children and eminent adults tend to come from family lines possessing a marked strain of high mental ability, it does not follow that environment has not played an important part. It is quite possible that association with mentally superior individuals and direct contact with cultural surroundings, such as excellent home libraries, helps the child to earn a higher score on an achievement test or on an intelligence test. This is almost certain to be true if the child is in accord with his environment. It is quite possible that the favorable early surroundings of those of Cattell's 885 American men of science who came from the professional classes had a great deal to do with their later success. Heredity had, to be sure, set a limit to the possibilities for achievement of the hundreds of thousands of boys born at the same time as were these children, who later became eminent in the field of science. Environment, however, in the guise of health, money, and opportunity, certainly modified the course which these children followed as they grew into manhood. Unquestionably there were many who, though having mental powers equal to those who actually attained eminence in science, were never heard of either because of an unfriendly environment or because of the possession of traits which were noncomplementary to intellectual capacity.

Mental Similarity of Twins

The question of likenesses between twins, always an interesting one to the layman, has become even more appealing since the birth of the Dionne quintuplets. The general public has followed the development of these five

girls with avid curiosity. Concerning the mental ability of the quintuplets, the orthodox psychologist would expect two things: first, that, considering their hereditary background and in spite of their seemingly favorable environment, they would possess average or less-than-average intelligence; second, that, being of multiple birth and especially since there is a probability that they are identical, they would be approximately equal in mental power. A recent report by William E. Blatz, Professor of Child Psychology at the University of Toronto, fulfills these expectations.

Language development is the best single indication of intellectual capacity in the young child. Professor Blatz[1] points out in his book, "The Five Sisters," that in this ability all five girls are retarded. At the age of two years each of the quintuplets had a vocabulary of less than ten words, a number which is typical for the average child of eighteen months. At three years of age each child had a vocabulary of approximately 110 words. This is somewhat less than the typical vocabulary of the average child of two years. Professor Blatz, who gives his readers the impression of striving to present the quintuplets in the best possible light, offers as one contributing cause of this observed retardation the fact that the quintuplets were born two months prematurely. He also suggests that, since there were so many of them all of the same age, they did not find the use of language important, relying rather upon gestures. The first of these reasons is a plausible one; it does take from three to five years for a child born prematurely to overcome this handicap in time. The second observation by Professor Blatz appears to have less foundation. To be sure, the need for talking and the desire to talk have a direct effect upon the size of

[1] Blatz, W. E., "The Five Sisters," pp. 34–37, William Morrow & Company, Inc., New York, 1938.

a child's vocabulary, but it is difficult to believe that this urge would necessarily be less with quintuplets than it would be with an only child.

Although the Dionne quintuplets are not intellectually gifted children, a statement of the results of Blatz's investigation of the mental capacity of the group at the age of three years throws light upon the heredity-environment question and so is pertinent to our present discussion. Blatz measured four aspects of the development of these children: language, motor, adaptive, and personal-social. From the data gathered, he concludes:[1]

> If we were to combine the score on all four divisions, we would then get a composite picture of the mental development of the child. When we do this for the quintuplets, we find that although they start out below the standard for their age, they are gradually creeping up. The expectation is that in due course their performance will approximate that of the average child. . . . The chart shows the order in which the children are placed from the 11th to the 35th month, with Yvonne at the top, Cecile and Annette about equal, Emilie next, and Marie last. This relationship is remarkably like that which will be described from the analysis of their physical characteristics, with Cecile in the center, Marie and Yvonne at opposite poles, Emilie more like Marie and Annette more like Yvonne. This may suggest that the fundamental basis of intelligence is structural and that the degree of intelligence, however difficult it is to determine, is an inherited characteristic.

Blatz then goes on to say:

> Also it must be pointed out that the differences in the behavior of these children on various tests are relatively slight, but that these differences are fairly constant, as illustrated in the rank-order chart, which shows that Yvonne throughout the whole period of testing was first and Marie last and Emilie consistently fourth, with Annette and Cecile interchanging.

There have been a number of studies made of twins. These agree that twins are more alike in every way,

[1] *Ibid.*, pp. 42–44.

including mentality, than are unrelated children and that identical[1] twins are much more alike than fraternal twins. Heredity is presumably the cause of this greater similarity. However, as Carter[2] points out, it may be that, actually, nurture influences are somewhat more alike for identical than for fraternal twins, their identical inheritance making them more congenial, more interested in the same things. But even identical twins do not have identical environments, although their similiar organisms do result in a likelihood of their reacting in much the same manner to similarly selected sets of stimuli.

The question of what happens when identical twins are reared apart has challenged the attention of investigators. If such twins have been brought up in widely differing environments and yet are found to be more alike than unrelated individuals, heredity would appear to be more potent than environment. If, on the other hand, such twins after a period of years are found to be markedly divergent in intellectual capacity, then it would appear that environment appreciably depresses or increases one's intellectual level.

Newman,[3] Freeman, and Holzinger studied nineteen pairs of identical twins reared in separate homes. These investigators found that identical twins reared apart differed somewhat more than do twins reared together. In one case a difference of 15 points in I.Q. was noticed. In general, however, it was found that the twins reared

[1] Identical or monozygotic twins are those which develop from the same fertilized egg cell; fraternal or dizygotic twins develop from two fertilized egg cells.

[2] Carter, H. D., "Thirty-ninth Yearbook of the National Society for the Study of Education," Part 1, p. 308, 1940.

[3] Newman, H. H., F. N. Freeman, and K. J. Holzinger, "Twins: A Study of Heredity and Environment," University of Chicago Press, Chicago, 1937.

apart were amazingly alike in spite of wide differences in environment.

Carter,[1] in summarizing the results of studies of twins during the past ten years, says:

> The whole array of twin-studies seems to suggest, to the writer at least, the futility and artificialty of the idea of untangling nature and nurture influences in the sense of ascertaining the percentage contributions of each in any general sense. The view that the idea of percentage contributions can have meaning only for specific mental traits, regarded under rather specific environmental conditions, seems to be implicit in much of the literature. The literature suggests that the hereditary determiners have a more pervasive influence than was heretofore believed; every increase in the body of data brings more evidence of hereditary influence. At the same time, the data indicate that further elucidation of the problems of operation of these hereditary factors is to be sought in study of the environment . . . The data show one thing clearly, that drastic differences in the educational and social environment are sometimes associated with moderate differences in the IQ's of identical twins reared apart. That only this can be said should bring caution into the writings of the most ardent environmentalists.

Effect of Changing Environment

A fourth method of studying the relative contributions of heredity and environment is to observe changes in children taken from one environment and placed in another. At the time the change is made the intelligence of the children is either measured by actual tests or estimated on the basis of the known socioeconomic status of the parents. If, after a period of years in the new environment, a reliable change in mental level is observed, environment, since it has been definitely altered, can be pointed to as the cause of the change. Although no one of the following investigations is immediately concerned with intellectually gifted children, each does throw light upon the question as to whether or

[1] Carter, *op. cit.*, pp. 248–249.

not genius can be created by education or by excellent home surroundings.

Barbara Burks studied 214 foster children who were placed in their new homes before they were one year of age. These foster homes represented a much higher social level than did those from which the children came. At the time the follow-up study was made, the children ranged in chronological age from five to fourteen. Miss Burks[1] arrives at the following conclusions: first, home environment can produce about 17 per cent of the variance in I.Q.; second, the total contribution of heredity is probably not far from 75 to 80 per cent; third, measurable environment one standard deviation above or below the mean of the population does not shift the I.Q. by more than six to nine points above or below the value it would have had under normal environmental conditions. In other words, nearly 70 per cent of school children have an actual I.Q. within six to nine points of that represented by their intelligence.

Freeman,[2] worked with 671 children. The results of his three most significant investigations, out of the many that were made, follow.

One hundred and twenty-five pairs of siblings were tested when they had reached an average age of 12 years 8 months, after having been separated from four to thirteen years. The test indicated a correlation in intelligence between these siblings of .34, somewhat lower than the .50 which is usually found for siblings reared together in the same home.

Seventy-four children of an average chronological age of eight years were given a Stanford-Binet intelligence

[1] BURKS, B., "Twenty-seventh Yearbook of the National Society for the Study of Education," Part I, p. 308, 1928.

[2] FREEMAN, F. N., "Twenty-seventh Year Book of the National Society for the Study of Education," Part I, Chap. IX, 1928.

test and then placed in superior foster homes. When these children had attained an average age of 12 years 2 months, they were retested. The average I.Q. of the first test was 91.2 and of the retest 93.7, indicating a gain of 2.5. Freeman, correcting the scores for age, publishes a difference between the mean I.Q.'s of 7.5.

Forty homes, in which there were both foster children and own children, were selected for study. It was found that the average I.Q. of the foster children was 95.1 ± 1.7, and for own children 112.4 ± 1.6. More complete data appear in Table III.

TABLE III.—COMPARISON OF PERIODS OF HOME INFLUENCE*

Child	Mean age entered home	Mean age at test	Mean time in home
Own.....	Birth	10 years 3 months	10 years 3 months
Foster.....	4 years 8 months	11 years 5 months	6 years 9 months

* FREEMAN, F. N., "Twenty-seventh Year Book of the National Society for the Study of Education," Part I, p. 137, 1928.

Freeman concludes from his studies that an improvement in environment produces a gain in intelligence.

Influence of Nursery School Attendance

A considerable majority of the investigations reported on in the 1940 Yearbook of the National Society for the Study of Education arrive at the conclusion that nursery school attendance or superior environment in the guise of excellent schools has little effect upon the intellectual status of the individual. For example, Reymert[1] and Hinton studied the case histories of 100 children who had been in the superior environment of Mooseheart for four years. These writers report that a comparison

[1] REYMERT, M. L., and R. T. HINTON, "Thirty-ninth Yearbook of the National Society for the Study of Education," Part II, p. 266, 1940.

of the entrance test scores of these children with the scores earned each succeeding year showed no significant gains in I.Q.

Goodenough and Maurer, in an excellent study of nursery school children at the Institute of Child Welfare, University of Minnesota, find no appreciable difference in the I.Q. changes between those children who had nursery school training and those who did not. Data on the changes which occurred during the interval between the first testing and a fourth, three years later, appear in Table IV.

TABLE IV.—CHANGES IN MEAN I.Q. ON THE MINNESOTA PRESCHOOL TEST AFTER THREE YEARS OF NURSERY-SCHOOL TRAINING COMPARED WITH CHANGES IN NON-NURSERY-SCHOOL CHILDREN AFTER AN INTERVAL OF THREE YEARS*

Occupational group†		Nursery	Non-nursery
I	Cases	5	5
	Test 1	105.5	113.5
	Test 4	121.5	124.5
II, III	Cases	5	8
	Test 1	109.5	105.6
	Test 4	112.5	106.9
IV, V, VI	Cases	3	2
	Test 1	117.5	125.0
	Test 4	110.8	122.5
Total, I to VI.....	Cases	13	15
	Test 1	109.8	110.8
	Test 4	115.6	114.8

* GOODENOUGH, F. L., and K. M. MAURER, "Thirty-ninth Yearbook of the National Society for the Study of Education," Part II, p. 171, 1940.

† Group I. Professional.
Group II. Semiprofessional and managerial.
Group III. Retail business, clerical, and skilled trades.
Group IV. Semiskilled trades and minor clerical.
Group V. Slightly skilled trades.
Group VI. Unskilled occupations. Day labor.

In a summarizing comment Goodenough[1] and Maurer say,

> None of the analyses that we have been able to make warrant the conclusion that attendance at the University of Minnesota Nursery School has any measurable effect whatever upon the mental development of children. Those who have had this training do no better on standardized intelligence tests than those who have not had it; they are neither more nor less advanced in school, and those who have attended longest and most regularly do not excel those whose period of enrollment was short and broken by frequent absences.

Hildreth, in a report on the records of 54 children who had been adopted into superior homes and who had been given superior educational opportunities, including attendance at Lincoln School in New York, found that this superior environment had not succeeded in lifting the children above the average for the general population. The average I.Q. of this group was found to be 103.3 while for the general Lincoln School population it was 120.3. Hildreth[2] concludes with the statement,

> From the results of this study we may conclude that adopted children in a gifted school population tend to rate on intelligence tests more like the general country-wide population in mental ability than like the general population in the selected school population. So far as our records go, there is little evidence that attendance at such a school raises the average ability of these adopted children much above the general population level, or that continued attendance in the school is accompanied by an increase in intelligence as measured by individual tests.

Starkweather[3] and Roberts, on the other hand, report an increase in I.Q. as a result of nursery school training.

[1] *Ibid.*, p. 76.

[2] HILDRETH, G., "Thirty-ninth Yearbook of the National Society for the Study of Education," Part II, p. 184, 1940.

[3] STARKWEATHER, E. K., and K. E. ROBERTS, "Thirty-ninth Yearbook of the National Society for the Study of Education," Part II, p. 335, 1940.

In their investigation 107 nursery school children were given the Merrill-Palmer intelligence tests and 103 children were given the Stanford-Binet intelligence tests upon entrance into the Merrill-Palmer Nursery School. These children were reexamined on the same tests after an interval of from 6 to 40 months. The authors found that:

1. Children attending the Merrill-Palmer Nursery School gain in I.Q. and percentile as measured by Stanford-Binet and Merrill-Palmer retests.
2. An inverse relationship exists between initial I.Q. or initial percentile levels and I.Q. gains or percentile gains.
3. Varying lengths of nursery-school attendance show no relationship to I.Q. or to percentile changes.

The Iowa Studies

At the time of this writing a series of studies of the effect of a changed environment upon the I.Q. is being conducted at the University of Iowa. Preliminary reports indicate an amazing increase on intelligence-test ratings by children who have come under the influence of good foster homes or of excellent preschool educational training. The mean increase found for certain groups is much greater than that ever reported elsewhere in psychological literature. An example of this is the thirty-point rise observed by Skeels.

Skeels[1] presents data on seventy-three children, sixty-five of whom were illegitimate and were placed in foster homes before they were six months of age. Thirty-nine of the seventy-three own mothers were measured for intelligence; the test scores indicated an average I.Q. of 83.8 with a standard deviation of 12.3. Only 10 per cent had I.Q.'s above 100, while 38 per cent had I.Q.'s below

[1] SKEELS, H. M., Mental Development of Children in Foster Homes, *J. Genet. Psychol.* Vol. 49, pp. 91–106, 1936.

80. It was impossible to test the own fathers for intelligence, but their occupational status indicated an intellectual level approximating that of the own mothers. Forty-six per cent were day laborers and only 13 per cent were above the semiskilled group. Moreover, a large number of them had been on relief for some time.

At the time the children were examined with the Stanford-Binet tests, their average chronological age was 24.4 months with a standard deviation of 14.2 months. Their mean length of residence in foster homes was 21.9 months. Based on the known intelligence of the mothers and the estimated intelligence of the fathers, the expected mean I.Q. of these children would be about 85; yet Skeels found it to be 115.3. Every child but one was found to be of average intelligence or better. Their intellectual level was superior even to that of their foster parents.

Other studies at Iowa of the effects of a changed environment on the I.Q. offer conclusions in keeping with those presented in the Skeels article. For instance, Beth Wellman[1] publishes data showing that children attending the preschool laboratories at the University of Iowa make substantial and significant gains in I.Q. Moreover, she points out that under the favorable environment in which experimental classes are conducted, the dull children gain more and the bright children less than do those of average ability.[2] In other words, there is a slight tendency to reduce the spread in intelligence.

Wellman[3] summarizes the main points of the published and unpublished studies made at the Iowa Child

[1] WELLMAN, B. L., The Effect of Pre-school Attendance on the IQ, *J. Exper. Educ.*, Vol. 1, No. 2, pp. 48–69.

[2] WELLMAN, B. L., Growth in Intelligence under Differing School Environments, *J. Exper. Educ.*, vol. 3, No. 2, December, 1934.

[3] WELLMAN, B. L., "Thirty-ninth Yearbook of the National Society for the Study of Education," Part II, p. 397, 1940.

Welfare Research Station on changes in intelligence associated with conditions of schooling as follows:

1. *Mental Growth during the Preschool Years*

1. The principal gains in IQ were made during preschool attendance and not during non-attendance.
2. The gains were cumulative over the first two years of preschool attendance.
3. Non-preschool children did not gain.
4. Correlations between number of days' attendance during one preschool year and change in IQ approached zero.
5. Cultural status of parents did not account for the changes in IQ.
6. An appropriate educational program appeared to affect the IQ change of very superior children.
7. Gains from preschool attendance appeared to be reflected in school achievement.
8. Decreases in IQ were made by non-preschool children in an orphanage.
9. Practice effects do not account for the changes.
10. Coaching does not account for the gains.
11. Tests at the preschool ages are fairly reliable and valid.

2. *Mental Growth during the Elementary-school Years*

1. The pattern of change varied with different elementary schools.
2. Gains were made in the University School by non-preschool children; slightly less gain by preschool children.
3. The peak of gain was reached in two years.
4. Practice effects do not account for the gains.

3. *Mental Growth from Preschool to High School and College*

1. High-school intelligence-test scores were related to length of attendance in the University Schools.
2. Preschool children made higher scores on the high-school test than did non-preschool children.
3. College-entrance examination scores were related to length of attendance in the University Schools.
4. Preschool children made higher scores on the college-entrance examination than did non-preschool children.

Criticisms by psychologists of the Iowa studies have been sharp. Leta Hollingworth[1] points out that Wellman "does not discuss these limitations of tests made at Iowa on preschool children. She does not take into consideration that tests standardized for preschool children are always brought out on less than a random sample. She uncritically accepts tests developed years ago for preschool ages as being tests standardized on the same samples of population as those now used during school years, which is not the case. Again, Wellman never considers the influence of negativism at all."

Terman,[2] in an even more pointed criticism of the Iowa Studies, says, "The reader cannot fail to be impressed by the number of variables left uncontrolled in these investigations, by the faulty statistics employed, and even more by the extraordinary discrepancies between data presented and the conclusions drawn."

It is too early to adequately evaluate the Iowa Studies. They must be continued for a number of years before well-founded conclusions can be drawn. It is interesting to note that even the Iowa workers,[3] although stressing the contributions which environment can make, admit that "the child can only be what he could have become." Stoddard and Wellman go on to say that "the Iowa-Binet theory of intelligence simply permits a large amount of change in a child's brightness through environmental impingements on the organism."[4]

Undoubtedly it is possible through education to do a great deal more in the matter of developing intellect

[1] HOLLINGWORTH, L. S., "Thirty-ninth Yearbook of the National Society for the Study of Education," Part I, p. 452, 1940.

[2] TERMAN, L. M., "Thirty-ninth Yearbook of the National Society for the Study of Education," Part I, p. 461, 1940.

[3] STODDARD, G. D., and B. L. WELLMAN, "Thirty-ninth Yearbook of the National Society for the Study of Education," Part I, p. 431, 1940.

[4] *Ibid.*, p. 436.

than has been done in the past. A child may possess great potentialities but he needs the right training and the right physical, mental, and emotional environment if he is to achieve on the level for which his inheritance equipped him.

Conclusions

It is an accepted fact, then, that an improved environment will be likely to effect a positive change in a score on an intelligence test. All studies, except those recently coming from Iowa, indicate, however, that this change is small. It is usually greater with preschool children than with school children. The fact that such changes do occur by no means proves that there has also occurred an actual change in the relative status of the mental capacity of the child. The I.Q. does not express the exact limits of a child's ability. It is, rather, the closest approximation that it is possible to obtain. As Terman[1] says:

> An obtained IQ is not only subject to chance errors resulting from inadequate samplings of abilities, but also to numerous constant errors, including practice effects, negativism or shyness, the personal equation of the examiner, and standardization errors in the test used. For these reasons an obtained IQ should never be taken as a final verdict, but only as a point of departure for further investigation of a subject.

The task of teachers, and it is a very important one, is to help the child to do as well as he can. This principle applies to the intellectually gifted pupil as well as to those who are of average or subnormal mentality. There is a possibility that even at the University of Iowa the gifted child is not receiving the right kind of stimulation in sufficient amount, and that this is the reason why his

[1] Terman, L. M., "Thirty-ninth Yearbook of the National Society for the Study of Education," Part I, p. 466, 1940.

I.Q. shows a less marked increase than that of the average and below-average child.

The studies reported in this chapter and in the one preceding add weight to the assertion that heredity and environment are interdependent. Every environmental situation must be interpreted in terms of the individual reacting to it, and his reaction will, in turn, be determined by the nature of his inherited bodily mechanism and of his earlier experiences.

CHAPTER IV

PHYSIQUE AND HEALTH

1. What is the relationship between physical size and intellect?
2. Do gifted children excel in athletic activities?
3. Are geniuses likely to be mentally unbalanced?

There are a number of generally held misconceptions concerning the physical characteristics and motor abilities of mentally superior children and adults. An examination of a few of these, together with an attempt to explain why they are so insistently held even by well-informed people, should contribute toward a better understanding of the causes which have created a picture of the genius so at variance with the facts. In this picture he appears as undersized, with narrow, stooping shoulders, but with a large head and high forehead. He is—especially if a girl—homely and likely to possess at least one feature which is sufficiently out of proportion and peculiar to make him appear ludicrous. He is weak and inept in handling himself. He is poor in penmanship and art work, slow and awkward in manual training, and, of course, nonathletic.

Reasons for Belief in Inferior Physical Equipment

Data gathered in scientific investigations will be presented later in this chapter to show that actually the typical gifted child is not at all a slight, poorly coordinated, or in any way incongruous individual. Then why do most people honestly believe him to be so? There are four fundamental reasons, and at least two of them are so

deeply rooted in human nature that to extirpate them is impossible. The four are as follows: first, overlooking the chronological- and mental-age factors; second, generalizing from too few instances; third, desiring to believe in a law of compensation; fourth, envy.

Chronological- and Mental-age Factors

The inability of others to keep his age in mind, has always handicapped the bright child and probably will continue to do so. For instance, there is the case of the boy with an I.Q. of 160 who entered the second grade in a large private school at the age of six. For weeks he underwent a barrage of criticism from teachers and classmates alike because he could not handle sweaters and buttons with the same facility as the other children in his grade. No one, not even his well-trained teachers, took cognizance of the fact that he was the youngest child in his class, the average age being something more than a year greater than his. It was especially easy to make this mistake since the boy, though the youngest, was also the largest, with respect to both height and weight. In this case, discrepancy between size and chronological age also added to the difficulty, for the child was expected, though only six, to do as well as or even better than his seven-year-old classmates since he appeared to be eight.

The correlation between physical size and motor coordination is far from perfect. The child who at four is as large as the average seven-year-old is not likely to handle himself so well as one aged seven who is in size typical of his age group. A more clear-cut example would be a comparison of a 6-foot adolescent with a 6-foot man in his middle twenties. Though similar in height and weight the chances would be all against the boy's being equal to the man in bodily control.

The brightest in a class is also likely to be the youngest. With that fact in mind it is easy to see why, when the valedictorian of a high school graduating class stands before his audience to deliver the valedictory speech, his listeners should note how small he appears among his classmates. It is but a step from that observation to the conclusion that all bright children are undersized. The boy's listeners have completely overlooked the fact that he is only sixteen while the average age of the adolescents around him is eighteen. Give him two more years in which to grow and he will quite surely be as large as if not slightly larger than they.

It is equally easy to overlook the importance of the mental-age factor in evaluating the physical characteristics of a gifted child. High mentality carries with it an ability for self-criticism and for properly evaluating the various school activities which is far in advance of that possessed by children of similar age but of average mentality. This critical capacity often leads a superior child to concentrate on those things which he can do well and which he feels are important. If he is poor in penmanship—and there is a slight negative correlation between intelligence and hand-writing—the cause is not likely to be a deficiency in coordination but rather a realization by the child that excellent penmanship is merely a grace note in this day of dictaphones and typewriters. If he is not on the football team, the reason may not lie in an inability to play football but rather in his desire to devote his energy to preparing for a profession. If he is slow in manual training, it may not be because of an innate awkwardness, but because his mind is occupied with some intellectual problem.

The gifted child is always "old for his age." This fact should never be overlooked in passing judgment on his qualities, physical or otherwise.

Hasty Generalizations

A second cause of the illusion concerning the physical characteristics of mentally superior children is the universal tendency to generalize from too few instances and to permit such generalizations to be influenced by wishful thinking. If it seems reasonable that a genius should have an extremely large head and a very high forehead, then it is natural to look for three or four examples in support of that theory. The final step is to generalize from these instances to a conclusion which is identical with the belief held before the cases were selected. If it seems reasonable that a man who has read many books should be a physical weakling, then it is not hard to remember sickly or even bedridden intellectual giants. As a high school student the author was given the impression by his English teacher that Robert Louis Stevenson was a great writer because he was an invalid.

This kind of reasoning is by no means limited to problems relating to genius. It is a limitation common to all men everywhere and works havoc to their thinking in any field.

Theory of Compensation

Most individuals possess the urge to endow the strong with compensating weaknesses and the weak with compensating powers. This desire has resulted in such widely held convictions as: morons and other feeble-minded individuals possess great strength; beautiful moving-picture actresses are of low mentality and of lower morals; those who are gifted in the arts are extremely eccentric if not actually insane; the beautiful child will develop into an unprepossessing adult; the rapid learner forgets quickly and, conversely, the slow learner retains well; the rich are blackguards and the poor, honest men;

a slow worker is painstaking and a fast worker careless; the good die young; the very bright child will grow into an average or below-average adult, and the average or dull child will be the successful man of tomorrow; a genius is also a fool.

This fundamental motivation of innumerable widely held beliefs has exerted a considerable influence upon the prevalent opinion concerning the physical characteristics of intellectually gifted children. If, so the reasoning goes, the child has a superior mind, it is no more than right that he should have an inferior body. If he can read better, handle figures with greater facility, knows more geography and history than his classmates, and can discuss with an understanding far beyond his years problems of national and international importance, then surely he must possess startling weaknesses which will reduce him to human proportions in the eyes of his fellows. Thus, if he happens to be small, or sickly, or homely, or lacking in social graces, the fact is noted with certain satisfaction.

To the credit of mankind it should be pointed out that people are equally eager to supply the dull child with gifts. Their insistence on believing in compensation is, actually, a manifestation of essential kindness.

Envy

Another source of the illusion concerning precocious children is one not nearly so complimentary to human nature as the desire to believe in compensation. It is envy. The bright child will, from infancy on, find this feeling in the attitude of others toward him. To vitiate its effectiveness he must possess and make use of more charm and patience and understanding than will ever be required of his less gifted fellows. Again and again envy will cause individuals to point out and to emphasize his

faults. Envy will color not only the attitude of casual acquaintances but also that of his teachers, his playmates, his brothers and sisters, and even his own parents. Envy has helped to create, and will help to perpetuate, a false picture of him.

Physical Characteristics

Since the early work of Galton, there have been a number of studies of the physical characteristics of intellectually gifted children and adults. There follows a presentation of the results of several significant investigations. It will be seen from them that the true picture of the physical equipment of mentally superior individuals is much different from that which takes its form from the four sources just discussed.

Height and Weight

Galton, as a result of his pioneer studies in the nineteenth century, concluded that there was a marked relationship between height or weight and intellect. He[1] says:

> There is a prevelant belief that men of genius are unhealthy, puny beings—all brain and no muscle—weak-sighted, and generally of poor constitutions. I think most of my readers would be surprised at the stature and physical frames of the heroes of history, who fill my pages, if they could be assembled together in a hall. . . . I do not deny that many men of extraordinary mental gifts have had wretched constitutions, but deny them to be an essential or even the usual accompaniment. . . . It is the second and third rate students who are usually weakly. A collection of living magnates in various branches of intellectual achievement is always a feast to my eyes; being, as they are, such massive, vigorous, capable-looking animals.

Later investigations have indicated that Galton somewhat overstated his case, but they have corroborated his

[1] Galton, F., "Hereditary Genius," p. 321, Macmillan & Co., Ltd., London, 1869; reprinted 1925.

assertion that a positive correlation does exist between physique and intellect, though that correlation is very low. Paterson,[1] after a critical evaluation of all the more important studies of height and weight in relation to intellect, concludes as follows:

> We may summarize the general trend of this critical review of the studies on the relation between height and weight and intelligence in normal children by stating that a slight positive correlation seems to exist between stature or weight and intelligence. The emphasis can be on either of two points: on the one hand, we would emphasize the fact that relationship, even though slight, is positive; on the other hand . . . it is important to emphasize the fact that physical status and mental status are to a great extent independent of one another.

In terms of coefficients of correlation the relationship between height or weight and intelligence is approximately 0.15. Some studies have resulted in a higher figure and others in a lower, but this is typical. For example, Murdock and Sullivan[2] selected data on the height, weight, and intelligence of nearly 600 children in Honolulu who were of old American, British, German, or Scandinavian descent, making, as Paterson points out, a fairly homogeneous race group. The mental measurements were made by Catherine Murdock, a school psychologist, and the physical measurements by L. R. Sullivan, an anthropologist representing the American Museum of Natural History in New York. They reported a Pearson r of $.16 \pm .03$ between weight and I.Q. for 595 children and a Pearson r of $.14 \pm .03$ between height and I.Q. for 597 children. These correlations are not high, but they become extremely significant when viewed in

[1] PATERSON, D. G., "Physique and Intellect," pp. 51–52, D. Appleton-Century Company, Inc., New York, 1930.

[2] MURDOCK, C., and L. H. SULLIVAN, A Contribution to the Study of Mental and Physical Measurements in Normal Children, *Amer. Phys. Educ. Rev.*, Vol. 28, pp. 209–215, 276–280, 328–330, 1923.

the light of the generally held belief in the existence of a negative relationship between intellect and physical size. They indicate that a *typical* intellectually gifted child will be somewhat taller and weigh somewhat more than a *typical* child of average mentality, who in turn will be taller and weigh more than the *typical* child of low mentality.

TABLE V.—TABULATION SHOWING HOW HEIGHT (IN INCHES) IS DISTRIBUTED AMONG THREE GROUPS OF CHILDREN, NINE TO ELEVEN YEARS OLD

Inches	Group *A*, I.Q. above 135, (median I.Q. of 151)	Group *B*, I.Q. 90–110 (median I.Q. of 100)	Group *C*, I.Q. below 65 (median I.Q. of 43)
59	1		
58			
57	3		
56	4	1	
55	4	1	1
54	8	2	3
53	2	3	4
52	9	8	2
51	8	10	3
50	3	7	6
49	1	8	10
48	2	5	3
47	..	..	3
46	..	..	5
45	..	..	2
44			
43	..	..	1
42	..	..	1
41			
40	..	..	1
Total	45	45	45

* Adapted from HOLLINGWORTH, L. S., "Gifted Children," p. 80, The Macmillan Company, New York, 1926.

Supporting the preceding statement are the results of a study made by Hollingworth and Taylor who matched each of a group of forty-five intellectually gifted children, ranging in intelligence from 135 I.Q. to 190 I.Q., with a child rating between 90 I.Q. and 110 I.Q. and with another belonging in the feeble-minded group. Age, race, and sex were kept constant. The data concerning height appear in Table V and for weight in Table VI.

The measurements in Table V when reduced to averages show that the medium height of the gifted was 52.9 inches, that of the average 51.2 inches, and that of the feeble-minded 49.6 inches. Corresponding results with respect to weight appear in Table VI.

TABLE VI.—TABULATION SHOWING HOW WEIGHT (IN POUNDS) IS DISTRIBUTED AMONG THREE GROUPS OF CHILDREN, NINE TO ELEVEN YEARS OLD*

Pounds	Group *A*, I.Q. above 135 (median I.Q. 151)	Group *B*, I.Q. 90–100 (median I.Q. 100)	Group *C*, I.Q. below 65 (median I.Q. 43)
115–110	2		
110–105			
105–110			
100– 95	2		
95– 90	2	1	
90– 85	3	1	
85– 80	6	2	1
80– 75	5	1	2
75– 70	9	6	6
70– 65	4	10	3
65– 60	8	9	8
60– 55	3	9	13
55– 50	1	5	4
50– 45		1	6
45– 40			2
Total	45	45	45

* Adapted from HOLLINGWORTH, "Gifted Children," p. 84.

A U. S. Public Health Report contains statistics on the relative height and weight of children on different intellectual levels. The groups compared are not sharply

TABLE VII.—AVERAGE MEASUREMENTS OF STANDING HEIGHT AND WEIGHT FOR THREE GROUPS OF CHILDREN CLASSIFIED ACCORDING TO I.Q., SEX, AND AGE*

Age	Boys, I.Q.			Girls, I.Q.		
	Under 90	90–110	110 up	Under 90	90–110	110 up
			Number			
8	16	135	86	20	130	89
9	43	127	70	34	129	60
10	34	112	61	32	111	68
11	64	93	81	48	88	75
12	46	55	122	44	76	88
13	41	52	66	17	58	52
14	22	41	33	14	41	33
			Height, centimeters			
8	121.94	124.61	126.60	120.15	123.86	124.60
9	129.28	129.92	131.16	125.26	129.71	130.58
10	132.88	134.63	135.67	133.69	133.12	136.57
11	138.47	138.71	142.16	138.52	140.25	141.67
12	143.13	145.09	146.32	141.32	145.72	147.60
13	149.05	149.04	150.80	147.82	150.21	152.87
14	150.95	156.80	156.97	151.93	153.88	157.03
			Weight, kilograms			
8	23.63	25.35	26.18	23.08	24.33	24.36
9	24.48	27.69	28.53	24.24	27.34	28.26
10	28.66	30.15	31.23	29.61	29.56	31.41
11	32.39	32.31	34.96	32.25	34.79	35.15
12	35.14	37.43	37.48	34.43	37.34	38.70
13	39.21	39.70	41.03	41.77	41.58	42.83
14	41.31	45.54	47.13	43.31	45.02	48.07

* Adapted from *U. S. Public Health Report*, Vol. 44, No. 29, pp. 1774–1775, July 19, 1929.

differentiated as were the subjects in the Hollingworth-Taylor investigation. Nevertheless, an examination of the figures discloses an unmistakable trend toward the greater size of the brighter children. These differences are small and not always present, but the tendency is significant (see Table VII).

Gray, in a study of the undergraduate careers of a group of children who entered Columbia and Barnard colleges before their sixteenth birthday, gives data concerning their height and weight. This group was made up of 126 boys and 28 girls. The average age of the boys was 15 years 6 months and of the girls 15 years 8 months, which made them approximately three years younger than the average college freshman, who, as Gray points out, begins his higher education at the age of 18 years 7 months.

The height and weight of these gifted young college students were checked against the Baldwin-Wood norms for boys and girls of the same age and against Gray's control group of college students of the same sex and college year. Gray[1] reports that in the case of the boys the young group's average deviation from the norms for their ages was plus 1.96 points in weight and plus 0.77 inches in height; in the case of the girls, the average deviation for the young group was plus 0.47 inches in height and plus 2.29 pounds in weight. When the gifted college students were compared with the control group, the boys were found to be 1.84 inches shorter and 14 pounds lighter, and the girls 0.86 inches shorter and 8.41 pounds lighter. The reason for the difference in favor of the control group lay in the fact that the gifted stu-

[1] GRAY, H. A., "Factors in the Undergraduate Careers of Young College Students," p. 42, Teachers College, Columbia University, New York, 1930.

TABLE VIII.—HEIGHT AND WEIGHT OF GIFTED AND OTHER GROUPS OF CHILDREN*

Age	Height, inches						Weight, pounds					
	Baldwin, California, 1923	Barnes, Oakland, 1892	Boas, Oakland, 1897	Faber, California, 1923	Baldwin, Oak Park, 1922	Baldwin, Davenport, 1920	Baldwin, California, 1923	Barnes, Oakland, 1892	Boas, Oakland, 1897	Faber, California, 1923	Baldwin, Oak Park, 1922	Baldwin, Davenport, 1920
Boys												
7	48.5	45.0	46.5	47.1	47.3	47.0	55.8	50.3	51.7	51.3	50.9	48.5
8	50.6	47.6	49.2	49.2	49.1	49.6	57.8	54.2	57.3	57.5	55.6	54.0
9	52.3	49.3	50.5	51.2	51.4	50.7	68.6	59.5	62.2	62.9	62.2	58.4
10	53.7	51.9	52.5	53.3	53.5	52.5	71.4	66.8	69.0	71.1	69.4	59.5
11	56.2	53.5	54.3	54.7	55.2	55.5	82.2	72.1	74.8	75.3	76.0	73.2
12	57.9	55.1	56.1	56.8	57.2	56.1	87.5	77.8	81.6	88.2	82.9	75.2
13	59.9	56.8	58.4	58.8	59.6	57.9	95.4	89.5	89.1	91.1	94.6	81.1
14	62.6	59.7	61.3	61.4	61.4		109.3	97.0	105.1	103.3	105.3	
15	64.7	61.8	64.3	62.8	63.0		118.8	108.0	119.5	111.1	110.9	
Girls												
7	47.5	44.9	46.3	46.9	46.7	46.3	52.5	48.1	49.6	50.3	49.9	46.1
8	50.0	46.8	48.3	48.3	49.3	47.7	60.2	52.2	55.7	56.3	55.9	47.6
9	52.3	49.2	50.3	50.9	51.4	50.4	65.9	58.6	60.0	62.4	61.5	54.9
10	53.6	51.5	52.6	52.7	53.1	52.4	71.3	63.3	66.8	69.4	68.9	61.3
11	56.5	53.9	54.7	55.0	55.0	54.9	83.0	69.7	74.3	78.0	72.4	66.8
12	58.0	56.6	57.1	57.3	57.2	56.6	87.7	78.9	84.2	86.3	84.3	87.2
13	61.1	60.0	59.7	59.4	59.7	59.3	106.5	90.6	94.2	97.1	92.0	81.8
14	62.3	61.2	61.7	60.7	61.8		114.2	98.1	105.8	105.0	102.3	
15	64.0	61.9	62.1	61.3	63.0		128.0	108.9	110.7	110.7	114.8	

Baldwin, California.—594 children between the ages of seven and fifteen, without clothing.
Barnes, Oakland.—4,956 children between the ages of six and eighteen, with clothing.
Boas, Oakland.—4,207 children between the ages of six and seventeen, with clothing.
Baldwin, Oak Park.—1,398 children between the ages of six and fourteen, with clothing.
Baldwin, Davenport.—563 children between the ages of five and thirteen, with clothing.
Faber, California.—7,463 children between the ages of seven and fifteen, with clothing.

* TERMAN, L. M., "Genetic Studies of Genius," Vol. I, p. 145, 2d ed., Stanford University Press, Stanford University, Calif., 1926.

dents were more than two years younger than the control group.

Terman, in his report on the California gifted group, presents figures showing that mentally superior children are superior in height and weight to unselected children. A summary of the data gathered by Bird T. Baldwin and his assistants appear in Table VIII.

It is a striking fact that the gifted group is inferior in only one instance in the large number of comparisons appearing in Table VIII. The exception is that of the fifteen-year-old gifted boys, whose mean average weight was 0.7 pounds less than that of the boys in the Boas-Oakland group. In every comparison with every other age and sex group the California gifted children were superior. In the face of these figures it is impossible to maintain that the typical gifted child is undersized. Baldwin,[1] commenting on his findings with respect to these 594 bright children, says:

> Since the weight-height relationship of a child furnishes one of the best general criteria for its physical status, the average heights and weights for all the children included between the ages of 7 and 15 were first computed and the results compared with those of earlier writers on California children and on a few representative groups in other parts of the United States. The results . . . show . . . that this group, measured by the group average, is physically superior in both height and weight for age, although several children are small and some are considerably under weight. The Oakland children measured by Barnes in 1892 are considerably inferior to this group, although they were heavier and taller than similar groups of children from Boston, Worcester, Toronto, St. Louis, and Milwaukee. . . . The Oakland children later studied by Boas were superior to those studied by Barnes, but inferior to those included in this study. The Davenport group represents a selection from the best residential district in the city. The Oak Park group is from one of the most favored social sections of Chicago. Faber's study, in 1923, was a group of California

[1] TERMAN, L. M., "Genetic Studies of Genius," Vol. I, p. 144, 2d ed., Stanford University Press, Stanford University, Calif., 1926.

children. The California gifted children excel them all in height and weight, for all ages included. They also excel the early Boas-Burk averages for the country at large, when approximately 90,000 children for height averages, and 68,000 for weight averages, between the ages of 5½ and 18½ years, were included.

Constancy of Height and Weight Status

If, as Galton and others have pointed out, adult geniuses are taller and heavier than ordinary men, and if, as the studies reported in the preceding pages show, intellectually gifted children are likewise taller and heavier than children of average mentality, then it would appear that the bright child maintains his superiority in size as he grows to maturity. Only a few studies have been made of the yearly increments in growth of gifted children. One of the best of these is that by Leta Hollingworth.

Hollingworth[1] recorded the successive measurements, for a period of seven years, of each of a group of forty-seven intellectually gifted children. The mean I.Q. of the group was 155, the lowest being 135. These children ranged in age from seven to nine, at the time the study was begun. Their heights were measured at regular intervals of twelve months from January, 1923, to January, 1929, inclusive. Each child was compared year after year with the norm approprixate to his age, race, and sex. A ratio was then given to indicate where the child stood in relation to those of average intelligence.

At the time of the first measurements, Hollingworth found that forty-one of the forty-seven children were above their respective height norm. At the time of the seventh and final measurements, forty-two were above

[1] HOLLINGWORTH, L. S., Do Intellectually Gifted Children Grow toward Mediocrity in Stature? *J. Genet. Psychol.*, Vol. 37, pp. 345–360, 1930.

and five below the appropriate norm. There were some variations on the part of a few of the children, but in the main they demonstrated a striking consistency in the constancy with which they maintained their relative positions. Professor Hollingworth took 100 as a ratio to

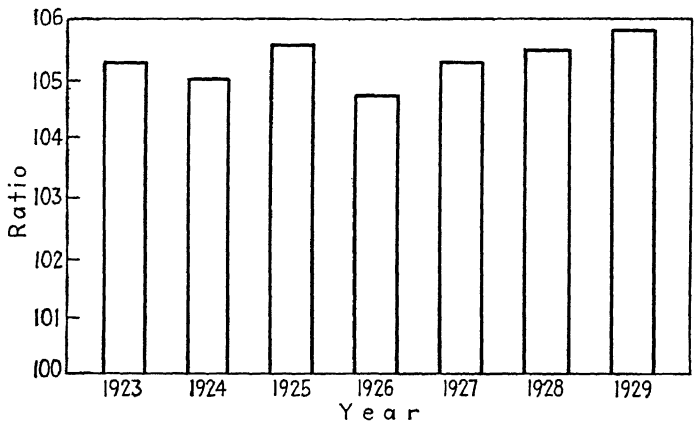

FIG. 4.—Mean ratio of stature of gifted to norms for age, sex, and race over a period of years.

indicate exact correspondence to the norm. The results, condensed into a graph, appear in Fig. 4.

Cranial Measurements

There are a number of reasons for the mistaken impression that an intimate relationship exists between head size and intellect. If intellect is dependent upon the brain, then why should it not follow that the larger the brain the greater the intellect? Since a large brain requires a large skull to encase it, then why should it not be true that individuals with large heads are intellectual giants? The story is told of the new village minister who struggled, during his first two or three Sunday sermons, to impress the man with the large head, noble forehead, and Van Dyke beard who sat in the front pew. The

minister was somewhat taken aback, later, to find that this Charles-Evans-Hughes-like member of his congregation was feeble-minded.

The fact that the most startling type in the lower feeble-minded group is the microcephalic idiot has provided the kind of proof that is eagerly seized upon, *viz.*, the spectacular and arresting instance. With the picture of a microcephalic idiot in mind, one easily forgets the much larger number of idiots whose head size approximates normality.

The scientists who made the first quantitative studies of the relationship between head size and intellect found a slight positive correlation. They made the mistake, however, (as Paterson points out in an excellent chapter on cranial measurements and intelligence in his book "Physique and Intellect") of overemphasizing the significance of these correlations and of high-lighting those which were considerable.

The first study of this subject was published by Galton in 1888. He concluded that there is an appreciable relationship between scholastic success and head size. Murdock and Sullivan, in the study referred to earlier in this chapter, correlated the head diameter and I.Q. of approximately six hundred children and found the relationship to be .22 ± .03. Reed and Mulligan[1] correlated the cranial capacity and scholastic performance of 449 male students at Aberdeen University and found a coefficient of .08 ± .03. Sommerville,[2] in a study of Columbia University students, reports a coefficient of correlation for intelligence and head length of .10, for intelligence and head height .09.

[1] Reed, R. W., and J. H. Mulligan, Relation of Cranial Capacity to Intelligence, *J. Royal Anthropological Inst.*, Vol. 53, pp. 322–332, 1923.

[2] Sommerville, R. C., Physical, Motor, and Sensory Traits, *Arch. Psychol.*, Vol. 12, pp. 1–108, 1924.

Other studies made during the past twenty years have produced corroborating data showing this tendency toward a slight positive correlation. Thus the U. S. Public Health Service presents the statistics found in Table IX concerning 2,707 children.

TABLE IX.—AVERAGE HEAD MEASUREMENTS FOR THREE GROUPS OF CHILDREN, CLASSIFIED ACCORDING TO I.Q., SEX, AND AGE*

Age	Boys			Girls		
	I.Q. under 90	I.Q. 90–110	I.Q. 110 or over	I.Q. under 90	I.Q. 90–110	I.Q. 110 or over
	Cephalic index					
8	80.00	81.04	80.20	80.60	80.56	79.76
9	81.47	80.68	79.83	81.35	80.36	79.47
10	81.32	80.72	80.48	80.78	80.88	80.04
11	80.61	81.27	78.90	80.77	79.30	79.79
12	80.65	80.49	79.58	80.23	79.89	79.85
13	80.88	80.29	79.12	80.06	80.36	79.71
14	80.05	80.15	79.58	80.50	79.10	80.85
	Head module,† cubic centimeters					
8	15.17	15.25	15.35	14.68	14.86	14.91
9	15.33	15.29	15.37	14.78	14.96	15.01
10	15.23	15.38	15.43	14.92	14.97	15.08
11	15.50	15.38	15.39	15.05	15.12	15.14
12	15.49	15.49	15.62	14.99	15.14	15.23
13	15.57	15.58	15.68	15.07	15.23	15.34
14	15.51	15.73	15.87	15.17	15.34	15.54

* Adapted from *U. S. Public Health Rept.*, Vol. 44, No. 29, pp. 1774–1775, July 19, 1929.

† Module is average of length.

In a study of intellectually gifted children, L. S. Hollingworth compared the average size and shape of head of a group of forty-five mentally superior children with a group whose intelligence ranged between 90 and 100 I.Q. Each gifted child was matched with a control

child according to age, race, and sex. In commenting on the measurements which she obtained, Hollingworth[1] says:

> The gifted have, therefore, larger heads than the ungifted, but only in accordance with their greater size in other respects. There is an interesting difference also in shape of head, between gifted and ungifted, in so far as shape is shown by cephalic index (which is the ratio found between width and length). There is no reliable difference between the two groups in width of head, as indicated by the probable error of the difference. There is, however, a reliably greater *length* of skull among the gifted. The gifted tend to be *long-headed* in comparison with their ungifted contemporaries of the same age, race, and sex.
>
> Here again it must be pointed out that the overlapping in both size and shape of skull between gifted and ungifted is so extensive that intellect cannot be safely inferred from cranial dimensions in an individual case. The chances are more than even that a long-headed child will be very intelligent, but they fall far from certainty for an individual chosen at random.

Hollingworth uncovers somewhat greater differences than have usually been found and emphasizes their importance. Her conclusions are not in agreement with those of Sorokin, who sees no significance in dolichocephaly, or long-headedness, or with MacDonald, who found a slight negative rather than a positive relationship. Paterson,[2] in his summary of the studies of cranial measurement and intelligence, says, "Head shape varies as a racial characteristic irrespective of the intellectual qualities exhibited by the several racial groups. Within a given racial strain, head shape appears to be indifferently related to intellect."

It would appear, then, that intellectually gifted children have, on the average, slightly larger heads than children of lower intelligence. This difference, however,

[1] HOLLINGWORTH, *op. cit.*, pp. 91–92.

[2] PATERSON, *op. cit.*, p. 123.

is extremely small and, when the slightly greater height and weight of the mentally superior child are taken into consideration, probably not at all out of proportion.

Physical Beauty

"Beautiful but dumb" is a phrase that has been current for a long time. It tersely expresses a tenaciously held belief.

It is very difficult to investigate the relationship between physical beauty and intelligence, for beauty is the result of a composite of traits which cannot be adequately measured. Consequently, there have been very few scientific studies to test the assumption that the homely girl is bright and her beautiful cousin dull. To select instances like Shirley Temple, whose I.Q. is well above the 130 customarily set as the minimum for intellectually gifted children, is to give an interesting example, but it proves nothing. One might reason along the line that, since there is a positive correlation of desirable traits and since the dull and feeble-minded as a group are likely to possess more physical stigmata than superior children, there must be a slight relationship between physical beauty and intellectual capacity. Probably such is the case, but there can be no finality attached to a conclusion reached in this manner.

Almost the only carefully controlled investigation in this field has been made by Leta Hollingworth,[1] who compared the physical beauty of a small group of intellectually gifted children with a matched group of control children. There were thirteen boys and seven girls in each of the two groups. All were of the white race and between fourteen and fifteen years of age. The children were photographed under conditions as nearly identical as pos-

[1] HOLLINGWORTH, L. S., Comparative Beauty of Faces of Highly Intelligent Adolescents, *Ped. Sem.*, Vol. 47, pp. 268–81 Dec., 1935.

sible. Two pictures were taken of each and the clearer one was given to the judges, who, ignorant of the mentality of the subjects, were asked to arrange them in order of merit. Twenty graduate students of education and their wives, between twenty-five and thirty-five years of age, and two older professors acted as judges. They divided the forty photographs into five piles of eight each, according to their judgment of the degree of beauty represented. Then each pile was arranged in order from one to eight. According to these judges, the faces of the intellectually gifted children were more attractive than the faces of the members of the control group, who were of average mentality.

Conclusions

Baldwin, cooperating with Terman in his study of the California group of gifted children, took 37 anthropometric measurements on each of 594 children between the ages of two and fifteen. Of these 312 were boys and 282 girls. The characteristics measured were as follows:

Height:
- Standing
- Sitting
- Stem length to vertex
- Stem length to sternal notch

Head:
- Anterior-posterior diameter
- Transverse diameter
- Height
- Circumference
- Width of face
- Length of face

Shoulders:
- Width

Arms:
- Span
- Length from shoulder to elbow, right and left

Length from elbow to finger tip, right and left
Width of wrist, proximal and distal, right and left
Circumference of wrist, right and left

Chest:
Width
Depth
Circumference

Hips:
Width at ischia
Width at trochanters
Circumference

Legs:
Length

Breathing capacity

Grip:
Right
Left

Weight, nude

After an analysis of the 21,978 measurements obtained, Baldwin[1] was able to reach a number of conclusions:

1. The gifted children deviate in a positive direction from the Baldwin weight, height, age, breathing standards for American-born children, but 62 to 73 per cent deviate not more than 10 per cent above or below these norms.

2. A large proportion have broad shoulders and hips, strong muscles, and well-developed lungs.

3. These children excel the children of a control group in Oak Park, Ill., in four selected physical traits: arm span, width of shoulders, width of hips, and grip.

4. Various types of cephalic indices are found within particular nationality groups represented by these children, but the majority of the children are of the mesocephalic type.

5. The results of this investigation show that the gifted group is, as a whole, physically superior to the various groups used for comparison.

The conclusion growing out of the data presented in this chapter, that gifted children as a group are superior to children of average mentality in their physical equip-

[1] TERMAN, *op. cit.*, pp. 169–171.

ment, is significant even though the relationship between intelligence and physique is so slight as to preclude any possibility of prophesying that any one bright child will be physically superior or, conversely, that a physically superior child will be bright. The significance lies in the fact that it disproves the generally held belief that precocious children are physical weaklings. There are times when a coefficient of correlation even as low as .10 assumes considerable importance. This is one of those times.

Participation in Athletics

The question of the degree to which intellectually gifted children participate in athletics has been scarcely touched upon by investigators. It is known that for unselected groups there is little, if any, relationship between intelligence and athletic activity. Before presenting objective data, it will be well to consider a few of the factors which influence the gifted child in making his decisions concerning competing for a place on one or more of his school teams.

Intellectual curiosity is nearly always associated with high intelligence; consequently, the mentally superior child, eager to learn more of the exciting facts which he senses all about him, may feel that he would be losing precious hours if he were practicing and playing football or baseball. The less intelligent boy, with relatively little interest in abstract knowledge, is much more likely to find his attention spontaneously turned to sports of various kinds. If the gifted child, however, does decide to participate, the chances are somewhat better than even that he will excel the boy of average mentality who is of the same chronological age.

The age of the gifted child is frequently an obstacle which he must overcome if he is to take part in sports. For example, if he is in high school, the chances are that

he is from one to three years younger than the majority of the boys in his class. For a fourteen-year-old child to compete against those who are sixteen years old, either in football, where weight is important, or in basketball, where height is an asset, is very difficult. In order to participate successfully, his youth must be compensated for by his greater intelligence, by his being large for his age, or by a fortunate combination of the two.

There are at least three points in favor of the superior child's being able to participate in school sports. In the first place he needs to spend so little time on the required academic work that he has plenty of leisure hours to do with as he pleases. Much studying at home in order to earn passing grades is not necessary for him, as it is for the average student. In the second place, if he is a typical gifted child, he is somewhat better equipped physically than boys of average intelligence. If he happens to be markedly superior in this respect, he may feel almost as strong an urge to excel in athletics as to excel in scholarship. There have been a number of college boys who, like "Whizzer" White, of Colorado, have earned both a Phi Beta Kappa key and one or more college letters. Finally, he may enjoy using his intellect in sport. If two boys are equal physically but unequal mentally, the brighter of the two has a considerable advantage. A classic example in the world of professional sport is the two championship boxing matches of Dempsey and Tunney. For instance, in a football game much depends upon the mental alertness of the quarterback, who more often than not is a high-ranking student. He plans the plays and then helps his teammates to execute them—an excellent bit of training for the leadership which, presumably, he will be exercising in later life.

Gray compared the athletic activities of 126 boys and 28 girls who had entered Columbia and Barnard colleges

TABLE X.—ATHLETIC ACTIVITIES OF GIFTED GROUP COMPARED WITH CONTROL GROUP*

Activity	Young group		Control group	
	Boys	Girls	Boys	Girls
Interclass:				
Crew	9		3	
Football	7		6	
Wrestling	4		2	
Baseball†	4	2	2	3
Basketball	3	3	1	2
Swimming	3	4	1	3
Water polo	3		1	
Tennis	2	2	1	1
Fencing	1			
Cross-country	1		2	
Varsity:				
Crew	3		1	
Water polo	3		1	
Baseball	2	2	1	1
Cross-country	1		1	
Tennis	1			
Track	1	2	3	1
Fencing	1			
Swimming		2		1
Intramural:				
Track	4		8	
Fencing	2		1	
Tennis	1			
Swimming		4		2
Dancing		5		4
Total activities	56	26	35	18
Students participating	30	17	27	11
Won letters	2	1	1	0

* Gray, H. A., "Factors in the Undergraduate Careers of Young College Students," p. 47, Teachers College, Columbia University, New York, 1930.

† Indoor baseball for girls.

before they were sixteen years of age with a control group matched for sex and college year. The resulting data appear in Table X.

In discussing the data appearing in Table X, Gray[1] points out:

> In inter-class activities, both boys and girls in the young groups engaged in more sports than did the members of the control group. The same is true for varsity and intramural sports, and in considering the totals it will be seen that a large number of each sex in the young groups participated in more athletic activities and won more recognition as measured by being awarded the college letter, than did the older students comprising the control group.

Physical Health

The parents of a gifted child were approached one day by a sympathetic friend, who asked them, in all sincerity, if they were not worried because their child was so bright. "He won't live very long," she warned. "Precocious children never do."

"Health" is an ever-changing variable and one not easy to evaluate in quantitative terms. However, though the evidence is inconclusive, it does cast considerable doubt over the point of view that the genius dies young or is "sicklied o'er with the pale cast of thought"; it tends, rather, further to substantiate the thesis that desirable traits are correlated. It would appear reasonable that a group of mentally superior children coming from better-than-average stock, living in better-than-average environment, and possessing better-than-average physique should also enjoy better-than-average health.

Frequency of Diseases

Mentally superior children are probably subjected to disease with about the same frequency as unselected children. Unfortunately there is no detailed and accurate

[1] Gray, *op. cit.*, p. 48.

comparison of the disease histories of a large group of intellectually gifted children with those of children of average mentality. Gray gathered information concerning the frequency of diseases suffered during precollege years by a small group of gifted college students. He compared these data with similar statistics on a control group (see Table XI).

TABLE XI.—FREQUENCY OF DISEASES CONTRACTED BEFORE COLLEGE ENTRY*

Disease	Young group		Control group	
	Boys	Girls	Boys	Girls
Indigestion	12	4	15	7
Scarlet fever	13	11	12	15
Constipation	10	7	9	6
Diphtheria	8	2	11	
Typhoid	4		3	2
Rheumatism	3		1	
Pleurisy	2			2

* GRAY, "Factors in the Undergraduate Careers of Young College Students," p. 43.

In five of the seven diseases listed in Table XI, the control group was slightly more affected than the gifted group. However, the number of individuals considered is so small that the difference noted cannot be considered very significant.

Terman summarized data supplied by parents concerning the frequency with which the California gifted children had suffered from infectious diseases. Unfortunately he did not make comparisons with a control group. He says:[1]

For both sexes the incidence of scarlet fever, diphtheria, and pneumonia seems high, but comparative data for the general popula-

[1] TERMAN, *op. cit.*, p. 190.

tion of the cities are not available. Roughly, one in twelve has had scarlet fever; one in fifteen diphtheria; and one in twenty pneumonia. About a quarter of the cases of scarlet fever and diphtheria and half of the cases of pneumonia are described as having been severe or very severe. With an incidence so high, these diseases doubtless rob the world of many potential geniuses. At the same time, the frequency of severe cases among the superior children suggests that contagious diseases may not be as important a factor in the causation of mental defects as they are popularly believed to be.

Tonsils and Adenoids

There was a period some twenty years ago when the idea that a dull child could be made bright by removing his tonsils and adenoids swept through the schools. It was the kind of simple, direct, easily understood remedy that invariably appeals. Human beings are as eager for a short cut to superior intellectual capacity as they are for a short cut to wealth or popularity. As a result of the widely disseminated idea that tonsils and adenoids obstructed the flow of mentation, the surgeons found their practice markedly increased; but there was no increase in the intellectual capacity of those operated upon.

The fact that Terman found that his California gifted children were much more likely to have had their tonsils and adenoids removed than were unselected children is not a negation of the point of view expressed in the preceding paragraph. It is rather the result of their having come from homes on a higher socioeconomic level. In his investigation, Terman asked both the home and the school for information regarding the removal of tonsils and adenoids. Such information was supplied by the home for 550 of the gifted group and by the school for 511 of the gifted group and for 493 of the control group. Data gathered in this manner are by no means completely accurate, but they do indicate a trend (see Table XII).

TABLE XII.—REMOVAL OF ADENOIDS AND TONSILS, PER CENT*

	Gifted boys	Gifted girls	All gifted	Control boys	Control girls	All control
Adenoids removed:						
School blank	44	32	39	29	18	23
Home blank	54	42	49			
Tonsils removed:						
School blank	48	38	44	32	18	25
Home blank	54	44	49			

* Adapted from TERMAN, "Genetic Studies of Genius," Vol. I, p. 195.

Since the gifted children have undergone tonsil and adenoid operations with much greater frequency than the control children, it would be expected that mouth breathing would be much less pronounced among them. Terman found in his study that this difference was very marked, certainly sufficient to show that a bright child is much less likely to be a mouth breather than a dull or average child.

Hearing and Vision

When the California group of gifted children was compared with children in the control group, it was found that the former were somewhat less likely to suffer from defective hearing and somewhat more likely to suffer from defective eyesight. The percentages, based on reports from the schools, were: for defects in hearing, 2.3 for the gifted and 5.9 for the control, and for defects in vision, 20.3 for the gifted and 16 for the control. A possible cause of the gifted children's inferiority in vision is the strain placed on their eyes by excessive reading and writing, especially during preschool years.

Summarizing Statement

A detailed presentation of the health data gathered in the California study can be found in Chaps. VIII and IX of Terman's "Genetic Studies of Genius," Vol. I. These data were summed up by Doctors Moore and Bronson, who conducted the physical examinations. Dr. Moore's statement follows:[1]

In regard to a general comparison of this group with unselected children, it is my opinion that major and minor defects are much less common in the former. I do not have suitable figures on which to base a comparison as to the relative incidence of various defects, but I have a strong conviction that, other things being equal, there is a direct correlation between physical health and mentality in children when studied in groups. In my opinion the physical superiority of the gifted group is indicated by the higher average of nutrition and by superior stability, physical and mental.

Mental Health

It is generally believed that highly intelligent individuals tend to be neurotic and often actually insane. Before an attempt is made to see what light scientific investigations have thrown on this question, it might be well to examine subjectively the basis of this popular conviction.

Probably the most important cause for the belief that geniuses are unstable is the one referred to earlier, *viz.*, the urge to supply those who possess unusual gifts with compensating defects. It is comforting to believe that the great man is eccentric or even psychotic. The term "paranoiac" is hurled with abandon at Mussolini and Hitler. Whispering campaigns against presidential candidates invariably accompany every national election

[1] Terman, *op. cit.*, p. 251.

in America. The most improbable stories gain currency with amazing and disturbing ease when they appeal to the prejudices of a large number of people.

Genius and neurasthenia are by no means incompatible. Consequently, it is possible to select cases in support of the statement that geniuses are mentally abnormal. This was the procedure followed by Lombroso (who, as a scientist, should have known better), and Lombroso's conclusions still exert a tremendous influence on thought concerning the relationship of mental health to intellect.

The desire to prove that neuroticism is widespread among those who are eminent often closes one's eyes to its frequency in individuals of average or below-average intelligence. Overemotional or temperamental behavior by an artist or a scholar is expected and emphasized; similar behavior by an ordinary person goes unremarked. For example, there is the case of a well-known novelist, who is unusually calm and well-balanced but who, simply because she is a writer, is generally believed to be temperamental and difficult to get along with. Sympathy is frequently expressed to her household help concerning the difficulties they must have in working for such an eccentric person. It so happened that at one time this novelist had in her employ an Irish housekeeper, whose intelligence was somewhat below average yet who was as temperamental as an opera star is supposed to be. A slight stimulus would throw her into a rage, and she frequently talked in all seriousness of seeing banshees and having incredible experiences. Nevertheless, in spite of this kind of behavior, because she was a housekeeper of ordinary intelligence, no one, except those who got in the way of one of her thrown dishes, ever thought of her as being temperamental or neurotic. To outsiders she represented normalcy.

A second factor which has strengthened the belief in a relationship between intellect and neuroticism is that certain brilliant people, especially artists, musicians, actors, and writers, have decided that in self-preservation they must behave as their public expects them to behave. Added to this feeling there is probably also a sense of relief in finding that being uninhibited is socially desirable. Human beings like a queen to look like a queen; in other words, to look as they think a queen ought to look. They also like a musician to be what they think a musician ought to be. For those who depend for success upon the public a certain amount of conformity is an absolute necessity. A musician who appears before his audience with the approved long hair, foreign name, dark, impenetrable features, exotic but slightly incongruous figure, and a nervous system so unstable that he makes a handsome show of temperament before the concert is over, has done much to insure his success.

If a public personage is great enough, he does not feel it necessary to enhance his prestige by stage play. He can be at all times that exceedingly rare person—himself. The individual of truly first-rate talent is usually poised, natural, well-controlled. Surely a lack of integration could hardly be considered an asset to anyone. On the other hand, there is a horde of second-rate minds in politics, in medicine, in the academic world, and in the arts who think that they can fool the public into believing that they possess great gifts by behaving as they know the public expects those who have great gifts to behave. Greenwich Village was once full of these men and women, who had more ambition and more emotional drive than their intellects were able to match. The game is frequently a losing one, but altogether too often a professor of moderate attainments, by always

carrying an umbrella and being conscientiously absent-minded, a hack writer, by filling innumerable pages with meaningless and repetitious words, an artist of limited talent, by wearing freakish and ornate clothes, wins a public far larger than his undramatized abilities would ever have commanded.

Stability of Gifted Children

Although it is not possible at the present time to give the exact relationship between intellect and emotional stability, there are indications from the studies that have been made that, at least in childhood, the relationship is positive to a rather marked degree. Terman, in analyzing the responses of the school to the question "Is child especially nervous?" found that the teachers replied in the affirmative for 13.3 per cent of the gifted and for 16.1 per cent of the control group. There were over 500 children in each of the two groups. When information on stuttering was asked for, the percentage of affirmative replies was 2.6 per cent for the gifted and 3.4 per cent for the control children. The gifted children were found to be slightly more timid than the control children and manifested a slightly greater tendency to worry.

Professor Hollingworth[1] concludes a discussion of the nervous stability of gifted children by saying:

> Investigators do not find a complete absence of the nervously unstable in large groups of gifted children. Nervous instability and superior intelligence are by no means totally incompatible; their incompatibility is but relative. The consensus of investigator's opinions is that there are fewer nervous children among the gifted than among unselected children, not that there are no gifted children who are nervous.

[1] HOLLINGWORTH, L. S., "Gifted Children," pp. 130–131.

Jersild[1] also points out that there is a positive relationship between stability and intelligence, although he emphasizes the fact that it is far from perfect.

Burdens Borne by Adult Geniuses

Even assuming that it is true that intellectually gifted children are less neurotic than their mentally inferior playmates, it is possible that, when they reach adulthood, they may develop psychoneuroses and psychoses. The brighter the individual the more problems he has. As a child and as an adult he is aware of complexities which never impinge upon the consciousness of the person of average mentality. For example, there is the case of the mentally superior child of six who wept upon hearing that Austria had been absorbed by Germany. The average child of six probably would not even have been cognizant of the existence of a nation called "Austria," to say nothing of regretting its effacement from the map.

The genius, young or old, conscious of the enormous problems which beset civilization and, at the same time, by virtue of the critical ability which usually accompanies high intellect, realizing how inadequately he is equipped to solve them, may falter after years of effort. Certainly the surgeon who must perform one delicate operation after another, the writer who attempts to interpret life truthfully, the conscientious businessman who feels a personal responsibility for the welfare of his employees, the musician who must night after night transmit the emotional values of the compositions which he is playing, the statesman who realizes that he carries the life of a people in his hand, certainly all these are under a strain seldom experienced by the man in the ranks. In many

[1] JERSILD, A. T., "Child Psychology," p. 361, Prentice-Hall, Inc., New York, 1933.

instances this strain works havoc with the nervous system. Lange-Eichbaum,[1] claims that from 12 to 13 per cent of between three and four hundred geniuses whom he studied had been psychotic at least once during their lifetime. When he limited the number to seventy-eight of the very greatest names, he claims that more than one-third of them were psychotic at least once during their lifetime and that more than 83 per cent had been markedly psychopathic.

Lange-Eichbaum does not adequately describe the methods by which he arrived at these conclusions. It would seem that these percentages are little more than his own estimates based to a too great degree upon selected cases. Nevertheless it is true that many outstanding geniuses of the past were mentally unbalanced. As Lange-Eichbaum points out, many did not become so until after the creation of their principal work. He says that this is true of Copernicus, Faraday, and others, who suffered in their later years from senile dementia. However, it is rather farfetched to claim that genius and insanity are related merely because a number of men of outstanding achievement have suffered from senile dementia, a disease of old age common at all mental levels.

H. L. Hollingworth takes a point of view which is the opposite of that expressed by Lange-Eichbaum, but which represents the one held by a considerable majority of the psychologists who have studied the relationship between abstract intelligence and mental disease. The following quotation from Hollingworth[2] will serve as a summary:

[1] LANGE-EICHBAUM, W., "The Problem of Genius" p. 112, The Macmillan Company, New York, 1932.

[2] HOLLINGWORTH, H. L., "Mental Growth and Decline," pp. 30, 31, D. Appleton-Century Company, Inc., New York, 1928.

Studies of individuals with psychoneurotic complaints show these individuals commonly to be of less than average intellectual competence. The degree of intelligence also exercises a determining influence on the nature of neurotic complaints. Thus Tendler, studying groups of civilian patients, found the median mental ages of the three groups, Neurasthenia, Psychasthenia, and Hysteria, to be respectively 11.0, 12.0, and 13.7 years, in comparison with an average of 14.0 to 15.0 years of mental age attributed to the normal adult. . . . Although individuals with any degree of intelligence may become involved in neurotic difficulties, the tendency is much greater in the cases of humble intelligence.

CHAPTER V

SOCIAL CHARACTERISTICS

1. Are intellectually superior individuals likely to be antisocial?
2. What adjustments do gifted children make in their play associations and activities?
3. What effect does high intelligence have on school popularity and opportunities for leadership?

It is difficult to know precisely what should be included in the term "social characteristics." Intelligence itself is an important section of the social-personality pattern; and certainly physical characteristics, especially beauty and bearing, cannot be left out. Actually, of course, no individual can be taken apart and put together again. Even though, for practical reasons, it is necessary to study him in his different aspects, it should always be kept in mind that his total personality is greater than the sum of his mental, physical, and social characteristics.

Usually social intelligence is thought of in terms of getting along with people, of being happy and comfortable with them, of being liked by them, of rarely coming into conflict with them. Theoretically a person with a high degree of social intelligence conforms sufficiently to the standards of his group and his kind. He is one with the crowd.

Happiness

Assuming that to be socially acceptable one must conform, it is easy to see why the intellectually gifted child is faced from earliest years with social problems which the child of average intelligence is never called

upon to meet. The intelligent individual, possessing imagination and insight, frequently sees where it would be more beneficial to his fellows and to himself to change rather than to conform, but his social sense warns him that, in self-defense, he must move carefully. Often he finds a way to bring about desirable innovations without disastrous consequences to himself. Many geniuses, however, are unable to hit upon happy solutions to the frequent clashes between what they know should be done and what they know would be socially approved and so lead baffled, unhappy, disillusioned lives. Familiarity with such cases as these caused the father of a gifted boy to write as follows:

If an experimenting God were to grant me the power to determine the intelligence of a child of mine, I should not hesitate, guided by my interest in the child, to make his mentality exactly average or, at the most, a little above average. Under no conditions should I make him intellectually gifted or precocious or a genius or whatever term it is appropriate to apply to a youngster whose mental endowment is far above that of the great majority of children.

I should be obliged to make this choice if, as a natural father, I wished my child to be happy, because I know his chances for happiness, especially in so far as they depend upon the understanding and comradeship of his fellows, would decrease inexorably with the increase of his relative intellectual stature. If I were to be wholly selfish for him, I might even go so far as to prefer that he be feeble-minded rather than intellectually gifted, for the feeble-minded individual can at least find solace in the complacency of ignorance.

I should hope, of course, that if God did not see fit to grant me the authority to select my child's intelligence quotient and should, during a brief lapse in His infinite kindness, put into my keeping an infant with the mental capacity to become a genius, I should be able to go down the years with that child in understanding and patience; but, since I am only a human being like other parents, the chances are too great that I should make the same mistakes other parents of bright children are making. That during his preschool years I should be forcing him to demonstrate his powers so that my friends—and those not so friendly—could see what a marvel I had produced.

That, as the child grew older, his questions, because I could not answer them, would irritate me; his intellect I should envy. That, when he reached adult years, I should find myself happier in his absence than in his presence and unable to prevent his knowing it.

Yes, if I were given the power to determine my child's intelligence, I should be strongly, bitterly tempted, in my father's desire for his early and perhaps lifelong happiness, to endow him with an average mind. And yet—I hope I should waver when the time came to make this choice.

I hope I should hesitate long enough to weigh my child's personal happiness against the welfare of a civilization, his and mine, now rushing toward disaster because we lack intellects equal to controlling the institutions which we have built or to solving the complex problems which we have created; a civilization standing perplexed and helpless, like a group of children who have built a pile of blocks so high that they cannot add another to reinforce the structure without causing its collapse. I hope I should be able to pity those who in their blindness imprison their potential leaders almost from birth, and to feel a new confidence in the possibility of a brighter future for the intellectual genius and so for the rest of us, and say, "All right, God, since You have made me the offer, I will take for my child the best intellect you have in stock; and may he as well as the human race profit by my choice."

Attitude of Immediate Family

The extreme pessimism of this father is probably unjustified, yet it is true that many of the relationships and experiences which bring pleasure to the child of average intelligence are denied those who are brilliant. If the gifted child happens to come of parents of average or below-average intelligence, his chances are small of ever experiencing the satisfactions which come from having a community of interests with one's father and mother. He may even discover with dismay that his parents are envious of him and seek to minimize his gifts; or it may be that they are merely puzzled like a hen who finds that she has mothered a duckling. For example, there is the instance of a ship's steward who,

in telling a passenger about his child, said regretfully that he no longer understood this boy, who had suddenly become very much interested in books.

It is often true that not only the gifted child but his parents as well experience disappointments when they are separated by a wide gap in intellect. There is the story—repeated often in America—of an ambitious mother of average intelligence who, from the earliest years of her son's life, had longed for him to be a great man. Since he had the mental capacity and the other characteristics necessary to the attainment of eminence, he did reach a high place, but it was in the world of chemistry. Research articles and textbooks meant nothing to his mother, who could only have appreciated the significance of a fame which brought newspaper headlines and cheering crowds. She died a pathetically frustrated and disappointed woman, finding comfort only in the stubborn conviction that some day her son might yet achieve.

The relationship between the mentally superior child and his brothers and sisters is comparable to that which exists between his parents and himself. Eve Curie, in her biography of her mother, Mme Curie, tells of an experience which the four-year-old Marie had when she presumed one day to read aloud to her family from an elder sister's reader. The story as told by Eve Curie[1] is as follows:

> One morning, while Bronya [an older sister] was faltering out a reading lesson to her parents, Manya [Marie] grew impatient, took the book from her hands, and read aloud the opening sentence. At first, flattered by the silence which surrounded her, she continued this fascinating game; but suddenly panic siezed her. One look at the stupefied faces of her parents, another at Bronya's sulky stare, a

[1] CURIE, E., "Madame Curie," p. 9, Doubleday, Doran & Company, New York, 1937.

few unintelligible stammers, an irrepressible sob—and instead of the infant prodigy, there was only the baby of four, crying through her tears:

"Beg—pardon! Pardon! I didn't do it on purpose. It's not my fault—it's not Bronya's fault! It's only because it was so easy!"

Manya had suddenly conceived, with despair, that she might perhaps never be forgiven for having learned to read.

Just as nature abhors a vacuum, so do human beings abhor the variant, the child or adult who is different. With this basic psychological fact in mind, it is not difficult to see why there is a marked tendency for the family, parents and siblings, to unite against the precocious child. Instead of their being made to feel inferior by his superior mentality, he, as a result of ridicule and of sheer weight in numbers, is often forced into a realization that he is a misfit. This family pressure is one of the two primary reasons for the prevalence of inferiority complexes among intellectually gifted children and adults. For example, there is the case of the very bright boy, born and reared on a farm in a family of average mentality, who was repeatedly told by his relatives that a college education would be necessary for him alone, out of all the family, because he would be unable to get along without it. This comment is not so absurd as it may at first seem, for it is a common human failing for a man to look kindly upon those whose interests and habits are similar to his own and honestly to think that there is something wrong with those who speak another language. Hence it was entirely natural that this boy, with an interest in books and abstract problems, should be regarded as an oddity and a probable failure by those who were concerned solely with the manual work and physical pleasures of the day.

As the typical bright child grows older, he finds himself becoming more and more ostracized by members of

his family. He watches their growing envy and puzzled resentment with deep concern. Often he tries to make contact with them by doing the things they like to do, by appearing interested in the things they consider important. Occasionally he succeeds, but he is much more likely merely to arouse resentment by what they consider to be his patronizing attitude. He is no more responsible for the breadth of his mental power than for the breadth of his shoulders and yet by its possession he brings down upon himself the dislike of those whom he loves most. Considering the difficulties of the situation it is amazing that the results growing out of it are not more serious than they are.

Fortunately for the mental health of the gifted child the happiness of an individual is by no means wholly, or even largely, dependent upon the sympathetic understanding of others. The sources of happiness differ with individuals; frequently for gifted children the sheer joy of mental activity makes each day pleasant.

Character Development of Gifted Children

In spite of the difficulties which the genius has in adjusting to a world made for average people, he rarely develops antisocial tendencies. This is fortunate for society, for the highly intelligent criminal is, of course, much more effective than his feeble-minded counterpart. Although conclusions reached in studies of the relationship between intelligence and delinquency are not always the same, they point to a negative relationship.

Cyril Burt[1] studied the characteristics of 200 juvenile delinquents. He reported an average I.Q. of 89 for the group. Eighty-two per cent were below 100 I.Q. and 18 per cent above. While 8 per cent fell below 70 I.Q.

[1] Burt, C., "The Young Delinquent," pp. 283–284, D. Appleton-Century Company, Inc., New York, 1928.

only 2.5 per cent rated above 115. The normal expectation for the total population is a frequency of 11 per cent above 115 I.Q. Burt concluded that mental defectiveness is a notable factor in the production of crime. He pointed out that the presence of intellectually gifted children in a delinquent group is exceptional.

The causes of juvenile delinquency and of adult criminal activity are too complex, too interrelated and interdependent, to be isolated and exactly evaluated. Superior mentality alone would not keep an individual from committing antisocial acts, but, as has been shown in previous chapters, superior mentality is likely to be part of a pattern made up of superior home life, superior economic opportunities, superior health, and so on. Coupled with these, perhaps caused by them, is superiority in character. Terman[1] maintains, after a study of the character and personality traits of his California group, that the gifted child of nine years has reached a level of character development corresponding roughly to that of unselected children of fourteen years.

Character Traits of Eminent Men

Catherine Cox[2] rated 67 character traits of 100 of the 301 most eminent individuals in the period from 1450 to 1850. The traits measured may be grouped as follows, according to character elements which predominate in each case: emotional, 14; emotional-social, 5; social, 15; self (negative), 2; self (positive), 5; intellectual, 8; intellectual-social, 2; intellectual-emotional, 2; intellectual activity, 2; activity (persistence of motive), 4; physical activity, 6; strength or force of character, 1;

[1] Terman, "Genetic Studies of Genius," Vol. I, p. 516, 2d ed., Stanford University Press, Stanford University, Calif., 1926.

[2] Cox, "Genetic Studies of Genius," Vol. II, pp. 169–180, Stanford University Press, Stanford University, Calif., 1926.

balance, 1; Each of these sixty-seven character traits was rated on a seven-point scale ranging from +3 to −3 with the midpoint at zero. Each step of the scale was defined as follows:

Plus 3 denotes the possession of a very high degree of the quality as compared with the average.

Plus 2 denotes the possession of a degree of the quality distinctly above the average.

Plus 1 denotes the possession of a degree of the quality slightly above the average.

0 denotes the possession of the average degree of the quality among youths in general.

Minus 1 denotes the possession of somewhat less than the average.

Minus 2 denotes the possession of distinctly less than the average.

Minus 3 denotes the lowest degree of the quality as compared with the average.

Miss Cox found that the average rating of the 100 eminent men, for the combined 67 character traits, was 1.2, which is considerably above the average represented by zero. She reports the average ratings for the trait groups to be as follows:

Trait	Average rating	Number of traits
Activity (persistence of motive)	2.3	4
Intellectual activity	2.0	2
Self (positive traits)	2.0	5
Strength or force of character	2.0	1
Intellectual	1.8	8
Social	1.2	15
Intellectual-social	1.1	2
Balance	1.0	1
Emotional-social	1.0	5
Intellectual-emotional	.9	2
Physical activity	.6	6
Emotional	.5	14
Self (negative traits)	.1	2

Miss Cox, then, studying the character traits of those individuals who actually became eminent, comes to a conclusion similar to that arrived at by Terman with respect to gifted children of the present day. Each group was found to be definitely above the average. Miss Cox, in commenting on the fact that the geniuses in her group possess not only great intellectual capacity but also marked strength of character and a considerable persistence of motive, says:

> Forcefulness or strength of character as a whole, persistence of motive, and the intellectual traits rate conspicuously high. The high scores on all traits containing the persistence of motive factor, and the intellective factor indicate that young geniuses possess these traits to an unusual degree. These and the summation trait of strength or force of character as a whole are the traits in which our subjects score the highest ratings. They appear to be peculiarly characteristic of young geniuses. The estimates on the self-traits and the persistence traits corroborate those on forcefulness or strength of character as a whole, emphasizing the presence of dynamic vigor of character and an innate assurance of superior ability in all of the members of the group.

Play Activities

The intellectually gifted child has a number of adjustments to make with respect to his play activities. If he is eight years of age chronologically and physically but twelve or thirteen years of age mentally, the possibilities are great that the games which interest average eight-year-old children will appeal but little to him; yet he will not be welcomed into the games of twelve-year-old children, to whom he seems a baby. Moreover, while he can understand the games which appeal to those older than he, he is physically incapable of playing many of them.

This problem is acute even on the high school level. For instance, there is the case of David Buxton, who entered high school when he was eleven years of age and

became very much interested in football. He tried out for the team but was too small to fill even the position of quarterback. David, however, became so popular with the other boys on the squad that in his junior year they elected him manager. In this position he was a great help to the team, not only in handling their business affairs but also in assisting in working out plays.

The play activities of mentally superior children have been studied sufficiently, during the past two or three decades, to justify a number of conclusions. Those which follow apply to the typical gifted child. There is, of course, much overlapping between a group of gifted children and a group of unselected children with respect to their play life, and this should not be overlooked.

1. Gifted children usually play with those who are older than themselves.
2. They are not so interested in competitive games as are other children of the same age.
3. They are interested in games that require thinking.
4. They possess more information about games than do average children.
5. If boys, they are slightly more interested than control boys in games with a high masculinity index.
6. They show a marked tendency toward having imaginary playmates and an interest in elaborately constructed imaginary countries.
7. They are somewhat more likely than average children to play alone.
8. They find their companionship sought by others as frequently as do average children.
9. If rating over 170 I.Q., they are less likely to make satisfactory play adjustments than those less bright.

With Older Children

The gifted child, faced with the problem of whether he shall be content with the simple games which children of his chronological age play or struggle to participate

in the games popular among those of the same mental age, usually compromises by playing with children who are from one to three years older than he. This question of play adjustment was raised by a group of seven gifted children, between nine and eleven years of age, possessing I.Q.'s of 170 or above, who were in a special class in a school in New York City. The incitement to comment was a news story which reported a leading psychologist as saying that the child with an I.Q. above 150 finds himself an outcast among youths of his own age and develops a feeling of physical and social inferiority to the older children whom he demands as companions.

Each of these seven unusually gifted children claimed that he was not unhappy in his play life but was as well adjusted in that respect as any other child. Two of the three girls present explained that their best friends were from one to two years older than they, but that this difference in chronological age presented no obstacle whatsoever. The four boys stated that they had no difficulty in playing with older children. Donald, for instance, maintained stoutly that, though he was only nine years old, thirteen- and fourteen-year-old boys did not object to his playing with them; that he preferred these older boys to those of his own age; that he enjoyed rough games, such as football. He claimed that his size was an asset rather than a handicap, for he could run under and around his bigger, clumsier playmates. Edward, usually very quiet, insisted with a similar warmth that his best friends were two to three years older than he but that the difference in age had no bad effects upon his relationship with them. Fred also claimed that his best friends were a few years older than he and that he was far from unhappy and lonely. Charles, too, seemed to feel that his social adjustments were satisfactory.

Terman considered the question of the age of the playmates of intellectually gifted children in his California study. He sent questionnaires to the homes of his gifted group and to the schools attended by members of this group and of a control group as well. The question put was whether the child preferred playmates who were much older, older, same age, younger, or much younger. The data, in terms of percentages, appear in Table XIII.

TABLE XIII.—SCHOOL AND HOME REPORTS ON AGE OF PLAYMATES*
Per Cent

	Much older	Older	Same age	Younger	Much younger
School blank, control.....	1.2	7.9	86.5	3.8	0.6
School blank, gifted.....	4.3	20.8	70.8	3.3	0.8
Home blank, gifted.....	4.2	30.4	61.2	4.0	0.2

* Adapted from TERMAN, "Genetic Studies of Genius," Vol. I, p. 431.

In commenting on the statistics in Table XIII Terman says:[1]

The school reports a much larger percentage of gifted than control children who prefer older playmates, and the home reports for the gifted agree fairly well with those from the school. This is probably due in part to the fact that the gifted child is usually associated in school with children a year or two older than himself, and in part to a tendency for mental ages to seek their level.

Interests

Although both gifted and unselected children are more interested in active, out-of-door games than in intellectual contests, the gifted show a relatively greater preference for games that require thinking, such as checkers and chess. Frequently mentally superior children delight in making up games of their own, working out elaborate sets of rules. For example, one gifted boy had shown no interest in gymnasium activities until

[1] TERMAN, *op. cit.*, p. 431.

one day the instructor asked for someone to volunteer to plan a new game. This was an unexpected opportunity for the child to exert a leadership in an activity which heretofore had meant nothing to him. In a few minutes, his fertile mind had created a game which, when it was explained to his classmates, met with their enthusiastic approval. The gifted boy, younger than they and in this instance not adept in athletics, had won their admiration. The gymnasium instructor had shown rare good sense.

Terman,[1] in reporting on the play interests of unselected children, says:

(1) As compared with the control boys, gifted boys show much greater preference for jackstraws, coasting, hiking, dancing, swimming, rowing, croquet, wrestling, racing or jumping, handball, soccer, tennis, dominoes, crokinole, parchesi, authors, guessing games, cards, checkers, and chess; and much less preference for rolling hoops, walking on stilts, flying kites, riding bicycle, garden work, shooting, riding horseback, hunting, ring around the rosy, farmer in the dell, drop the handkerchief, cat and mouse, anty over, jump the rope, fox and geese, volleyball, basketball, and playing house.

(2) As compared with the control girls, gifted girls show much greater preference for jackstones, skating, hiking, dancing, fishing, swimming, sewing, using tools, shinny, wrestling, dominoes, parchesi, authors, guessing games, cards, puzzles, and chess; and much less preference for walking on stilts, riding bicycle, hunting, cooking, ring around the rosy, hopscotch, cat and mouse, anty over, dare base, fox and geese, baseball, racing or jumping, handball, volleyball, basketball, and charades.

Masculinity of Gifted Boys' Games

The causes which have actuated the belief that intellectually gifted children are inferior physically and socially have also given rise to the conviction that gifted boys are effeminate as well; but this picture of the sex

[1] *Ibid.*, pp. 406–407.

TABLE XIV.—MASCULINITY RATINGS OF CONTROL AND GIFTED BOYS, BY AGE*

Rating	8		9		10		11		12		13		Total 8–13	
	C	G	C	G	C	G	C	G	C	G	C	G	C	G
20	.....	.....	.....	.....	.....	1	.....	.....	1	.....	.....	.....	1	1
19	.....	.....	.....	1	.....	2	.....	.....	0	.....	1	.....	1	3
18	.....	3	.....	0	.....	1	2	.....	0	2	2	.....	4	6
17	.....	2	.....	5	3	7	3	12	2	4	6	3	14	33
16	.....	10	4	7	2	21	5	16	7	15	16	7	34	76
15	2	8	3	15	7	23	7	25	7	15	14	6	40	92
14	3	15	4	14	9	12	8	15	8	4	2	2	34	62
13	3	3	8	3	8	1	7	.....	4	1	1	.....	31	8
12	1	.....	.....	3	.....	2	.....	1	.....	.....	.....	.....	1	6
11	.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	2
10	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1	
9														
8														
7														
6														
5	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Total	9	42	19	49	30	71	32	69	29	41	42	18	161	290
Mean	13.67	14.95	14.16	14.63	14.27	15.38	14.84	15.32	15.00	15.56	15.81	15.61	14.90	15.22
S.D.	0.94	1.45	1.18	1.90	1.46	1.48	1.49	1.08	1.49	1.04	1.12	0.89	1.49	1.45

*TERMAN "Genetic Studies of Genius," vol I, p. 411.

characteristics of genius fits into the true pattern of his personality no better than does the popular picture of his physical size and strength. In his interests—play and otherwise—he is actually slightly more masculine than boys of average intelligence.

Terman and his coworkers developed masculinity indices for a large number of play activities. Using these as a basis for judgment, a masculinity rating was computed for each child of the gifted and control groups. The results are similar to those obtained when the two groups are being compared as to physical traits. At every age, except thirteen, the gifted boys rate higher than the control boys in the masculinity of their play interests (see Table XIV).

Imaginary Playmates and Countries

Imaginary play is very common among young children and even more common among those who are gifted because these possess the more constantly creative minds. Occasionally the imaginary person or animal becomes almost as real to the child as though it were actually alive and in his presence, as in the case of the little girl of five who always insisted on taking her imaginary dog with her when she went for a walk. Often there were difficulties in getting the animal across the street and occasionally, to the distress of the child, he was nearly run over. There should be no concern over the vivid quality of a child's imagination, for at this early age the line between the real and the make-believe is indistinct. To be sure, if such illusions continue into adolescence they constitute an indication of abnormality.

Jersild[1] and Markey, in a study of 400 ranging in age from five to twelve, describe in detail the day-

[1] JERSILD, A. T., "Child Psychology," p. 274, Prentice-Hall, Inc., New York, 1933.

dreams and imaginary companions experienced by these children. It is interesting to note that 19 per cent of this group mentioned having daydreams which involved a certain amount of self-glorification. It is possible that this constitutes one of the reasons why the gifted child is likely to give his imagination full sway. Unable to achieve and to lead on a level with his mental age, because he is so young in calendar years, he finds it pleasant to build for himself in imagination a position of prestige. No danger is involved if the self-delusion is not persisted in. However, if carried on into adult years, it may result in paranoia—a psychosis which is more frequently found among those of superior mentality than among those of inferior mentality, and which has its beginnings in balked childhood ambitions coupled with early disillusion concerning the motives of others.

Terman agrees with Jersild that a large portion of gifted children have imaginary playmates. There is need for comprehensive studies of this phenomenon, the conclusions of which might reveal many new facts concerning the mental process of gifted children. The writer, knowing a boy of six who had worked out a system which combined imaginary playmates, imaginary and real countries, imaginary travels, and imaginary wars, asked him to dictate a description of what he called the "Lel Things." The child did so and later made corrections in the transcription. The following excerpts, rather remarkable for vocabulary and sentence structure, are taken from his narrative.

THE LEL THINGS

In the country of New South Wales, Australia, there was once a great bee-hive with a lot of bees. One was magic. It was a mother. On September 6, 897 A. D., she gave birth to a bee so queer that the others didn't think it was a bee. They decided it must be the first of

a new race, and, since he was so small, they called him and his race "The Little Things." They named him Bydgojappebee.

He grew up and married another one of his race (there were a lot of them being born now) and they had a child called Fernaxpo. He was the first Little Thing President from the time he was a day old. That could happen because the Little Things know more when they are born than human beings do. There was getting to be so many of them now that they began to call themselves, for a pet name, "The Lel Things."

More and more came, and there was quite a crowd of them while Leev was president.

By the time the next one, Djerra, was president, there was such a crowd that explorers began to go out looking for new countries where there would be more room and they could live peacefully. On these expeditions they found Norway, Sweden, and Finland. Djerra was the leader of the explorers. He died almost two years after he finished being president, for he got very tired out from leading all their expeditions.

The next president of the Scandinavian Lel Things was Gangset. He was the Lel discoverer of America. His voyage was very important and I will tell you about it. In September, 1272, almost forty years after he had become president, he set out on a voyage to go around the Arctic. He had two ships when he started, the Elgraira and the Ddvor, but the Ddvor, the older of the two vessels, sank when it got into the Arctic because it was not strong enough to stand the pressure of the ice.

Then all in the Elgraira went down and landed for a time on Bermuda, then went north and discovered Cape Cod. They stayed there for about a year and a half, and returned to Scandinavia in 1279. America was wholly settled in 1286.

In 1298 there came a great war in Australia between the Bees and the Lels. Lder Eve was one of the bravest generals of the Australian Lels. In that war the Bees were trying to drive out the Lels because there were so many there; the Bees didn't know what they might do to them. The Bees won.

All the Australian Lels migrated to America. Broadway was their next president. He was president from 1500 (when Gangset died) to 1611 when he was assassinated. From the year 1558 to 1572 there was a war in the United States between the Bees and the Lels. This time the Lels won.

Broadway almost died in 1567 but not quite. In 1610 the men who voted against him planned to shoot him but their plans failed that year. The next year, 1611, in late December, they shot him.

General Lder was the next president. In early February, 1621, he died of pneumonia.

The next was George Narragansett. He died in the famous disaster of 1890. The famous disaster happened this way. NrPkSecchule, Elrev, Narragansett, Huna, Bartelot, Dyzico and Felomozo were on board "The Hourearlier," so called because it was supposed to go faster than most boats, but it certainly did not. When it was five leagues from Recife, Brazil, it began to sink. All the Captains had raisers then. These were big irons with which to turn the boat over and dump the water out and turn the boat back again. To do this the captain had to jump out into the water. Narragansett was so old that he was getting rather weak and when he went into the water, down he sank like a rock! NrPkSecchule and Elrev were the only ones to survive. NrPkSecchule had good luck in raising the ship, and these two sailed back to Recife.

In 1891 he became president. NrPkSecchule was quite young when he became president. He was only twenty years old.

In 1933 I was born, and a great excitement grew up among the Lel Things. I didn't begin to know NrPkSecchule until the middle of 1938. When 1939 came along, we knew each other even better and were very good friends. I built a cave for NrPkSecchule, his officials, and all the lesser Lels who inhabited the neighborhood. Now they all live there.

NrPkSecchule is my highest helping Lel. His greatest singer is Zaco, his greatest printer is Veranops, his greatest musical composer is Abbldox. The baby Lels usually eat dirt, ferns, leaves, and grass.

How do you think that describes the Lels? All right? Well, this is the end.

Besides the vivid imagination shown in the preceding paragraphs, certain characteristics of the interests of gifted children are manifest. For instance, although the boy was only six at the time he dictated this material, his handling of dates and of the element of time is far in advance of his age. He shows also an interest in biography —in detailed facts concerning the lives of his imaginary characters. It so happens that this boy is also much inter-

ested in the biographies of great men who have actually lived. He has already read extensively into the lives of Galileo, Faraday, and others.

The boy's fluency in dictation has been developed through much practice. As early as the age of four he dictated a travel narrative of several thousand words. He writes well, also, but his writing vocabulary is not yet so large as his speaking vocabulary.

Solitary Games

Gifted children are somewhat more likely than control children to play by themselves, though the difference is not considerable enough to be serious. The causes of this tendency are not hard to find. The gifted child, knowing more than he can do and possessing a creative imagination, is somewhat more likely than the average child to play solitary games in which he can make use of his vast amount of information concerning games and at the same time avoid the handicaps of physical size and youthfulness which so frequently keep him from thoroughly enjoying the typical competitive games of other children. The problems in play adjustments increase proportionately with the distance between chronological age and mental age.

TABLE XV.—EXTENT OF SOLITARY PLAY OF GIFTED AND AVERAGE CHILDREN, PER CENT*

	Very much	Average amount	Little
Control boys	33	55	12
Gifted boys	20	64	16
Control girls	33	57	10
Gifted girls	24	64	12

* Adapted from TERMAN, "Genetic Studies of Genius," Vol. I, p. 430.

Yoder, in a study of the play interests of children who later became eminent, found that they were often of a solitary kind. However, as Leta Hollingworth points out, the persons studied by Yoder would probably all rate above 170 I.Q. Gifted children of a lower order are less likely to play alone. Terman, in reporting the extent of solitary play of gifted children as compared with control children, gives percentages based on data gathered on approximately 1200 cases (see Table XV).

Witty,[1] in a genetic study of 50 gifted children begun in 1924–1925, says, "The children engage in the same number of play activities as the control group, though the gifted are somewhat more solitary and sedentary in their play."

It seems safe to conclude that although solitary play is somewhat more frequent among gifted children than among average children, the incidence reaches serious proportions only among those possessing the very highest intellects.

Companionship Sought

If the gifted child is somewhat more likely than the average child to play alone, then it would be expected that his companionship would be sought a little less frequently. This appears to be the case, although again the difference between the two groups is extremely small. Terman,[2] in comparing his gifted children with a control group, found that the gifted boys' companionship was sought in 29 per cent of the cases while the control boys' companionship was sought in 32 per cent of the cases. Five per cent of the gifted boys were "rather avoided" as against 3 per cent of the control boys. Sixty-six

[1] WITTY, P., "Thirty-ninth Yearbook of the National Society for the Study of Education," Part II, p. 409, 1940.

[2] TERMAN, *op. cit.*, p. 432.

per cent of the gifted and 65 per cent of the control boys found themselves neither sought nor avoided. A comparison of the gifted girls and the control girls results in a similar picture. These differences are surprisingly small when one considers the intellectual barriers between gifted and average children.

Greater Difficulties of the Extremely Gifted

Although many children with I.Q.'s above 170 succeed in making satisfactory play adjustments, the chances are great that they will not. Instead of participating in the activities of other children, they are much more likely either to stand on the sidelines to watch or to find solace in solitary play. It is difficult to know to what extent an extremely brilliant child should be forced into play that is typical of children of his own age. Certainly, in some instances, such forcing results in irreparable damage.

There was the case of a five-year-old girl with an I.Q. of 180, who preferred, during the first-grade play period, to observe other children rather than to join with them. She was not consciously scornful of the activities of her classmates, but their pointless running, jumping, and dancing about seemed as unappealing to her as would the gyrations of a group of junior high school children to an intelligent adult. This girl interested herself in studying the personalities of her classmates; in observing the way they did things and what they said. Then, after school hours, she would write character sketches of them. When pressure was brought to bear by children and teachers to make her conform with the others, she refused. She was not impressed by argument that she should do certain things because all the others did them. It is probably as impossible to make such a child socially typical as it is to make one of average intelligence into a genius.

Both Leta Hollingworth and Terman are in agreement with the point of view that children falling at the very top of the curve of distribution are likely, at least during their early years, to be socially maladjusted. Hollingworth says:[1]

> When the intelligence quotient is extremely high, falling into the highest one hundredth of one per cent, the discrepancy between physical size and intelligence becomes so great as to render a satisfactory choice of playmates difficult. In these cases the child often falls back upon some form of solitary, intellectual play, such as intricate puzzles, mathematical calculations, reading, designing, chemical experimentation, radio, and the like. Attempts to interest extremely intelligent young children in the forms of play ordinarily enjoyed during early childhood are futile.

The child with an I.Q. of 170 or above is confronted with problems of social adjustment of the greatest complexity. He needs all the sympathetic understanding that is possible for those about him to give. In future years he is likely to repay to society a thousandfold all that is done for him.

Leadership

There are a number of factors involved in the attainment of leadership or eminence. The more important of these, as they pertain to success in adult life, will be considered in a later chapter. Brief comment, however, is appropriate in the present discussion of the social characteristics of gifted children, for to be rewarded by being made a leader is the best evidence that a child possesses positive social traits.

Intellectually gifted children are somewhat more likely than average children to become leaders. This is, of course, not solely the result of their superior intelligence,

[1] Hollingworth, L. S., "Gifted Children," p. 147, The Macmillan Company, New York, 1926.

but of their superior size, bearing, social sense, initiative, and social status as well. Terman found that, when his California group of gifted children was compared with a control group, 67 per cent of the gifted boys and 73 per cent of the gifted girls were rated above the control mean for leadership. Yates, in a study of gifted high school seniors, found that 28 per cent showed genuine ability as leaders as against 12 per cent for average children. Brown followed the careers of 259 high school leaders over a period of 2½ years. He found these leaders to be above the average in intelligence and scholarship.

Finch and Carroll[1] made a study of leadership among pupils in the University High School at the University of Minnesota. They examined the records of three groups of students, each numbering sixty-six. The first group was made up of those who were of average intelligence for the University High School; the second, those who were below average; and the third, those who were above average. They found that over twice as many of the elective offices went to seniors in the superior group than to an equal number in the average group. Children in the below-average group were very much out of the running.

One reason why gifted children become school leaders is that they have more time for extracurricular activities. The writer was interested, when attending the graduation exercises of a New England academy, to hear the principal say in his talk that a certain boy who was graduating as salutatorian of his class, with an average for the four years well up in the nineties, was a member of nearly every club in the school and president of two of them. In addition to this, he had won his letter in baseball and was a member of the debating team. This

[1] FINCH, F. H., and H. A. CARROLL, Gifted Children as High School Leaders, *J. Genet. Psychol.*, Vol. 41, pp. 476–481, 1932.

boy further conformed to the typical picture of the gifted high school child by being two years younger than the average age of his classmates. The principal, with old-fashioned American philosophy, maintained that all these achievements had been possible through hard work and that any other boy in the school, by being equally persistent, could do as well. No reference was made to the factor of innate intelligence, yet a quick mind had made it possible for this boy to meet the school requirements with casual ease and so make available time for other activities.

Discrepancy in Intelligence between Leader and Followers

Leta Hollingworth has recently expressed the opinion that no group would tolerate a leader who completely outclassed them in intelligence; they prefer one who is superior to themselves but not too superior. She says,

> There is a direct ratio between the intelligence of leader and that of the led. To be a leader of his contemporaries a child must be more intelligent, but not too much more intelligent, than those who are to be led. There are rare exceptions to this principle, but, generally speaking, a leadership pattern will not form or will break up when a discrepancy of more than about 30 points of IQ comes to exist between the leader and the led.

This point of view appears to be a reasonable one. Children, like adults, tend to distrust the individual who uses words that they cannot understand, who thinks and talks about matters which are foreign to their interests. For example, there was the case of the boy with an I.Q. of 195 who was hooted down at an assembly of the upper

[1] HOLLINGWORTH, L. S., What We Know about the Early Selection and Training of Leaders, from a pamphlet "How Should a Democratic People Provide for the Selection and Training of Leaders in the Various Walks of Life?" pp. 16–17, Advanced School of Education, Teachers College, Columbia University, 1938.

grades when he attempted to present a program of action. The very sentence structure which he used antagonized the other children. A boy with a much lower intelligence then took the floor and successfully explained what was to be done.

Occasionally a child—even one with an I.Q. of 195—is able to adapt himself with humor and understanding to the limitations of average people. Such a one has the makings of the greatest of leaders. For example, Leta Hollingworth tells of an eleven-year-old boy with an I.Q. close to 180 who had decided to run for the office of class president in the senior high school in which he was a student. His classmates were approximately five years older than he. In a speech during the campaign, one of his rivals said tellingly, "Boys, we don't want a president in knee pants!" As soon as the applause had died away the eleven-year-old boy rose, and waving his hand casually in the direction of the full-length portrait of George Washington on the wall, said, "Fellows, kindly remember that when George got to be the father of our country, he was wearing knee pants." Hollingworth reports that the gifted boy was elected.

CHAPTER VI

MENTAL CHARACTERISTICS AND ACHIEVEMENTS

1. Are such traits as curiosity, alertness, and self-criticism characteristic of intellectually superior individuals?
2. Do the scholastic attainments of gifted children approximate their mental status?
3. Are gifted children retarded with respect to their grade placement?

Studies of the childhood of eminent men reveal that in the great majority of cases these individuals stood out against the background of average children. They were recognized as being different, as possessing abilities which by comparison seemed almost nonexistent in their playmates. They were already marked for greatness.

A visit to a school which has enrolled children of both high and low intelligence gives one a similar impression. To go from a room containing a group of ten-year-old morons to a room containing a group of ten-year-old gifted children is almost like journeying from one world to another. Even a visitor untrained in psychology or pedagogy could not help but realize that the gifted group was made of finer stuff. In fact this quick transit from a very dull group to a very bright group makes one doubt for a moment the psychological principle that individuals differ not in kind but in degree. However, the illusion of the difference in kind grows out of the contrast of the two extremes. The gifted group would not seem so different if they were being compared with superior children—those with I.Q.'s between 110

and 120 or 130. In the discussion, then, of the mental characteristics of intellectually gifted children it will be kept in mind that they possess characteristics which are common to all, but possess them to such an extreme degree that they frequently appear as being unique traits.

Mental Qualities

Gifted children as a group are characterized by the following mental qualities: power, broad attention span, alertness, keen observation, curiosity, self-criticism, a sense of relative values, initiative, insight into relationships.

Power

Thorndike lists level, range, area, and speed as the attributes of intelligence. Of these, level—the gradation of difficulty—is probably the most important. Gifted children excel in their ability to perform difficult mental tasks. It is not at all unusual for one of them to be reading history at the age of six or beginning to explore the mazes of calculus at twelve or thirteen. Although in certain individual cases, one may feel that the gifted mind is superficial, usually one is impressed by its tremendous energy. A bright child, possessing this vital mental energy—and most of them have it—approaches a problem with the same steady, assured attitude that an athlete, conscious of his strength, enters a sporting contest.

Attention Span

Gifted children possess a wider attention span than average or below-average children. They are able to concentrate on one activity for a long period without a

lagging of interest. This concentration is noticeable whether the bright child is building a house in his playroom, looking up material on the American Indian, or carrying on a discussion with his parents. For example, there was the gifted child of seven who was troubled by a statement in his history book to the effect that Christopher Columbus was the first to discover America. He thought the credit should have gone to the Vikings. This identification of his sympathies with the Vikings led him into extensive library research not only into the history of the Vikings but also into the early history of the Scandinavian countries. This interest and concentration continued for several months. At the end of that time the child was better informed in this field than most adults.

The attention span of the gifted child exists not only in the present but is likely to project itself into the past and future. Closely associated with the attention span is the time sense, which is usually present to a remarkable degree in gifted children. To the average child or adult, anything that happens before his lifetime is of little consequence. Prehistoric and early historic times are so completely beyond his comprehension that he is quite likely to laugh them off. He does not really believe that there were such eras anyhow. The gifted child, on the other hand, is usually vitally interested in the past. He is not nonplussed by the phrase "a thousand years" or even "a million years." He wants to know what has happened and he struggles to see what has happened in relationship to what is now happening—and to what will happen. His attention span is in direct contrast to those of the monkeys in Kipling's "Jungle Books." The following lines from that book might almost be a description of the inability to concentrate which is characteristic of children of ordinary intelligence:

Here we sit in a branchy row,
Thinking of beautiful things we know;
Dreaming of deeds that we mean to do,
All complete, in a minute or two—
Something noble and grand and good,
Won by merely wishing we could.
Now we're going to—never mind,
Brother, thy tail hangs down behind!

The bright child is interested in the future as well as in the past. Occasionally his concern with what has gone before and with what is coming later results in insufficient concentration on the present. This is one of the reasons why the gifted child—and adult—is sometimes thought of as being absent-minded. He feels that there are more important matters requiring his attention than the chatter of his playmates or his teacher's oversimplified explanations of already familiar material. The bright child, interested in a wide sweep of events and in trying to weave them together into a meaningful pattern, has a number of delicate adjustments to make with respect to his behavior in an immediate situation. Most bright children make these adjustments extremely well.

The intellectually gifted child, interested in the future, is concerned about such matters as death at a much earlier age than average children. Parents must use care in their explanations when this problem arises, for it is likely that their child's intellectual development is far ahead of his emotional development and he may become upset in his attempt to understand that all life ends inexorably in dissolution. The bright child looks forward at an earlier age than average children to his own personal future. He is likely to decide upon his vocation and to plan his preparation for it with great care. With his knowledge of the past and of the present and with

his interest in the future, he is likely to possess a relatively clear vision not only of what is the best program of action for himself, but also of what is best for society. Frequently he is wrong, for even the most brilliant intellects seem insufficient to organize and run a well-ordered world.

Quickness

Intellectually gifted children possess not only greater power than average or below-average children but also more alertness or quickness. The relationship between power and speed is high. A gifted child understands directions with comparatively little difficulty; the average child usually has to be told several times before he sees what it is that he is expected to do. Some high school teachers make it a practice to explain an assignment to a class from three to five times in order to be sure that it will be understood. Even then there is an excellent chance that some of the dull children will not know what she means. The brightest in the class is likely to understand it the first time. For example, there is the case of the bright girl of ten who was standing outside a door waiting for a friend to complete her music lesson. While she stood there she overheard the explanations of the teacher concerning the reading of notes. When the child came in for her own lesson and the teacher began a repetition of the explanation, the girl told her politely but firmly that it was not necessary for her to spend any time on that. She had heard them once. A little questioning proved that once was enough.

Observing

Closely related to alertness is the ability to observe and to remember details. The bright child, though he may occasionally appear to be absent-minded, actually

sees and hears a great deal more than the average child. What the neurological arrangement is that makes this possible is not known, but the fact remains. The bright child learns punctuation and spelling not so much from direct instruction as from indirect learning through reading. A dull child can go through the grades and through high school and, in spite of all the direct teaching and direct contact with books, still not know when to capitalize or how to spell a simple word.

A housekeeper of a little less than average intelligence who has spent forty years buying groceries, seeing them in stores and in her kitchen, spells coffee with one *f* and sugar with two *g's*. A seven-year-old gifted girl in the home, with only a short period of time for observation, can spell the name of every article in the kitchen perfectly. The difference between the woman and the girl lies in the difference which exists in their respective abilities to observe. Keen observation largely underlies the fact that approximately 50 per cent of intellectually gifted children learn to read before they attend school. The gifted child cannot easily be kept from seeing signboards, magazine advertisements, letters on cereal boxes, and so on. He asks a few questions, and he knows his letters; a few more questions, and he recognizes simple words; a few more questions, and he is reading, even though he may be only four years old.

Curiosity

The gifted child is nearly always characterized by an insatiable curiosity. He has a passion for knowing. If given an opportunity, he is likely to explore many subjects in the school curriculum merely for the satisfaction which he experiences in acquiring new facts. In these explorations he is somewhat more likely to select abstract subjects in preference to commercial

and manual-training work. Even though only a second- or third-grade child, he may find considerable delight in looking up material on grammar, or fractions, or natural history. This boundless curiosity should be encouraged even though the parent or teacher may find it very difficult to supply the inquiring mind with personal answers or with references to source material.

The writer—together with all others within earshot —was interested and amused to overhear a conversation between an obviously gifted boy of eight and his father, who were having lunch together in a public dining room. The boy was pushing a discussion of the French Revolution and the subsequent Napoleonic era to a point which was embarrassing for his father. It was clear that the child had no intention of being discourteous or of testing his father's information; he was eager only to check up on what he had read and to have it explained. The father was an intelligent man but knew far less than his son about the historic period being discussed. Several times his statements concerning dates and geographical locations were critically questioned by the child. In every instance the child was right. The situation was not an easy or a pleasant one for the father, yet he showed no sign of impatience, but seemed, rather, to be pleased with the vitality and range of his child's interests and information. He was willing to help in any way that he could and frequently referred the boy to books which would give him some of the specific information which he was seeking.

Terman made an objective study of the intellectual interests of his gifted California group and found, as would be expected, that they excelled average children by a wide margin. He says in a concluding statement:[1]

[1] TERMAN, L. M., "Genetic Studies of Genius," Vol. I, p. 482, 2d ed., Stanford University Press, Stanford University, Calif., 1926.

In intellectual interest the mean score of the gifted children at most ages exceeds the mean of unselected children of corresponding age by approximately 1.4 times the S.D. of the latter. This is approximately half as great a degree of superiority as obtains in the case of intelligence. Stated in another way, about 90 per cent of the gifted children equal or exceed the mean of unselected children in intellectual interest.

Self-criticism

The bright child with his wide range of information and his desire to know the facts is more likely than the average child to be critical of his own shortcomings. The possession of a high intellect makes it easier for him to know when he has made a mistake. For example, in giving the Stanford-Binet intelligence test to a dull child, it is easy to follow the formula of saying after each answer, whether it is right or wrong, "That's fine"; but in giving the test to a gifted child, it is neither easy nor wise, for usually he will know when he has not given the right answer and will lose his confidence in the examiner if praised for an erroneous solution.

This ability to criticize one's self is present in intellectually gifted children at a very early age. Ruth, who was six years old and in the first grade, had become very much interested in her art work. She possessed no special talent in this direction but her satisfaction in conceiving and painting pictures had excited in her the ambition to become a great artist. She often referred to her paintings as the famous pictures by Ruth White. One day her mother took her to an art museum. With the care which is characteristic of superior children, Ruth studied a half dozen or so great pictures for over an hour. At the end of that time she announced that she was ready to go home, saying that she did not wish to look at any of the others. On the return ride the child was silent for a long time, then turned to her mother

and said with finality, "Why did my teacher say my pictures were so good? They're not at all." Ruth had no more illusions about becoming a famous painter.

The gifted child not only properly evaluates his shortcomings, but also, to the occasional discomfort of some of his adult associates, properly evaluates his assets. There has been and is much talk concerning whether or not bright children should know their intellectual level. The answer is that they know it anyhow regardless of camouflage devices used by teachers. The writer recalls talking with such a child a short time ago and, in an attempt to suggest to him that there were other children in his school who could do as well as he, was met with the matter-of-fact statement, "I have been carefully watching all the other children for a long time and I know that there isn't one who can do nearly as well as I can." This statement was made without egotism. It was as objective an observation as if the child had said that he was the tallest member of his class or could run the fastest. It would seem that in the education of gifted children it would be best for the teacher to start with a frank understanding with her pupils that they were mentally superior. To proceed on that assumption, rather than to be constantly debating it or even trying actually to disprove the existing fact, would not only gain the confidence of the superior child but would also help him to avoid the danger of thinking too much about his intellectual equipment. There is a vast difference in influence upon attitude between recognizing the fact of possession of superior intellectual ability—and then forgetting about it—and being constantly compared either favorably or unfavorably to other children.

Seeing Relative Values

Highly intelligent individuals are likely to see and understand the gradations in moral and social values.

Nothing to them is ever wholly white or wholly black, wholly right or wholly wrong. Possessing this ability, they are usually more generous and sympathetic toward the faults of others. They realize that any specific act is an inevitable outgrowth of a set of complex causes. The really great humanists are not found among bigots of limited intelligence but among those who have sufficient intellectual capacity to realize that all values are relative.

Initiative

Initiative or independence in thinking is characteristic of the minds of intellectually gifted children. That this is a desirable trait goes without saying. In school it manifests itself through a facility in working out highly individualistic approaches to problems in subject matter. Such creative approaches should be encouraged, but, if the teacher knows of a better method, then she should explain it to the gifted child and recommend that he substitute it for his own. If he can see that it is really a better one, he will make the change.

For example, there was the gifted child in the second grade who had worked out devices which would increase his speed in addition. When he was asked to add 18 and 8 he would, instead, add 18 and 10 and then subtract 2, for he had found that he could do this more quickly. He had found, also, that he could add a long column of figures more rapidly if he skipped about in the column adding the larger numbers first. His teacher, upon discovering this, instead of flatly ordering him to add his figures from the bottom up—the procedure which she required of her class—took pains to explain to this child that, although his method was a good one, there were two excellent reasons for accepting the one which she recommended: first, that by following a more ordered procedure he was less likely to make mistakes; second, that it would

give him needed practice in handling difficult combinations of numbers.

Because of his ability to learn quickly and to create relatively satisfactory methods for study, the gifted child often shows an impatience with drill; yet drill is needed even for brilliant minds. In the teaching of gifted children the amount of drill can be reduced, but there is danger in too much reduction. A little mental discipline will do a great deal to steady the mental processes of the bright child.

Ability to Generalize

Perhaps the most important mental characteristic of the bright child is that of being able to see relationships, to make logical associations, to adapt abstract principles to concrete situations, to make mental transfers between situations with identical elements, to generalize. Actually all these statements mean very much the same thing. Any one of them might constitute a working definition of intelligence. Thorndike and Gates[1] have stated the relationship between native ability and the ability to generalize as follows:

> The native ability of a pupil has a pronounced effect upon the degree of transfer. In most subjects, the brighter pupils, other things being equal, can make wider use of their acquisition than duller pupils. Brightness, indeed, means in a considerable measure sensitivity to the factors or principles which are common to many situations. Not only do the bright pupils isolate the essential elements in a learning situation more quickly, but they also perceive more acutely the same elements in new settings. Transfer of experience therefore occurs more fully among bright than among dull individuals; it is in considerable degree determined by intelligence.

The marked ability of the bright child to generalize obviously has a great many implications for his education.

[1] THORNDIKE, E. L., and A. I. Gates, "Elementary Principles in Education," p. 104, The Macmillan Company, New York, 1929.

TABLE XVI.—A COMPARATIVE PHONETIC ANALYSIS*

Subjects	Number of subjects	Mean I.Q.	σ	Total words spelled incorrectly		
				Number	Per cent phonetic	Per cent non-phonetic
IV*A*:						
Bright.....	36	126.4	8.8	2,473	68.9	31.1
Dull.....	36	88.5	9.8	7,724	37.8	62.2
Difference.....		−37.9		+ 5,251	−31.1	+31.1
IV*B*:						
Bright.....	35	110.5	11.3	2,031	65.5	34.5
Dull.....	25	89.5	13.7	4,415	46.0	54.0
Difference.....		−21.0		+ 2,384	−19.5	+19.5
V*B*:						
Bright.....	29	140.6	12.3	1,498	74.7	25.2
Dull.....	39	96.8	11.2	6,262	46.1	53.9
Difference.....		−43.8		+ 4,764	−28.6	+28.7
Total:						
Bright.....	100	124.9 ± 1.09	16.3	6,002	69.2 ± .401	30.8 ± .401
Dull.....	100	92.0 ± .87	12.9	18,401	42.6 ± .245	57.4 ± .245
Difference.....	...	−32.9 ± 1.40		+12,399	−26.6 ± .470	+26.6 ± .470

* CARROLL, H. A.: "Generalization of Bright and Dull Children," p. 44, *Teachers College, Contributions to Education*, No. 439, Columbia University, New York, 1930.

Because of this ability he is able to apply rules or to make rules of his own through observations of a body of facts. He is able to apply what he knows. Occasionally this ability gets him into trouble, for transfer may be negative as well as positive. The bright child frequently makes negative generalizations in reading, pronouncing words as it seems to him from their spelling they ought to be pronounced, or in spelling, through spelling words as they sound. Concerning the second example, Carroll[1]

[1] CARROLL, H. A., "Generalization of Bright and Dull Children," p. 44, *Teachers College Contributions to Education*, No. 439, Columbia University, New York, 1930.

made a study of the comparative amounts of negative transfer made by a group of bright children and a group of dull children. He found, as would be expected, that bright children were much more likely than dull children to make phonetic misspellings, while, on the other hand, the misspellings of the dull child were much more likely than those of the bright to be wholly illogical (see Table XVI).

Scholastic Attainments

Variations among children are as great in achievement in school subjects as they are in intellectual capacity. Although the relationships between school achievement and intelligence is far from perfect, it is, nevertheless, sufficiently positive to make possible sound prophesies with respect to groups. Gifted children, by and large, will excel in all the school subjects. This statement, of course, is made in the light of the realization that there is overlapping—that some gifted children will do poor school work and some average children, by dint of much application and, occasionally, through the possession of a special gift, will do superior work.

The superiority in accomplishment of gifted children over average children is greater in the abstract subjects and less in the manual subjects. Terman, in his California study, asked teachers to rate the school work of over 500 intellectually gifted children and an equal number of control children. The ratings were made on the following 7-point scale.

1 = very superior to average child of the same grade
2 = superior to average child of the same grade
3 = high average
4 = average
5 = low average
6 = inferior to average child of the same grade
7 = very inferior to average child of the same grade

When rated on this scale the gifted and control children rank as follows:

TABLE XVII.—ORDER OF SCHOOL SUBJECTS WITH RESPECT TO DIFFERENCE IN QUALITY OF WORK OF GIFTED AND CONTROL GROUPS*

Subject	All gifted	All control	Difference
1. Debating or speaking	2.04	3.88	1.84
2. U. S. History	2.11	3.92	1.81
3. Composition	2.25	3.93	1.68
4. Literature	1.90	3.56	1.66
5. Ancient history	2.04	3.60	1.56
6. Grammar	2.25	3.76	1.51
7. General science	2.35	3.78	1.43
8. Geography	2.26	3.67	1.41
9. Civics or citizenship	2.12	3.49	1.37
10. Reading	1.92	3.26	1.34
11. Arithmetic	2.52	3.80	1.28
12. Spelling	2.13	3.39	1.26
13. Dramatics	2.40	3.64	1.24
14. Nature study	2.57	3.66	1.09
15. Agriculture	3.28	3.96	.69
16. Singing	3.24	3.89	.65
17. Folk dancing	2.86	3.45	.59
18. Cooking	3.06	3.63	.57
19. Physiology or hygiene	2.72	3.28	.56
20. Instrumental music	2.89	3.38	.49
21. Physical training	3.25	3.60	.35
22. Sewing	3.11	3.41	.30
23. Drawing	3.62	3.87	.25
24. Modeling	3.48	3.64	.16
25. Penmanship	3.79	3.92	.13
26. Games and sports	3.41	3.52	.11
27. Manual training	3.49	3.60	.11
28. Painting	3.71	3.80	.09
29. Shop work	3.57	3.50	— .07

* TERMAN, "Genetic Studies of Genius," Vol. I, p. 261.

When 565 of the California gifted children were given the Stanford achievement battery, they earned

scores considerably in excess of those earned by 1,800 unselected children who were tested in the derivation of the norms published for the battery (see Table XVIII).

TABLE XVIII.—MEAN SUBJECT QUOTIENTS FOR 565 GIFTED CHILDREN*

	Boys	Girls
I.Q.	151.6	151.6
Language	146.2	148.3
Reading	145.3	144.7
Arithmetic	138.5	135.7
Spelling	140.2	137.7

* TERMAN, "Genetic Studies of Genius," p. 291.

It is interesting to note that, although the gifted children are definitely superior to the control children in language, reading, arithmetic, and spelling, their superiority in these school subjects is not so marked as their superiority in intelligence. The principal reason for this discrepancy is presumably their lack of opportunity, since their average acceleration is only slightly more than one grade, for contact with the more difficult and advanced subject matter.

This same group of gifted children was given a general information test and earned scores which were comparable to their intelligence-test ratings. In fact, their superiority was so marked that all but two of the 291 gifted boys and five of the 242 gifted girls earned an information quotient above 120. Not a single gifted child fell as low as the average for the control group.

Stedman has reported on the school attainments of a group of sixteen gifted children who had been placed in an opportunity room and given special instruction over a period of five years. The educational quotients earned by these children exceed those earned by the Terman

group, presumably because needed adjustments in their school training had been made. It is significant, as Stedman points out, that her pupils, although spending relatively little time on routine subject matter, not only invariably excelled the highest available norms for each subject, but also very nearly equaled what their mental ages would lead one to expect (see Table XIX).

TABLE XIX.—SCHOOL ATTAINMENT OF 16 GIFTED CHILDREN IN AN OPPORTUNITY CLASS*

Pupil	I.Q.	Reading quotient	Arithmetic quotient	Science quotient	History and literature quotient	Language quotient	Spelling quotient	Education quotient
1	140	136	107	133	139	133	120	125
2	155	142	156	147	142	142	143	148
3	155	154	167	160	154	138	144	154
4	140	142	130	154	150	143	128	138
5	214	199	206	206	198	174	207	200
6	141	141	124	145	142	128	112	131
7	120	130	108	137	143	116	100	119
8	110	122	111	125	126	109	114	117
9	140	146	148	161	158	142	132	146
10	140	139	136	138	136	140	134	137
11	138	143	145	150	146	134	140	143
12	168	163	171	178	165	154	160	165
13	129	114	100	135	140	122	97	110
14	142	138	153	160	161	140	128	144
15	146	166	140	158	168	130	135	150
16	140	138	115	152	146	127	130	131
Average	144	144	138	153	150	136	133	141

* Adapted from STEDMAN, L. M., "Education of Gifted Children," p. 107, World Book Company, Yonkers-on-Hudson, N. Y., 1924.

The reading quotients of gifted children in the lower grades are likely to be somewhat higher than other subject quotients. This results in part from the existence of greater opportunities to learn how to read as compared

with opportunities to become familiar with the content of such a subject as arithmetic. Occasionally the reading quotient of a gifted child exceeds his intelligence quotient. This is even more likely to occur if his interest in reading has been stimulated by his home associations.

For example, Eugene Smith, who had been reared in such a home and who had learned to read at the age of three, earned, at the age of 8 years 1 month, an eighth-grade rating on the Gates Silent Reading Tests. His reading ages on the four types were: Type *A*, 12 years 10 months; type *B*, 15 years 4 months; type *C*, 13 years 9 months; type *D*, 13 years 9 months. Averaging the four tests results in a reading age of 13 years 11 months as contrasted with a mental age of 13 years. This boy at the time the tests were given was in the third grade "studying" a third-grade reader and working hard at devising methods of killing time.

Witty[1] agrees that in the elementary school gifted children do their best work in reading and in language. He reports, however, that the 50 gifted children, whose school histories he has followed for a number of years,

> exceeded the norms for children of their ages in *all* subjects. . . . The sixth-grade group exceeded January averages for eighth-grade children in the composite results of the tests, and the composite score of the seventh-grade group exceeded ninth-grade standards. The children appear to have a knowledge of educational subject matter at least two years in excess of their grade placement.

Extremely Gifted Compared with Less Gifted

In the fall of 1938 the writer worked for some months with the group of intellectually gifted children at Speyer School in New York City. In the course of that work the American Council Cooperative General

[1] WITTY, P., "Thirty-ninth Yearbook of the National Society for the Study of Education," Part II, p. 405, 1940.

Achievement Tests were given to the six brightest children in the Speyer group, whose average I.Q. was 180.3, and to a less gifted group of six, matched for chronological age and sex, whose average I.Q. was 138.7. Data concerning these children, together with a record of the achievement-test scores which they earned, appear in Table XX.

TABLE XX.—COMPARISON OF SCORES MADE ON AMERICAN COUNCIL COOPERATIVE GENERAL ACHIEVEMENT TESTS BY TWO GROUPS OF GIFTED CHILDREN

Child	Sex	C.A.	M.A.	I.Q.	Social sciences		Natural sciences		Mathematics	
					Score	P.R.	Score	P.R.	Score	P.R.
Extremely gifted group (mean I.Q. 180)										
A	M	11-5	22-2	194	61	97.5	82	99	42	99
B	M	11-0	19-3	175	18	61	23	25.5	28	95
C	M	9-8	16-5	170	22	74	37	61	14	22
D	F	9-4	18-8	200	11	37	39	56	25	72.5
E	F	10-6	18-1	172	10	32	38	61	13	17
F	F	10-3	17-6	171	12	41.5	18	18	9	
Average		10-4	18-8	180.3	22.3	57.2	39.5	53.4	21.8	50.9
Less gifted group (mean I.Q. 139)										
A	M	11-8	16-3	139	33	90.5	47	76	17	34
B	M	11-2	15-8	140	13	46	40	66.5	9	
C	M	9-8	13-6	140	7	20	20	21	14	22
D	F	9-10	14-1	143	14	46	21	21	4	
E	F	10-9	14-2	132	9	27	21	21	7	
F	F	10-1	13-1	138	10	32	41	66.5	11	
Average		10-6	14-5	138.7	14.3	43.6	31.7	45.3	10.3	9.3

The average percentile rank, in terms of ninth-grade norms, for the two gifted groups on the three parts of the achievement battery is approximately 45. In other

words, these ten-year-old children did about as well as average ninth-grade children, who are approximately four years older. The less gifted group, with an average mental age of 14 years 5 months, earned a mean test score comparable to their intellectual rating. The extremely gifted group, however, although it consistently achieved higher average scores than the less gifted group, did not do so well as would be expected from its much higher average mental age.

Leta Hollingworth, in an earlier study, compared a group with an average I.Q. of 165 with a group with an average I.Q. of 145, and found that the former consistently excelled the latter in school achievement. The differences between the two groups in the present study, though not great, are pertinent. Remembering that each unusually gifted child was matched with a less gifted child for chronological age and sex, it will be interesting to note certain comparative performances. On the social-studies test child *D*, a girl, was the only member of the less gifted group who excelled her "twin" in the very gifted group. On the mathematics test, no child in the less gifted group excelled the one with whom he was matched in the very gifted group. The two *C*'s were tied. Child *A* of the very gifted group, a brilliant Jewish boy with an I.Q. of 194, consistently topped the series of scores. This is as it should be, since *A* had a mental age of 22 years 2 months, the highest among the twelve children.

Progress Quotients

Terman[1] mentions the fact that not a single child in his gifted group of 616 was retarded when retardation was defined as being in a grade lower than would be expected on the basis of his chronological age. As a

[1] Terman, *op. cit.*, p. 253.

matter of fact, on this basis four out of five gifted children are actually accelerated. However, when mental age is used as a criterion, the picture is entirely different. On this basis, all but six of Terman's group of 616 were retarded. He found the average amount of actual acceleration to be a little more than one year, or one grade, which placed them on an educational level far below their scholastic attainments.

Witty[1] found a similar situation existing among the gifted children whom he studied. He reports a mean progress quotient of 116 for this group as contrasted with a mean I.Q. of 153 and a mean I.Q. of 136.

This situation is a serious one and merits careful consideration. Should the gifted child be given full acceleration? Should he be placed with others of the same age, but have his school program enriched? Should he be segregated in an opportunity class where both acceleration and enrichment are possible? These questions are important ones and will be given attention in later chapters on educational adjustments.

[1] WITTY, *op. cit.*, pp. 405–406.

CHAPTER VII

CONSTANCY OF MENTAL DEVELOPMENT

1. Were eminent men and women mentally backward when they were children?
2. Do intellectually precocious children regress toward mediocrity as they grow into adulthood?
3. If constancy of development is an established principle, are there any exceptions?

Thinking concerning the important question of the constancy of mental development has been considerably prejudiced by the frequent recurrence of two contradictory assertions: first, that the I.Q. of an individual remains exactly the same throughout his life; second, that the I.Q. varies so markedly that it is possible for a child to be at one end of the distribution of intelligence at a certain age and at the other a few years later. No psychologist of standing would advocate either of these two extreme points of view, yet in many lay or student discussions one or the other is advanced as representing the thought of a group of scientists. Psychologists, rather, are concerned with the question of *how much* the I.Q. varies from year to year, fully realizing that it does change but fully realizing, also, that it changes within limits. The question of the extent of this change has a very important bearing upon any discussion of genius, for if it is great, then the whole program of the selection and education of intellectually gifted children for future leadership collapses, since this program rests on the assumption that those who are identified in their early years as being mentally superior will maintain their

relative position throughout life. In the following pages data that have been collected—largely during the last twenty years—will be examined to see if the conclusions of scientific investigations support the principle that mental growth proceeds at the rate at which it starts.

Nemzek[1] analyzed a number of studies dealing with the constancy of the I.Q. He considered not only investigations in which the Stanford Revision of the Binet-Simon Scale was used, but also those which reported results from the use of group tests. He summarizes his findings in the following concluding remarks and table:

The results from studies concerning the constancy of the IQ present a high degree of consistency. As one method of comparing the results of individual examination with those of group tests, the reliability coefficients found by correlating test and retest IQ's may be arranged into a frequency distribution.

TABLE XXI.—FREQUENCY DISTRIBUTION OF RELIABILITY COEFFICIENTS FOUND BY CORRELATING TEST AND RETEST I.Q.'s

r's	*f* (Stanford-Binet)	*f* (Group)
.95–.99	5	1
.90–.94	15	3
.85–.89	20	9
.80–.84	23	6
.75–.79	12	3
.70–.74	9	4
.65–.69	8	0
.60–.64	3	1
.55–.59	1	0
.50–.54	1	0
N	97	27
Median	.832	.846
Q^3	.889	.885
Q^1	.76	.779
Q	.0645	.053

[1] NEMZEK, C. M., The Constancy of the IQ, *Psychol. Bull.*, Vol. 30, p. 154, 1933.

The preceding table presents correlations; hence, gives no information concerning changes in individual I.Q.'s. Theoretically, a single I.Q. possesses a probable error of ± 5, which means that the chances are fifty-fifty that the obtained measure lies within five points of the true measure. This, however, allows opportunity for considerable variation; it is not at all uncommon to find that, on a retest, a child's I.Q. is ten or fifteen points higher or lower than the one first obtained. Miller[1], analyzing data gathered by Hirsch, who had reexamined annually for a period of six years a group of 343 elementary school children, found that 1736 of the 2400 obtained I.Q. differences were less than ten points. However, of the remaining 434 differences, 67 were twenty points or more.

From these figures two deductions can be drawn: first, that in the great majority of instances the I.Q. remained approximately constant; second, that in a few cases there was a considerable change. These figures are based on the test scores of elementary school children. As has been pointed out before, present-day intelligence tests are best adapted for use with this group.

R. L. Thorndike analyzed the Stanford-Binet retest records in the files of three well known New York private schools: Ethical Culture, Horace Mann, and Lincoln. Thorndike based his analysis upon those retests which had been given after intervals of at least two and one half years. No test record was used if the child was over fourteen years of age at the time of testing. In the case of a few of the records used the children were below five years of age at the time the initial test was given. This fact would tend to result in somewhat greater I.Q. changes than would occur if all the tests had been given at a somewhat later age. Thorndike points out that the

[1] MILLER, W. S.: Variation of I.Q.'s Obtained from Group Tests, *J. Educ. Psychol.*, Vol. 24, pp. 468–474, 1933.

mean I.Q. for each of the three schools is approximately 118.

The amount of change in I.Q. between test and retest for 1167 children in these three superior schools is summarized in Table XXII. In two of these schools the

TABLE XXII.—DISTRIBUTION OF DIFFERENCES BETWEEN INITIAL AND RETEST I.Q.*

Amount of change (difference)	School *A*	School *B*	School *C*	Total
48 to 52	..	2	..	2
43 to 47	..	2	1	3
38 to 42	2	4	1	7
33 to 37	1	9	1	11
28 to 32	3	7	5	15
23 to 27	3	22	20	45
18 to 22	14	31	15	60
13 to 17	26	46	33	105
8 to 12	42	56	56	154
3 to 7	48	62	69	179
−2 to 2	49	55	72	176
−7 to −3	47	48	71	166
−12 to −8	27	31	65	123
−17 to −13	20	18	42	80
−22 to −18	7	5	9	21
−27 to −23	3	2	3	8
−32 to −28	1	2	1	4
−37 to −33	1	2	3	6
−42 to −38	..	..	1	1
−47 to −43	..	..	1	1
Number	294	404	469	1,167
Mean difference	+1.40	+6.17	+0.65	+2.77
S.D.	11.65	13.75	12.36	12.89
S.D. of the mean	0.67	0.68	0.57	0.38

* THORNDIKE, R. L., "Thirty-ninth Yearbook of the National Society for the Study of Education," Part II, p. 355, 1940.

average gain is much too small to be considered significant. In the third however, there is a mean differ-

ence of 6.17 points. Thorndike confesses his inability to explain so considerable an increase.

As in the case of the Miller analysis the Thorndike data indicate that while, in general, the amount of change in I.Q. is small in a few instances it reaches considerable proportions.

Psychologists who have studied the development of preschool children present conflicting evidence concerning their mental development as measured by tests. A tendency for these young children to earn higher scores after a period of time in a stimulating environment is pointed out in the Iowa studies. Shirley reports in "The First Two Years" that she finds much uneveness in development during the first eighteen months, but that after this period the children whom she studied were likely to hold their respective places.

Gesell[1] after a ten year study of 30 children, many of whom were tested during the first year of life, feels justified in saying:

> In no instance did the course of growth prove whimsical or erratic. The behavior biographies give clear evidence of a high degree of latent predictability, even in infancy.

Gesell,[2] by way of illustration, gives the following brief description of the intellectual development of a gifted boy.

> Child O. P., at the age of three years was clinically adjudged to be distinctly superior because of the dynamic qualities of his performances, even though his initial intelligence score was not very extraordinary. On six annual examinations his drawing abilities proved equal to the average; his IQ's fluctuated widely: 115, 135, 140, 130, 165, 160. Our clinical estimates of his capacity, however, remained consistently favorable and did not undergo corresponding

[1] GESELL, A., "Thirty-ninth Yearbook of the National Society for the Study of Education," Part II, p. 149, 1940.

[2] *Ibid.* p. 152.

fluctuations. He passed his College Entrance Board examinations at age 16, after a superior record in preparatory school. He remains true to the superiority foreshadowed at age three.

Anderson,[1] on the other hand, points out that intelligence tests are much more satisfactory when used upon elementary school children. He says,

> Infant tests, as at present constituted, measure very little, if at all, the function that is called 'intelligence' at later ages. Preschool intelligence tests, while they are instruments of some value and usefulness, measure only a portion of that function. Whether it will be possible to develop tests at these levels that will measure more of the function remains to be seen.

Looking Backward

There are two ways of gathering facts on the problem as to whether or not genius maintains its relative place on the intellectual scale. The first is to look back into the early years of men and women of recognized eminence to see if they were mentally precocious children. The second is to follow the development of children who, at an early age, have been identified as being intellectually gifted to observe whether or not they grow into adult geniuses.

As was pointed out earlier, it is commonly believed that most great men not only come from humble social and economic beginnings but also as children were mentally dull. It seems more just to have it that way rather than to believe that they were bright and successful all their lives. This point of view is aided and abetted by the difficulty which is experienced in comparing a certain eminent man with the populace as a whole. For instance, President Harding has frequently been referred to as an average man because he did not equal many other American presidents and statesmen; but

[1] Anderson, J. E., "Thirty-ninth Yearbook of the National Society for the Study of Education," Part I, pp. 401–402, 1940.

when compared to the actual average man—such a one as would fit the Hollingworth description in the first chapter—Harding is obviously superior. The following letter, written by a young man of grade school education whose intelligence is known by test to be slightly above average, will serve as a reminder of what the intellectual behavior of an average adult is really like:

Dear John:
Jim and I have about finished work on your automobile.
Except a little more to be done on the fender.
An hour's work or so which we would of done this morning but it's raining hard.
And I have to go back to Stratton today.
Jim will finish that when it clears up.
And he'll send you his bill.
Yours truely,

Statements similar to those concerning Harding are commonly made of other eminent men of the present and of the past. For instance, it is frequently said that Grant, graduate at the middle of his class at West Point and a rather mediocre president, was a man of only average intelligence; yet to have been graduated from West Point at all required superior mentality. Hitler is commonly offered as a man of average intellect who has attained tremendous power. It is perhaps true that Hitler does not have so good a mind as some of his contemporaries, yet he is obviously far above average in this respect. Huey Long is a favorite example of a dullard who attained a high place, yet an examination of the intellectual behavior and school achievement of the boy Huey indicates an I.Q. of close to 200. There are, of course, wide differences in the intellectual capacities of men who have achieved eminence, but it is extremely unlikely that even one of them was below average, or even average, in intelligence as a child.

Helen Cohen[1] and Nancy Coryell have edited a volume containing reports on gifted high school children in the city of New York. Scattered through the book are comments on the school successes of certain outstanding graduates. Such instances do not constitute final proof of the constancy of achievement, but they are interesting examples of the "able man—bright child" principle. The following items are taken at random from the section on English studies:

Anna E. Bennet, who was graduated there in June 1931, wrote a number of remarkable poems for the school magazine and won the interschool poetry contest. She received a scholarship from Adelphi College where she is now a student. The poems she wrote have appeared in *Harper's Magazine*, *The Lantern*, *Poetry*, and *Voices*.

Esther Horowitz, who was editor-in-chief of the school magazine, has shown decided literary ability. Shortly after graduation she was engaged by the Mathilde Weil Literary Agency as critic of poetry. Contributions of hers have appeared in *The New Yorker*.

While Alice Glasgow was in Hunter College, two of her plays, *Orientale* and *Scherzo*, were produced and awarded prizes by the Century Theatre Club. After graduation, she was teacher-in-training in the Department of English in Washington Irving. Her first novel, *The Twisted Tendril*, a portrayal of the life of Guy Wilkes Booth, was published by Stokes in 1928.

Claudette Colbert, undoubtedly the most widely known graduate of Washington Irving on the stage or screen, discovered herself in the course of her training on the boards of the Washington Irving theatre. Because of excellent class work in English this student (then known as Claudette Chauchoin) was recommended for and took part in *Launcelot George*, a one-act play by a teacher of English in the school. Immediately following this, while still in the school, she appeared at the Provincetown Playhouse with Alice Rostetter in the latter's play *The Widow's Veil*. This was Claudette's first professional appearance. In the last term she won a book, the class prize in English. After graduation in 1920 and her stage success, Miss Colbert visited the school, by invitation, and talked to the

[1] COHEN, H. L., and N. G. CORYELL, "Educating Superior Students," pp. 75, 81, 82, 83, American Book Company, New York, 1935.

students in the auditorium. Her stage and screen successes are so numerous and so well known that it would be idle to list them.

The Cox Compilation of Biographical Data

The most complete body of information gathered on this question—the intellectual status in childhood of men who later attained eminence—is that of Catherine Morris Cox and her coworkers. Miss Cox made a careful and detailed study of all available biographical material on 301 of the most eminent men and women in the world during the period between 1450 and 1850. On the basis of her data, the early mental behavior of these eminent individuals was compared with the standards of behavior of present-day children as determined by scientifically constructed intelligence tests. From this comparison, described at length in "Genetic Studies of Genius," Vol. II, three experienced judges, Lewis M. Terman, Maude A. Merrill, and Catherine Cox, made two I.Q. estimates for each of the 301 subjects. The first of these was based upon the mental behavior of the individual up to age seventeen; the second from age seventeen to age twenty-six.

Miss Cox[1] presents three conclusions of considerable significance.

Youths who achieve eminence, have in general (*a*) a heredity above the average and (*b*) superior advantages in early environment.

Youths who achieve eminence are distinguished in childhood by behavior which indicates an unusually high IQ.

Youths who achieve eminence are characterized not only by high intellectual traits, but also by persistence of motive and effort, confidence in their abilities, and great strength or force of character.

Since the second of these conclusions bears directly upon the central problem of this chapter, Miss Cox's[2] elaboration of the bare statement is presented in full.

[1] Cox, C. M., "Genetic Studies of Genius," Vol II, pp. 215–218, Stanford University Press, Stanford University, Calif., 1926.

[2] *Ibid.*, pp. 217–218.

A corrected estimate indicates that the true mean IQ for the group is not below 155 and probably at least as high as 165. The average of the obtained IQ estimates for a small group of cases more adequately reported than the others is 176 for the first 17 years of life. The corrected estimate, indicating a nearer approximation to a true IQ, is for the same group 184. It is probable that a number of the cases included among the 301 actually ranked in intelligence not far below the composition scores of several of their number and of these, many are well above the 200 IQ mark. Arnauld, Comte, Goethe, Grotius, Laplace, Leopardi, Michelangelo, Newton, Pascal, the younger Pitt, Sarpi, Schelling, Voltaire, and Wolsey probably rated at 200 IQ or even higher. . . .

The significant conclusion in the present study is derived from the evidence it presents that the extraordinary genius who achieves the highest eminence is also the gifted individual whom intelligence tests may discover in childhood. The converse of this proposition is yet to be proved.

The biographical material summarized by Miss Cox constitutes a storehouse of factual material on the constancy of mental development and of achievement. From it—to take a very few items—it is learned that: Coleridge and Swift could read the Bible at the age of three, and von Humboldt could both read and write at the same age. Tasso was using words meaningfully when he was six months old and began the study of grammar at the age of three years. Victor Hugo had taught himself to read before he was six and learned writing and arithmetic almost as quickly. Longfellow was well into Latin grammar at the age of seven, and Scott had learned to read before he was four. At the age of eleven, Scott made the following translation from Latin:

> In awful ruins Aetna thunders nigh,
> And sends in pitchy whirlwinds to the sky
> Black clouds of smoke, which, still as they aspire,
> From their dark sides there bursts the glowing fire;
> At other times huge balls of fire are toss'd,
> That lick the stars, and in the smoke are lost:
> Sometimes the mount, with vast convulsions torn,

Emits huge rocks, which instantly are borne
With loud explosions to the starry skies,
The stones made liquid as the huge mass flies,
Then back again with greater weight recoils,
While Aetna thundering from the bottom boils.

George Sand had learned to write before she was five, but she never learned how to spell correctly. It was said of William Pitt that he grasped the meaning of a passage so readily that he never seemed to learn but only to recollect. Washington became a professional surveyor at fifteen, and had the responsible task of surveying the Fairfax estate when he was only sixteen. Newton was a silent, thoughtful boy who never played with other children, but devoted all his leisure time to making inventions. Charlotte Brontë and her sisters were authors while they were yet children. By the age of ten Charlotte was writing stories of 20,000 words. At the age of thirteen, she wrote this letter to a magazine editor:

Sir,—It is well known that the Genii have declared that unless they perform certain arduous duties every year, of a mysterious nature, all the worlds in the firmament will be burnt up, and gathered together in one mighty globe, which will roll in solitary grandeur through the vast wilderness of space, inhabited only by the four high princes of the Genii, till time shall be succeeded by Eternity; and the impudence of this is only to be paralleled by another of their assertions, namely, that by their magic might they can reduce the world to a desert, the purest waters to streams of livid poison, and the clearest lakes to stagnant waters, the pestilential vapours of which shall slay all living creatures, except the blood-thirsty beast of the forest, and the ravenous bird of the rock; but that in the midst of this desolation the palace of the Chief Genii shall rise sparkling in the wilderness, and the horrible howl of their warcry shall spread over the land at morning, at noontide and night; but that they shall have their annual feast over the bones of the dead, and shall yearly rejoice with the joy of victors. I think, sir, that the horrible wickedness of this needs no remark, and therefore I haste to subscribe myself, &c.

July 14, 1829.

The following description of the early behavior of Goethe indicates the kind of criteria upon which Miss Cox[1] and her cojudges based their estimates of the intellectual status of the eminent men whom they were studying. It serves the purpose, also, of bringing into bold relief the boyhood picture of the man of genius.

Development to age 17.

1. Interests. When Goethe was 4½ a puppet theatre, presented by his grandmother, stimulated his dramatic sense, and at 6½ he began to arrange and conduct plays on this miniature stage. Before he was 8 he and some of his companions developed a passion for writing poetry. Young Goethe thought his works superior to the others; but when he found that his fellow "authors" had the same impression of their verses, he became discouraged and gave up writing for a time, only, however, to resume activity later, after praise had heartened him to try again. Intellectual or political discussions quickened the lad's thought, and the tales of his father's travels aroused in him the desire for wider horizons. In this stimulating intellectual atmosphere he enjoyed the balancing advantage of a first hand knowledge of the arts and crafts as practiced by his townsmen. At local fairs young Goethe was thrilled by the view of strange wares from many a far country; on his explorations of the city, history became a living tale. At the age of 9 he built an altar and developed a mystical religion of his own in the hope of approaching God directly and thus worshiping him without priestly intervention. Between 9½ and 12, he became deeply interested in French. He studied the language with the French commandant, quartered in his father's house; he read dramatic theory and criticism; and he visited the French theatre regularly on a pass presented by his grandfather, the mayor. In connection with his attendance at the play he learned, by visits behind the scenes, something of the contrast between the actors' lives and their professional attitudes.

Dispatched to the university, Goethe (at 16) was, as always, full of literary and social interests. He read widely, attended the theatre, and discoursed with his friends. He also devoted considerable time to the writing of verses in German, French, English, and Italian, attempting in his productions something more than the pseudo-poetry of the day.

[1] *Ibid.*, pp. 694–698.

2. Education. From the age of 3 until he was 6, Goethe attended a day nursery or kindergarten, and here, according to tradition, he learned to read. His father had already begun to tell the little lad and his sister the history of the town. An ABC book was purchased for young Goethe (aged 4½) and a year later a catechism with Biblical quotations was presented to him. At this latter age, he attended a public school with his sister for several months. . . . Goethe's training in Latin began when he was 7 and within a few months he was writing free Latin compositions and learning military and legal phrases in the language. The corrections in his exercise books concern errors in orthography and the like rather than errors in language usage. One of his tutors, who was also a public school teacher, arranged prize literary competitions in which Goethe competed successfully with boys in the regular school. A legal friend instructed the boy in international law, while other associates of his father and grandfather took an interest in his education along the lines in which they had specialized. When Goethe was 9½, the French were quartered in Frankfort. The French commandant of the city was quartered in the Goethe house where he attracted an interesting group of people, especially artists, from whom Goethe learned something of their art. The prescribed preconfirmation instruction, which followed in regular course, was thoroughly distasteful to the 12-year-old boy. More satisfying to him were a variety of studies carried on at this time including mathematics. English, drawing, piano playing and at length after much importunity, Hebrew also. At 14 his reading included law and Latin. From 14 to 17 his scientific and pre-legal education progressed; Latin had by this time been thoroughly mastered.

At 17 Goethe had completed a broad and liberal course of training: he was familiar with the poetry of the leading nations; his reading of German, French, Latin, and Hebrew literature had been extensive; he was conversant with the language and history of the principal countries of Europe and he knew the political and legal history of Germany in minute detail; he had made progress in the study of theology and jurisprudence and the natural sciences; he knew something of drawing and music; he played the piano and the flute; and the artist Seekatz considered him a promising art student. At 16 he entered the University of Leipzig as a student of law and literature, for the elder Goethe intended that the brilliant career as a jurist which he had failed to achieve for himself should be realized by his son; but young Goethe wished to be a poet.

3. School standing and progress. "By means of a ready apprehension, practice, and a good memory" Goethe soon outgrew the instructions his father and his other teachers were able to give without ever requiring or receiving elementary drill in anything. Grammar which seemed to him a matter of arbitrary rules and exceptions, he despised, and he learned it only with some difficulty; Latin and geography, which he learned in verse, he thoroughly enjoyed and hence acquired readily enough. In rhetoric, composition, and the like he always excelled. Grammatical exercises, written when little Goethe was 7½ and 8 show thorough and painstaking study and the ability to express the experiences and impressions of every-day life in natural and facile Latin form. When his penmanship was rated with that of other children in the town it stood, on an average, 9th in a group of 30. At 8½, Goethe began to translate exercises into Latin in imitation of the historian Justinian similar to those designed by his tutor, who was also assistant school rector, for the senior class in the Gymnasium. Thus in his 9th year the lad was competing with boys of 16 to 22 years. At 8 Goethe learned so readily that he was able to pick up Italian from overhearing his sister and her tutor, while he himself was studying his Latin lesson. His rapid progress in French reconciled his protesting father to his attendance at the theatre when the French classics were presented. A serious boy, and even at the age of 10 always the most industrious of them all, he was annoyed by the trifling of his playmates.

4. Friends and associates. In consequence of being made much of by his father's friends, Goethe became self-conscious and somewhat vain; but even his playmates admitted his actual superiority: "We were all his lackeys," later wrote one boy two years his senior. Goethe's intellectual endowment, his skill in narrating thrilling tales, the distinction of his bearing and manner made him a leader among his fellows. At the university, many of Goethe's associates were men of established reputation and ability, ten or more years his senior. Two girls had in turn won Goethe's passionate devotion before he was 17; the first when he was 14, the second when he was 16.

5. Reading. When barely 6 years old Goethe began to examine and read the illustrated *Orbis pictus*, Merian's illustrated Bible (then and later a favorite), Gottfried's illustrated chronicles of universal history and Heidegger's *Acerra philologica*. A little later he was reading *Robinson Crusoe*, *Rie Insel Felsenburg*, and similar tales. At 8, he was already somewhat acquainted in his father's library with the older German poets of the 18th century, the best Latin and Italian

poets, Roman antiquities, classic works on jurisprudence, books of travel, historical and philosophical treatises, and encyclopaedias of all kinds. A little later modern works, forbidden by his father, were secretly obtained and devoured. Evenings at home were spent in reading aloud in various edifying works. Bower's *History of the Popes* was one book so read and reread in its heavy entirety, for according to the elder Goethe's plan a work once begun had always to be finished. In his uncle's library the lad found a delightful translation of Homer with copperplate illustrations. Virgil came to hand a little later. While the French were in Frankfort, Goethe (between 9 and 12) read the works of the principal French dramatists: all of Racine and Molière, and most of Corneille. In his 13th year he studied Hebrew and read much and long in the Bible; at 14 he read chiefly legal and philosophical books. But he was best satisfied by works in which poetry, religion, and philosophy were united. At 15 he read among other things the works of Wieland, French plays, and the dramas of Lessing. At 16 he was especially impressed by Lessing's *Laokoön* and Dodd's *Beauties of Shakespeare*. To supply the shortcomings in his prescribed training he had recourse to such encyclopaedic works as those of Bayle and Gessner.

6. Production and achievement. The free compositions which Goethe wrote at 7½ and 8 include three conversations that possess genuine creative quality and exhibit a remarkable ability in characterization. The "morning salutations" in German, Latin, and Greek, written before he was 9, express charming sentiments in artistic form; but Greek exercises of this period exhibit the faults of a beginner. At 9½ Goethe had amassed a considerable collection of lessons and stories. At 10 he wrote a little play, hoping it might be staged; at 12 he composed a story in the form of letters written in Latin, with a sprinkling of Greek, English, French, Italian, Yiddish, and German. In this year a series of controversial sermons so aroused his interest that he undertook to preserve them by dictation to his father's secretary, and with the help of a few notes he succeeded for several weeks in reconstructing what he had heard for the edification of his father. Gradually, however, interest in this undertaking waned and the report dwindled into a mere outline.

7. Evidences of precocity. When the Christian world was staggered by the Lisbon earthquake, Goethe, aged 6, heard more than one sermon devoted to an explanation of this apparent contradiction of Providence. His comment was as follows: "After all, it is probably much simpler than they suppose. God knows that the immortal

soul can suffer no harm through such a fate." Goethe's father early recognized his son's unusual ability, and friends of the family enthusiastically mapped out careers suited to such rare talents. One wished to make him a courtier, another a diplomat, a third a jurist. Goethe's mother, when her son was 9, noting that he was distinguished from the other boys by his erect carriage, mentioned the fact to him in praise. He replied that he would later be distinguished from them in other ways. On another occasion he stated that he would never be satisfied with that which satisfied others. His more than common rapidity of development admitted him to confirmation at an unusually early age (12). Intellectual forwardness appeared in many serious discussions with his tutor. For example the 14-year-old was interested to argue at length that there was no need for a separate study of philosophy, as religion and poetry covered the field. At 16, Goethe was familiar with the culture of Europe and his interests and tastes were those of a scholar and man of the world.

Looking Forward

The typical intellectually gifted child, possessing at birth a much greater mental capacity and a slightly superior physical equipment than the child of average intelligence, progresses through early infancy at a relatively rapid pace. The rate of development varies, of course, with his various abilities. While it is very rapid for intellect, it may be only slightly above average for physique or social sense. The median for a group of gifted children, however, will nearly always exceed the median for a group of unselected children for any ability.

There is an old New England saying, "Talk before you go, born to sorrow and woe." Mentally superior children —born to the sorrow and woe of carrying the major part of the burdens of civilization—are likely to be able to use several words meaningfully before they can walk. The age at which the normal child learns to walk is, on the average, fourteen months, and the age at which he learns to talk—that is, to use one or more words with meaning—is approximately fifteen months. The feeble-minded

child is approximately two years old before he learns to walk and over three before he learns to talk. The typical gifted child uses three words with understanding at the age of eleven months, and walks at thirteen months. In both walking and talking, bright children are superior, but their acceleration is relatively much greater in language than in physical movement.

The extent to which gifted children maintain their mental status at or toward the top as they grow from infancy through childhood into maturity can be determined only by long-range studies. The two most satisfactory efforts in this direction are the Hollingworth Growth Study of a group of intellectually gifted children in New York and the Terman Growth Study of a much larger group of such children in California.

The Hollingworth Growth Study

In 1922–1923 Prof. Leta S. Hollingworth, of Teachers College, Columbia, assisted by a committee from Public School 165, Manhattan, and Teachers College, initiated a project of selecting and following the development of a group of intellectually gifted children. One hundred and forty-eight such children, identified as having an I.Q. of at least 133, were chosen. Of this group fifty-six were taken as a randon sample whose growth would be carefully and accurately followed for a period of ten years. Of these fifty-six only two were missing at the time the final test was given at the end of the decade.

The follow-up studies which Prof. Hollingworth and her collaborators made definitely proved that the intellectual development of this group of gifted children had been strikingly constant. One of the earlier reports appeared in a monograph by Edna Lamson.[1]

[1] LAMSON, E., "A Study of Young Gifted Children in Senior High School," p. 117, *Teachers College, Contributions to Education*, No. 424, *Columbia University*, 1930.

Miss Lamson, working with the aforementioned group of fifty-six, presents data which show a slight increase in the average I.Q. of the group during the first three years, when it was possible to test them with the Stanford Revision of the Binet-Simon Scale. The mean I.Q. of the group on the first test was 153 ± 1.7. One year later, the average I.Q. for the same group was 156 ± 1.1. One year after the second test was given, the average I.Q. was found to be 157 ± 1.2. The range also remained constant, no child, on any one of the three tests, falling below an I.Q. of 135. The first-year range was 135–190, the second-year range 135–188, the third-year range 137–188. Miss Lamson points out that the standard deviations for the three distributions were almost exactly the same. She also emphasizes the fact that all these children, who were in the top 1 per cent of the population at the beginning of the series of tests, were still in the top 1 per cent at the end of the series.

Miss Lamson, following the development of these children into and through high school—from which they were graduated at an average chronological age of sixteen—tested them with the Army Alpha examination in 1929, when the average chronological age of the group was fifteen. She found that they were in the top decile of the high school population when chronological age was held constant. Since high school students are a selected group, Lamson says that the scores which her group of gifted children earned on Army Alpha place them in the top 1 per cent for an unselected group. The median score earned by the gifted group on Army Alpha was fifteen points higher than the median obtained by a group of 252 graduate students at Columbia University.

Hollingworth and Kaunitz[1] report on the intellectual status of the Hollingworth group of gifted children

[1] HOLLINGWORTH, L. S., and R. M. KAUNITZ, "The Centile Status of

approximately ten years after their identification. These children, now at an average age of 18 years 6 months,

TABLE XXIII.—PRESENTING TOTAL DATA ON AGE, SEX, AND TEST SCORES OF EVERY FOURTH CHILD OF 116 INTELLECTUALLY GIFTED CHILDREN RETESTED AT OR NEAR MATURITY*

Subject	Sex	I.Q. (S-B)	Age		Army Alpha score	Form of Alpha	Age	
			Years	Months			Years	Months
4	M	178	7	7	188	5	15	10
8	F	173	7	1	181	5	16	1
12	F	170	8	1	180	8	19	0
16	F	167	9	0	197	8	19	1
20	M	162	8	8	192	8	19	3
24	M	160	5	6	188	8	15	7
28	M	157	7	2	189	5	15	9
32	F	157	9	5	189	8	19	1
36	M	156	9	9	200	8	20	0
40	M	154	8	6	153	8	18	11
44	M	153	10	2	177	7	18	6
48	M	152	11	4	197	7	18	10
52	M	151+	11	4	184	7	18	11
56	F	150	9	0	191	8	19	0
60	F	147	10	6	150	7	17	4
64	F	146	7	5	153	7	16	6
68	F	145	9	4	159	8	19	7
72	F	145	8	11	192	8	19	3
76	F	144	8	10	171	8	19	4
80	M	141	8	3	160	8	17	9
84	M	141	9	8	182	8	19	11
88	M	140	8	7	189	7	18	1
92	M	139	9	0	183	8	19	2
96	M	138	8	3	171	7	17	3
100	M	138	8	6	167	8	18	8
104	M	136	8	4	164	7	17	4
108	M	135	6	8	163	5	15	9
112	F	133	8	1	156	7	17	3
116	M	133	9	3	151	8	18	8

* Adapted from HOLLINGWORTH, L. S., and R. M. KAUNITZ, The Centile Status of Gifted Children at Maturity, *J. Genet. Psychol.*, vol. 45, p. 109, September, 1934.

Gifted Children at Maturity," *J. Genet. Psychol.*, pp. 106–120, Vol. 45, September, 1934.

with no one less than 15, were too old to be given the Stanford-Binet test, so Hollingworth and Kaunitz chose Army Alpha even though, as the writers point out, the general-information section of this instrument is now at least partly obsolete and hence somewhat penalizes any group taking it at the present day. Data on each of the 116 intellectually gifted children are summarized in table form by the writers. Table XXIII includes the reports on every fourth child of the 116.

As Hollingworth and Kaunitz point out, an analysis of the scores earned by soldiers in the American army during the World War indicates an average of 62.9 points with the top centile earning 165 points or better. When Hollingworth and Kaunitz[1] compared the scores earned by their 116 gifted subjects with those earned by the large group of male adults who were examined with the Army Alpha in 1917–1918, they found that 95 of the 116 subjects, when tested as they approached maturity, reached the top centile. Nineteen fell at or about the ninety-seventh centile. Two, both girls, fell below the ninety-seventh centile. They point out that 82 per cent of the gifted group fell, at maturity, into the same centile of the white draft on Army Alpha which they occupied in childhood among school children on Stanford-Binet. The remaining 18 per cent very nearly reached this status. No individual regressed to average.

A later report on the Hollingworth group was made by Lorge and Hollingworth.[2] In this study the investigators were concerned with the problem of the extent to which status on the CAVD scale at maturity is predictable from status on the Stanford-Binet in childhood. Eighteen

[1] HOLLINGWORTH and KAUNITZ, *op. cit.*, p. 116.

[2] LORGE, I., and L. S. HOLLINGWORTH, Adult Status of Highly Intelligent Children, *Ped. Sem., and J. Genet. Psychol.*, Vol. 49, pp. 215–226, 1936.

children who had been identified as being intellectually gifted when they were at or near eight years of age and who, ten years later, had been found to rate well toward the top on Army Alpha were now, thirteen years after the original test, given the CAVD, levels *N* to *Q*. Lorge and Hollingworth conclude that children possessing I.Q.'s of 140 and above fall within the upper quartile of the college-graduate population of the United States when they are at or near maturity.

The data on the Hollingworth group, then, collected over a period of more than a decade, show definitely that these children, at least, have maintained their intellectual status through the years. There is little reason to believe that what has been found to be true of them is not typical of intellectually gifted children everywhere.

The Terman Growth Study

Terman's genetic study of a large group of intellectually gifted children in California is, as has been mentioned earlier, the most comprehensive so far conducted. Terman and his coworkers gathered extensive data on the 643 cases in what he called the "Main Experimental Group." They also studied, although not so completely, approximately 300 other bright children. These subjects were selected in 1921–1922, and a full report of their progress during the first six years—that is, up to 1927–1928—was made in "Genetic Studies of Genius," Vol. III. Included in this is a chapter[1] which presents data on the intellectual status of these gifted children six years after their selection.

The average age of the regular group of 643 cases, at time of selection, was 9 years 11 months, with only 68 cases under seven years of age. For this reason, a

[1] TERMAN, L. M., "Genetic Studies of Genius," Vol. III, Chap. III, Stanford University Press, Stanford University, Calif., 1930.

serious difficulty arose in 1927–1928 concerning the selection of adequate tests for reexamination purposes. The Stanford Revision of the Binet-Simon Scale could be used with the younger children only, because it is not difficult enough to test the mental capacity of superior adolescents. Terman and his assistants finally decided to use the Stanford-Binet for those children who, at the time of retesting were less than thirteen years of age, the Terman Group Test for those who were between thirteen and twenty, unless above college freshman standing, and the Thorndike College Entrance Examination for the small group of older children and those who were above the freshman year in college.

TABLE XXIV.—COMPARISON OF STANFORD-BINET I.Q.'s, 1921–1922 AND 1927–1928*

	Boys			Girls			All		
	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.	N
Regulars, 1921–1922	147	8.4	27	150	11.8	27	148	10.4	54
Regulars, 1927–1927	144	14.5	27	133	14.0	27	139	15.1	54
Difference	3	− 6.1		17	− 2.2		9	− 4.7	
S.D. of difference (approximate)	2			2			2		
Regulars and outside Binets, 1921–1922	146	8.2	38	149	11.2	35	148	10.0	73
Regulars and outside Binets, 1927–1928	143	17.8†	38	136	15.4	35	140	17.0	73
Difference	3	− 9.6		13	− 4.2		8	− 7.0	
S.D. of difference (approximate)	2			2			1		

* Adapted from TERMAN, "Genetic Studies of Genius," Vol. III, p. 251.

† The excessively high standard deviation is here due to one case, a boy who scored 198 I.Q. We have reason to believe this boy had been coached before he took the retest.

Contrary to the Hollingworth findings, Terman discovered that there was a tendency for the I.Q.'s of those who were retested with the Stanford-Binet to decrease (see Table XXIV).

It is important to note here that while the decrease of the boys' I.Q.'s is very slight, that of the girls is considerable. This sex difference consistently appears in reports on the constancy of the intellectual status of gifted children.

As Terman points out, the distribution of changes in individual I.Q.'s is of greater significance than changes in means. He summarizes these in the following table:

TABLE XXV.—SUMMARY OF I.Q. CHANGES, 1921–1922 TO 1927–1928*

	I.Q.'s lower in 1927–1928		I.Q.'s higher in 1927–1928		All Stanford-Binet retests 1927–1928		
	Mean drop	*N*	Mean gain	*N*	Mean change	S.D.	*N*
Regular boys	13	15	12	10	12	8.3	27
Regular and outside Binet boys	14	24	16	12	13	11.1	38
Regular girls	16	25	1	1	16	9.3	26†
Regular and outside Binet girls	16	30	10	4	15	9.8	34†
Total, boys and girls	15	54	14	16	14	10.5	72†

* Adapted from TERMAN, "Genetic Studies of Genius," Vol. III, p. 26.

† One girl, whose original I.Q. was 192 and whose corrected 1928 I.Q. was 173, was not included in the tabulation, because she passed every test on the Stanford-Binet scale and hence was not adequately measured.

In further explanation of Table XXV, Terman[1] says:

Five of the twenty-seven regular boys and eight of the total thirty-eight boys lost as much as 15 points in IQ. Five of the regular boys and seven of the total thirty-eight boys gained as much as fifteen points each. None of the regular girls and only one of the entire thirty-four girls gained as much as fifteen each. There were several cases of extreme change, two regular boys and four regular girls each dropping 25 points or more.

[1] TERMAN, *op. cit.*, pp. 26–27.

A much larger number of gifted children, 399 to be exact, were examined with the Terman Group Test. This instrument is by no means wholly adequate for measuring the mental capacity of highly intelligent individuals. As Terman points out, a child capable of earning a score of 180 or better is under a handicap. An examination of the following table shows that a great majority of the scores earned by the 399 gifted children fall about 180.

TABLE XXVI.—DISTRIBUTION OF TERMAN GROUP TEST SCORES, 1928, REGULAR GROUP*

Point scores	Age 13		Age 14		Age 15		Age 16		Age 17		Age 18		Age 19	
	B	G	B	G	B	G	B	G	B	G	B	G	B	G
216–220	..	..	..	..	1	..	..	..	..	..	1	1		
215	..	..	..	1	2	1	4	..	5	..	..	1	1	
210	..	..	..	..	6	..	5	..	7	5	6	3	2	
205	1	..	5	3	8	1	8	6	8	9	4	1	1	
200	3	..	5	5	7	5	9	6	8	4	2	4	..	1
195	5	2	4	5	10	8	10	3	5	5	3	2	..	1
190	1	..	5	5	5	6	9	7	5	2	..	2		
185	2	3	4	7	6	5	2	4	..	4	2			
180	2	4	3	3	5	3	3	3	2	..	..	1		
175	1	2	1	1	1	3	1	..	..	1	..	1		
170	1	..	1	2	..	1	1	..	1					
165	1	3	..	..	1	..	..	..	..	1				
160	1	1	1	1										
155	1	1	..	2	..	..	..	1						
150	1	..	..	1	1									
145	1	1	..	1	..	..	..	1						
140	1													
135														
130	..	1												
125														
120														
111–115	1													
Total.....	23	18	29	37	53	33	52	38	41	31	18	16	4	3

Grand total..... 399

* TERMAN, "Genetic Studies of Genius," Vol. III, p. 32.

Terman concludes from an analysis of the scores found by retesting gifted children with the Terman Group Test that the average is equivalent to an I.Q. of between 130 and 135. This figure, although showing that the children still remain well toward the top with respect to intelligence, indicates that there has been a slight decrease in the average I.Q. In connection with the Terman Group Test scores, it is interesting to note also that the boys once more excelled the girls. This fact is consistent with the observations of Lincoln, in the Harvard Growth Study, and of Hollingworth in her work with the New York group of gifted children.

Lincoln,[1] reporting on 109 children, 45 boys and 65 girls, with initial I.Q.'s ranging from 119 to 145, says that, when his cases were reexamined after intervals ranging from five to eight years, the girls were found to have lost more in I.Q. than the boys. Lincoln points out that during this period 46.7 per cent of the boys gained in I.Q., the median gain being 8.27, while only 32.8 per cent of the girls gained, the median gain being 5.36. On the other hand, 51.1 per cent of the boys lost, the median loss being 8.25, while 62.5 per cent of the girls lost, the median loss being 11.54. The girls showed about 14 per cent fewer gains and 11 per cent more losses than the boys.

In the Hollingworth-Kaunitz study referred to earlier in this chapter, the authors, in their summaries, mention the fact that the girls regressed somewhat more frequently than the boys. This regression was not fully accounted for by the known sex difference between medians on Army Alpha.

It would appear, then, although psychologists can offer no adequate explanation for it, that boys are more likely

[1] LINCOLN, E. A., A Study of Changes in the Intelligence Quotients of Superior Children, *J. Educ. Res.*, Vol. 29, pp. 272–275, 1935.

than girls to retain in later years a high I.Q. earlier evidenced.

The oldest of the Terman group of gifted children were tested with the Thorndike College Entrance Examination. The scores earned were then compared with those made by a group of students of typical college ability entering Stanford University in 1921–1922. This comparison shows that only about 11 per cent of the scores earned by typical Stanford men exceeded the average earned by the gifted boys, and only 16 per cent of the scores earned by Stanford women exceeded the mean earned by the gifted girls.

Witty, in his genetic study of 50 gifted children previously referred to, reports a marked constancy in intellectual status. At the time the study was begun in 1924–1925 the children ranged in I.Q. from 140 to 183 with a mean of 153. At the time of the third study, in 1935, the majority of the group were in college. Witty[1] says that analyses of the scores made on group intelligence tests at that time show that

> all the group would fall among the upper 5 per cent of college students. These results confirm the observation that those who will be highly gifted in college and in high school can be identified with considerable accuracy by intelligence tests administered when they are still children in the elementary school.

Summary

The conclusions of the above studies are in agreement that, in general, those individuals found to be intellectually gifted during the grade school period will be found in or near the top 1 per cent of the total population with respect to intelligence when they reach adolescence or adulthood; that there are some exceptions does not dis-

[1] Witty, P., "Thirty-ninth Yearbook of the National Society for the Study of Education," Part II, pp. 404–405, 1940.

prove the rule. These exceptions may be in part the result of certain flaws in the measuring instrument or, what is more likely, of the intrusion of such factors as lack of effort or emotional blockings at the time of taking the test. It is also possible, as Terman points out, that in a few persons there exists an inherent change-of-rate factor which causes intellectual growth to proceed spasmodically rather than constantly. That this happens in physical growth has long been known. However, it is important to keep in mind that such a condition is the exception, not the rule, and that gifted children, like normal children, tend to develop steadily, maintaining their relative position on the intellectual scale.

CHAPTER VIII

DETERMINERS OF EMINENCE

1. Is there any relationship between college grades and later business success?
2. What influence do such intrinsic factors as "drive" and "singleness of purpose" have when achieving eminence?
3. Are such extrinsic factors as "manner of death" and "period of activity" important in determining a man's place in posterity?

Intellect is by no means the sole determiner of success or eminence; it is but one of the foundation stones upon which achievement is built. So interdependent are the stones in this foundation that it is hazardous even to say that intellect is the most important; however, it is certain that without superior mental capacity, any considerable success is impossible.

Intellect Versus Achievement

It is important to keep in mind this difference between intellect and achievement; a person frequently has the first without the second, but rarely the second without the first in high degree. This point of view is not antithetical to the law of constancy discussed in the preceding chapter. If an individual known to be intellectually gifted in childhood becomes a complete failure in adult years, the cause cannot be found in an appreciably lowered intellectual level, but lies rather in the absence of other determiners of success. To point to a Sidas is not to prove that all precocious children come to nought but merely to indicate what every student of genius knows, that many intellectually gifted children never fulfill their promise. A man may have great material wealth and squander it.

Possession never guarantees wise usage. If he has no wealth, however, he has nothing either to squander or to use wisely. All that can be said of intellectually gifted children is that they have the wealth, the potentialities for great achievement. Only time and circumstance will show how their wealth will be used.

The disparity between intellectual capacity and actual achievement appears again and again from earliest infancy to adult years. For instance, the very bright child of a year and a half may, because of an intense interest in play or because of laziness, still have a vocabulary of only two or three words. Such a case would be most unusual but is possible and occasionally occurs. The fact that the child has such a small vocabulary is in itself not absolute proof that he is not gifted. On the other hand, if he does have a vocabulary far in excess of that of average children of the same age, then it is certain that he is gifted. A similar example can be taken from the field of reading. A child may be intellectually gifted and yet not have learned to read at the age of five or six. His inability to read is not in itself proof that he is incapable of doing so. On the other hand, if he reads fluently at the age of five, it is certain that he is mentally superior. A gifted adolescent may do poor work in high school, but this is not in itself sufficient proof that he is dull. His failure to achieve may be the result of a number of other causes.

A book could be filled with instances of very bright children who have at different times in their school careers done very poor work. In many cases these children achieved on a high level after leaving the educational world behind them. Then there are other instances where the bright child did extremely well in school but failed in later life. For example, there is the story of two high school boys, one of whom had an I.Q.

of 135 and the other an I.Q. of 160. In high school the boy with the lower I.Q. consistently excelled his brighter classmate. After being graduated from high school, they went on to college. The boy with the I.Q. of 135 was graduated at the head of his class, while the boy with the I.Q. of 160 barely passed his courses. The two then went into the same law school. Suddenly the brighter boy, though indolent by nature, realized that here was work in which he could be really interested; here was information that was going to be valuable to him in his profession. He settled down to work for the first time in his life, and was graduated from law school second in his class. The less intelligent boy, though working as hard as ever and continuing to capitalize on a magnificent personality, found that he could not keep pace with his old high school friend, once this friend had decided to make full use of his greater mental capacity. Today each is a successful lawyer.

Although there are many exceptions to the rule, then, there is in general a marked relationship between intelligence and school achievement. For elementary school children the coefficient of correlation is approximately .60; for high school children, .50; and for college students, .45. Any teacher knows that, by being familiar with the intellectual capacity of his pupils, he can prophesy with considerable accuracy where they will fall on their achievement tests. If he knows his students personally, his prophesies will be even more accurate, for he will have taken into consideration some of the factors other than intelligence which determine success in any field.

College Grades and Business Success

Although the layman is quite willing to admit that there is a relationship between abstract intelligence and school achievement, he finds it much more difficult to accept the equally well established fact that there is

a marked positive relationship between intelligence and later success, or between school achievement and later success. For instance, there is the case of the high school principal who was very proud of the fact that he had been graduated from college at a position well toward the bottom of his class. He maintained stoutly that to be number one or number two man in a graduating class was to court certain failure. It is interesting to note that this principal never went far in the educational system and is now in a small position in the hardware business, while the valedictorian of his college class became a well-known surgeon.

Some years ago Donald S. Bridgman[1] published a report on the relationship between college grades and success attained in the American Telephone and Telegraph Company by more than 4,000 college graduates who were employed by that company. Instead of working with the usual letter grades Bridgman classified his subjects according to whether or not they were in the first tenth of their classes, or the first third, or the middle third, or the lowest third. He found that of the 3,806 college graduates reported on in his studies, 14 per cent had come from the first tenth of their classes, 40 per cent from the first and middle thirds, and only about 20 per cent from the last third. Bridgman found a marked relationship to exist between scholarship position and salary earned from the Bell Telephone Company fifteen years later.

He says:

> Fifteen years after graduation the median of the first tenth men is 20 per cent above that for the whole group, 25 years after graduation it is 40 per cent and 30 years after graduation it is nearly 60 per cent. The median of the first third rises steadily but rather slowly

[1] BRIDGMAN, D. S., Success in College and Business, *The Personnel Journal*, Vol. 9, No. 1, June, 1930.

and only approaches 20 per cent above the entire group median at 25 years after graduation, and is only slightly above it at 30 years after. The median of the middle third is somewhat below the median of the whole group and that of the last third falls rather steadily until at 30 years after graduation it is only 80 per cent of that of the whole group.

Continuing his study, Bridgman took a single group for whom he had complete data concerning scholarship, extracurricular achievement, degree of college earnings, and so on. This group numbered 1,310, all of whom had been four or more years out of college. He then studied the interrelation of these several factors, finding, as would be expected, that they were positive. In other words factors such as high scholarship, campus leadership, and early graduation tended to go together. Of these 1,310 men, 185 were in the first tenth in scholarship. Of these, 53 per cent were found to be in the first third in salary and only 18 per cent in the last third in salary. Forty-five per cent of the men in the first third in scholarship were in the first third in salary and 27 per cent in the last third, while those who were in the last third in scholarship were found to be, in nearly 50 per cent of the cases, in the last third in salary. It is important to note, however, that 22 per cent of these low-ranking students were in the first-third salary group. As always, the fact of overlapping must be recognized.

In his concluding remarks, Bridgman says:

Good scholarship, campus achievement, early graduation, in that order are significant indices of success in the Bell system.... Not all the members of the groups which were highly selected by combinations of these several factors do succeed. It is very evident that other elements are highly important. What all of these elements are, we have no way of knowing. They certainly include a man's ability to adjust himself to the environment of his home and of his business as distinct from his ability to adjust himself to the environment of college.

Thus, as Bridgman points out, there are a number of factors other than college achievement which affect success, just as there are a number of factors other than intellectual capacity which determine eminence. These latter may be roughly classified into two main groups: intrinsic and extrinsic. This division should be considered in the light of the realization that the individual is being constantly affected by his environment and that the environment, in turn, is different for every individual.

Intrinsic Factors

The intrinsic factors are those which come primarily from within. Among the most important ones are:

1. Ambition
2. Drive
3. Health
4. Physical size and appearance
5. Race
6. Fluency in speaking or writing
7. Singleness of purpose
8. Ability to get along with people
9. Character

Ambition

The desire to excel is usually found in a man who attains eminence. Marat once wrote that from earliest childhood he had been "devoured by the love of glory." Saint-Simon developed very early in life an intense desire to distinguish himself. O'Connell, Irish patriot, from the age of seven, felt that he would be a great man and on one occasion was said to have remarked, "I'll make a stir in the world yet." Thomas Chatterton, even before he was five, insisted on preeminence, ruling his playmates autocratically.

The desire to excel can, of course, be carried to such an extreme that the individual having it becomes anathema

to his associates. However, when it is equaled or exceeded by intellectual power and is tempered by kindness and understanding, it becomes a tremendous driving force. Few individuals have greatness thrust upon them. In most cases it is attained only after great obstacles have been surmounted.

Drive

Second in importance only to intelligence among the factors which make for great success is what is commonly called drive. An individual with drive experiences a compelling force which actuates him to prodigious labors. It is in this respect that drive differs from ambition; for to be ambitious is to wish for or to desire without necessarily pushing on to accomplish that desire. Drive is so characteristic of genius that it has given rise to the popular belief that a man can reach any goal if he will work hard enough. Certainly high achievement rarely comes to one who has not toiled more than his fellows. To be sure, if his intellect does not match his energy then his labors may avail him nothing, but if he has been endowed with superior mentality and then makes that mentality work to the highest degree possible, success will almost certainly be his reward.

Frequently, very persistent individuals whose intelligence is not of the highest achieve more than those who excel them in mentality. Everyone knows of examples of two young men, seemingly equally equipped, starting out together in the same business or profession. After a few years one has achieved striking success while the other is still where he was at the beginning. It may be that the one who made progress was less brilliant than his friend, but through sheer endurance did what the other man, more dilatory, more complacent, failed to accomplish. To be specific, there is the instance of two

young university instructors, one brilliant but volatile, the other less gifted intellectually but willing to work fourteen or fifteen hours a day. The first of these two never progressed beyond the rank of instructor, while the second at the end of eight years was a full professor in a leading American university. The latter could not have achieved this by hard work alone; he had to have adequate mental equipment, but, almost as important, he had persistence as well.

Cox, in investigating the relative importance of drive, makes a number of interesting comparisons between certain subgroups of the geniuses whom she studied. In one instance she made the following four classifications: the ten most eminent geniuses, the ten least eminent geniuses, the five with the highest I.Q., and the six with the lowest I.Q.

TABLE XXVII.—FOUR TYPICAL GROUPS OF YOUTHFUL GENIUSES*

Last ten	First ten	Lowest I.Q.'s	Highest I.Q.'s
Coleridge	Napoleon	Hogarth	Goethe
Murat	Voltaire	Cromwell	Leibnitz
Mazzini	Bacon	Cobden	Pitt (the younger)
Chatterton	Goethe	Murillo	Schelling
Danton	Luther	Murat	Voltaire
Chalmers	Burke	Ney	
Haydn	Newton		
Bunsen	Milton		
Lamennais	Pitt		
Cobden	Washington		

* Adapted from Cox, C. M., "Genetic Studies of Genius," Vol. II, p. 181, Stanford University Press, Stanford University, Calif., 1926.

Concerning the comparative persistence of these four groups, Cox[1] says:

Whereas young geniuses who become eminent men are characterized by the possession to a very high degree of two general factors

[1] Cox, C. M., "Genetic Studies of Genius," pp. 186–187, Stanford University Press, Stanford University, Calif., 1926.

of personality, persistence of motive and general intelligence, the First Ten (the youths who become the most eminent of all) and the Highest IQ's (the youths who earliest gave indication of superior endowment) are, with respect to the possession of one of the general factors of personality, intelligence, significantly above the average of a group of typical geniuses. With respect to the other factor, persistence of motive, the Highest IQ's rate approximately at the same point as the Eminent Men while the First Ten rate significantly higher. It appears further that the Last Ten rate considerably lower than the First Ten in intellectual traits, but approximate the ratings of the latter in persistence traits; while the Lowest IQ's rate below the other subgroups on intellectual traits and also on persistence of motive. The Highest IQ's exceed the First Ten in desire to excel, but they are exceeded by them in perseverance in spite of obstacles and in tendency not to abandon tasks from mere changeability.

The appearance within the group of "most eminent" men of individuals who, according to the records, possessed in childhood, intelligence somewhat below the highest order, is explained by this conclusion: that high but not the highest intelligence, combined with the greatest degree of persistence, will achieve greater eminence than the highest degree of intelligence with somewhat less persistence.

The sources of drive are varied, differing not only among individuals but also within individuals. Drive may appear, as Witty[1] points out, as a product of intense energy, of a desire to achieve, or of psychic and somatic infirmities. The intense energy is inherited with the individual's physical mechanism. It may be a direct result of glandular action, or it may be, as Crile suggests, a result of so simple a physical fact as the possession of an oversized coeliac ganglion. Whatever the cause, it is certainly a known fact that many men are capable of an amazing amount of work. Edison at eighty-two was laboring sixteen hours a day. Theodore Roosevelt preached and practiced the doctrine of the strenuous life. Such dynamic force when combined with high intellect cannot fail "to make a stir."

[1] Witty, P. A., Exploitation of the Child of High Intelligence Quotient, *Educ. Method*, Vol. 15, pp. 298–304, March, 1936.

Impelling motivations to achievement frequently come from certain psychological deficiencies; personal frustrations may provide needed drive. A man may prefer hard work to leisure time in which to think about his unhappiness. The possible causes of such personal frustrations or unhappiness are of course multitudinous: the loss of one to whom he was devoted, a feeling of inferiority because of social position, need for money, an unhappy marriage, a desire to excel someone disliked, an inner conflict over some earlier failure, an urge to attain power to compensate for a feeling of inadequacy. In fact, a very good case could be made for the supposition that high achievement is dependent primarily upon psychic infirmities. The well-integrated person is complacent. Perhaps the world needs fewer well-integrated people and so less complacency. Certainly, as Witty points out in the previously mentioned article, there is considerable doubt as to the desirability of trying to make intellectually gifted children conform to the comfortable standards of their less brilliant fellows. It may well be that they should be encouraged in developing an extreme form of individualism.

Physical Defects and Health

Closely allied with the point of view expressed in the preceding paragraph is the theory that physical defects constitute an important source of drive. This is the fundamental philosophy of the psychoanalyst Adler. According to his reasoning, the Napoleonic era was a direct outgrowth of the diminutive stature of the great French general, and the Kaiser's urge to power, which resulted in the World War, was engendered by his withered arm. It might likewise be argued that Franklin Roosevelt owes his high place to the fact that he suffered from infantile paralysis early in his political career. How much does a Steinmetz owe to his broken back, or a Milton to his

blindness? Because of their dramatic quality, the importance of such physical irregularities as sources of drive is usually overemphasized. However, it should be remembered that an infirmity can be used as a stepping stone to success.

Physical defects and poor health, however, are handicaps which, in the great majority of cases, decrease rather than increase the chances for achieving eminence. It is obvious that an individual who possesses the physical energy which springs from good health has an advantage over his ailing contemporary. Other things being equal, the man of forty who has a heart which is functioning perfectly is much more likely to press on toward great successes than is the man who suffers from coronary thrombosis. Likewise, the man whose nervous system does not betray him in a crisis has an advantage over a rival whose nerves become so tense when difficulties arise that clear thinking is impossible. It is true that some men capitalize on deafness, but a great many more will find that it is a heavy weight to drag up the high road to success. A blind senator or a blind university professor is a dramatic figure worthy of the admiration which is accorded him; the same man, however, might have gone much farther if he had retained full use of his eyes. Surely no man would pray for poor health or for any other physical handicap in the belief that it was essential to success. For the most part men who have achieved eminence owe their achievements, in part, at least, to a magnificent physical equipment which made it possible for them to work long hours at top speed.

Physical Size and Appearance

The size of a person exerts considerable influence upon the opinions that others have of him and upon their attitude toward him. If he is extremely large, he excites

others to ridicule or occasionally to pity. If he is extremely small, he excites others to pity and occasionally ridicule, with a dash of condescension. If he is only slightly below average in height and general physical equipment, the three attitudes just mentioned are modified accordingly. The most desirable status with respect to physical size is to be somewhat superior to the average but not too superior. The situation here is similar to that presented in connection with intellect. Admiration is likely to go to the one who deviates in a positive direction so long as he does not deviate too far.

Physical size and appearance is of considerable importance in leadership. It is not by chance that the average height of the world's leaders is definitely greater than that for the average. It is without question a determinant of success. For instance, there is the case of the college board of trustees which was considering two candidates for the position of president. The trustees eventually selected the man whom they said "looked like a president" even though the one whom they turned down had a better standing in the world of education. In business, the man who is large and well built is likely to carry more weight with his associates than another of equal ability who is small and quick in his movements. In politics a Jim Farley holds a considerable advantage over an opponent who is physically insignificant. Since stature is a determiner of success, it is fortunate that there is a correlation between stature and intellect, for stature then can serve as an additional aid to those who have the mental ability to exercise intelligent leadership.

Race

Racial and national antagonisms, whether instinctive or learned, play an important part not only in international affairs but also in the affairs of individuals.

ıe inheritance of a black skin carries with it a social ndicap that only a most fortunate and unusual com- ıation of abilities and circumstances can surmount. ·en though a Negro possesses an intellect of a high ler, he finds nearly all of the avenues to eminence her wholly or partly closed to him.

Conditions are similar although somewhat less acute th such other groups as the Indian and the Jew. A ding psychologist, interested in gifted children, was ce heard to say that he never attempted to obtain ancial assistance for needy Jewish children, regardless the degree of their mental superiority, because such investment was not a good risk. This may appear to a cold-blooded statement, yet it conforms to the facts. any graduate schools refuse to permit the registration Jewish young people and many firms, both business d professional, close their doors against them. Preju- :e against Jews is especially unfortunate in view of :ir high level of intelligence. Perhaps their superior :ntality has been one of the predisposing causes of the nost universal hatred of their race which has existed · centuries.

However, this is not the place to discuss either the ıses or the possible eradication of racial prejudices. ıe fact to be faced is that such prejudices do exist, d that the color of a man's skin, the shape of his nose, d the texture of his hair profoundly influence his ssibilities for achievement. To say that intellect, or aracter, or drive, or even a combination of all three of ese will insure success is an oversimplification.

Fluency in Speaking or Writing

The ability to speak or to write well has an important aring on the attainment of eminence. The pages of :tory are filled with examples of men and women who

found it easier to attain greatness because they were effectively articulate. The pamphlets of Voltaire and the innumerable speeches of Hitler have played a considerable part not only in the careers of these men but also in the story of civilization. Unfortunately it is not only the most brilliant individual who is able to express himself fluently and well. Every teacher has had experience with the dull child who is a good talker: It happens less frequently that such a child can express himself with equal glibness in writing.

The two greatest American orators were Webster and Bryan. Webster possessed a mind which matched his oratorical ability, and he stands in history as one of the

TABLE XXVIII.—DISTRIBUTION OF 282 EMINENT MEN ACCORDING TO THE FIELD IN WHICH EMINENCE WAS (PRIMARILY) ACHIEVED*

Field	Eminent men	
	Frequency	Per cent
1. Writers (PND)†		
Poets, 31 / Novelists, Dramatists, 21	52	18.0
2. Statesmen and politicians	43	15.0
3. Writers (EHCS)‡		
Essayists, Critics, Scholars, 31 / Historians, 12	43	15.0
4. Scientists	39	14.0
5. Soldiers	27	10.0
6. Religious leaders	23	8.0
7. Philosophers	22	8.0
8. Artists	13	5.0
9. Musicians	11	4.0
10. Revolutionary statesmen	9	3.0
Total	282	100.0

* Cox, "Genetic Studies of Genius," Vol. II, p. 35.

† Writers (PND) include the authors whose fame rests chiefly on imaginative works, i.e., the poets, novelists, and dramatists.

‡ Writers (EHCS) include the essayists, historians, critics, and scholars.

world's great. Bryan's mental equipment was considerably inferior to his ability as an orator. Nevertheless, through the sheer beauty and effectiveness of his speaking, he attained considerable success.

The attainment of recognized eminence is partly dependent on the extent to which a man's contribution is available in written form. Of two equally able persons, he who publishes more will have the better chance of being remembered, for he has bequeathed to posterity concrete evidence of his ability. It is for this reason, that Cox found that writers constituted the largest single occupational group among the geniuses whom she studied (see Table XXVIII).

Likewise, the child who can write well has a distinct advantage over the one who cannot. This advantage is especially marked in schools where the essay form of examination is used. As a matter of fact, the importance of being articulate manifests itself from earliest infancy to old age. It is one of the most important determiners of success.

Singleness of Purpose

Occasionally an individual whose intelligence is not of the first order attains eminence because of his complete devotion to one idea or to a small group of closely related ideas. In fact, even a moron, if he applies all his mental energy toward the attainment of a single limited end, is able at times to perform astounding feats. Such a person is commonly called an idiot-savant. If a man with a superior mind applied himself with the same concentration to a specific piece of work, he would achieve miraculous results. For instance, there was the case of the medical student whose intelligence was less than that of his classmates, though considerably above average. This student, upon graduating, decided to become a bone

specialist; he limited his field with great care and devoted himself to it exclusively. As a result his name is now famous in the annals of medicine.

It is commonly believed that most geniuses possess this singleness of purpose or what is more commonly called a one-track mind. The possession of a one-track mind has been, in certain instances, one of the important determiners of success. It is not, however, a necessary or even a customary corollary of eminence. Geniuses are broad rather than narrow in their interests. Perhaps, in popular thought the one-track mind has been confused with a marked ability to concentrate, this last being nearly always a characteristic of eminent men. A Henry Ford manifests the same enthusiastic interest in the collection of antiques that he does in the production of automobiles or a Paderewski in the problems of government as in playing a piano. Nevertheless, in spite of the fact that those who attain high places in the world are usually well-rounded individuals, it is important to keep in mind that, in certain exceptional cases, singleness of purpose, concentration on one small area, has resulted in great achievement.

Social Intelligence

Social sense, or the ability to get along with people, is perhaps a greater asset to the less important leaders than it is to those who achieve eminence. However, even to the outstanding genius it is no handicap to be well liked. Among eminent men there have been notable instances, as in the case of both Theodore and Franklin Roosevelt, in which a pleasing personality proved to be a great asset. While the ability to get along with people is important in politics and in business, it plays a minor role in the achievements of a scientist. In fact, because of the popular picture of him as an unsocial, eccentric individual,

sociability actually might be a handicap, for people like their heroes to fit a preconceived picture. Although many geniuses have unquestionably been lacking in sound social sense, in terms of central tendency they are a congenial group.

Character

It is not by chance that geniuses are usually men of good character; a high moral outlook exerts an important influence on the achievement of eminence. Pasteur is an excellent example of a great man who combined intellect and character in high degree.

The character of Louis Pasteur and his philosophy of life all bear witness to the moral and social traits of a superior boy. Slowly they evolved in a pattern of life and work which clearly sets forth unusual devotion to an ideal—the service to humanity. The books that Pasteur read, the letters he wrote, and the friends he chose all bear witness to the effective moral traits of his youth. His love of home and parents, interest in the welfare of his sisters, the meticulous care in following the advice of his worthy father are indices to the tractableness of his intellect and bear out our theory of reasonable submission to authority, which is usually seen in the gifted child.

Pasteur, early in his life, habitually worshiped great men, and this reverence and devotion for the illustrious was a dominant element in his character. He believed that the spirit of jealousy and suspicion was alien to manhood at its best and should not be allowed to influence judgment on a man's work. He was devoted to his friends, just and generous to his rivals, and patient under trying contradictions and vexatious oppositions. Sir William Osler has said of him: "In his growth the man kept pace with the scientist. Heart and head held even sway in his life. This story will reveal the true side of a great person in whom filial piety, brotherly solicitude, generosity and self-sacrifice are combined with a rare devotion to country. His success was due to the untiring assiduity with which he worked, never sparing himself, never thinking of himself, but only of what might be accomplished to benefit humanity."[1]

[1] BENTLEY, J. E., "Superior Children," pp. 236–237, W. W. Norton & Company, Inc., New York, 1937.

Extrinsic Factors

There are a number of extrinsic factors—those outside the individual and largely beyond his control—which determine to a considerable extent the degree of fame he attains. Eminence, it should be remembered, is by no means an inevitable result of great mental ability or even of great mental ability plus such intrinsic factors as those previously discussed. Frequently environmental or chance conditions are the final determiners of whether a man shall be an outstanding success or remain unknown. The following list contains a few of the specific conditions which often play an important role:

1. Economic status of family
2. Size of home town
3. Marriage
4. Age and manner of death
5. Strength of competition
6. Nature of interests
7. Period of activity

Economic Status of Family

The socioeconomic status of the parents of a gifted boy frequently exercises considerable influence upon his achievement as an adult. If the parents are living in poverty, they will be unable to send their boy to college or, it may be, even to high school. A great many boys with potentialities for greatness have found their way blocked by lack of funds.

Examples without number could be given by way of illustration. For instance there was the case of a grade school child whose I.Q. was 165. She possessed not only a brilliant mind but also high social intelligence, being very popular among her classmates. Investigation of her home background revealed that her parents were living in poverty; they planned to take the girl out of school as

soon as the law would permit and put her to work in her father's little store. This was done before she finished high school. Later she married a young man far beneath her intellectually and is now living in a poverty as hopeless as that of her parents. Her opportunity to succeed was cut off by lack of money.

Then there is the story of the boy with an I.Q. well within the top 1 per cent who was a descendant of a family which possessed a marked strain of intelligence. His immediate family, however, was so poor that it required state assistance. The boy had the opportunity to go through high school and finished as the top-ranking student in a class of over 300. Further education, however, was impossible, and at the present time he is employed as a bellhop.

A third case is that of a boy of a poor farm family who possessed not only the intelligence but also sufficient drive to cause him to work his way through school. Since there was no high school in his home town, he went alone to a city some 50 miles away and found work which made it possible for him to continue his education. Toward the end of his third year, he reached the end of his financial resources. There was no possibility of help from his relatives. At this juncture a businessman in the city loaned him $10. This seems a small amount, but it was the turning point between success and failure for this ambitious young genius. He continued with his high school course, was graduated at the head of his class, went on to college, working his way through, and there also was graduated at the head of his class. He then went on to medical school and later became an outstanding physician.

Occasionally a great deal of money in a family will have the same deleterious effect upon a gifted child as does a lack of money. If the child feels that his economic

future is taken care of by the family bank account, he is deprived of one of the sources of drive—economic necessity. The most desirable economic condition is the possession by the parents of a moderate income; this makes it possible for the gifted child to continue his education as far as he likes and at the same time gives him the realization that he has a living to make.

Size of Home Town

A minor determiner of eminence is the size of town in which a man resides. Obviously, the smaller the town, the more limited the number of opportunities. Also a young man of genius, situated in a small village, would, in certain occupations, find the scope of his activities seriously curtailed. A lawyer, no matter how brilliant his intellectual attainments, would find it extremely difficult to gain national attention if he were practicing in a town of 3,000 people. A scientist on the faculty of a small college will not command the attention that goes to a man of similar achievements in a large university. A political leader in Presque Isle, Maine, has more difficulty in emerging as a national figure than a political leader in New York. Occasionally, of course, a great man, on the building-a-better-mouse-trap theory, forces the world to come to his doorstep. Especially successful in this respect were William Allen White of Emporia, Kan., and the Mayo brothers of Rochester, Minn.

Marriage

Marriage involves a number of factors which may exert a critical influence on a man's possibilities for attaining eminence. Age at time of marriage, number of children, and, of course, the personality and influence of the wife—any one of these may spell the difference between greatness and mediocrity or even failure. For instance, there

was the brilliant young theological student who married at the age of eighteen. Before he was twenty he was the father of a child and before he was thirty, the father of eight children. Instead of fulfilling the promise of his youth, this man, carrying family burdens which were much too heavy for his young shoulders, finally lost his grip and committed suicide. In this case marriage at twenty-eight instead of eighteen might well have meant the difference between recognized greatness and ignominious self-annihilation.

Marriage exercises an even more important effect upon a woman's possibilities for achieving any considerable success. A few women are able to follow a career while at the same time carrying family responsibilities. However, in most instances one or the other—usually the career—has to be dropped. Even single women find it almost impossible to win an eminent place in a man-controlled world where the belief is still strong that woman's proper place is in the home.

Age and Manner of Death

A man may have all the potentialities for greatness, yet if an automobile, for instance, runs over him and kills him, he has no further chance for realizing on those potentialities. No one knows how many men of exceptional talent have been cut off by death before they had time to achieve greatness. Who would have heard of Napoleon, if he had lost his life in battle at the age of twenty-one? Or what would the name of "George Washington" mean, if he had been killed with Braddock in the French and Indian War? Occasionally fate grants a man too much time, as in the case of Kipling, and the bright sunlight of his fame fades into the dim background of a long twilight. Sometimes, as in the case of von Hindenburg, a long life grants fresh opportunities for

refurbishing a fame that has been tarnished. A great general, he suffered from being a leader of a losing cause, but survived the eclipse and became a much-beloved president of the German Republic. If he could have died at the height of his popularity, his position in the eyes of posterity would have been greater than it now is; but he lived on into his dotage, and, while still president of Germany, became a cat's paw for the ambitious Hitler, into whose hands he placed the destinies of his country. The mere fact of chronological age certainly played a tremendously important part in the success of von Hindenburg, in the history of Germany, and in the fate of the world.

Fame by no means rests upon a carefully considered opinion by one's contemporaries or even by posterity. Frequently it is affected out of all proportion by some unusual characteristic of the individual or by some amazing event. If a man attacks traditional values with brilliant and extreme audacity, as did Jesus, Martin Luther, Galileo, and Charles Darwin, he impresses himself upon the popular mind with vividness and finality. It matters little if people hate him; perhaps they remember their hates longer than their loves.

If a man's manner of death is spectacular, his chance for being remembered by posterity is considerably enhanced. Lincoln's position in the hearts of Americans was made secure by the fact that his assassination came so soon after the close of the Civil War. Had Wilson been shot before the making of the Treaty of Versailles, he would hold a greater place in popular affection than he now does. Napoleon, always interested in what succeeding generations would think of him, was fully aware of the importance of the way in which he spent his last days. He took every opportunity to dramatize himself as "an eagle chained to a rock." Occasionally even premature

death is a determiner of eminence, providing, of course, that death does not come before the man has already achieved a relatively high place. The pity that is aroused by the death of a young man who has already accomplished much and gives promise of accomplishing a great deal more is occasionally so poignant that it exerts a considerable effect upon the estimation of the man. Even suicide may increase a person's importance. However, the best way for a great man to die, if he wishes to insure his position in history, is either to have himself assassinated or to die, as Will Rogers did, in a spectacular accident.

Competition

The degree of competition which a man meets during the period of his greatest activity exerts some influence upon opinions concerning him. Ideally those in opposition should be inferior, but not too inferior. To compete with another of equal ability is to divide the spoils.

The best examples can be drawn from the realm of sport, where it is easy to make direct comparisons. For instance, in the case of Tilden and Johnston in tennis, Tilden's reputation as a great tennis player was helped considerably by the fact that he was able to defeat again and again a man who was almost but not quite so good as he. On the other hand, Johnston had no opportunity to gain first position because his career coincided with that of the greatest tennis player that the world has ever known. If Johnston had been at the peak of his powers a few years before or a few years after, his reputation as a great athlete would have been definitely greater. A similar situation existed for a number of years in the case of Helen Wills Moody and Helen Jacobs.

In the world of politics and science, a number of examples could be offered of the influence of competition upon a man's reputation. It was unfortunate for both

Disraeli and Gladstone that their careers were contemporary. It is unfortunate, apparently, for Mussolini that his career and Hitler's coincide. Occasionally two scientists working in the same field make a discovery at approximately the same time. The public, finding it difficult to distribute honors, usually bestows the credit upon one and forgets the other.

Nature of Interest

It is easier for a man to attain world-wide recognition in some fields than in others. For instance, in literature one's abilities can be displayed before the world in a manner which all can understand. On the other hand, it is difficult for a mathematician, equally gifted, to catch popular attention. Einstein appears to be an exception, although even in his case recognition by the masses has not been given so much to his great intellect as to his physical appearance and personal idiosyncrasies, which match so perfectly the picture of a genius which the average man enjoys and insists on preserving.

A man must be a tremendous success in business before he is considered a genius, and even then most individuals would hesitate to apply the term. Henry Ford is as eminent in his field as Robert Frost is in his, yet he would not popularly be considered a genius. Two men of equal ability, each interested in politics, but one in the academic side and the other the practical side, would experience widely divergent opportunities for fame.

Occasionally a man engages in a piece of work the results of which antagonize the masses. It is true, as was pointed out earlier, that if his conclusions antagonize them sufficiently, as in the case of Darwin, his fame is made even more secure. However, if his results are of the kind that can soon be brushed off and forgotten, his

chances for being remembered are considerably less than those of one who is, like Edison, a benefactor of society.

Period of Activity

The time or period in which a potentially great man works is another determiner of success. It makes no difference how great a general's capacity for military leadership may be, he cannot become a Napoleon or a Wellington or a Lee unless there is a war. Obviously, of two men running for the position of president of the United States, the one who is elected is presented with a much greater opportunity for achievement than the one who is defeated.

Periods of upheaval and war give certain groups of individuals opportunities for outstanding contributions. Periods of quiet and peace give other groups similar opportunities. In times of upheaval and war, generals and politicians flourish. In times of quiet and peace, scientists and the industrialists prosper. Artists and writers may be productive in any period, although they are more likely to create their greatest works during periods of calm.

It is clear then, that intellectual capacity alone does not guarantee high achievement. Every characteristic of the individual, every environmental influence, plays its role. Occasionally one of these factors, seemingly unimportant, proves to be the decisive determiner of success or failure.

CHAPTER IX

SPECIAL GIFTS

1. Does creative genius in the arts necessarily imply a high degree of abstract intelligence?
2. Is the possession of a special gift likely to be recognized at an early age?
3. Is there any relationship between sex and either creative or critical ability in the arts?

Although great mental capacity is the most important single prerequisite to genius, there does occasionally appear an individual who possesses such an unusual special gift that he attains eminence in spite of a relatively low intelligence. This is not to say that it is possible for a moron to become a great musical composer or for a person of less-than-average intelligence to become a great creative artist. It means rather that, in certain exceptional cases, unevenness of abilities may be so marked that a person succeeds on a very high level because of one considerable talent even though in certain other abilities, such as intelligence, he may approach mediocrity. This is especially likely to be true of musicians and artists, for it is a known fact that the relationship between abstract intelligence and artistic ability or between abstract intelligence and musical ability is only slightly positive. Once in a great while it is true even in the field of mathematics, as in the case of the lightning calculator, and in language, as in the case of the child whose reading age is far in excess of his mental age.

In the present chapter there will follow a discussion of five special gifts: music, drawing, arithmetical computa-

tion, mechanics, language. The first two of these, music and drawing, appear much more frequently as specialized abilities than do the remaining three. In fact, it is doubtful if language should be included at all, for the correlation between language ability and intelligence is very high. However, there are a few cases of children and adults who show a facility either in reading or in the use of words for the writing of poetry or prose which so far exceeds what would be expected from their known mental age that it may be said to constitute a special gift.

Music

An interesting fact concerning the gift for music is that it manifests itself very early in life. This may be because ability in music depends very little upon experience. In nearly every instance, great musicians have been recognized early as musically gifted children. Mozart is an excellent example. By the time he was three years old, he had already demonstrated his unusual talent. Cox[1] in a biographical study, reports as follows on his early history:

When Mozart was 7 his first published work appeared—four sonatas for piano and violin, one of which showed especially remarkable taste. Between the ages of 7 and 15 he composed works for pianoforte and violin, pianoforte concertos, masses and church music, 18 symphonies, 2 operettas, and at the age of 14, an opera. When he was 12 his first operetta was performed. At 13 he received an appointment as grand ducal concert master (without salary), and in his first year of office he composed 20 numbers. At the age of 14 his first Italian opera was presented with great success. During these years his musical genius was so prolific that his fingers ached with the work of committing his ideas to paper. At 16 he received his first salary. Mozart was a brilliant executive artist as well as a great creative genius. His first musical tour was undertaken at the age of 6, when he visited Munich and met there with a very favorable reception. By his 8th year two more successful tours had been made, the first to

[1] Cox, C. M., "Genetic Studies of Genius," Vol. II, pp. 593–594, Stanford University Press, Stanford University, Calif., 1926.

Vienna and cities en route, the second through Germany. From his 8th to his 15th year Mozart visited Paris, London, The Hague, Amsterdam, and Vienna (for a second time). Two tours to Italy were carried out in his 16th and 17th years. Mozart's letters show the characteristics of an average pre-college student.

When he was 3 or 4, Mozart began to invent musical ideas; impressed by seeing his sister play, he seated himself at the clavier and picked out thirds, to his great delight. Even at that early age he could retain musical passages that he had heard. On one occasion before his 5th birthday, he learned at half-past-nine at night and in half an hour a minuet and a trio, pieces requiring independence of the two hands and some musical comprehension. Before he was 6 Mozart had begun to insist upon the presence of real connoisseurs whenever he played. His first concerto the little musician wrote down himself; the written composition was a daub of ink, but there was real order in its music. The child exceeded expectations on his first musical tours, and he was received everywhere as a prodigy; he was an enthusiastic critic of the playing of others. He played charmingly, whether with one finger, with the keyboard covered, or in the usual way. At 7 his extraordinary sense of absolute pitch was discovered, as well as remarkable skill with the violin and the organ, which he had never been taught. His repertoire included the naming of any note played at a distance, improvising in any key on the harpsichord or organ, and transposing to any key. He could supply the accompaniment to a singer without knowing the air in advance, or to a dictated melody with the use of the clavier. In his 10th year he was called by Tschudi, the instrument maker, "the most extraordinary performer in the world," and in the same year he was "investigated" in London by a lawyer who "reported proofs of the boy's decided inventive power." Compositions from the following year reveal remarkable ability in elaborating a theme. Locked up for a week by an incredulous archbishop, and required to prove his ability to write an oratorio without outside aid, Mozart (aged 11) achieved a brilliant triumph, a mature musical composition although written with blotted notes in a childish hand.

It is interesting to note that Mozart's I.Q. is estimated to have been approximately 150. Biographical studies of other great musicians, such as Bach and Beethoven, indicate a like high intellectual level. It would appear that while eminence in musical composition, at least, is largely

conditioned by intellectual capacity, a man may become a great performer and yet be of average mentality. When large, unselected groups are measured for intellectual capacity and for musical ability, the coefficients of correlation hover about zero, usually being slightly above. The relationship is so low that it is impossible to predict musical ability from the results of general intelligence tests or intelligence from the results of musical ability tests.

Scientific workers in the field of music have been handicapped in their investigations by a lack of adequate measuring instruments. There is no objective test in the field of aesthetics which is equal in validity to the better tests of intelligence. The best of the music tests is the one devised by Seashore, who, recognizing that musical talent is a complex of many specific abilities, reduced musical sensitivity to what he considered to be the six basic elements: pitch, intensity, time, consonance, rhythm, and tonal memory. He then constructed a test of each of these elements and had it recorded on a phonograph record.

The results of the Seashore tests are largely negative; that is, those who make low scores have very little chance of becoming successful musicians, but those making high scores are by no means sure of success. As in the case of abstract intelligence, other abilities than the musical gift alone are needed to ensure achievement.

It is a mistake to assume that musical talent is a natural gift, the mere existence of which will inevitably bring achievement of a high order. Environmental factors are fully as potent in the case of the talented child as in the case of the intellectually gifted child. A man will not become either a great performer or a great composer without a thorough musical education or without long hours of arduous labor. There exists here the familiar

situation: a child may be precocious in music and yet fail to achieve on a high level in adult life because of certain lacks in himself or in his environment; but an individual will not achieve on a high level in music without having inherited the potentialities.

Drawing

Ability in representative drawing or, for that matter, in all forms of drawing or art usually shows itself at an early age. It is interesting to note, however, that manifestations of artistic ability do not appear so soon as do manifestations of musical ability. The early appearance of artistic talent in the great majority of celebrated artists indicates that it has been inherited. However, as in the case of music, other factors influence the extent to which it will be developed.

A study of biographies of famous artists reveals many interesting facts concerning the relationship between later achievement and early tendencies. Rembrandt, Raphael, Murillo, and Rubens were successfully expressing themselves through the artistic medium while they were still adolescents. Of Michelangelo, Cox[1] says:

> At school Michelangelo devoted most of his time to drawing, a pursuit not included in the curriculum and which his father tried to discourage as he did not wish a painter in the family. Michelangelo early sought the acquaintance of artists, and took every opportunity to converse with them. From his fourteenth to his sixteenth year, during the period of Lorenzo de'Medici's patronage, the youth devoted most of his time to the study and practice of drawing, painting, and sculpture.... At the age of thirteen Michelangelo was so proficient in drawing that he received a salary although he was then in the first year of his apprenticeship. His passion for his art was so strong that every available space became a sketch surface. It is written that he drew so well at this time that he caused wonder to all that saw it, and envy to the less generous.

[1] *Ibid.*, pp. 543–544.

Representative drawing, like music, shows little relationship to intelligence when large, unselected groups are tested. However, as was pointed out with respect to music, it does not follow from this that high achievement will result from the possession of artistic talent alone; it must be supplemented by abstract intelligence. Michelangelo was estimated to have an I.Q. of 160. It is doubtful if there has ever been a celebrated artist of average or below-average intelligence.

Relationship between Intelligence and Art Appreciation

In art, as in music, investigators have been handicapped by a lack of satisfactory measuring instruments. There does not exist at the present time an adequate test of creative ability. It has proved to be somewhat easier to evaluate the ability to appreciate or to judge. The two best tests constructed for this purpose are the Meier-Seashore Art Judgment Test and the McAdory Art Test. Even these, however, are limited in their validity. Carroll and Eurich, using the two instruments together with certain intelligence tests, studied the relationship between abstract intelligence and art appreciation. Their results coincide with the conclusions of earlier studies by Ayer and others.

Carroll and Eurich[1] report a coefficient of correlation between Miller Analogies Intelligence Test and the Meier-Seashore Art Judgment Test of $.26 \pm .02$ for 674 college students and a coefficient of correlation between the Analogies Test and the McAdory Art Test of $.10 \pm .05$ for 203 college students. Interested in the question of a possible difference in the ability to appreciate art between mentally superior and mentally inferior children, they matched 43 intellectually gifted children with 43

[1] Carroll, H. A., and A. C. Eurich, Abstract Intelligence and Art Appreciation, *J. Educ. Psychol.*, Vol. 23, pp. 214–220, 1932.

borderline children and tested them with the McAdory Art Test. The distribution of the scores obtained appears in Fig. 5.

It will be seen from Fig. 5 that, although there was a difference of more than 60 points between the mean scores of the two groups, there was considerable overlapping; actually 63 per cent of the borderline children (those with I.Q.'s of approximately 70) exceeded the lowest score made by the gifted. Only 9 per cent of these

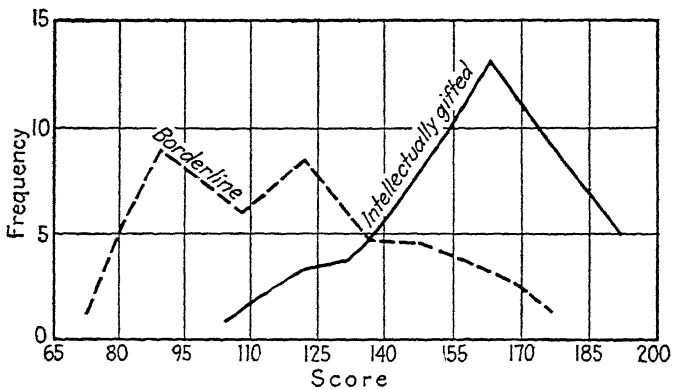

FIG. 5.—Distribution of McAdory Art Test scores of 43 very dull and of 43 very superior junior high-school children.[1]

very dull children exceeded the mean of the intellectually gifted group, and no dull child equaled the best among the gifted children. On the other hand, no bright child fell below the average for the dull group. It would appear from this study that abstract intelligence at the extremes affects art judgment ability.

The effect of intelligence upon the accuracy of drawings, with respect to the correct inclusion of detail, is considerable. This would be expected since the more

[1] EURICH, A. C., and H. A. CARROLL. "Educational Psychology," p. 184, D. C. Heath & Company, Boston, 1935.

intelligent the child, the more he sees. As Goodenough[1] says:

> The drawings of bright children are not always or necessarily more artistic than those of backward children, but they excel in such matters as the number of items shown, the correctness with which the parts have been assembled, the relative proportions of the different parts, and in the control of eye and hand movements as shown by the regularity of the lines and the smoothness of their joinings.

A comparable situation is found in music, where a brilliant child, though lacking in any real gift for music, may experience considerable pleasure and success in learning facts about music. He may even become a moderately good performer as an outgrowth of a purely intellectual interest.

Sex Factor

The role played by sex in art achievement is not as yet very well understood. Two seemingly contradictory observations have been made: first, that nearly all the great artists have been men; second, that girls as a group are definitely superior to boys in artistic ability. It may well be that lack of opportunity has kept many artistically gifted women from achieving any marked success. Even today, when women are more free than ever before to have careers of their own, family responsibilities and social pressure block their progress. It may be that lack of opportunity is not wholly responsible, but that artistically gifted girls, like intellectually gifted girls, are much more likely than boys to retrogress toward mediocrity as they approach maturity; or it may be that the ability to create is more closely linked with the male sex hormones and the ability to appreciate more closely linked with the female sex hormones. It is interesting to note that boys

[1] GOODENOUGH, F. L., "Developmental Psychology," pp. 335–336, D. Appleton-Century Company, Inc., New York, 1934.

who are gifted in art and music are much more likely to possess feminine traits than are intellectually gifted boys or unselected boys—a fact that blurs the picture still more. It is possible, though not likely, that an element of homosexuality profoundly influences all achievements in aesthetics.

Lightning Calculators

Mathematical ability is made up of many subdivisions, some of which are more closely related to general intelligence than others. For example, the ability to handle symbols in a subject such as calculus requires more abstract intelligence than the ability to make arithmetical computations. However, even the relationship between performance in arithmetical computations and intelligence is very high; the fact that it is not perfect permits the occasional appearance of a lightning calculator of less-than-average intelligence. In such instances mathematical ability constitutes a special gift.

As Binet pointed out a long time ago, the spectacular achievements of lightning calculators result from highly developed habits of computation, with multiplication being used as the basic operation. By a peculiar quirk of circumstance, the lightning calculator of low intelligence is interested almost solely in performing arithmetical feats. He concentrates every ounce of mental energy that he has upon mastering the mechanics of computation and of remembering combinations. Even a dull mind, by limiting his field of interest, can occasionally achieve astounding results. It would be a mistake, however, to assume that all lightning calculators are men of inferior mentality, for the gift has been possessed by such eminent individuals as Whately, Gauss, and Ampere. The fact that the gift appears at a very early age—in Whately, Gauss, and Ampere at three—indicates that the ability

is not wholly acquired but is based upon some specialized inherited mechanism. The dull child inheriting the talent (and it should be emphasized that the talent rarely appears) grasps it as his one means of impressing others with his mental ability. The bright child, finding himself possessed of the gift, delights in using it as a tool for broader achievement.

Leta Hollingworth[1] reports as follows on two lightning calculators who gave every indication of being of low intelligence:

Jedediah Buxton (b. 1702) seems to be the first such calculator on record in modern accounts. He lived at Elmton, England, and "labored hard with a spade to support a family, but seems not to have shown even usual intelligence in regard to ordinary matters of life." In 1754, when he was taken to London, to be examined before the Royal Society, he went to see *King Richard III* performed. "During the dance he fixed his attention upon the number of steps; he attended to Mr. Garrick only to count the words he uttered. At the conclusion of the play, they asked him how he liked it. . . . He replied that such and such an actor went in and out so many times, and spoke so many words; another so many. . . . He returned to his village, and died poor and ignored." It is further stated that he could give an itemized account of all the free beer he had had from the age of twelve years.

Another person who appears to have had a very special gift for calculation is Tom Fuller, "The Virginia Calculator" (b. 1710). He came from Africa as a slave when about fourteen years old. He is first recorded as a calculator at the age of seventy, when he mentally multiplied two numbers of nine figures each, and performed other remarkable arithmetical feats. He was totally illiterate, and no evidence of high general intelligence is given in the various anecdotes about his case.

Mechanical Ability

Early in the testing movement, Thorndike subdivided intelligence into three classifications: abstract, social,

[1] Hollingworth, L. S., "Gifted Children," pp. 211–212, The Macmillan Company, New York, 1926.

and mechanical, the last named being defined as the ability to understand and to manipulate mechanical objects. During the years since the time that this classification was made, a number of investigations into the possible relationships existing among the three have been conducted, with the result that it has been established that those relationships are positive. The coefficient of correlation between mechanical intelligence and abstract intelligence is approximately .30. A correlation of that size indicates that, although there will be considerable overlapping in test scores when an unselected group is measured with a mechanical aptitude test and with an intelligence test, in terms of groups intellectually gifted children will do better and the intellectually inferior children less well in a situation requiring mechanical ability.

To achieve greatness in the mechanical world, a man needs a high degree of abstract intelligence. Even the so-called chance invention requires that the inventor be able to observe and to make deductions. An apple falls on the head of Newton, and he gives to the world, as a result of the experience, a statement of the law of gravitation. The same apple falling on the head of a moron would suggest to him—only an apple.

In considering mechanical ability, it is important to make a distinction between understanding and manipulative skill, the former requiring much more intelligence than the latter. A dull boy might be able to take a clock apart and then reassemble it without having any appreciation of the principles involved. A bright child might be able to duplicate the performance, but in addition to that would be very much interested in the whys and wherefores. In fact, very often the bright child is so interested in the principles involved in the creation and functioning of a mechanical object that he cares but little about

watching it go. His mind is busy while his hands are idle. In the case of the dull child, the hands are busy while the mind is idle.

Observations concerning the relative mechanical abilities of bright and dull children are often faulty because of failure to check both mental age and chronological age. Since there is such a low correlation between abstract intelligence and physical equipment, it follows that the child who is mentally accelerated is going to find that his manipulative ability has not kept pace with his mental development. On the other hand, the dull boy of ten with a mental age of six can use his hands relatively well. To be specific, if, in a fourth grade, there were a bright child of seven and a dull child of ten, it would appear to the casual observer that mechanical ability is negatively related to intelligence, for the dull child would presumably be able to handle tools better than his younger classmate.

Education itself is a conditioning factor in the relationship between mechanical and abstract intelligence. Bright children are more likely to be interested in and to be taught subjects that are strictly verbal, while dull children, lacking both interest in and capacity for such abstract subjects, are encouraged to take up work in manual training or in similar fields, where special attention will be given to developing dexterity.

Special Language Abilities

The relationship between abstract intelligence and language ability, including both reading and writing, is extremely high. However, as in the case of the correlation between abstract intelligence and arithmetical ability, it is not perfect and so permits certain exceptions to occur. Consequently, an occasional child is found to have a specific language ability or disability markedly superior

or inferior to his intellectual level. A superiority in this respect occurs much more rarely than an inferiority.

Reading

Examples of unusual reading ability among very dull or feeble-minded children are as scarce as the presence of lightning calculators among the same group. On the other hand, a fairly large number of intellectually superior children are deficient in reading or writing.

Terman reports the case of a girl who was able to read simple material at the age of two. Since usually a child needs to reach a mental age of six before it is possible for him to read, this precocity would indicate an I.Q. of about 300. When she was tested, however, it was found that her I.Q. was only 150. Terman points out that the child had been given special instruction by her father, but it seems unlikely that this, in itself, would be sufficient to account for the unusual accomplishment. It is probable that she inherited a special talent for reading and that the personal instruction was an effective means of developing it. As the girl grew older she continued to excel in reading and in literature, a further indication that she had been endowed with a special ability.

Goodenough tells a remarkable story of an imbecile boy with an I.Q. of only 25 who did not enter school until he was more than ten years old. Unlike most feeble-minded children, the boy talked a great deal and was intensely interested in stories. Concerning his reading, Goodenough[1] says:

> Because he was so greatly retarded it was not thought worth while at first to try to teach him to read. But one day, when the teacher was giving a word drill by means of "flash cards" to some of the more advanced children, she happened to glance at the corner where Arthur sat. There on the edge of his chair, all agog with excitement,

[1] GOODENOUGH, *op. cit.*, pp. 417–418.

hands on knees, body swaying backward and forward as each new card was shown, he was pronouncing the words along with the other children. The amazed teacher tried him out by himself and found that he could recognize and name quite a number of words without hesitation. From then on he was given a short lesson in reading each day and in three years time, that is, by the age of thirteen, he had learned to read easy stories well enough to give him much pleasure. To be sure his reading ability never exceeded that which an ordinary child accomplishes by the end of the second grade. If compared with the performance of the average boy of thirteen his reading would seem poor enough. But in comparison with what he could do along other lines, it was extraordinary.

It is difficult to explain such a case of special reading ability. It may be the result of inheritance of the special gift or of the concentration upon this activity to the exclusion of nearly all others; perhaps it is a combination of both. It is again important to keep in mind that there is in reading a distinct difference between mechanics and understanding. The dull child who performs excellently at reading aloud will not be able to interpret what he has read on a level beyond his mental age. The situation is similar to that of the child who has memorized a poem which he can glibly recite without having the faintest idea what a line of it means. There was a certain dull high school boy who had come up through the grades bearing with him the reputation of being a wonderful reader. This boy could take a book like *Ivanhoe* and read aloud from it without mispronunciations and with adequate attention to punctuation marks, yet he was unable to pass his high school English courses—or his other courses, either, for that matter—because he could not understand what he had read.

Writing Poetry

Another form of specialized language ability is the writing of poetry. Poetic ability usually appears at an

early age, although not at so early an age as music ability. Tennyson began writing poetry when he was eight. Macaulay, at seven, began a long poem, "Olans the Great," with the following lines:

Day set on Cambria's hills supreme,
And, Menai, on thy silver stream.
The star of day had reached the West.
Now in the main it sunk to rest.
Shone great Eleindyn's castle tall:
Shone every battery, every hall:
Shone all fair Mona's verdant plain;
But chiefly shone the foaming main.

Bryant, at the age of ten, was sufficiently gifted to write the following, called "After a Total Eclipse of the Sun":

How awfully sublime and grand to see
The lamp of day wrapped in obscurity.
To see the sun remove behind the moon,
And nightly darkness shroud the day at noon;
The birds no longer feel his genial ray,
But cease to sing and sit upon the spray.
A solemn gloom and stillness spreads around,
Reigns in the air and broods o'er all the ground.
Once-smiling Nature wears another face,
The blooming meadow loses half its grace.
All things are silent save the chilling breeze,
That in low whispers rustles through the trees.
The stars break forth and stud the azure sky,
And larger planets meet the wondering eye.

Now busy man leaves off his toil to gaze,
And some are struck with horror and amaze,
Others of noble feelings more refined
Serenely view it with a tranquil mind.
See God's bright image strikingly portrayed
In each appearance which his power had made.
(Fixed in their hearts cool Meditation sate,
With upraised eye and thoughtful look sedate.)

Now bursts the Sun from silence and from night,
Though few his beams, they shed a welcome light;
And Nature's choir, enlivened by his rays,
Harmonious warble their Creator's praise.
The shades of darkness feel his potent ray,
Mine eye pursues them as they flee away;
So from the greyhound flies the tim'rous hare,
Swift as the dart divides the yielding air.

Terman, in his work with gifted children, found a number who possessed remarkable poetic talent. The following was written by a girl only five years of age:

THE PLACE I'D LIKE TO BE

The place I'd like to be
Is where the spreading tree
    Spreads its shade
    And is made
By the gentle hand of God
In the rich, black mud.
And the brooklet ripples down
To the other end of town,
And the roses are in bloom,
And the violets give perfume,
And the blue grass waves like bushes,
And in the brook, here, wave rushes,
—But instead—a dingy town!

A girl of seven wrote this:

MY PRAYER

Oh, Master of fire! Oh, Lord of air,
Oh, God of waters, hear my prayer!
Oh, Lord of ground and of stirring trees,
Oh, God of man and of pleasant breeze,
Dear Father, let me happy be—
As happy as a growing tree!

Obviously it takes a high degree of abstract intelligence to write such lines as appear in the preceding selections. The relationship between poetic ability and

abstract intelligence is much higher than that found between either musical ability or drawing ability and abstract intelligence. Terman, in an investigation of the writing of children, selected fourteen who showed the most merit. Their intelligence ratings appear in Table XXIX.

TABLE XXIX.—I.Q.'S OF 14 CALIFORNIA GIFTED CHILDREN TENTATIVELY SELECTED AS OF OUTSTANDING LITERARY ABILITY*

Name (fictitious)	I.Q.	Corrected I.Q.	Age when tested
Beatrice	188	...	7-10½
Edith	138	148	13- 0
Ethel	172	...	8-10
James	144	152	12- 3
Jeanette	153	...	10- 4
Juanita	134	145	13-10
Margaret	166	...	8- 4
Pauline	143	155	12-10
Ralph	152	...	6- 5
Ruth	141	157	13- 2
Verda	170	186	11- 7
Vivian	140	...	8- 6
Walter	144	148	11- 7
Wanda	172	...	9- 0

* TERMAN, L. M., "Genetic Studies of Genius," Vol. III, p. 365, Stanford University Press, Stanford University, Calif., 1930.

For purposes of comparison, Terman selected twenty-eight writers who had achieved eminence in English or American literature. An estimated I.Q. for each of these, based on the Cox biographical survey, appears in Table XXX.

In 1925, Mearns published a number of examples of pupils' writings in a book called "Creative Youth." It was rather generally assumed at the time that any group of children, under wise encouragement and direction, could do equally well. The fact that Mearns was working

TABLE XXX.—ENGLISH AND AMERICAN MEN OF LETTERS FOR WHOM JUVENILIA WERE AVAILABLE*

Name	Estimated I.Q. (Based on Data to Age Seventeen)
Browning, Robert	165
Bryant, William C	170
Burns, Robert	140
Byron, Lord	160
Coleridge, Samuel T	180
Cowper, William	150
Dryden, John	160
Emerson, Ralph W	155
Franklin, Benjamin	160
Freneau, Philip M	160
Hamilton, Alexander	150
Hawthorne, Nathaniel	150
Holmes, Oliver W	155
Jefferson, Thomas	160
Johnson, Samuel	165
Keats, John	165
Longfellow, Henry W	160
Lowell, James R	165
Macaulay, Thomas B	185
Milton, John	155
Poe, Edgar A	165
Pope, Alexander	165
Shelley, Percy B	165
Tennyson, Alfred	160
Thackeray, William M	145
Thoreau, Henry D	155
Whittier, John G	155
Wordsworth, William	160

* TERMAN, "Genetic Studies of Genius, Vol. III," p. 366.

with a group of mentally superior children was given scant attention. A later report on the mental level of the children mentioned in "Creative Youth" showed that the I.Q.'s ranged from 100 to 157. Since these children were at an age when the Stanford-Binet I.Q. should be corrected, it is probable that the true quotients were ten or fifteen points higher. In general it can be said that intellectually gifted children can be taught to write

excellent poetry and prose. However, this does not mean that in later years they will become eminent authors, for creative literary achievement rests upon a number of gifts, of which intellect and the ability to understand and to handle words are but two. A gifted poet will usually show promise not only in an interest in words but in such other contributing factors to creative ability as a vivid imagination, a sensitivity to beauty, and a retentive memory for detail.

Tests

There is at present no adequate objective test of creative ability in writing. It is likely that there never will be, for creative ability by its very nature is unique and cannot be evaluated according to set standards. It is even difficult to measure the ability to appreciate or to judge, although some progress has been made in this field. Psychologists, in attempting to measure critical ability in the field of literature, have to keep in mind that standards of excellence change. The best that they can do is to compare the judgments of the child examined with a consensus of the opinions of a group of contemporary critics of established reputation.

Abbott and Trabue have constructed a moderately adequate test of the ability to judge poetry. The test is low in reliability and its validity is open to question. Carroll has constructed a test of prose appreciation, the reliability of which is .70. This test depends for its validity upon three criteria: source, expert opinion, the comparative performances of groups on different educational levels. It is interesting to note that examinations with the Carroll Prose Appreciation Test show a decided sex difference in the ability to appreciate prose literature.[1]

[1] CARROLL, H. A., Influence of the Sex Factor upon Appreciation of Literature, *School and Society*, Vol. 37; pp. 468–472, 1933.

Similar differences are found with the Abbott-Trabue Poetry Test. As was pointed out earlier, there appear to be like differences in art and music. Terman emphasizes the fact that the seven most gifted child writers in his group were all girls, yet opposed to that observation is the fact that practically all the eminent adult writers are men. This merely indicates once more the important part which factors other than inherited ability play in the attainment of eminence.

Summary

Of the five gifts discussed in this chapter—music, drawing, arithmetical calculation, mechanics, language—only the first two, music and drawing, stand out distinctly as special talents. The relationship between either of these and abstract intelligence is only slightly above zero. In each of the remaining three, the relationship is definitely higher. However, to attain eminence, even in music and drawing, it would appear that a high degree of abstract intelligence is needed. Most assuredly this is true in authorship.

Musical talent appears at a very early age, frequently before three. Ability in drawing, depending somewhat more on experience, does not manifest itself until the child is older, usually just before or during early adolescence. Unusual ability in the use of language, especially in the writing of poetry, also appears at an early age, generally before adolescence. Measuring instruments in these special fields are not nearly so satisfactory as those used for objectively evaluating intelligence. Nothing of a satisfactory nature has been done to test creative ability in music, art, or writing, but critical ability in each of these fields can now be measured with some degree of accuracy.

CHAPTER X

EDUCATIONAL ADJUSTMENTS: ACCELERATION

1. Is differentiation of education justifiable?
2. What are the advantages and disadvantages of acceleration?
3. What is the opinion of gifted children themselves concerning acceleration?

Educators disagree concerning the advisability of making special provision for intellectually gifted children. Antithetical opinions exist among them concerning any method which may be proposed—acceleration, enrichment, or grouping. There is the sharpest division, however, concerning the plan of classification according to ability, especially when this involves putting gifted children in a group by themselves.

Issues Involved

There are a number of questions which are raised whenever school adjustments for gifted children are proposed. The issues in the following list bear more directly on the problem of segregation than on that of enrichment, although, in some respects, they apply to the latter method as well:

1. Is differentiation democratic?
2. Does differentiation violate the principle of respect for personality?
3. Does differentiation make the bright child egotistical?
4. Does differentiation prepare the child for actual life situations?
5. Do dull children need those who are gifted as examples?
6. Do gifted children need help?

Democracy in Education

Paradoxical as it may seem, there has developed in America, side by side with an enthusiasm for success

stories, a cult of mediocrity. This is everywhere apparent in American social and political structure and, unfortunately, in the educational system. As De Tocqueville wrote in the last century, "A middling standard is fixed in America for human knowledge. All approach as near to it as they can; some as they rise, others as they descend." American schools are adjusted to meet the needs of the great average group. Direct effort, usually unsuccessful, has been made to raise the dull child to the standard considered desirable for the typical student, and indirect effort, in the guise of ignoring his needs, has been made to pull down the gifted child toward the middle.

To canonize mediocrity at the expense of superiority is not sound democratic education. The writer remembers that, on taking up his duties in his first high school teaching position, he was instructed by the principal to devote his efforts to the training of average students, the principal asserting that these were the ones who would at some future date bear the burdens of leadership. He made the further statement, heard often in educational circles, that the bright children needed no special attention because they could take care of themselves.

A true democratic conception of education penalizes no group, whether bright or dull, but asserts that every child should be given an opportunity to develop to the full extent of his capacity. As Strayer has said, "Every pupil in the ideal school system is judged by the best which he can do and not by the median performance of a non-selected group." The same point of view is expressed by Harold Campbell,[1] superintendent of schools in New York, who says:

> The school that fails to offer opportunities for the child of unusual gifts is fully as neglectful as the school that offers nothing to the child

[1] COHEN, H. L., and N. G. CORYELL, "Educating Superior Students," p. v, American Book Company, New York, 1935.

of limited endowment. The school must be as zealous to do for the genius as for the dullard. There must be special education for the gifted as well as for the handicapped.

The belief is held by those who feel that differentiating instruction is undemocratic that the creation of opportunity classes for the gifted, or even the creation of an enriched program for them, constitutes special privilege. Those who hold this point of view concerning democracy in education interpret equality of opportunity as meaning identity of educational offerings. A broader conception of democracy would admit of the existence of individual differences and recognize that each child must receive the education best suited to his abilities and needs, in order that in later years he can better contribute to a democratic society the service for which he is best qualified. To force upon all an education planned for average children, regardless of individual intellectual capacity, is to grant special privilege to the central group and to deny to the bright and the dull their rights. It is as undemocratic to require a high school freshman with an I.Q. of 75 to take algebra as it is to insist that a gifted child capable of reading "Treasure Island" must study a second-grade reader merely because he happens to be seven years old and has been placed by the educational machine in the second grade.

A truly democratic system provides for the education of all children. It grants no special privilege to the middle group even though this happens to be the most numerous. It is wholly impartial, recognizing the needs of the moron as well as of the genius, or, more significantly, of the genius as well as of the moron. A democracy needs not only to draw upon its man power of average intelligence but also to utilize the smaller contributions of the "hewers of wood and drawers of water" and the potentially greater contributions of its men and women of high intel-

lect. No democratic society can afford to ignore the development of its greatest single possession—its intellectual resources.

Respect for Personality

An argument advanced by Kilpatrick and others against grouping is that it violates the principle of respect for personality, the assumption being that the dull and even the average are being stigmatized by a recognition of the existence of individual differences and a resulting classification. The concern appears to be, unfortunately, not with the benefits to be gained by the gifted through grouping and differentiation of instruction but rather with the question of how the dull and average children will feel about it. This is a strange attitude. Children are segregated for almost any other purpose without objection. The muscle boys can be put on a football team and given the benefit of a highly specialized training by a well-paid staff of coaches. The future purveyors of "swing," or whatever it is that radios will be exhaling a decade from now, can be organized into an orchestra and given special instruction. Children with dramatic ability can be assigned parts in plays and experience the pleasure of public recognition of their talents. Even feeble-minded children stand a fair chance of being put into a special class, where instruction will be adjusted to their limited mentality. All these classifications can be made without the objections being raised that someone's personality is being violated; but if a superintendent or principal organizes his gifted children into a special group he may expect a roar of disapproval.

The above-mentioned groupings should not be eliminated. It is indeed difficult to visualize a football coach giving all the boys in his school the same kind of football training and then sending a team, selected at random,

against an opponent. Such a procedure would be unfair to everyone, especially to those boys who are good football players. It is not undemocratic to make use of the best available material in an athletic contest; neither is it undemocratic to provide for the best available intellects. There even seems to be a danger in some of the so-called progressive schools in America that intellectual achievement may be outmoded. Here it is considered admirable to be successful in such activities as art, or calisthenics, or emotional control, and neither the art teacher nor the gynasium instructor hesitates to praise those who do well; but in the classrooms the child who is gifted in reading, or in arithmetic, or in geography soon learns that to allow his ability to be detected is not socially desirable. In these fields, praise and rewards go, rather, to the mentally slow pupil who, as one teacher remarked, "need the encouragement."

Unsound though the point of view concerning the stigma attached to classification may be, its existence is, nevertheless, a fact which must be faced by any teacher or school administrator who is interested in providing suitable education for all children. The present attitude being what it is, it seems desirable to camouflage differentiation as much as possible. For example, it is unwise to call a segregated group of superior children "a class for gifted children." It is better to use some such phrase as "opportunity class."

Grouping within a heterogeneous class can usually be disguised very easily through the use of meaningless names and through complete flexibility, permitting the transfer of children from one group to another whenever such transfer seems wise. For instance, a teacher may divide her class, according to reading ability, into "bluebirds" and "robins," the "bluebirds," being the poor readers and the "robins" the good readers. No child's

personality appears to be violated by this classification, the "bluebirds" never suspecting the basis for it and even the "robins" being misled by their mental pictures of the two birds.

Egotism

It is generally believed that the brilliant child is egotistical. This belief may spring from the feeling of average children and adults that if they were brilliant they would be aware of it and make sure that others knew about it. A similar situation is found in the misconception that men of wealth are forever conscious of their possessions or that successful writers and artists delight in reviewing their achievements. The person who has not won popular acclaim cannot be expected to understand how those who have achieved actually feel. During the first flush of success the experience is sweet, but the bitter-sweet stage comes quickly, and this is frequently followed by a period that is bitter without any sweetness.

Gifted children, as a rule, are too busy taking stock of the world about them and of looking ahead to their future work to have time for self-congratulation. The average or below-average child, on the other hand, may compensate for his mental weakness by affecting a superior manner. Experienced teachers will testify that in general it is the dull rather than the bright child who is overassertive. Concerning this point, Leta Hollingworth[1] says:

> The conceit of the gifted need in any case give little concern, apparently. According to the repeated testimony of teachers, they are rated much above average children in modesty, whatever the circumstances under which they have been schooled. There appears to be a decided tendency among the very intelligent to compare

[1] HOLLINGWORTH, L. S., "Gifted Children," p. 302, The Macmillan Company, New York, 1926.

themselves with those above them, instead of with those below them, in any category of relative standing. One very gifted boy of ten years, asked to rate himself for achievement, wrote as follows: "I have not done much, when you think of Darwin and Newton and all the things they did."

The more one knows, the more keenly he recognizes his limitations.

The statement is frequently made that, even though gifted children are not naturally conceited, to place them in an ability group would make them so; yet this has not been the case, according to those who have had personal experience with such groups. Goddard[1] says flatly,

> The briefest and most conclusive answer to this objection is that *it doesn't happen.* Out of some 500 children who have been in the Cleveland special classes from one to four years, we have yet to hear of one who has been made conceited.

Stedman[2] says,

> Among the many objections voiced to the plan of segregation was the suggestion that the opportunity to advance regardless of the progress of the other members of the class might result in developing selfish, self-centered, egotistical children. An experience of five years with the class has amply demonstrated the fallacy of this argument.

Coy,[3] in a study of seventeen gifted children who had been placed in a special class, reports,

> It is often said that membership in a gifted class will make children conceited. We have practically no evidence of conceit except in the case of Number 11, who had acquired it before he came to the class.

[1] GODDARD, H. H., "School Training of Gifted Children," pp. 26–27, World Book Company, Yonkers-on-Hudson, N. Y., 1928.

[2] STEDMAN, L. M., "Education of Gifted Children," p. 17, World Book Company, Yonkers-on-Hudson, N. Y., 1924.

[3] COY, G. L., "Interests, Abilities, and Achievements of Gifted Children," p. 176, *Teachers College Contributions to Education,* No. 131, Columbia University, New York, 1923.

If there were a tendency for mentally superior children to become egotistical, a heterogeneous class would provide a more favorable situation for the development of this characteristic than would a homogeneous class. In an unselected group, the gifted child is constantly being made conscious of the fact that he is brighter than his classmates. Problems which are easy for him are difficult for them; he succeeds where they fail. Put this child into an opportunity class, where he will be competing with other children who possess minds as good or perhaps better than his, and his ego will tend to be deflated. For an individual who has lost sight of relative values through lack of competition there is nothing better than a contest with someone who can defeat him. A gifted boy who graduates as valedictorian of his class in a small high school may be tempted to believe that he will always be at the top, but, when he reaches college in the fall and finds himself in competition with a number of other boys and girls who also were valedictorians of their classes, he is likely to awake to the fact that his standards of comparison were low.

In conclusion, then, it would appear that gifted children as a group are somewhat less egotistical than other children of the same age. It appears also that a differentiation of educational procedures to meet their special needs eliminates one of the causes of an inflated self-esteem, *viz.*, the heterogeneous class, in which there is little or no competition for the brilliant child.

Preparation for Actual Life Situations

An issue frequently raised concerning the grouping of gifted children for purposes of instruction is that the grouping creates an unreal situation, one which the child will not find in adult life where, so the argument runs, he will be associating with individuals of widely differing

intelligence. This is another example of the curious habit that human beings have of failing to distinguish theory from facts. Theoretically, there are no groupings, no class distinctions, in democracy. Actually, adult society in America is made up of innumerable tight little groups. So long as individuals continue to be characterized by wide differences in every trait, groupings will exist. Even in a town of a few hundred people, those who are like-minded will seek one another's company. Grouping, of course, is not always on the basis of intellect, but in general those with able minds will seek intellectual companionship. Those with less able minds naturally and rightly look for their friends among those of like interests; they would be bored and restless in the presence of an intellectual. Therefore, to force a bright child to find his friends and playmates among children of a wholly different intellectual level is to fail completely to train him for the situations in which he will find himself in later adult life.

Individuals not only choose friends who are intellectually and socially congenial, but they also tend to choose vocations in which competition will be limited to men of approximately equal mental capacity. As Elsbeth Kroeber remarks, "Candidates for teaching licenses would find examinations easier if subway guards entered into competition with college graduates." It is especially fortunate for the subway guards that they prefer not only to compete with, but also to associate with, other subway guards. Certainly not even the educational philosopher who objects to all groupings would care to teach a truly heterogeneous adult class made up of college students, a sprinkling of day laborers, and, perhaps, an imbecile or two to make the group really representative; yet this same philosopher, arguing before his homogeneous class, maintains that in the public schools

the gifted child should be required to compete and to associate with an unselected group of children because this is the condition which he will find in adult life.

The facts of the case are that in adult life the doctor associates pretty much with doctors, the college professor with other college professors, the baseball player with other baseball players, and the farmer with other farmers. Perhaps this is not an ideal situation, but it is a more comfortable and pleasing one than could possibly exist in a group of individuals chosen at random and forced to associate intimately with one another. Such a group, as social and political history clearly proves, is purely artificial and does not long endure.

Gifted Children as Examples to Others

It is believed by many that a heterogeneous class of students is desirable because it gives to the dull and average child an opportunity to imitate and to be stimulated by the intellectually gifted child. It is, however, very doubtful if the less intelligent children admire their superior classmates sufficiently to imitate them. It is more likely that the average child will feel somewhat uneasy in a class with a very bright child and will compensate for that uneasiness by being critical of him; or it may be that he will be discouraged by the ease with which the bright child solves problems that are so difficult for him, and will ask himself, "What's the use? John always gets the best grades. Why should I try?"

It is well to think not only of the possibility of the gifted child's stimulating those who are less intelligent, but also of his being stimulated by competing with other children who are as bright as he—a situation in which he would find himself were he in a segregated class. Even assuming that average children do need to have gifted children in their classes to serve as examples, it is doubt-

ful wisdom to require the mental stultification of the gifted as a sacrifice to possible benefits which others are supposed to derive from his presence in the class.

Gifted Children Need Help

It is often maintained in educational circles as well as outside them that the gifted can take care of themselves. This, for instance, is the point of view usually expressed by philanthropic foundations when asked for funds with which to promote studies of the nature and needs of the bright. As a matter of fact, as Leta Hollingworth[1] points out, "not only the leaders of philanthropy today, but political, educational, and other kinds of leaders would give all to the burdens of society and nothing to the burden-bearers."

There are two bases for this attitude toward the educational needs of gifted children. The first is that most individuals envy and resent those who possess minds more brilliant than their own. This feeling is common among teachers perhaps because they are working in a field where the importance of mind is disproportionately magnified.

Any high school teacher should hope and expect that there will be one or more children in her classes who excel her in intellect. Theoretically, she does expect exactly that, but emotionally she rebels against it, not because she is a teacher, not because she is more sensitive than others, but because she is a human being. The rebellion is natural and involuntary, and the expression of it, unfortunately, is seldom curbed. Any psychologist or teacher with an interest in bright children could tell

[1] HOLLINGWORTH, L. S., What We Know About the Early Selection and Training of Leaders, in a bulletin "How Should a Democratic People Provide for the Selection and Training of Leaders of the Various Walks of Life," Advanced School of Education, Teachers College, Columbia University, New York, 1938.

stories without number of the humiliating treatment accorded by instructors to those who are intellectually superior. For instance, there is the case of the teacher who, upon being told that she had in her class the child with the highest intelligence in the school, informed the child publicly that she would now learn her place; that she might think she was bright but would find here that she was no better than the others. Then there is the story of the child of eight whose ears were soundly boxed by his teacher because he was getting the better of her in an argument concerning the relative size and position of the planets. It would be only a half-truth to state that this represents the attitude of all teachers toward precocious children, for there are many conscientious and understanding instructors who suppress their spontaneous jealousy and experience an intense pleasure in contributing to the development of genius.

The second basis for the belief that gifted children should be left to rely upon their own resources is the honest, considered opinion that it is better for them and for society if they are left alone. Witty expresses this point of view when he voices his concern about the publicity which is often attached to the selection and special training of mentally superior children. He[1] says,

> Publicity centering about geniuses may result in stultifying their ability and developing undesirable attitudes in these and other promising children—an unnecessary eventuality that would be ruinous for the children and socially detrimental.

In the same article, however, he recognizes the fact that something ought to be done for gifted children when he says in his concluding statement that "the present social order is neglecting its richest asset, the gifted and precocious child."

[1] WITTY, P. A., Exploitation of the Child of High Intelligence Quotient, *Educ. Method*, Vol. 15, pp. 298–304, March, 1936.

Although the fact is recognized that in certain instances gifted children may be harmed by too much attention, this hardly seems sufficient reason for leaving them to find their way by trial-and-error methods. To say that "Cream will always rise to the top" or "You can't keep a good man down" is to refuse to face the facts. There are a great many factors, both intrinsic and extrinsic, as was pointed out in Chap. VIII, that "will keep a good man down"; and the obvious retort to the homely simile concerning cream is that if the housewife keeps stirring the cream into the milk it is likely to be submerged. The striking success of men like Lincoln and Garfield, who achieved on a remarkably high level despite innumerable obstacles, obscures the loss of many potential Lincolns and Garfields whose abilities have been crushed by the weight of an unfriendly environment.

Intellectually gifted children constitute democracy's greatest wealth. There seems little reason to question Thorndike's statement that "all competent observers of the world's work and workers will agree that a very small number of men and women of great ability and good will account for a very large fraction of the world's progress." This being true, it would seem that public education should feel itself responsible for meeting the needs of these few. Certainly guidance, educational adjustments, and, frequently, financial help should be provided for those who have so much to contribute to society. Even without such help a great many gifted children will achieve success and a few may even completely fulfill their promise; but if society is to realize fully on their possibilities, educators should see to it that all such children are given the best possible opportunity to develop their potentialities. Concerning this duty Thorndike[1] says:

[1] THORNDIKE, E. L., The Distribution of Education, *School Review*, p. 345, May, 1932.

Doubtless great ability will often manage to get education outside of schools or to get along without it, but those who can do so much for the world with so little are the very ones who should be given more. In the wars we are incessantly waging against disease, misery, depravity, injustice, and ugliness, we should not provide our best marksmen with the poorest weapons nor ask our bravest to fight with their naked hands.

While education cannot make a creative genius; it can do much to develop one who has inherited the capacity for great achievement. No form of education will increase the number of brilliant minds, but a lack of the right kind of education can effectively decrease the number of those who make great contributions to human society.

Acceleration

For over half a century acceleration has been the most popular method of adjusting education to the superior learning abilities of the gifted child. Although full acceleration has rarely been effected, it has been, and is, a common experience for gifted children to be advanced one grade. Occasionally this has been stretched to two, but seldom to as many as three. When it is remembered that a child with an I.Q. of 150 is capable of doing high school work at the age of ten, and one with an I.Q. of 175 at an even earlier age, it can be seen that the skipping of a single grade goes only a little way toward adapting the difficulty of the curriculum content to the mental ability of the gifted child.

During the last part of the nineteenth century, flexible promotion was the only method of adaptation. In spite of present-day enthusiasm for opportunity classes and enrichment in heterogeneous classes, rapid promotion is still the most popular procedure. It was first introduced by W. T. Harris in the city of St. Louis in 1868,

when he put into operation a plan whereby pupils could be promoted at short intervals, even in as brief a period as five weeks. In 1886 Supt. Shearer, of Elizabeth, N. J., introduced ability grouping. Each group, bright, average, or dull, was permitted to set its own pace in covering subject-matter essentials. Comparable to this was the Cambridge Double Track Plan, which made it possible for the brighter children to do the eight years' work in six, thus permitting an acceleration of two years. These plans, and many others which attained popularity, all stressed speed.

Two other widely known plans which emphasize the importance of the timesaving element are the Winnetka Plan, developed by Supt. C. W. Washburn of Winnetka, Ill., and the Dalton Plan, used at Dalton, Mass. In each of these the importance of individual instruction is emphasized. Each permits the child to travel at his own rate, requiring only that he master the essentials of the curriculum. These plans, and many others which are variations of the same principle, indicate a recognition by school men of the necessity of taking into account individual differences in learning ability. Although no one of them adequately satisfies the needs of the intellectually gifted child, the contribution which these pioneers have made is great.

It is entirely possible that acceleration, either partial or full, is the best means of adjusting the educational program to the superior child. It has not been—and perhaps never can be—scientifically established that gifted children should keep in step educationally with others of the same chronological age. The problem still has to be approached subjectively, and the considered opinion of one educator is perhaps as good as that of another. Possibly the opinions of gifted children themselves are as valuable as any.

Advantages

In Chap. I it was pointed out that the youngest child in an unselected class is usually an intellectually gifted child. It is true also that the youngest child in an unselected class is usually among the top-ranking students in that class. In other words, the customary partial acceleration of gifted children does not appear to handicap them with respect to scholastic achievement. This is true not only in the elementary but also in the high school and in college. Gray, in a monograph on the undergraduate careers of young college students, quotes a number of opinions concerning the relationship between chronological age and academic achievement. He refers to a statement made by Jones that studies at Northwestern University show younger students to be superior in academic achievement; to an address by former Pres. Lowell of Harvard University, in which he urged that students be allowed to enter college at an earlier age than now because the younger the boy, the more likely he is to be a good scholar; and to Bear, who found that the sixteen- and seventeen-year-old freshmen at Center College in 1925 led all their classmates in intelligence-test scores and scholastic achievement. Gray[1] concludes his survey of opinion with the statement:

> The majority of educators who have expressed their views in the literature on the subject seem to favor the early admission of otherwise well-qualified students to institutions of higher learning, even though they are younger than those with whom they will have to associate. . . . Taken as a group, the younger students do achieve more scholastic success than average or over-age students.

There is little doubt, then, that the truly gifted child will be able to absorb an acceleration of one, two, or

[1] GRAY, H. A., "Some Factors in the Undergraduate Careers of College Students," p. 9, *Teachers College Contributions to Education*, No. 437, Columbia University, New York, 1930.

three years without difficulty. Even an acceleration of as much as four years would not completely bridge the gap in mental age between a ten-year-old child with an I.Q. of 160 and a typical high school freshman.

An argument that is frequently advanced in favor of full acceleration is that it makes it possible for the bright child to compete with others of approximately the same mental age. (No group, of course, is ever truly homogeneous in mental equipment; for that matter, no two individuals are ever mentally identical, even though their chronological and mental ages may be the same.) A bright child, accelerated to a grade in which the subject material is sufficiently difficult to challenge him, will be less likely to develop bad mental habits than if he were required to mark time in a lower grade, where he would be competing with children of the same chronological age but where there would be little or nothing in the subject matter to interest his active mind. Gifted children respond to the latter situation in many different ways. They may become lazy; or they may develop a feeling of frustration, as in the case of David Brown, who at the age of six entered Grade 1.

David could do fourth-grade work with ease, but the superintendent had an inflexible rule that six-year-old children entering school must begin at the beginning. For weeks David was obliged to sit quietly and listen while his classmates of average mentality struggled with the task of reading "I see a cat" and attempted to remember from one day to the next that 2 and 1 make 3. One day, after months of this disillusioning experience, David came home and said, "Daddy, I'm caught in a trap." Many gifted children have experienced this feeling of being caught in a trap and as a result have developed an open antagonism toward formal education. It is possible that acceleration to a more stimulating grade

level would do much toward eliminating both indolence and frustration.

An argument that is a very important one from the point of view of the superintendent or principal is that acceleration places no strain upon the administrative machinery of the school. All that is required is that the child be taken from one grade and placed in another. Moreover, this is a money-saving device, for the shorter the time a child stays in school, the less it costs to educate him. These two reasons probably account in large part for the considerable popularity of this method among school executives. It has the added, pleasant feature of being satisfactory to the majority of parents.

Perhaps the most logical argument in favor of acceleration is that it permits the gifted individual to enter upon his life's work at an earlier age than would be the case if he traveled through school at the usual rate. The saving of from two to four years in time would be especially valuable to the many brilliant students who wish to go to professional school after finishing college. For a young man to have his graduate degree and to be ready to enter upon his profession at the age of twenty-two instead of twenty-five might well constitute a considerable advantage. A number of individuals who have been prominent in American life and letters were graduated at an early age, and it is possible that this fact exercised some influence upon their later eminence. For example, Emerson entered Harvard when he was only fourteen, Longfellow entered Bowdoin at fifteen, and Charles Evans Hughes was graduated from Brown at the age of nineteen. More recently, Berle was graduated from Harvard at the age of eighteen. "Who's Who in America" contains the names of many men and women who seem to have made good use of the time saved through early graduation from college.

On the other hand, it is true that many have found themselves, upon leaving college, seriously handicapped by immaturity. In this, as in all other situations concerning intellectually gifted children, much depends upon the individual. If he is accelerated socially and physically, the chances are excellent that he will not find early graduation from college a handicap. If, however, he is retarded either socially or physically, then early graduation is undesirable and may even prove to be disastrous.

As an example of the first situation, there is the case of the boy who entered college when he was fifteen. In physical development he appeared to be eighteen or nineteen. His social qualities were such that he was elected president of his freshmen class. He was graduated with a Phi Beta Kappa key at the age of nineteen and went on to Yale Law School, from which he was graduated at the head of his class. He was immediately taken into a leading law firm and rapidly developed into a very successful attorney. If this young man had been undersized or socially backward, the three years' acceleration might have been a handicap instead of an asset.

Disadvantages

Although ease of administration, timesaving, and other advantages of acceleration are sufficiently important to warrant serious consideration, they are overshadowed by the disadvantages which are likely to attend a too rapid progress through school. If a child is advanced according to a flexible promotion scheme wherein he is allowed to skip one or more grades, he misses important basic material. This is one of the reasons why so many gifted children do poor work in spelling or make errors in simple arithmetical computation. Most teachers of

heterogeneous groups have little time to help an accelerated child fill the gaps in his scholastic information.

The most serious disadvantage of acceleration, however, is a social one, resulting from the discrepancy which exists between the child's intellectual maturity on the one hand and his physical and social maturity on the other. For instance, a ten-year-old boy who is accelerated five years mentally may be accelerated physically only one year and emotionally and socially but two years. The child is capable of doing tenth-grade work, but actually to place him in the tenth grade might result in numerous maladjustments. This boy of ten, although as large as the average eleven-year-old, would be unable to participate successfully in the athletic activities of fifteen-year-old children. He would have considerable difficulty, also, in adjusting to the social life of the school. The exciting new world of adolescence into which all his classmates had entered would still be closed to him. A ten-year-old child, he would be baffled by manifestations all about him of emotions and social interchanges which he could not experience. This disadvantage alone outweighs all the advantages which can be enumerated in favor of full acceleration for intellectually gifted children.

Terman,[1] taking the point of view that the amount of acceleration should always be determined by the characteristics of the individual pupil concerned, reports on a case of unwise acceleration as follows:

ROGER

For a fifteen-year-old college boy who has been continually in boarding school from a very tender age, Roger presents an astonishing picture of profound childishness. . . .

Roger was nearly eleven years old when first tested by us, and was finishing the seventh grade in an exclusive boarding school for boys.

[1] TERMAN, L. M., "Genetic Studies of Genius," Vol. III, pp. 262–264, Stanford University Press, Stanford University, Calif., 1930.

The Stanford-Binet test gave him at the age of 10-10 an I.Q. of 149 (corrected, 152). A Stanford Achievement Test administered a few weeks later showed him to be advanced in most school subjects to the standards of grades several years beyond that in which he was located. . . . Roger skipped the eighth grade, and entered the ninth grade at the age of 11-3. His progress after that time was at the normal rate. At 15-3 he entered the junior college department of the school that he had attended most of the time since the age of ten.

The wisdom of placing a boy of Roger's type in the ninth grade when he was barely eleven seems to us at least questionable. When still in the seventh grade he was said by his teacher to be a solitary child, "decidedly less popular than the average," though his mother, in filling out the Home Information Blank, was inclined to be more liberal, assigning him an average rating upon popularity and leadership. . . .

At the time of our recent follow-up, Roger's situation was rather pitiful. At an age when most boys are in their second year of high school, Roger was finishing his first year of junior college. He was thus three years accelerated. At this time he not only did not look or act like a college youth, but looked and acted several years younger than he really was. There were transparent attempts to assume the rôle of collegian, but with his round, childish face, short stature, and wistful expression, his stiff dancing-school bow when he acknowledged introductions, and his naïve conversation, the effect produced was that of a young child playing grown-up. He was courteous and responsive, but ill at ease in the presence of the other members of the group with whom he took our follow-up tests. The fact of his precocious school advancement was evidently a source of both gratification and chagrin to him. At one instant he told the examiner with childlike relish that he was a freshman in junior college, "though I won't be sixteen till this summer, and haven't done a bit of studying since I entered the college." A little later he was confessing that he found life very dull. "You get so sick of going to movies twice a week, playing bridge, and then doing the same thing all over again. There's nothing to do, and I'm left out of everything." And he added plaintively, "I can't go out with girls the way the other fellows do because they would all say the girls were cradle-snatchers." . . .

In our judgment, Roger has neither the maturity, the interests, nor the attitudes to make him a successful and happy college student at present. His case is one of the clearest in our entire gifted group of unwise haste in school advancement.

Opinions of Gifted Children

Earlier reference has been made to the Speyer School group of gifted children with whom the writer worked for a time. In the course of that work two hours were given over to a parliamentary discussion of the following proposition, selected and phrased by the children themselves: *Resolved, That intellectually gifted children should be allowed to progress through school at their own rate of speed.* Eight children, under the chairmanship of the writer, participated in this discussion. They were a remarkable group, since only one had an I.Q. under 170. Their I.Q.'s and chronological ages, together with identifying but fictitious names, appear in Table XXXI.

TABLE XXXI.—AGES AND I.Q.'S OF EIGHT GIFTED CHILDREN PARTICIPATING IN A DEBATE ON ACCELERATION

Name	C.A., years and months	I.Q.
Miles	11-5	190
Eva	9-5	197
Mary	9-4	184
Ernest	11-1	175
Nina	10-6	172
Ruth	10-3	171
Donald	9-8	170
Fred	10-7	159

The discussion on acceleration by this gifted group ran for two hours with an intermission at the end of the first hour. A stenographer was present and took down in shorthand every word that was said. Her transcription appears in the following pages. This material not only reveals what gifted children themselves think about the desirability of progressing rapidly through school but also

vividly displays the characteristics of the thinking of brilliant nine- and ten-year-old children.

PARLIAMENTARY DISCUSSION

Present: The Chairman, Miles, Eva, Ernest, Mary, Donald, Fred, Nina, Ruth, parents, and guests.

(The children have some prepared comments. They discuss the number of words contained in their "papers"—86, 72, etc. They tease Miles, asking him whether he has "2,000 to 5,000" words prepared, but he replies that it is "nearer 200 to 500." Before his entrance they ask each other whether "the professor" is coming.)

CHAIRMAN: Everyone will be allowed to talk as long as he likes. You will arise and address the Chair and wait for your turn. Be sure to address the Chair before you begin speaking. Stand while you talk. You may say anything you want to say that concerns the subject.

Will Ernest open the discussion by presenting the proposition?

ERNEST: The proposition is: Resolved, That intellectually gifted children should be allowed to progress through school at their own rate of speed. "Intellectually gifted" means all children of 130 I.Q. or more. "Own rate of speed" means they should be able to go ahead as fast as their I.Q.'s will allow them.

I and the group I am working with think that all these children should be allowed to go through school as fast as they can, because if they are held back, they might develop a superiority complex.

CHAIRMAN: Are there any comments on this?

MILES: This is only a parliamentary discussion and "resolved" should not be used.

CHAIRMAN: Are there any arguments? You may say anything you want to say.

MARY: Our opinions?

CHAIRMAN: Or you may refer to material you have read. What is your point of view?

MARY: I rather think that Ernest is mixed up. I am arguing for moderate acceleration; it would be all right to go ahead one grade, one and a half grades, or even two grades.

CHAIRMAN: Why?

MARY: Well, if you went ahead very far—Well, I don't mean any *special* child, but there is a child named Betty who was skipped one grade and then skipped another grade and then she was skipped again. And she developed an inferiority complex and thought she was very very wonderful. They would lose their friends and nobody would like

them and they wouldn't have any fun. Nobody would play with them. Nobody would care what *happened* to them, because they were stuck-up.

MILES: I have an objection to make. The last thing that Mary brought up was that the child would lose his or her friends. This was brought out in an article recently in the *Times*. But in games of skill a child of high I.Q. could contend with older children because strength would not be at grips there but brain, and his brain would be as far developed as the normal or older children's. When it comes to games of brawn he could associate with children of his own age because he wouldn't be superior or inferior to them.

MARY: Just the same, children wouldn't want to let him into their games because he would have an inferiority complex. Because any person if he gets stuck-up—I am sure from experience and stories and all—no one would want him. They can't expect to have friends if they do get inferiority complexes and affected.

CHAIRMAN: You have made the point that older children wouldn't want to play with you if you were much younger and that they certainly wouldn't if you felt stuck-up.

ERNEST: I don't think anyone would get stuck-up unless they stay in the same grade, and then they really are better than anybody else.

MARY: *Some* people do.

ERNEST: Well, I think very few, less than one out of twenty-five.

MARY: I know about three.

NINA: I know a lot of people stuck-up because they have been accelerated too far. One of my girl friends is bragging that she is in a higher class.

CHAIRMAN: Mary and Nina are saying very definitely that an accelerated child will become stuck-up and egotistic; Ernest says that if they are allowed to stay in the same class they will also become egotistical because they will be the brightest in the class.

MILES: I want to say that Mary has been using the wrong term. She has been defining inferiority complex as stuck-up while superiority complex is the word.

If a child were held back in a class of the same chronological age, he would be doing work outside of school, because the class work will become boring to him. And as it became more so, he wouldn't bother taking part in the class discussions or class work and children would think that the child didn't know the answers. But the real reason would be because he knew only too well and they were too boring for him to answer.

MARY: That may happen sometimes, but not very often. There was Ruth, another girl I know. She was put in another school—Lincoln or Horace Mann, I think—and she was very, very bright and sat in the first row in class and everything, and she *always* raised her hand, to show off.

CHAIRMAN: Donald, do you have anything to say?

DONALD: I will have to find something to argue against!

RUTH: I have a friend who is bragging that whenever they have arithmetic or spelling or any other subjects she always gets ahead and is bored with it. One time I had one of my books home and she took the book and copied an example and worked it just as fast as I did, even though she is only in *4B*.

NINA: I don't think that what Miles said would happen often. They would try to study. If they weren't told that they were better, they would try to keep up with the children of their own age.

CHAIRMAN: Let me say that if you want to bring in any quotations or any references from your reading, do so.

ERNEST: Nina just said that she disagreed with Miles because she thought that a child would have to be told. He *wouldn't*, because if he tried to keep up, he would be able to do that much faster than the others. And then he would just sit around. If he was held back, he would get bored and would have to find something to do, so he would do something outside of school and get still farther ahead.

EVA: Miles said if a child was held back, it would make him feel superior. But if he was left back, he would feel badly.

FRED: When I saw a big boy—bigger than Ernest—very tall and old, marching with little kids, I said, "Look at that big gawk; he must be awfully dumb." They must be ashamed.

CHAIRMAN: This concerns the question of dull children rather than bright children. We should probably keep to the question of superior children here today.

MILES: First, I have an objection to make to the way Mary has been bringing in experience, because she is no expert on I.Q. and we do not know whether the child was really superior or only between normal and superior.

Here, in this question of obtaining a superiority complex, according to Goddard, if the child is kept back and only allowed to go ahead at the pace of the regular public school child, he will develop a superiority complex and that should be seen from the fact that the child is able to do better and more work and can see differences from his own action and those of the others even if he doesn't know he is superior.

DONALD: Eva said that if a child is left back, he wouldn't develop a superiority complex. He would, because he has had this work so much that it has become *boring.*

MARY (heatedly): Miles referred to experience. Why should he take himself for an example, then?

MILES (excited): If you can point out *one instance* in *this* debate where I have used myself as an example I will give you a dollar for each one!

(Children are quieted.)

NINA (to Chairman): At the beginning of this discussion, you said that we should address you as "Mr. Chairman," and no one has.

CHAIRMAN: It would help if you did that, and if each stood as he spoke. It would be easier for us to follow.

(The children act accordingly throughout the rest of the discussion —reminding each other when necessary.)

MARY: Miles said that he would give a dollar for each one—but this is not a *debate,* but a formal discussion!

CHAIRMAN: We are concerned with the question given to us by Ernest. Very often political discussions degenerate into personalities, but we don't want that to happen here.

ERNEST: Eva and Fred said that a child would develop a superiority complex by being left back, but we are talking about being *held back to his chronological age.*

RUTH: I had a friend who was just promoted when I was being skipped. And she was supposed to have been skipped also, but the principal made her stay back, and so this girl started crying and got a great superiority complex. She started to brag about it, that it wasn't fair. I told her that I didn't think so either but that *I* couldn't do anything about it.

CHAIRMAN: I don't want to direct this discussion too much, but I think we have talked about superiority enough. I know you have considered many other possibilities, such as social difficulties, difficulties in making adult adjustments if graduated from college at 16, 17, or 18.

RUTH: The child labor law says that children under 18 may not work. If I were accelerated, I could right now be in second year high school and then, if I went along steadily, by the time I would be 15, I would be out of high school; college four years and I would be 18 and able to work.

MILES: Here I have a big point to bring up in this discussion about adjustments. In the rehearsals we have had before, some of the children have stated that if a child were allowed to finish college much

earlier, it would be hard financially. I want to bring out that if a child gets out of college at even 17, he will have all his time available for attempting to earn a living. He won't have college expenses any longer. He might not be able to go to work because of the child labor law, but he can have smaller jobs and be partially independent. Also if he wants to enter business, he will be gaining experience and then he can get a major job and hold it. By the time he is of age to support others, he will have had more experience in doing it and will have a better chance of obtaining a good job.

CHAIRMAN: Miles has made an excellent argument. Some of you who are on the other side should try to reply to it.

DONALD: It would be almost impossible to accelerate him seven or eight years. I think he could adjust himself, if he has the mental standard to do that.

RUTH: Even if he was accelerated seven or eight years—the child labor law is only for factories and so on. If a child wanted to be a lawyer, he could go right into law school after college or even if he wanted to go in a store, he could get some older person than he is to help him run the store. There would be no law against that.

MARY: I think if Nina or anybody wanted to be *technical*, they could get a better argument, but I didn't think that was allowed here.

CHAIRMAN: We do want to give facts from authorities, although, in an informal discussion like this, it is a little more difficult to do than it would be in a formal debate.

DONALD: If a child went into a profession, he would be glad to have the extra time. If he was kept back, he wouldn't have any time for it. If he was going into medical school or law school, each takes three or four more years. He would be glad to have the extra two or three years that you are arguing for.

NINA: Two or three years—moderate acceleration.

CHAIRMAN: Would some one in your group explain what you mean by moderate acceleration?

MARY: Full acceleration would be three years or more . . .

CHAIRMAN: May I say that Ernest defined full acceleration at the beginning by saying that it meant intellectually gifted children should be allowed to go ahead at their own rate of speed. That is what that group is arguing for.

MILES: I ask those against acceleration to refute this. Their main argument centers about financial and social difficulties and adult maladjustments. They are arguing that the child would not fit into the social world. Any person could see that if they were allowed to finish college, to get into a profession, and to gain experience, they would

have a better source of income for the time when they get married. And I think a person would rather be married to one with a better source of income than to one kept in school. He would have more time to save up and also would be able to provide for a family. Here, with financial difficulties ruled out, social maladjustments are too, because he would be able to gain money from his experience and he would have money to get married on.

FRED: You say that he will have more time afterwards. I say: what will he do *in* college? He won't have any fun there. Besides that, while he is in college, he could earn money enough to be able to pay for a little by having a little job; besides that, he could save up.

RUTH: I object, because Fred said that he wouldn't have anything to do. Full acceleration would mean the child would be physically fit.

NINA: He *wouldn't* be physically fit. Suppose he entered high school at ten, then, Dr. H. said when she was talking to us, he would have to have physical education, or a certain amount of it, and he wouldn't be *fit* for it.

DONALD: There are *many* children now in high school not physically fit even though they are years older. If a person has the mental capacity, he could go in at *any* age.

FRED: If you went to high school or college a few years younger than the others—Well, did you ever see a nine-year-old wrestle with a twelve-year-old and come out on top?

ERNEST: I have seen many.

FRED: You have no proof, no evidence, no witnesses!

RUTH: Let's see yours!

FRED: I tried it.

(The children are all very excited.)

CHAIRMAN: I think the point is good but I don't think we should follow it up any further.

NINA: I don't think we should take Ernest's statement; he has no proof.

RUTH: If you think Ernest is lying—

(This sets off a new storm.)

CHAIRMAN: We aren't going to have any more of this. The points made were very good, but we don't want to quarrel over them.

MILES: Fred has no evidence himself, but the matter concerns intellectually gifted children. According to observations made by many authorities, they develop faster *both* mentally and physically more than other children. We can't say that they develop *just* as fast physically, but brain plays a big part in brawn. In boxing and wrestling a man can weigh more, but if he doesn't know where to

strike, he will never come out on top, because the knowledge of the other man will tell him how to win the match.

CHAIRMAN: Are there any further comments on this?

RUTH: It was said before that, if he was playing football, the child who was fully accelerated wouldn't have fun. But full accelerations don't mean those who are very small. Mary is much taller than I am, although she is younger, so many people like her could go through high school.

MARY: There aren't many children that are so big. I think nine out of ten children are average size or smaller.

NINA: I disagree with Miles because if the college had a wrestling match, the other person would have to know just as much about it as he would, because if he didn't know about it, *how could he get in college?*

MILES: I don't want to quote personal experience, but it stands to reason that, in a good football team, someone behind the team would have to look up the plays because two teams would try to match each other by developing plays, going by trick plays that will win the game, and here an intellectually gifted child would be the best person to fit into it because he would be the best fitted to devise schemes, although he might not be physically fitted to play in the game.

ERNEST: Even though an intellectually gifted child may be younger, he can play football with the others; you have seen many men as big as others being knocked out.

NINA: Miles said that maybe he would figure out plays. Suppose he wants to *play* football? And, *after* college, he can't.

ERNEST: Why not?

FRED: If a child is too small, he can be tackled better.

ERNEST: When he is out of college, he could play with those his own age and weight. Nina said he can't play when he is out of college.

MILES: This statement about not being able to play after college: He could play with a team of his own age. There would be no restriction; it is just up to himself what he is going to do.

I don't believe that many intellectually gifted children would *want* to be football players. They would be interested in chemistry, and so on.

DONALD: What if he *don't* play football—it would not *ruin his life!*

NINA: Perhaps a little bit. I don't think there is so much enjoyment outside of college as on college teams—the crowds, the cheering, and everything.

CHAIRMAN: Let's turn to the social difficulties involved. Fred, you had some ideas on that subject?

FRED: I think that if the gifted child is accelerated four years or more, he wouldn't be able to keep up with the others.

CHAIRMAN: Why not?

FRED: Well, a kid almost all the time has a girl—all the others in college are the same age—he wouldn't have any boy friends of his own age or any girl friends.

DONALD: In the Minnesota *Journal of Education* it says: "Pupils so chosen are segregated for class work only and so may associate with children of their own chronological age."

NINA: Suppose you want to go to dances? You are not invited because you are too small. Can you *picture* somebody trying to dance with someone much smaller!

MARY: It would be very uncomfortable. I saw a girl dancing with a dog—

MILES: Who has ever seen anyone go out and dance with a dog! Here we are discussing dancing with human beings. That is irrelevant. In these social difficulties, what Donald brought up has something to do with it. He can't go back with children of his own age. We have often heard of child marriages. If a child gets married, it doesn't have to be a child marriage.

NINA: I don't think that makes sense!

RUTH: We had a maid who was just about eighteen but she was very small and she had a boy friend, she had a great big boy friend, and they went out to dances so frequently.

CHAIRMAN: Some of you had more to say about full acceleration.

DONALD: We are for acceleration, but not to a point that is harmful.

CHAIRMAN: What do you mean by harmful?

DONALD: As far as the child can *take* it.

RUTH: To go ahead as far as he can mentally, but not to be harmed mentally.

MILES: As far as a child can go, and tests will tell whether he knows what goes before, or not.

FRED: All these are trying to explain is that they think a child should go ahead as far as he can, without missing anything he would *need.*

CHAIRMAN: You must define your terms better. What is meant by *full* acceleration?

DONALD: I *have* defined *full* acceleration. I say it is to a point where the child can *take* it.

MARY: I disagree, if he says that we are just for acceleration that way. If a child could go ahead, then just let him go.

CHAIRMAN: As I understand it now, those on the affirmative are still in favor of full acceleration but want to guarantee to the bright child the right to cover all the needed material before he goes on into high school or college; they want him to have a chance to get fundamentals.

MILES: If he has the required knowledge to pass the tests with high marks.

RUTH: I think that acceleration would also mean that—supposing a child would be accelerated five years in every subject except, let's say, geography, then I should think that he would be allowed to have the books. I'm only in the fifth grade English and in the sixth year history, and so on. I think that's how a child should be, so that he would be able to go ahead in all his subjects.

NINA: Last time I think it was Donald that asked the question of the negative team what a child is supposed to do, if he is only accelerated a few years, if he has finished the work earlier. I think he should be allowed to work on some subject that would ordinarily be out of school.

DONALD: That would be developing a superiority complex to the children in his class. He would get so bright that he wouldn't play with them.

MARY: Some children do study out of school. Lots take piano lessons, dancing lessons, and all sorts of lessons. Frances does, Thelma does, Barbara, Jack, I, and others. Lots of children do it, so I can't see how anyone should get stuck-up about it. And if you take other lessons out of school, *please tell me* where you can get them if you don't have a tutor!

CHAIRMAN: That is a good point—to get enrichment at home.

DONALD: He would develop a superiority complex. If he stayed out of school, they would be so far advanced in the other subjects, what would happen to him?

NINA: I don't think he should stay out of school. Here we are having different subjects. At the other schools they don't study outside. I didn't. Maybe some do. We have units. There may be more than one bright child in the class and the others might try to keep up with them.

MILES: In the point that Mary has brought out, I want to make a comeback to it. She has brought out music. I have Hebrew lessons out of school. She says something like enrichment. In half the class in most schools the children study these different things. But the point is that if you haven't a good ear for music and can't play, it doesn't mean that you have to sit down and sulk the rest of your life; there are things you will have to use—all kinds of arithmetic; if you want to be a good

salesman, you will have to know English, etc. Those are subjects which most people don't take out of school. The things you (Mary) brought out are not important unless you are becoming a maestro or something.

RUTH: There is not a child I don't think in the two Terman classes that don't have one special thing like music—

FRED (bursts out): I don't take any!

RUTH (resuming): That is, only one or two, out of fifty. They might not develop a superiority complex for music. *But* I know that I could read a lot in my father's library. *Then* if there was a child like that he would develop a superiority complex if he was allowed to go at modified acceleration only. But if he went at full acceleration he could take those books and read them and go at his own rate of speed.

(Donald and Fred have been drawing. Chairman comments on this. The boys stop.)

MARY: Donald said that if they took lessons out of school, it would give them a superiority complex. But that can't happen in anything besides music and dancing and drawing and handicrafts and military things, because—well, so far Donald or *anybody* hasn't been able to answer my question: Where could they get lessons in other things unless they had a private tutor?

DONALD: Let me see now—

NINA: It may not be the right thing to do, but I start to disagree with Mary, because I know a lot of children whose mothers and fathers could help them. If a child is bright, he could help himself. This may not be a good thing to do, to oppose my own side, but it is true.

CHAIRMAN: You have a good point there.

FRED: To bring up Mary's point. I think if a boy was better than anyone else in dancing lessons or telling stories, he could just come out with all he knows, he'd think he was *so* smart.

DONALD: I want to answer Mary's point. Where could he develop a superiority complex? There are arithmetic, history, and the other subjects.

CHAIRMAN: Mary is suggesting a good substitute, enrichment in the home, through the home library, dancing lessons, music lessons, etc. I suggest that you four negative people stick to it.

DONALD: What about *poor* children? What about the children in the *South?* Maybe they haven't a good book to their *name!* They don't have books.

MARY: Don't I know! I've lived there! Mr. Chairman, there are libraries all over the world, even where there are poor children. And if they lived way off they could walk or hitch-hike to the libraries.

FRED: We are talking about the Southern country boy and he hasn't any books or libraries. But he can go through the woods and learn a lot about nature.

DONALD: Still he isn't advanced in his other school subjects.

NINA: Sometimes children inherit some of their knowledge from their parents. And so if the parents didn't know enough to earn enough money to buy books, how can the child know enough to want books?

CHAIRMAN: It is true that there is a relationship between size of library and intelligence of children; you have hit upon something which Prof. Bagley pointed out a long time ago.

MARY: He could study some kinds of arithmetic, addition and subtraction, if his mother or someone explained to him. He could say: "There are four purple flowers (using vase on library for example) and four yellow flowers," and so on. Or if he said, "If I have picked ten red flowers and three got crushed, how many would I have?" He could get a little *arithmetic* in. He could get *English* when people come to visit and when he went into towns or cities, because everyone does go in *sometimes*. He could get his own family *history*.

CHAIRMAN: I don't think this point needs to be added to because she has made it very clearly: it *is* possible to learn outside of school.

RUTH: I have a very good friend in the South who has *never* been in town. They haven't any schools down there. And *also* I object because —well, I don't think *we* are going through with full acceleration, yet my mother teaches me some of the work in high school and my father knows enough to teach me something about law; I take music lessons and my parents try to teach me English; we have a maid that's German and I am learning German; and I am going to learn Russian and Hebrew; and French we have at school; and I am taking dancing, dramatic, and art lessons—so *what more* do I need for full acceleration!

MILES: Mary says a child could learn by himself. From the reports of very eminent men, when a child is born he is no better than an ape. He has to be taught in order to learn. Otherwise he stays just as dumb *as the day he was born*. If you say he is going out in the woods and know things without a tutor, then you are mistaken: if he comes in contact with children who have had tutors he will have an inferiority complex.

MARY: Well, first, Ruth was arguing for our side and now she is on the other side. Then, in answer to what Miles is saying, I didn't say that he would go out by himself and learn things; I said if his mother told him about different things, then he certainly could learn it, because if he didn't then someone else would turn up to teach him.

FRED: About Ruth. First she said that she had a friend in the South without schools or cities. But then directly after that she brought up tutoring at home by the parents. This is just what the girl *would* get. Then, Miles says if a boy went out in the woods he wouldn't think anything of it. I think he would see flowers and colors and birds and would learn to appreciate them and love them. He would want to know who made them, and everything.

DONALD: He wouldn't know enough to do it.

NINA: In answer to Miles's statement about being born without knowledge: what about his parents? Are they *deaf mutes* or something? A child learns to talk, at least, from his parents. He wants to inquire about different things from his parents.

ERNEST: In answer to Fred. Well, instead of that, I think a boy would take it all for granted. He would probably see them every day and would probably take them for granted.

CHAIRMAN: May I raise this question, Wouldn't the amount of learning vary among different children? We are speaking of *intellectually gifted* children.

MILES: I would like to make some definite answers to Mary, Nina, and Fred. When a child opens his eyes, he is very young and he hasn't any intelligence. His intelligence is marked according to how much he has for his age. He may have a lot relatively, but, in relation to the intelligence of older people, he has very little and he wouldn't have enough to think why they were there. The second time he saw them he wouldn't think much of it either and as time went on he would be used to seeing it and he wouldn't be used to asking questions, *because* he would take it for granted because even when he was born they were there.

Then, Fred stated that a child would get an education from his parents, that he would learn to speak, etc. Yes. He would learn the things that the parents *through necessity* had remembered, but you can ask plenty of school teachers in New York City and they don't remember things. For example. I asked one about square root and she didn't know. The other things his parents will have forgotten because they haven't had occasion to use it.

FRED: Miles's first statement: He said that a child kept seeing these flowers and wouldn't notice them. I think there are so many things in the woods and so many things about them that each day he would learn a little bit more.

MARY: Miles said that when a baby was born he might have, say, 100 or 200 or 300 brain power but older people have more: but *how do they get it* without learning?

CHAIRMAN: This may help to clarify the matter: the issue is between formal education in schools and the education which we get more or less indirectly through experience and through the casual teachings of other people. Miles is for formal education and Fred, for instance, is for indirect teaching.

RUTH: I object. First, when Fred said that I was only taking this friend and then showing that you could get languages and everything at home. That doesn't make a person brighter, because even if you go abroad and see things as, let's say, he is going in a store in France and didn't know arithmetic and gave the man a five-dollar bill—he wouldn't know how much change he should get. Suppose the store keeper wanted to cheat him or was dumb. If he took my money, and I knew I deserved some change, I could point it out to him.

CHAIRMAN: In order to give you time to prepare yourselves, let me say that I am going around the table and give each of you a chance to tell what he thinks should be done. We will have a moment longer for general discussion.

ERNEST: I have another answer for Fred's statement. You live in the city and see houses every day—do you think who built them?

RUTH: Would you if you weren't gifted?

FRED: No, because most of them in my city are just the same. But the woods are always different.

NINA: First of all, I would like to ask Miles to give Mary a dollar, because at the last discussion he said he would for every time that he took himself for an example and he took himself for an example just before, when he said he went to some New York teachers about square root!

In answer to Miles again, I want to ask him did he ever wonder about houses when he first saw them?

CHAIRMAN: We will take time for just one more reply and then give each a chance to give his position.

MARY: Since some of my opponents said that they probably would take flowers and things for granted, some might take *arithmetic* for granted and just learn it because they have to and so even if they do go to school and get taught they don't take a great interest in arithmetic all the time.

CHAIRMAN: I am going to ask each of you for your personal opinion. Ernest?

ERNEST: I am still for the affirmative, that each child if he has a high I.Q. should be able to go ahead as far as he may, going by tests and results on tests.

May I reply to Fred? You said that you love to go out in the woods —well, that's because you do live in the city and there you won't find many trees and flowers, but one who sees them every day would love to come into the city just as you would to go into the country.

NINA: What are we talking about now? About last Thursday or what?

CHAIRMAN: Do you think an intellectually gifted child should be fully accelerated?

NINA: I don't believe they should, because suppose a child were eight and were put into high school, as someone already said, what fun would they have? They wouldn't be able to take part in any games, they wouldn't have the ability to. And if they went into college at eleven, they wouldn't be able to do anything either. If they were put ahead one or two years even although he could go farther, I think if he weren't told that he could go ahead more he would try to study outside of school, and that's all right as long as you don't boast in school.

DONALD: I am still for the affirmative. I want to bring up the A.Q., the Achievement Quotient. If the Achievement Quotient is also good enough that he can achieve in high school and college program I think it would be all right.

RUTH: I am still for the affirmative because I think that if a child's got the ability even if he isn't tall he will feel he has and will hate the other children and all his surroundings if he is kept at modified acceleration.

I have two more statements. First of all—jokingly, maybe—on Mondays, Wednesdays, and Fridays, on WHN at 7 o'clock there is a program and you will get an Emerson radio if you bring up a question. I think I will send in this question we have been discussing.

And also, to the statement that Fred made that he loved to go into the woods. There are so many different kinds of things in the woods that the only reason he does is because he knows about everything and the rest he could pick up, but if he didn't know anything about it then there are so many different kinds of trees, leaves, and everything, that he wouldn't know *anything*.

FRED: I am for modified acceleration. I think that a gifted child should be accelerated a few years because when a person is young, between the ages of four and seven, he grows very rapidly and age is a great difference, but when he gets older, ten or eleven, there isn't so much difference in height and unless he is very short or very tall there isn't much difference. So if he is accelerated a few years, he can make

up to this in high school and will be just as big as the other boys on the teams.

MARY: I am still for modified acceleration because I think it would be all right. Like in this school, you go ahead as fast as you can but you do the grades just the same. In the regular school, if you are skipped once and go on for a little while, you could be skipped again. But more than two years would be silly. If the child could take more than that the parents could teach them at home. My mother lived near Mexico and she is going to teach me Spanish. I am for different lessons outside of school, and *in* school if they don't have anything else to do; if it is a school like this, he could get books from the library upstairs and there would not be time to get bored, and I think there should be more schools like this one.

MILES: I am the last speaker here and I would like to answer all the negative team's arguments, but first I want to rid myself of a debt. When I made that statement I used the teacher as an example, not me.

In answer to Mary: The child *would* take it for granted, and I am going to ask her if she can remember what she saw the first time she opened her eyes and I *will* give you a dollar!

Fred's statement was arguing for full acceleration. I believe that full acceleration will not hurt under the conditions we have set down.

I believe that most of the negative-team arguments have been pushed down. I have answered the question of maladjustment. Others have answered the other arguments. And about growth and development, if a child were put ahead it has been answered that in games of brawn he could stay with children of his own age and in games of skill he could go with older children. If it is as Fred says, but I don't believe it is quite the way he says it, then to push him ahead entirely wouldn't be bad from the point of view of physical development: Fred says that a child doesn't grow much when he gets older. I don't believe that any school would give any child a physical-development program that would tax him to the maximum; I think they provide for a margin of safety.

(Discussion is officially closed here, but the children continue with animation as they return to their classes.)

CHAPTER XI

EDUCATIONAL ADJUSTMENTS: ENRICHMENT

1. What are the advantages and disadvantages of enrichment in a heterogeneous class?
2. How may the home contribute to an enrichment program?
3. What principles should govern the conduct of the special class?

As the defects of acceleration, in terms of skipping grades, have become more widely recognized, various methods of enrichment of the program of studies for intellectually gifted children have increased in popularity. Those who favor a policy of enrichment feel that a broad and well-integrated body of knowledge is a much better foundation upon which to build a career than is a period of three or four years of time saved.

Details concerning the several kinds of enrichment programs belong in a book on teaching methods rather than in one on the psychology of gifted children. Consequently, this chapter will deal in broad outline only with the problems involved in such a program. The most important question has to do with the relative merits of enrichment within the heterogeneous class and enrichment within the special class. Either procedure has much to recommend it.

Intraclass Grouping

Grouping within the heterogeneous class liquidates many of the objections which were discussed at the beginning of the preceding chapter. Neither pupils nor parents are likely to feel that a child has been stigmatized because he has been asked, in company with a few other children,

to give additional time to arithmetic drill or to feel that a bright child's head will be turned because he has been asked to make a special report. Intraclass groupings rarely excite resentment because the emphasis is placed upon subject achievement rather than upon intellectual capacity. It is much easier for a parent to admit that Mary is a poor reader than to grant that her I.Q. is only 75. From the practical standpoint, this is an extremely important advantage of differentiated instruction within a class made up of children of varying intellectual levels, as opposed to a system which involves segregation. No theory, however good, will work in a democracy unless it has the support of the public.

Flexibility

Intraclass grouping is characterized by flexibility. Under this plan a child who has shown that he cannot do so much or so difficult work as the others in the group of which he was originally a member can be transferred to another little group without administrative red tape. Moreover, this plan makes grouping within the subject itself relatively easy. A certain amount of unevenness in achievement is characteristic of all children, a fact which makes classification according to subjects desirable. A child might be doing such excellent work in history that he would be placed in the rapid group and given an opportunity to broaden his knowledge in that field. The same child might be doing relatively poor work in arithmetic and so be placed with a slow group which was giving special attention to drill.

The typical gifted child is superior to the average in all subjects, but there are a number of individual cases of marked unevenness. For instance, it frequently happens that a bright child does poor work in handwriting or spelling; in a system of intraclass grouping, he would be

placed with the slow group in these two subjects. His placement there would help to keep the other children from feeling that the groupings were arbitrary and prejudiced. As an example of the sort of attitude that this kind of classification builds up, there is the reply of the fifth-grade boy who, when asked who was the brightest child in his class, said, "Well, I don't know. David knows the most about arithmetic, Martha is the best reader, and I think I know the most about history." Feeling that you "know the most about history" is perhaps a more desirable slant than feeling that you have the highest intelligence.

Use in Rural Schools

A strong argument in favor of enrichment within the heterogeneous class is that it is the only possible method in small school systems. The one-room country school, which has by no means gone out of existence, has had more than its share of criticism during the last two decades, but in this school the gifted child frequently had—and has—better opportunities for development than his city cousin. The degree of opportunity provided him depends to a considerable extent, of course, upon the vision of his teacher. The attitudes of many eminent individuals of today concerning the benefits which they derived from their years in the little red schoolhouse are not based wholly on nostalgia; in many cases they come from a realization that there they enjoyed a freedom in intellectual exploration which would have been denied them in the typical urban educational factory.

Modification of Curriculum and Methods

The disadvantages of intraclass grouping are many and serious. Under this plan it is difficult to modify either the curriculum or the methods of teaching. The subjects

studied by a heterogeneous class are determined by tradition and by the needs and interests of average children. There is little or no opportunity, for instance, to introduce into the middle grades such subjects as biography and French as a means of broadening the scholastic and informational background of mentally superior children. There is little opportunity, also, for modification of methods, no matter how eager a teacher may be to help the bright children in her class. Knowing that the average children need a large amount of drill, she feels forced to put the superior children through the process whether they need it or not. Knowing that detailed explanations, often repeated several times, are needed by average children, she is forced to make the bright child sit and listen attentively while what is already simple to him is being simplified.

A favorite method of enrichment within the heterogeneous class is that of asking the bright members of the group to do more work such as, in English, bringing in additional book reports or writing extra themes or stories. Some bright children, previously trained in laziness and observing that their more fortunate though less intelligent classmates have less to do, resent this as unfair. If these children were in a special class, where all were doing a considerable amount of work, this attitude would not be so generally found. The gifted child, like a contestant in an athletic event, desires and needs competition. One of the serious disadvantages of the heterogeneous class, insofar as the gifted child is concerned, is that it provides little or no competition.

The principal objection to enrichment for gifted children in the heterogeneous class is that in most cases it fails to work. Teachers are human beings with all the failings of human beings. Consequently, most of them prefer teaching procedures which require the least amount

of time. They find it much easier to treat the class as a unit than as a loosely organized group of subgroups and individuals. Mass education is infinitely simpler than individual education. Whenever there is time or thought for variants, the pressure from parents, school officials, and children is all in favor of more help for the dull. Teachers, even those with vision, are not keeping their bright children in at recess and after school for special help even though in many instances these children would welcome the additional guidance; rather, it is the children of low mentality, who, much against their will, profit by the extra attention. There is, the country over, very little actual enrichment for intellectually gifted children in the heterogeneous classes of the public schools.

Teachers who do make provision for individual differences in their classes do so in many and varied ways. Hymen Alpern, in a report appearing in "Educating Superior Students," gives the results of a questionnaire which was sent to the modern language department in each of the senior high schools of New York. One of the questions in this questionnaire was as follows: "If your department is too small to warrant grouping of pupils by differentiated classes, how do you provide for the varying ability of students within each class?" Alpern[1] lists the following answers from those who made such provisions:

Individual coaching is done by teachers and the brighter pupils. Teachers hold conferences with the pupils, their grade advisers, and their parents. While the abler students are preparing some project, the teacher gives intensive drills to the slower pupils. Teachers grade questions to suit the ability of individuals. Questions on new matter are asked of the abler pupils first. Additional work is assigned to bright pupils. Segregation into three groups—rapid, average, and slow—is practiced. Homework assignments are differentiated. Adjustment of recitation devices is made—giving slower pupils simpler

[1] COHEN, H. L., and N. G. CORYELL, "Educating Superior Students," pp. 215–216, American Book Company, New York, 1935.

exercises to work out and sending poorer pupils to the board for review or very simple work. The project method is used, or individual instruction, or supervised study, or supplementary reading for bright pupils. Slower pupils are seated in the front of the room. Outside reading is assigned to brighter pupils. Brighter students do original work for the language clubs. "Make-up" classes are arranged for slow pupils. Bright pupils make up special notebooks, or look up illustrative material. Bright pupils contribute to the school foreign language paper. Bright pupils report to the class on special topics concerning which they have made independent investigation and research.

In response to the question "In what respect does the work done with bright students differ from that with average students?" Alpern[1] summarizes the replies as follows:

One school states that it makes no difference except in one special college preparatory class. In this class there is more oral and aural training and sight reading. Three schools state that bright pupils are encouraged to activity in language clubs. Six schools state that the pace is quickened. Of these, five take less time for a given amount of work; one increases the amount of work done in a given time. One department states that the bright group does supplementary work during one regular class period a week while slower pupils are receiving drill and doing individual work. Six schools state that the bright pupils have an enriched course. Six schools state that the bright pupils do additional supplementary reading. Six schools state that the bright pupils are given more oral work. Two schools state that the bright pupils do more creative work. Seven schools state that the bright pupils do more reading (not supplementary). Four schools state that the bright pupils do more composition work. Three schools state that the department aims at more individualization with the bright student. Several departments report that the bright students are encouraged to correspond with students in foreign countries.

Osburn and Rohan[2] present a program for enrichment in "Enriching the Curriculum for Gifted Children."

[1] *Ibid*, pp. 216–217.

[2] OSBURN, W. J., and B. J. ROHAN, "Enriching the Curriculum for Gifted Children," The Macmillan Company, New York, 1931.

These writers, believing that neither segregation nor acceleration is desirable, seek to broaden the school life of the gifted child by making it possible for him to participate in absorbing constructive activities. They do this through a variety of school clubs, which are open to high-ranking students. Osburn and Rohan feel that these clubs not only serve as a stimulus to scholastic endeavor but also provide opportunities for discovering and developing individual aptitudes and for exploring vocational interests.

Enrichment at Home

Since gifted children tend to come from a superior socioeconomic level, it is possible and in many instances desirable for them to acquire at home the needed enrichment of the school program. Instruction so received is not often direct, as in most cases parents do not have much time to devote to teaching their children; but a great deal can be done indirectly through conversation and reading. For example, there is the case of the gifted boy of ten who became interested in history. He read all the books in that field that were in the home library, discussing them at length with his parents. It is possible that this unhampered, undirected kind of enrichment is more valuable than a well-organized program would be.

There have been a number of famous instances of men who received their early education at home. Frequently the requirements set up by the parents are of the most rigid kind. More often enrichment at home is largely a matter of encouragement and of making available opportunities for contact with worth-while books and with cultivated people.

The most famous instance of a successful program of home training is that of John Stuart Mill, great English

philosopher. Cox[1] reports on Mill's early education as follows:

Until he was 14, Mill was educated at home by his father. He began to learn Greek at 3; and from then to his 9th year he studied Greek classics, making daily reports of reading. At the same time under his father's direction he read innumerable historical works. At 7 he read Plato; at 8 he began the study of Latin. Before the end of the year he was busily reading the classical Latin writers. He did not neglect mathematics: at 8 his course included geometry and algebra; at 9 conic sections, spherics, and Newton's arithmetic were added. In the latter he "performed all the problems without the book and most of them without any help from the book." At 10 and 11 both mathematical and classical studies were continued; astronomy and mechanical philosophy were also included. In fluxions, begun at 11, Mill was largely self-taught. One part of his course, the writing of English verse, he heartily disliked. At the age of 12, philosophy and logic, inculding argumentation, became important parts of the program. Daily debate with his father, who taught him above all things to accept no opinion unchallenged, was a most stimulating exercise. At 13 a complete course in political economy was undertaken with intensive supplementary reading. Young Mill attended also a course of lectures on chemistry at the royal military college. In spite of the wide variety of subjects and the early age at which he started to study them, Mill's education was not one of cram; complete understanding was made to precede, or at least to accompany, every forward step. Self-conceit of a sort was guarded against, for the boy never heard himself praised; moreover, he had no one with whom to compare himself except his father, and this comparison was always humbling to his own pretensions. His father's frequent request for the definition of words used accentuated young Mill's sense of ignorance.

Instruction at home played an important part in the education of such men as Thomas Macaulay, Thomas Edison, Karl Witte, Louis Pasteur, and Charles Lindbergh. Thomas Edison's teacher considered that the boy was dull, if not actually half-witted, and placed him at the

[1] Cox, C. M., "Genetic Studies of Genius," Vol. II, pp. 707–708, Stanford University Press, Stanford University, Calif., 1926.

foot of his class. She complained that Thomas was forever asking questions that had nothing to do with the lesson. His first school report was so bad that his mother, a former teacher, decided to educate him at home. Under her sympathetic and understanding instruction, he soon demonstrated his great mental powers. Before he was twelve years old, he had read such books as Gibbons' "Decline and Fall of the Roman Empire," Hume's "History of England," and Burton's "Anatomy of Melancholy." When he was eleven years old, he became interested in chemistry and physics, in which latter field he was later to display remarkable genius. One stands aghast at the thought of what the world might have lost if Thomas Edison had been deprived of the rich education which he received at home.

The help which Witte, Pasteur, and Lindbergh received was of a more indirect nature. The fathers of each of these men provided an intelligent and understanding companionship. In each case the father's position was such that contacts with people of culture were available to the growing boy. It is often overlooked, for instance, that Charles Lindbergh's father was a Congressman and that each year, from the time that Charles was five until he was fifteen, he spent some time in Washington, where he played with Quentin Roosevelt and made other similar friends and where he had the opportunity of meeting men distinguished in public service.

Home training has also proved to be helpful to many gifted children of the present. Stedman[1] reports, after five years of personal experience in working with a group of young geniuses in a special class, that those children who came to her with a background of home teaching possessed a large fund of general information. She says

[1] STEDMAN, L. M., "Education of Gifted Children," Chap. XV, World Book Company, Yonkers-on-Hudson, N. Y., 1924.

that the home-trained gifted child, even though he has had no formal school education, can at the age of nine or ten do sixth- or seventh-grade work in an opportunity room. Occasionally some of these children need special help in certain of the mechanical subjects such as handwriting and, less frequently, arithmetic. This is to be expected since, as a group, they are more accelerated in content subjects than in tool subjects. Almost any gifted child, if given encouragement and if provided with opportunities at home, will have amassed, at the age of nine or ten, an extraordinary amount of information and will have developed a facility in oral and written expression that is comparable to the typical high school student.

Concerning the means used by parents to educate their children, Stedman[1] says:

> The method of teaching employed by the parents of our gifted children has usually been favorable to the development of individuality. "Let the child be free," "Loose him and let him go," is the essence of their educational philosophy. Teaching has been incidental, informal, and exceedingly effective because administered in response to a "felt need" on the part of the child. The mechanical processes have been taught through games originated by the parents and by the use of much concrete material. Self-activity and self-expression in some definite concrete way have been fostered. The gifted child usually has a hobby which he is permitted to indulge, such as writing books, painting, modeling, inventing toys or mechanical apparatus, and numberless other creative activities. These interests lead to investigation, wide reading, visiting libraries and museums, collecting data, using the research method, and attacking problems in a scientific manner.

It must be kept in mind, however, that a large percentage of intellectually gifted children come from homes which can contribute little to their cultural development. Children of such homes must depend upon the school to satisfy their intellectual needs.

[1] *Ibid.*, pp. 184–185.

Principles of Education of Gifted Children in Special Classes

The segregation of intellectually gifted children into a special class makes it possible to meet their specific educational needs more adequately than in a heterogeneous class. This can be done through a far more complete adaptation of curriculum content and methods of instruction than is possible in any unselected group. The special class, too, makes possible a combination of acceleration and enrichment. The amount of acceleration, as was pointed out earlier, should always be dependent upon the characteristics of the individual child concerned. For the typical gifted child, two years is not excessive, but in certain instances no acceleration at all should be permitted and in others as much as three years can be absorbed. In a special class the amount can be determined upon and then carried through without any basic material's being skipped. At the time this acceleration is taking place, the child is benefiting from an enriched course of study in which a broad base rather than a high altitude is emphasized.

In the adaptation of curriculum and methods to the abilities of gifted children, it is necessary to keep in mind that they differ from other children not in kind but in degree. Consequently, many of the principles underlying an enlightened education for average children are basic also to an education for mentally superior children. In the following discussion, emphasis is placed upon those fundamentals which are of greatest importance in the conduct of a special class.

Needs and Interests of Children

There has been going on for a long time in American education a conflict between those who maintain that

education is preparation for life and those who maintain that education *is* life. At present the battle appears to have been won, insofar as theoretical discussion is concerned, by the latter school, but in actual practice the former is still far stronger. In this debate, as in most arguments, the man who stands in the middle, between two extremes, is most likely to be right. The middle-of-the-roader takes the stand that the curriculum should avoid unduly emphasizing either preparation for adult life or the interests of the immediate present, but should rather be made up of material which will be both utilitarian and interesting—which will on the one hand provide the child with information which will be basic to his adult activities and on the other be so selected as to have meaning for him. It is relatively easy to apply this principle to the education of gifted children, for they are more interested than average children in the kind of subject matter which is usually considered as an important part of the preparation of the child for adult life.

In the education of gifted children, and of all others, for that matter, no subject should be included in the curriculum because of its supposed disciplinary value. As Thorndike has said in this connection, "Whatever is valuable mainly as general training for the mind may be eliminated. The education which enables great abilities to do their proper work will give sufficient general training to their minds." If a gifted child happens to become interested in Latin, Greek, Hebrew, or Arabic, let him study it because of that interest and for the values which he may in later life derive from his knowledge of the language. Greek to a Greek professor is as utilitarian a tool as a hoe is to a farmer. It should be kept in mind in the education of gifted children—indeed in the education of all—that no sharp line can be drawn between the utilitarian and the cultural.

Rich Background of Associations

The special class provides an excellent opportunity for providing gifted children with a rich background of associations. Time which would in the typical heterogeneous class be given to drill, or to doing nothing, can here be devoted to intellectual excursions of great interest and value. The gifted, more capable than the average in acquiring their experiences vicariously, will with a little direction cover an amazing amount of ground. In this process of collecting facts, so satisfying to the gifted child that frequently he reads the encyclopaedia just for the fun of it, care should be taken that some meaningful creative use be made of the information gathered. There are already too many people who possess the kind of intelligence which easily acquires and retains facts and yet are unable to integrate them. It is one thing for a child to know the name and date of a battle and quite another to have those facts woven into the pattern of his thinking. The following story will serve to illustrate an instance in which this transfer was made.

A six-year-old boy with an I.Q. of 170, who had already read a good deal of history, was reporting at home one afternoon on a battle royal which had occurred at school that day. It appeared that one of the older boys had been maltreating a number of smaller children. On this day a gang from the primary grades banded together, attacked the bigger boy in a body, beat him soundly, and dragged him off. Said this gifted second-grader, who had participated in the fight, "We Waterlooed Danny." This child's associative background was functioning perfectly.

Standards of Achievement

One of the objections to leaving gifted children in heterogeneous classes is that in such classes the accepta-

ble standards of achievement are necessarily low. In the special class high standards must be set and every effort made to see that the children reach them. Norms for the usual achievement tests have little value in gauging the accomplishments of highly gifted children beyond showing that they have mastered the regular work of the school up to a certain grade level. These tests reveal much concerning altitude of achievement but little concerning breadth. To evaluate properly the results of the enriched curriculum of the special class, tests which sample the contents of that curriculum must be used.

It is an unwise procedure for any child to compare his school achievement with the achievement of his classmates. It is much more unwise for a gifted than for an average child to do this. If he wishes to make comparisons, let him do so with his own previous work; or, through his knowledge of biography, with the early achievement of men who became great. Such comparisons will tend to keep him modest and to spur him on to greater endeavors.

Learning to Think

A great deal has been said and written concerning the importance of teaching children how to think. The results of attempts to instruct average and below-average children in the art of straight thinking are meager; as a matter of fact, they are none too positive with gifted children. Even the most intelligent of men arrive at their conclusions along pathways of emotion as well as of reason. Although intellectually gifted children and adults, even jurists and scientists, are by no means unemotional thinking machines, their conclusions are, nevertheless, based to a much greater degree upon processes of logic than are the conclusions arrived at by less intelligent individuals.

Special-class children will be found eager to do their own thinking. Although they should be encouraged in this self-reliance, they should also be made to realize that it is important, in doing one's own thinking on any problem, to become familiar with the facts relating to that problem and to consider the opinions of authorities. Gifted children, having met with little competition from other children and often in conversation with adults found themselves the better informed, frequently tend to consider themselves as authorities. For instance, in connection with the parliamentary discussion appearing in the preceding chapter, one of the boys remarked most confidently that some day he wanted to have a long talk with Prof. A on the education of gifted children, because he felt that the point of view of the professor, who is an authority in this field, was wrong, and he wanted to set him right. It was with some difficulty that the boy was convinced that before he argued the matter with Prof. A, or even with the members of the debating group, he should go to as many sources as possible to find out what research workers had learned and what leading educators thought concerning the question to be discussed.

Development of Creative Resources

Not all gifted children possess sufficient imagination to be truly creative. However, no child can be creative on a high level without being intellectually gifted. To illustrate this point there is the case of the eleven-year-old girl who disliked school, was considered stupid by her teachers, and greatly preferred the out-of-doors, especially ranch life and horses. She developed a remarkable talent for sculpturing, filling her home with horses which she had made. One day she remarked that she could visualize every part, every muscle, of a horse's body. An intelligence test showed that she had an I.Q. of 145. Without a

high level of intelligence she could not have visualized "every muscle in the horse's body."

All subjects in the gifted child's curriculum can be made to serve as media for the development of his creative ability, with English probably being the most useful, since most gifted children are proficient in the use of language. Art and music are less promising, although the teacher should always stand ready to encourage the pupil who has a specialized talent. Creative imagination in any field is, by definition, original. The child who possesses it should be encouraged in every way possible, but care should invariably be taken to leave him unfettered by rigid requirements.

Physical Exercise and Play

In the education of gifted children emphasis should be placed upon physical exercise and play activities. These are especially needed by the bookish child of high mentality, the one who has become so entranced by the things of the mind that he has overlooked the importance of social development and of the need for a strong body. Physical exercise in the special room and play among the segregated children themselves should be a part of the daily program. Participation in the athletic and social activities of the school as a whole should be required. The children in the special class have been segregated for purposes of instruction only; there is no reason why they should not participate in the normal school life of unselected children

Training for Social Responsibilities

Gifted children should learn early in life that the possession of superior mentality carries with it great responsibilities. The human race has never been in greater need than it is today for men of superior intellect who are more eager to serve society than to serve themselves. Man

has built for himself, largely during the present century, great social and economic structures before which he now stands like the creator of Frankenstein before the colossal creature whom he had brought into being. The difficult problems which have followed in the wake of industrialized, urbanized life can be solved only by the best minds that can be mustered, and even they may not be equal to the task. Gifted children should be made conscious of these problems and given to understand that society looks to them for a solution.

Drill

One of the important modifications of methods in teaching a group of gifted children is the reduction of drill. This does not mean that drill should be eliminated, for even gifted children require a certain amount of repetition in mastering essentials. In the special class approximately one-half as much drill is needed as would be required for children of average mentality. This is a considerable saving both in time and in freedom from the boredom which a gifted child is likely to experience in a heterogeneous class. There are few situations so trying to an active, eager, questioning mind as to be forced to hear over and over a fact already known.

Occasionally teachers or gifted children, somewhat too conscious of the impatience of their pupils to get on to difficult problems, have not required enough drill. As a result, the work of these children may be shot through with errors in such fields as arithmetical computation, spelling, and handwriting. For example, the Speyer group of gifted children, previously referred to, were unexpectedly faced one day with the task of spelling *causally* with the following result:

Ruth: causily
Ernest: causely

Donald: causilly
Ernest: causuly
Ruth: caussily—illy
Donald: *i*lly
Nina: causelly
Donald: causilly
Ernest: causeley
Donald: causilly
Ruth: caussilly
Miles: either causilly or causally
Ernest: -ally!
Miles: -ally

New Subject Material

In enriching the program of studies for the Speyer School group of gifted children, Leta Hollingworth added three new subjects: French, biography, and what she called "the evolution of common things." The study of biography is especially interesting and valuable for gifted children, who like to read about men and women who have achieved eminence and who like also to gather information about the social forces at work during the periods when the world's great figures were active. It contributes also to the social development of the child. Through knowing the lives of statesmen like Disraeli, Lincoln, Bismarck, Charlemagne, and Cardinal Richelieu, he understands more fully how to influence and direct others. By becoming familiar with the life stories of great scientists, he becomes conscious of the necessity of frequently making great personal sacrifices. It would be possible to build a complete curriculum for gifted children with the single subject, biography, as the core. Carlyle once said that "history is the essence of innumerable biographies." This statement is true not only of history but also of art, literature, music, science, and all other fields of study.

Emotional Education

Leta Hollingworth,[1] in discussing a program of emotional education, lists five of the special problems of general conduct which most intelligent children face, and then considers ways of helping them to arrive at solutions. The five problems are as follows: (1) to find enough hard and interesting work at school, (2) to suffer fools gladly, (3) to keep from becoming negativistic toward authority, (4) to keep from becoming hermits, (5) to avoid the formation of habits of extreme chicanery.

In connection with negativism toward authority, Hollingworth reports a conversation which she had with a ten-year-old boy, whose I.Q. was 165 and who had been sent to her as a school problem.

What seems to be your *main* problem in school?

Several of them.

Name *one*.

Well, I will name the teachers. Oh, boy! It is bad enough when the *pupils* make mistakes, but when the *teachers* make mistakes, Oh, boy!

Mention a few mistakes the teachers made.

For instance I was sitting in 5A and the teacher was teaching 5B. She was telling those children that the Germans discovered printing, that Gutenberg was the first discoverer of it, mind you. After a few minutes I couldn't stand it. I am not supposed to recite in that class, you see, but I got up. I said, "No; the Chinese *invented*, not discovered, printing, before the time of Gutenberg—while the Germans were still barbarians."

Then the teacher said, "Sit down. You are entirely too fresh." Later on she gave me a raking-over before the whole class. Oh, boy! What teaching!

Professor Hollingworth granted that the teacher was in error, but urged the boy to remember that he must

[1] HOLLINGWORTH, L. S., "How Should a Democratic People Provide for the Selection and Training of Leaders in the Various Walks of Life?," pp. 21–23, Advanced School of Education, Teachers College, Columbia University, 1938.

learn to "suffer fools gladly." The boy, grasping in his resentment at the word "suffer," replied:

Yes, that's it. That's what I say! Make 'em suffer. Roll a rock on 'em.

Summary

The principles underlying the educational program of gifted children in a special class may be summarized as follows:

1. A curriculum content based on the needs and interests of the children themselves
2. An enriched associative background
3. Insistence upon high standards of achievement
4. Encouragement in independent thinking
5. Instruction in scientific methods of attacking problems
6. Provision of opportunities for doing creative work
7. Requirement of participation in play and athletic activities
8. A program of character training
9. Training for coming social responsibilities
10. Provision of opportunities for exploration
11. Arrangement for increased use of libraries, museums, etc.
12. Requirement of participation in the extracurricular activities of unselected children
13. Reduction but not elimination of drill
14. Inclusion in the program of studies of such subjects as French, biography, and argumentation
15. A program of emotional education

The Teacher

The success of a special class for intellectually gifted children depends to a very large extent upon its teacher. The qualifications for leading a group of youthful geniuses include, of course, those which are necessary to good teaching everywhere, together with a few additional requirements which are needed to meet the exceptional situations inherent in the special class.

The teacher of gifted children should herself possess superior intelligence. She cannot be expected to have greater innate ability than the brightest child in her group, but surely she should excel the lowest in mental capacity. Being highly intelligent herself, she will presumably possess a large fund of general information upon which she will be obliged to draw heavily in teaching a gifted group. She cannot be expected to know more than each and every child in her class, but she may be expected to have a sufficiently wide range of knowledge to command the respect of the group. Anyone who has attempted to teach gifted children will realize how difficult a requirement this is.

The teacher of gifted children should be modest and yet confident. She should be interested in her pupils and enthusiastic about their projects. She should be as free from jealousy as is humanly possible, realizing at the outset that it is not going to be a disgrace to discover that on many subjects her eight- or ten- or twelve-year-old charges are going to be better informed than she. This, too, is a difficult requirement and one rarely met even by teachers of special classes.

Such a leader should be thoroughly trained in educational psychology and in modern educational methods. She should have a thorough knowledge of individual differences and of the characteristics and problems of children of superior mentality. She should also have had teaching experience, preferably with normal children. She should, however, be open-minded and ready to make original approaches. Instruction in a special class can follow no set pattern.

The qualifications of the teacher of intellectually gifted children in a special class may be summarized as follows:

1. Intellectually gifted
2. Well-informed
3. Modest but confident
4. Interested in children
5. Free from jealousy
6. Positive in personality
7. In good mental and physical health
8. Possessed of a sense of humor
9. Open-minded
10. Interested in social problems
11. Thoroughly trained in pedagogical methods and in educational psychology, especially in the psychology of individual differences
12. Experienced in teaching

CHAPTER XII

BIOGRAPHICAL SKETCH OF A TYPICAL INTELLECTUALLY GIFTED CHILD

Every individual is so uneven in his abilities that no one can be designated with scientific accuracy as "an average man" or as "a typical gifted child." For practical purposes, however, such descriptive phrases are acceptable. A feeble-minded child whose behavior, in general, conforms to that which is known to be characteristic of the majority of morons may be considered as being typical of that group. A man whose attainments approximate those described by Hollingworth earlier in this book may be looked upon as an average man. A child whose mental, physical, and social traits are similar to those which are known to be representative of precocious children may be considered as a typical gifted child.

The biographical material which follows constitutes an attempt to construct a picture which conforms to established facts concerning the development of a gifted child during the first decade of his life. Robert Adams is not an actual child, but a hypothetical case; the story of his first ten years is, in a sense, a summary, a recapitulation of this book. However, all figures, tables, and quotations are authentic, being taken from case studies of gifted children whose I.Q.'s are approximately 150. It is especially important to keep this fact in mind with respect to the excerpts from the writings of gifted children which will be included in the following pages. These are in every instance reproduced exactly, with the excep-

tion of proper names, which have been changed for obvious reasons.

Development during Infancy

Robert Adams was born on May 15, 1930. His parents were of Scotch-English descent. His father, who had been graduated from Harvard Law School in the top 10 per cent of his class, was a successful Boston attorney. His mother was a college graduate of moderate intellectual attainments. Robert's parents were not wealthy but had sufficient income to provide the cultural as well as the physical necessities of life.

Robert was born in a hospital under normal conditions. His weight at birth was 7 pounds 14 ounces, nearly ½ pound more than the average weight of unselected boys at birth. His length was 19 inches, and the circumference of his head 12½ inches. The obstetrician in attendance pronounced the baby's condition to be excellent. At the end of a two weeks' stay in the hospital, he was taken home.

The First Year

By the end of the first month of his life Robert gave some indication of accelerated development. This was most noticeable with respect to motor ability. He had already performed such acts as rolling from stomach to side and from stomach to back. He had even lifted shoulders, chest, hips and legs from the table at one time with only his forearms and stomach resting on the table. He smiled occasionally, probably a manifestation of internal contentment rather than of social understanding. When an adult stood near him and talked to him he watched intently and appeared to be pleased. When a colored rattle was moved vertically or horizontally or in a circle he followed it with his eyes.

Early in the second month of his life Robert lifted his body completely off the bath table and rested on his forearms and knees. He hit a rattle which was held hanging about 4 inches from his face several successive times with his right hand. The movements appeared to be voluntary. At the age of about five weeks he could be depended upon to greet his mother with a social smile. During this second month he learned how to hold a spoon by the handle and would struggle toward a sitting position which, however, he was unable to attain. At the end of the second month he would intently regard his face in a mirror and occasionally smile at it; also, at the end of the second month, he was observed to carry a spoon to his mouth.

At the end of the third month Robert's health was excellent, as indeed it had been since birth. He slept soundly for about fifteen hours out of each twenty-four. His sensorimotor development had reached a point which approximated that of an average child of between four and five months. He was distinctly aware of strangers at this age, crying if taken up by one. He watched individuals soberly, tending to concentrate on their eyes.

At the age of four months Robert was able to sit alone and unsupported for brief periods of eight or ten seconds. He was able to pick up toys which were sufficiently near him, such as those on the tray of his high chair. He was much more socially inclined than formerly, smiling and leaning toward any other child who came near.

At the age of six months Robert's motor development was equal to that of the average eight-month-old child. In language he easily reached the eighth-month level, vocalizing in short, sharp syllables but not yet using words with meaning. His social behavior was not quite

so advanced, being only a little in excess of what would be expected of a six-months-old baby.

At the age of eleven months Robert was given the Kuhlmann Intelligence Test and earned a mental age of 15.6 months, which gave him a Kuhlmann I.Q. of 141. Tests given in later years showed this to be too low, for Robert's rating at an age when intelligence tests are most

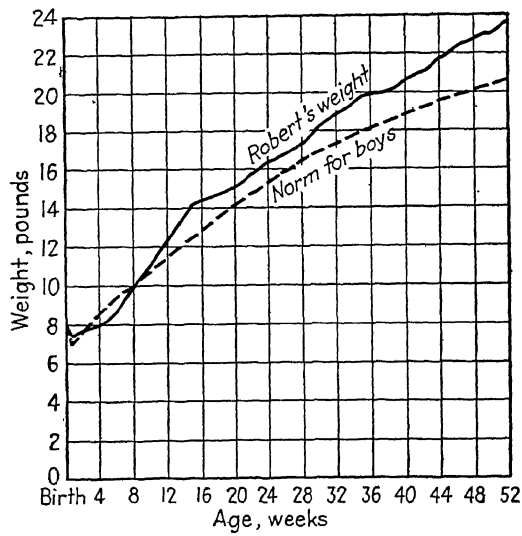

FIG. 6.—Weight chart of Robert's first year.

dependable indicated an I.Q. of between 150 and 160. However, at the age of eleven months Robert passed all the tests on the six-month level, four of those on the twelve-month, three on the eighteen-month, and two on the two-year level. The child now used meaningfully two words, dada and bye. His health continued to be excellent.

At the age of one year Robert had a vocabulary of twelve words, a somewhat larger number than is typical of an average child of eighteen months. The words which

he used with full understanding were as follows: dada, mama, Nonna (for nursegirl), baby, bye-bye, bowwow, duck, flower, yes, no, boy, toes. Occasionally he put two of these words together in a phrase as "bye-bye dada." He could indicate on command his hair, ears, eyes, mouth, toes, and hands. At that age he had not yet learned to walk but could stand alone for a brief period.

Robert's physical development during his first year, although by no means so accelerated as his mental development, was distinctly above average. Except for a brief period from his second to his tenth week, his weight at all times exceeded the norm for boys of his age (see Fig. 6).

The Second Year

Robert took three steps unassisted when he was thirteen months of age. He continued to manifest marked facility in language, using the full sentence "I see you, dada" at the age of sixteen months. At the age of seventeen months, he had a vocabulary of 74 words, which included the following:

frog, flag, sand, shell, stone, water, bird, shoe, sock, suit, supper, sweater, wall, coat, milk, book, boat, horse, mouth, sunshine, towel, and soap.

At the age of eighteen months he had added the following words:

outdoors, gone, arm, foot, cold, door, fly, doctor, jar, hand, zipper, cereal, height, pajamas, apple, out, bear, parrot, truck, home, car, cauliflower, bowl, hair, chair, block, girl, shadow, spoon, joint, screw, barrel, button, telephone, jump, airplane, handkerchief, high chair, shelf, eggs, potato, paper, brush, belt, dress, bottle, button, world, rock, melon, light, cow, man, flashlight, pin, blanket, raindrops, swing, bacon, hat, glasses, windmill, tree, blue, thank you.

At the end of his second year Robert weighed 35 pounds and was slightly less than 3 feet tall. He had

maintained the physical superiority noted in infancy. His health had been very nearly perfect during the entire period, chicken pox constituting his only illness. He still manifested only slightly better-than-average sociability. Although he was cheerful and placid, he tended to be somewhat shy and cautious in his relations with strangers. In intellectual development he approximated that of the average three-year-old. He could enumerate objects in pictures without difficulty and could point upon request to various parts of his body. In language he showed a somewhat greater precocity than would be expected from his mental level. This special gift, so noticeable at the age of one year, when he had the unusual vocabulary of twelve words, had remained relatively constant. At the age of two years he could recognize all of the letters in the alphabet except q, x, and z, and spoke in phrases and sentences.

On Robert's second birthday a record was made of everything that he said during a half-hour period. The boy was in his playroom among his books and toys at the time, which accounts for many of the bizarre references which appear in the following transcription.

See geyser. Mountain. Another mountain. What's next the geyser? Waterfall. What's next to geyser? Boat. Railroad tracks. Another waterfall. House. Another house. Grand canyon. Take a book out. Take a book out. Mummie take a big book up. Mummie put the big book on the davenport. Mummie put the big book on the geyser. Bobby carry big book. Daddy take the green book out. See "R." See "K." See "O." See another "O." See "B." What's there? Candle; balloons. What's there? Christmas tree; chu-chu train, 'nother chu-chu train, tops, 'nother top, truck and another truck, and little boy. Lion. Little boys on wagons. Swing on gate. Horsie and another horsie; carriage; baby in carriage. Giraffe and zebra and monkeys and bears and lion. Stars. Daddy take other book out. Show letters. I see "A." I see "L." I see "E." I see "R." I see "V." Oh, ball! Play ball with daddy! Oh, my! See new truck. Bobby take truck down. Rooster make truck go. Pull truck. Daddy show clouds

on the rug. Bobby carry truck downstairs. Make a truck go. Make a truck go. Make the rooster go. Flowers in picture, windows, other windows, doors, roof, chimney. Daddy pile blocks way up on top—yellow block, now blue block, now orange block, now red block. Make a truck go. Make a rooster go. Engine, coal car, boxcar, caboose. Daddy make a top go. Mummie answer telephone. Doll in cradle. Put doll in cradle Dere's Tinkle. Daddy stop the auto, all go out, went walking along and walking along, came to window, looked in window and saw bunny. Daddy take the baby out. Put blanket on baby. Ball! Daddy pile blocks way up on top. Girls in shoe. Rooster; hen; chicken. See boat. Elephant, goat, dog, jaguar, horsie; now put the elephant in the dish. Make the truck go. Piggie and wolf. Daddy pile the blocks way up on top. Bout the outdoors again. Play ball with daddy. Bobby lay down side daddy on davenport and daddy tell stories. Put ball in truck and make truck go. Went outdoors. Wagon got all muddy. Put auto up on book and daddy tell about the pheasant. Daddy and Bobby looked at pheasant till auto came by and pheasant ran down over bank to river and daddy and Bobby couldn't see the pheasant more. Daddy got wood and daddy got paper and brought beside the fireplace and fire was hot. Wood was daddy's. Bobby played in living room and watched fire daddy made. Mummie smell flower. Put flower down on table. Make a truck go. Pull ball in truck and make the truck go. Daddy put the cows in barn. Bobby put the cow in the barn. Jump, jump in the barn. And all the cows. Daddy help the cow. Water, silo, tree, farmer. Put the cows in the barn, then the red cow. Daddy help the cow. Then the other red cow. Daddy help the cow. Daddy put the cow in the barn. Daddy put silo, farmer, cow, tree, another tree, another tree, another tree, another cow, another cow, another cow all back.

Preschool Period

During the next four years Robert continued to develop with striking constancy. In physical characteristics he maintained his superiority in height and weight, his weight being somewhat excessive for his height. With respect to motor coordination he was but little, if any, above average. This may have been the result of an inherited predisposition, his size, or his preoccupation with intellectual interests. Socially, especially during the

latter part of the preschool period, Robert found it necessary to work out adjustments to problems which had arisen because of the difference between his mental age and that of his playmates. Their aimless movements and inability to concentrate on any game for more than a brief time disconcerted him. Although continuing to play with other children when opportunities arose, he took recourse in elaborately planned solitary games and in association with imaginary companions. This was in no sense abnormal, but rather a reasonable and adequate solution to some of his early social problems.

Early Reading

At the age of four Robert was given the Stanford Revision of the Binet-Simon Scale and earned an IQ. of 146. At this age Robert became interested in reading. He needed no teaching, but only someone to answer his questions. Earlier he had learned his letters from cereal packages and from advertisements which caught his eye. A considerable period elapsed between learning to identify letters and learning to read words, but shortly before his fourth birthday he began to ask questions concerning the signboards which he saw as he rode along with his parents on automobile trips. Because signboards were his primer, the first three words which he learned to read happened to be "Four Roses Whiskey."

The boy's library was well stocked, and in a short time he began reading simple books. Since he was especially gifted linguistically, he soon mastered these and went on to more difficult material. By the age of five, he had read the Gates-Huber and the Elson-Gray Readers as far as Book Three. At five, he became interested in prehistoric animals and read eight or ten children's books in this field. He even attempted to gather information from adult books such as Wells' "Outline of History."

Shortly before and for some time after his sixth birthday, Robert's interests made a natural transition from prehistoric animals to geography. His parents, who never forced him but stood ready to encourage and to supply source material on whatever subject at the time interested him, gave him a globe and two atlases. These were soon worn out and new ones had to be supplied. The child amused himself by drawing rough maps and by learning the location of all the countries in the world, their capitals and more important cities, their rivers, mountains, and climates.

The study of prehistoric animals and of geography had aroused his interest in the various eras and he referred to them by name, easily and naturally, his sense of time, like that of most gifted children, being excellent. Robert's ability to handle figures, however, was not nearly so marked as his sense of time or his facility in language. This was presumably due in part to the fact that his parents were giving him no formal training; to compute accurately requires drill.

Achievement in School Subjects

Although standardized achievement tests do not adequately sample the breadth of a gifted child's fund of knowledge, they do indicate where he stands in comparison to other children with respect to his grasp of essential school information. During the summer after Robert was six, he was given a Stanford-Binet Intelligence Test and several achievement tests from the Stanford battery. The results appear in Table XXXII.

There are a number of facts of interest in Table XXXII. It can be seen that Robert's educational age almost exactly equaled his mental age in spite of the fact that he had never attended school. His grade level, at a chronological age of 6 years 3 months, was 3.8. This had

been raised somewhat by his exceedingly high score on the geography test. In language usage, also, he was exceptionally superior, a natural outgrowth of growing up in a home of culture. He rated lowest in arithmetic computation, but even in this subject he proved that he was ready to begin third-grade work. All Robert's information had been gathered incidentally without formal training of any kind. The gifted mind learns without apparent effort.

TABLE XXXII.—ROBERT'S RATING ON CERTAIN OF THE STANFORD ACHIEVEMENT TESTS

C.A., 6 years 3 months, M.A., 9 years 6 months

Tests	E.A.	Grade
	9.4	3.8
	Yrs.Mos.	
Geography	10-10	4.9
Spelling	10- 6	4.6
Language usage	10- 7	4.6
Reading (average)	9- 2	3.6
To note details	10- 1	4.4
Word meaning	10- 0	4.15
Word meaning	9- 2	3.45
Understand directions	9- 4	3.8
To predict outcomes	9- 0	3.5
Paragraph meaning	9- 2	3.45
Paragraph meaning	8- 9	3.35
General significance	8-10	3.4
Sentence reading	8- 9	3.35
Word recognition	8- 9	3.3
Arithmetic reasoning	9- 0	3.3
Arithmetic computation	8- 7	3.1

During the summer of 1936, when Robert was six, his parents began to wonder what would happen when he went to school. Would the first-grade material be so boring to him that he would lose his intellectual interests? Should an attempt be made to persuade the school

principal to place him in a grade commensurate with his mental age? If this were done, would he be able to make the necessary social adjustments?

Elementary School Period

Robert's parents decided that they would make no effort to have Robert begin his school experience in an advanced grade. Consequently he began his work as a first-grade pupil. There was, of course, little for him to do insofar as subject matter was concerned, but he was tremendously interested in the social aspects of his new world. The interrelationships existing among the other pupils fascinated him. He was acquiring nothing new academically, but he was learning very valuable social lessons.

The organization of the school was as interesting a problem to him as anything in mathematics could have been. He was eager to learn all the rules and to know just how everything was done. He was equally interested in observing various means by which children broke these rules with impunity or, if they were caught, in what manner they were punished.

His knowledge of what should be done exceeded his ability to do it; his social intelligence was greater than his sociability. At first his classmates looked upon him as being a little odd, but, because he was naturally warm and eager, they soon learned to accept him.

Dictation as a Medium of Expression

During this period Robert was obtaining a valuable social education at school and an intellectual education at home. He had added to his interest in reading a delight in dictating stories. At the age of five he had dictated a series of travel narratives about a boy of three which eventually reached about 8,000 words in length. The

speaking vocabulary of a young gifted child is considerably greater than his writing vocabulary. Moreover, his mind works so much more rapidly than his hands that he is likely to become impatient with the mechanical business of putting down thoughts on paper. Consequently, in many ways the material which a gifted child dictates is a better indication of his linguistic ability and of his capacity to think than is the material which he actually writes.

A comparison of the results of the two methods of self-expression is interesting. When Robert was six-and-a-half years of age he wrote the following on a typewriter:

STORY OF THE PIGEON

In Winter days the pigeons were quite cold. One day the leader of the pigeons was flying over the top of a bulding. He was swooping quite close to the bulding. In a moment he saw some sheltered lowered eaves where they could sleep during the cold Winter days. Then he told all the other pigeons about it. They shouted goody, goody we can lie there until Winter is over. After that they thought he was the best pigeon in the world.

At about the time when Robert wrote the above brief story, he dictated a dozen or fifteen much longer ones. Of course, in the dictated material, the spelling and punctuation is that of the one dictated to; the words, however, are Robert's own, exactly as he spoke them. The following is a sample of one of the shorter, dictated stories:

HOW SPECKLED HORSIE CAME TO ME

Back in the olden days of the Eocene Period there lived a family of three-toed horsies. All died but one called Speckled Horsie. He lived on through the Oligocene and Miocene Periods. In the ice age of the Pliocene Period he had quite a struggle to live but he dug a hole before the Ice Age was at its height, gathered some food, and went down in it so he did not suffer very much. After the ice went back, he came out and lived on and on, on, on, on, on, on, on, on, on, on, on,

on, until at last one time he was standing on the banks of the Atlantic Ocean near Chesapeake Bay's mouth when down swooped Santa Claus on the night of the twenty-third of December, 1936.

"Will you let me take you up to my observatory at the North Pole?" asked Santa.

"I'd love to go up there," said the Little Horsie.

So the next night, which was Christmas Eve, Santa Claus swooped down to Boston, taking Speckled Horsie as a present to a little boy who was living there. But in a letter the boy had left at the foot of his bed he said he wanted part of his presents to be left at his other home in Vermont. So Santa Claus took the Speckled Horsie to Vermont and left him there.

On Christmas day the little boy found Speckled Horsie and has always kept him and loved him ever since, especially because he is so old.

Accelerated and Retarded

After the Christmas holidays of his first year in school, Robert, upon the recommendation of the principal, was accelerated to the second grade. The work here was almost as easy for him as it had been in the first grade. It did include, however, some materials in arithmetic upon which he found it necessary to drill. He was now accelerated a year and a half, taking chronological age as a reference point, but retarded about the same amount in terms of mental age. In physical size he slightly exceeded the average boy in the second grade; socially, he was somewhat younger.

Continued Interest in Writing

Robert maintained his interest in writing, continuing to do somewhat better than would be expected of a child with an I.Q. of 152. Shortly before his seventh birthday, he wrote the following letter to his father. (This was written, not dictated.)

Dear Daddy,

I liked your letter very much. I hope you will write me about the mines.

I like the sun lamp quite a lot only it gets me very hot, and I am peeling from it.

Mother bought me "Robinson Crusoe." I began it where his ship got wrecked and I liked that quite a lot. I liked also where the boat comes and rescues him. I think he should have gotten everything for himself instead of from the ship.

I am perfectly well and could go to school but Mother has a little cold and Mary has a bad one so there is nobody to take me. I am looking after them, and I went downstairs to get the mail and upstairs for the menu.

Mother said you were starting April 27 so when does that mean you'll be back?

With love,
Bobby

Robert's ability in art was slightly below that of average children of the same age. With the self-criticism which is typical of gifted children, he came home one day and remarked that he was glad that his teacher had taken the pupils' Easter paintings from the wall because his was the worst one there.

Robert, like most children, was interested in keeping a diary. Gifted children differ from those who are average in that they begin their diaries at an earlier age, and keep them in somewhat greater detail. Robert began his before he was six and continued with it for about two years, at the end of which time his interest waned. The following is his entry for May 11, four days before his seventh birthday.

I woke up this morning at 7:56½ and got up to read at 8:11. I got up at 9:00 and got dressed. Then I had breakfast without Hot-Cross Buns. Then I looked at my Atlas until quarter of twelve. Yesterday night Mother and I made an agreement that I should only drink a quart of milk a day because I had been drinking over two quarts of milk. (But return to today's history) Then I went for a walk just after it rained. I watched the make-up vessels on the "Midlaw archipelago of rivers" in the gutters, and went home. Then we talked about Germany and had rest. I am going to write a list of the coun-

tries' empires after I finish this. We read "Hiawatha" last night and read a lot of funny names, here are some of them, Gitche-Manito, the Mighty, (the great Spirit) The Ojibways (an Indian tribe) Mudjekewis (an Indian) Kaebyun (the west wind) Wabun (the east wind) Kabibanokka (the north wind) Shawandasee (the south wind) Mishe-Maukwa (the great bear of the Mountains) Shingabis (the diver).

Reading Interests

During the summer after he was seven in May Robert lived a normal, active life, playing whenever possible with other children, especially with those who were somewhat older. He continued to read and to write a great deal. His own library at this time numbered approximately 300 books. In addition, he had the unrestricted use of his father's library. Robert kept in a bookcase in his bedroom the volumes which were his favorites. They constituted a catholic collection, ranging from the very youthful "Four Little Kittens" to Sir James Jean's "Through Space and Time." Of course this seven-year-old boy was incapable of reading and understanding all of "Through Space and Time." There were pages in it, however, which he could read and understand and which excited his imagination and curiosity. Robert had read many of these favorite books of his several times. Among the volumes which were given this repeated attention were "Science Stories, Book III," "The House at Pooh Corner," "The Bastable Children," "Heroes of Civilization," "Grammar Can Be Fun," "Homes and Habits of Wild Animals," "Robinson Crusoe," "New Pictorial Atlas of the World," "World Atlas," "Sonny Elephant," "The Earth for Sam," "Men Who Found America," "Wind in the Willows," "Famous Explorers," and "The Jungle Books." Of these the first of the two "Jungle Books" was named by Robert as being the book in his library which he liked best of all. The complete list of

favorite books chosen from among several hundred by this gifted boy was as follows:

"Aesop's Fables"
"Alice in Wonderland"
"A Modern Journey Put-together Book"
"Animal Pets"
"Art Stories, Books II and III," by William G. Whitford, Edna B. Liek, and William S. Gray
"The Bastable Children," by E. Nesbit
"Beasts of the Tarpits," by W. W. Robinson and Irene B. Robinson
"The Beginners' American History," by David Montgomery
"Cinderella"
"The Earth for Sam," by W. Maxwell Reed
"Electricity Comes to Us," by Rose Wyler and Warren W. McSpadden
"Fairy Grammar," by J. Harold Carpenter and Alice Hoben
"Famous Explorers," by Jennie S. Kates
"Four Little Kittens"
"Four Little Bunnies"
"Four Little Puppies"
"Grammar Can Be Fun," by Munro Leaf
Hammond's "Modern Atlas of the World"
"Hans Andersen's Fairy Tales"
"Heroes of Civilization," by Joseph Cottler and Haym Jaffe
"Homes and Habits of Wild Animals," by Karl Patterson Schmidt
"The House at Pooh Corner," by A. A. Milne
"The Junior Outline of History," by I. O. Evans
"Manners Can Be Fun," by Munro Leaf
"Maple Sugar Time," by Royce S. Pitkin
"Men who Found America," by Frederick Winthrop Hutchinson
"Motor Days and Motor Ways"
"New Pictoral Atlas of the World"
"Old Rhymes for all Times," by Cicely Mary Barker
"Robinson Crusoe"
"The Rootabaga Stories," by Carl Sandburg
"Safety Can Be Fun," by Munro Leaf
"Science Stories, Book III," by Wilbur L. Beauchamp, Harriet M. Fogg, and William S. Gray
"Seacoast Region of New Hampshire"

"Sonny Elephant," by Madge A. Bingham
"Story of Earthquakes and Volcanoes," by Gaylord Johnson
"The Sun-egg," by Elsa Beskow
"Sunshine and Rain," by Willard Frasier and Helen Dolman
"Talking Leaves," by Julius King
"Through Space and Time," by Sir James Jeans
"Trains and Ships"
"The Two Jungle Books," by Rudyard Kipling
"Wait for William," by Marjorie Flack
"Wind in the Willows," by Kenneth Graham
"World Atlas"

Intellectual Status at Age Seven Years Six Months

When Robert was 7 years 6 months of age, he was given a Stanford-Binet intelligence test. The four I.Q.s obtained from previous examinations were: 141 (Kuhlmann), 146 (S-B), 150 (S-B), and 152 (S-B). At the age of seven and a half Robert passed all the tests on the ten-year level of the Stanford-Binet Scale.

Responses to Tests on Ten-year Level

1. *Vocabulary:* Robert gave satisfactory definitions of twenty words. A few of these, verbatim, follow:

   a. puddle: a very little pool of water.
   b. envelope: Something you put a letter into and a stamp on. Really a paper folded.
   c. copper: What pennies are made of. A kind of metal.
   d. dungeon: A deep dark prison underground.
   e. nerve: Something in your body that carries messages back and forth.
   f. Mars: Mars is a planet.
   g. priceless: Something so costly that it can hardly be paid for.

2. *Absurdities:*
   a. Answer: It couldn't be. If it were down hill all the way to the city, it would have to be up hill all the way back home.
   b. Answer: That isn't true. The more cars he had the slower he would go, because there would be more weight.
   c. Answer: She couldn't have killed herself. Somebody else would have had to cut her into eighteen pieces.
   d. Answer: I think it would be serious if 48 people were killed.

3. *Drawing Designs from Memory:* Robert reproduced each of these correctly.

4. *Reading and Report:* Although 35 seconds are allowed for the reading of the passage in this test, Robert read it without error in 20 seconds. He remembered twelve of the specific details read.

5. *Comprehension:* Robert gave satisfactory answers to all three of the questions included in this test. In his reply to *b*, he explained at length how he would prepare his men if he were going on an exploring trip, or how he would think out in detail a story that he was going to write.

6. *Naming Sixty Words:* Robert named 82 words during the allotted 3 minutes, organizing them into related groups.

Robert passed the first, second, fourth, sixth, and eighth tests on the twelve-year level and the second on the fourteen-year level. This gave him a mental age of 11 years 7 months and an I.Q. of 154.

At the time when the above test was given Robert was in the third grade, accelerated in terms of chronological age, though considerably retarded in terms of mental age. His interest in observing the workings in the educational machinery had waned and he was becoming impatient with the hours which he had to spend in waiting for the other children to do their work. Although he was still not so advanced in arithmetic as in other subjects, he was ahead of everyone in his grade and was usually the first to complete the day's assignment. Then he waited until the others finished or used the time in writing comments or in working out his own enrichment techniques. The following sample is an exact copy of one day's notation. The words in the left hand column are those which he listed as ones to be included in a paragraph which he then set himself to write.

class
children
trouble
times

In my class the children have trouble with seven times four. Our teacher has gone over it about forty thousand times. I hope you

teacher
forty
thousand
answer
eight
around
numberwork
pupils
stop
amount
going
remember
hope
quickly

know the answer! Twenty-eight. When she goes around the class in numberwork, when she comes to seven times four, the pupils always stop. No amount of going over can make them remember. I hope some day they will be able to say it quickly.

Robert continued, however, to find at home satisfactions for his eager mind. Among his voluminous papers, this item on Copernicus was found:

CHEERFUL COPERNICUS

1473–1543

"What!" everybody cried "the earth not the center of the universe. We great men not the center of attraction. We won't believe it. You say we are of insignificant in size. You take us away from our shining center, you make us wabble around the sun, like a moth around a lamp. Outrageous!" (This was all about 1503.)

Copernicus knew outrageous meant foolish! So he couldn't help laughing. "It *is* true" said Copernicus at last *very* cheerfully, almost laughing. "And" continued Copernicus "You will believe it in time when someone else as great as I will *make* you believe it. For I am great and shall not be forgotten."

The quotation in the first paragraph of the preceding passage was written down as Robert remembered it from a book which he had read. The remaining material is his own comment.

Ability in Music

During the year following his seventh birthday Robert began taking lessons in piano. He progressed at a moderate rate of speed but showed no unusual talent. He was much more interested in composing music than in playing it. His compositions possessed some promise

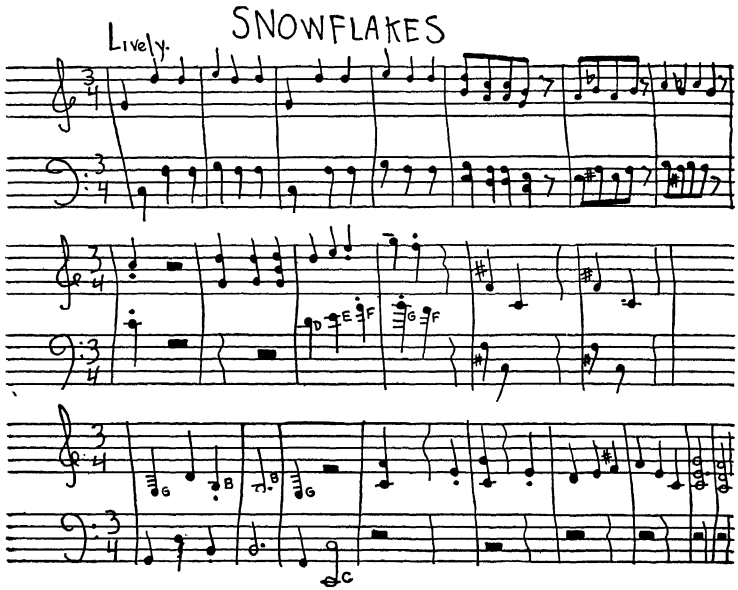

FIG. 7. —Composition by Robert at seven years of age.

but showed no indications of musical genius. In a period of three months he composed twenty-two songs. These like his stories were an outgrowth of intellectual energy and of an urge to create. One of Robert's compositions is reproduced in Fig. 7. It is included here because it indicates the kind of work that can be done by a seven-year-old gifted boy who is not especially talented in music.

First Chapter of a Book

At about the time of his eighth birthday, Robert decided that he would begin a book. He refused to write it in longhand, saying that it would take too long. He said that he had carefully planned the entire story and wanted to tell it in the quickest way possible. Consequently an adult member of his family consented to act as stenographer.

It is true that dictated material does not possess the scientific accuracy that written material does. However, as was pointed out earlier, it does present a better picture of the richness of a gifted child's thoughts, for in dictating his mind can run free, unhampered by the necessity of coordinating the flow of ideas with the mechanics of writing. The phrasing in Robert's "The Adventures of Two Little Turtles" is everywhere his own. However, as he dictated, he was asked leading questions which tended to cause him to elaborate on his theme somewhat more than he would otherwise have done. The spelling and punctuation are, of course, those of the adult who wrote down what Robert dictated. The story eventually ran to 15,000 words. The first chapter follows:

THE ADVENTURES OF TWO LITTLE TURTLES

Chapter One

The Escape

Once upon a time there were two turtles living with a little boy in Whitingham, Vermont. They lived in a bowl which was black and they had two rocks to rest on, one for each turtle. They were fed ants' eggs mixed with other things, and once in a while they were given lettuce. Lettuce was like candy to them because they hardly ever had it.

One turtle was bigger than the other and the other turtle was littler than the other. Their shells were white. The bigger turtle had a crow painted on him and under the crow were the words *Wizard of Oz.*

On the littler turtle's shell were painted two bunnies and beside them were the words *Alley Oop*.

Before they had been put in the big black bowl they had been put in an aluminum pan. The little boy put them in the black bowl because Alley Oop had jumped out of the aluminum pan. Before they were in the pan, they were in a Maxwell House coffee can, which got rusty. Before they were bought by the little boy, they were in a big glass bowl in a florist's shop, and that was all the little boy knew about them.

One night about quarter past eleven Wizard of Oz said sleepily to Alley Oop, "Do you remember when we used to live in Mexico with our dear mother and father?"

"I don't remember very clearly," said Alley Oop, even more sleepily, "because I didn't have my eyes open when we came away. But I remember what you have told me about it."

"I was just thinking about it," said Wizard of Oz, stretching. "It was very sad we had to come away. I wonder if we could ever get back again."

"Oh, we never could, I don't believe," said Alley Oop. "We're very far from Mexico."

"We might try," said Wizard of Oz, wide awake now. "Let me think. . . . I've seen people come in and go out of those holes over there. Why cannot we go out, too?"

"That's an idea," said Alley Oop. "But how shall we get through? They're all closed now."

"Well," said Wizard of Oz, "I don't know myself. But I was just thinking that if we could get out of this bowl, we might go over there and see if we could find a way to get through, and start back to Mexico."

"But if we did get through," said Alley Oop, thoughtfully, "we'd need a map to find our way by along the roads, and we'd need to know how to keep from getting killed by those bangs we hear outside."

"Yes, I had my eyes open before we left Mexico," said Wizard of Oz, "and mother showed me clearly how to make a map of the United States and Mexico. So I can draw us a map on this rock. Then we can listen to anything wise that the mother tells her little boy whenever he is going out, and I can write the rules down for us. We'll see tomorrow night if we can get out of this bowl."

"That is a fine idea," said Alley Oop, getting sleepy again, "I'm going down to the bottom of the bowl and get a nap before we start."

"While you're doing that," said Wizard of Oz, "I'll make our map. You be sure to get a good sleep because we're going to have a very busy day tomorrow."

So Wizard of Oz made the map. He showed the Atlantic Coast states, the southern end of Mississippi and Alabama, the north, east, and south of Texas, and all of Mexico, and the Gulf of California. On the western side of Mexico he put a big square, half in the Gulf and half on land, and beside that he wrote, "Where We Used to Live and Where We Want to Live Again." He did not draw any lines because he knew he and Alley Oop would not follow roads. They would have to go into the woods sometimes to find water, and they would travel where it was woody because turtles like that kind of country.

By the time he finished the map, it was seven o'clock in the morning, and Alley Oop woke up.

"Good morning, Wizard of Oz," he said. "Have you made your map?"

"Yes," Wizard of Oz answered. "Now you remember we are going to listen very carefully to what the mother says to the little boy when he goes out to play."

All that forenoon they didn't hear any rules at all. Wizard of Oz was a little worried. But that afternoon the mother wanted the little boy to go down to his grandmother's on an errand. Wizard of Oz's ears were practically falling off he was listening so hard, hoping to hear some rules. At last he heard the mother say, "Be careful. Look out for the cars. Stop and look in all directions before you cross the road."

"Thank goodness," said Wizard of Oz, and he wrote down on the rock which he had not used for his map these words in big letters:

Look out for cars. Stop and look in all directions before crossing a road.

"Have you got any rules yet?" asked Alley Oop, who had got tired from listening so long and had been dozing on the far side of the bowl.

"Yes, sleepyhead," said Wizard of Oz. "Now you wake up, and *stay* waked up! We've got a big business. I've got one rule at least. Now let me tell you that!

"*Look out for cars. Stop and look in all directions before crossing a road.*

"Now you come over here, and stay here, and listen for rules, while I eat. And don't fall asleep, either!"

"I'll try very hard," said Alley Oop, good-naturedly.

So Alley Oop listened. Whenever he felt sleepy, he shook the sleepiness out of him. But he didn't hear any rules. When Wizard of Oz finished eating, Alley Oop ate, and Wizard of Oz listened. But he didn't hear any rules.

Now it was almost six o'clock.

"Next, Alley Oop," said Wizard of Oz, "we'd better each eat a piece of lettuce and go down to the bottom of the bowl and sleep. I'll wake you up at ten o'clock. And try to wake up fast, when I call you, because we're leaving at eleven o'clock!"

After a while, the clock struck ten, Wizard of Oz had been awake about five minutes and was just getting the sleepiness out of him when he heard Alley Oop say, "I'm awake! You needn't wake me up!"

"What a smart Alley Oop!" said Wizard of Oz. "You woke up early, for you!"

"I woke up of excitedness," said Alley Oop.

Wizard of Oz said, "Well—"

"I shall be so glad to get out of this water," chattered Alley Oop. "They haven't changed it for a quite a long time, and it's dirty."

"I think it's quite dirty, too," laughed Wizard of Oz, "but be a little patient. We'll be in fresh, clean waters on our journey. But now we've got to get ready. I've got to see if I can balance those two rocks on my shell."

"But what can I take?" asked Alley Oop, all excited. "I can't go without carrying anything."

"You're to take the food," replied Wizard of Oz.

"But the food box isn't in the bowl," said Alley Oop. "How can I tell whether I can balance it?"

"Be patient. Be patient. Be patient," said Wizard of Oz. "You ask me one question right after another. I can't answer them so fast. I have to *think!* But I can answer this one. As soon as I see if I can balance those two rocks, we're going out and *get* the food box. That will prove two things: first, that we can get out of the bowl, and, second, that we can carry our supplies."

"All right, but let's hurry," said Alley Oop.

Wizard of Oz turned around, and found the rocks. He lay down between the rocks in the bottom of the bowl.

"Please push one of the rocks onto the front of my shell, close to my head," he said to Alley Oop.

Alley Oop did, but it was quite hard work because Wizard of Oz was just about Alley Oop's size when he lay down.

Then Wizard of Oz said, "Now please put the other rock on top of that."

Alley Oop had to stretch *very* hard to get that rock on, but he did.

"Now we'll see if I can walk with them on my shell," said Wizard of Oz.

He got up on his legs slowly and carefully and took a short step, then a few others, and his steps grew a little longer as he got used to his load. At last he felt sure that he could balance it all the way to Mexico if he could get out of the bowl.

"Now, Alley Oop," said Wizard of Oz, "You climb up and hang onto those rocks so they won't fall off. Push them right against my head. And I'll give you a ride."

"Wonderful," said Alley Oop excitedly, so he climbed on.

Then Wizard of Oz stretched, and stretched and stretched, very hard and carefully, and at last he got both his front paws on the side of the bowl. Even more carefully, he pulled his body with its heavy load up over the side of the bowl and hung on with his back feet, holding his load against the back of his head, until he got his front feet onto the shelf which the bowl stood on.

"All right," he said then, panting. "You can get off now, Alley Oop. When I'm on a level the rocks will stay balanced."

"With all this pulling and stretching and shoving and bouncing," said Alley Oop, "I've forgotten what we've come out for."

"Well, if you aren't light-headed," said Wizard of Oz. "We've come out to go to Mexico! Now see if you can balance the food box, you little dummy!"

Wizard of Oz took Alley Oop's paw and they started walking across the rug toward one of three holes which sometimes were open but now were closed. Wizard of Oz did not walk as fast as he could because he was leading Alley Oop, who could not go quite so fast. Finally they came to one of the closed holes.

"I wonder if it pushes open," said Wizard of Oz.

He pushed and pushed, but it did not open.

"I wonder if you have to pull it," suggested Alley Oop.

"That's an idea," said Wizard of Oz. "It isn't tight closed. I can get my paw in the crack and pull."

And the first hard pull he gave—swish! the door came open!

"You showed us how to get out, Alley Oop," said Wizard of Oz. "That was pretty smart of you. I hope you'll make suggestions like that all the way to Mexico."

But Alley Oop was too little to understand praise and did not exactly know what Wizard of Oz was talking about. So he tried to change the subject.

"We're in a *very* big room," he said.

"Not so terribly big," answered Wizard of Oz. "Wait until you see how big the world is!

Now they walked toward another crack.

"We'll try pulling this," said Wizard of Oz.

And he pulled *very* hard, and heard shk-shk-shk. Then the door came open.

"Here's a big step, down," said Wizard of Oz. "We shall have to stretch for this one!"

And now they were in the wide world.

"It's very dark," said Alley Oop.

"But there is light above your head," said Wizard of Oz. "Look up!"

So Alley Oop looked up.

He saw many lights. Nearly all were little and round with points on them. Those seemed to be winking their eyes at him. A few were round balls without points and these did not wink at him. Perhaps they didn't have any eyes. And there was one very large ball with no points but with zigzag marks all through it. That gave the most light of all.

"They are funny lights," said Alley Oop, "but they are quite beautiful."

"And they will light us all the way to Mexico," said Wizard of Oz.

So the two little turtles set out into the wide world.

The preceding story is sufficiently unusual to indicate a special gift. Most of the greatest contributions to civilization have been made by those individuals who, inheriting and developing a special ability, were able to make full use of it because it rested upon a base of high intelligence. The man with a special gift but with inferior mental capacity is likely to become either eccentric or neurotic; the man with superior mental capacity but without a special gift may scatter his energies or, perhaps, become a nonproductive scholar. Genius might well be defined as the possession of great mental capacity together with a special ability.

In the Middle Grades

Robert entered the fourth grade in the September after he was eight. His class was made up of unselected children. His teacher made a few tentative efforts at differentiation. Robert was encouraged in his writing and reading but otherwise was given little opportunity either for acceleration or for enrichment. This situation continued during the remaining two of the ten years of his life here being considered. Robert acquired almost no academic benefits from his years in the early grades. However, the social education which he received in school was invaluable. He learned how to get along with other children and how to lead by stratagem instead of by force. He learned the routine of institutional activities and came to understand how valuable it is to save personal strain by relaxing within the framework of a system.

Association with other boys brought with it an interest in physical activities, including wrestling and fighting. This new interest was reflected in a few of the stories which Robert wrote during this period. These were not so ruminative, so introspective, as the earlier ones had been, but showed delight in rapid action. The following paragraphs are taken from one of these stories:

So on he went to Big Horn Creek, where he found hoof marks that forded the creek. He followed these up the canyon, until the going was so rough he had to dismount. All of a sudden a roar sounded up the canyon. Down came a landslide right in front of him! Up the high wall of the canyon Jim jumped to a path barely a foot wide with a thousand foot drop on the left side, and the side of the mountain straight up on the right side.

Suddenly a rock crashed down and wiped out the trail behind Jim. "What a pretty mess I'm in now! Guess I'll go on ahead."

Jim walked on a ways till he came to a cave. As he walked in a voice ordered, "Reach fer the sky, Cowboy!" You can bet Jim reached for the sky, and said, "Well, what do you want? I suppose

you're the guys that burned my place up. Well, that's what I call a darn neat job for a bunch of polecats like you. I'll sure skin you rats when I get away!"

At the End of Ten Years

When Robert reached the end of the first decade of his life, he was, as he had always been, a strong, healthy boy with a positive, striking personality. His intellect corresponded roughly to that of the average child of fifteen. He was original and resourceful and showed considerable ability in applying his intelligence to concrete life situations. He was very ambitious and yet critical of himself, properly evaluating his defects as well as his assets. He had supreme confidence in his intellectual powers but was not arrogant. He wanted to be a leader and, although not the most popular boy in his class, was sufficiently well liked to be occasionally elected to a class office. He continued to show an ability in writing which exceeded that which would be expected on the basis of his mental age.

Robert was somewhat taller and heavier than other ten-year-old boys and in nearly all other respects was physically superior. However, he was already having some trouble with his eyes and the school nurse recommended that he wear glasses. Although now capable of doing tenth-grade work, he was in the fifth grade, where there was nothing to challenge him intellectually. He was, however, acquiring an excellent education at home through a broad reading program.

During the first decade of his life Robert, inheriting great mental ability and a special gift in verbal expression and surrounded during these formative years by a favorable home environment, had developed with marked constancy. There is every reason to believe that he will continue to maintain his present pace and in future years make an outstanding contribution to society.

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