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A Comparative Study of Inferior and Superior Pupils on the Junior High School Level

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A COMPARATIVE STUDY OF INFERIOR AND SUPERIOR PUPILS
ON THE JUNIOR HIGH SCHOOL LEVEL

BY

SISTER MARY JAMES O'SHEA

A THESIS SUBMITTED IN PARTIAL FULFILLMENT
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CHAPTER I

THE STATEMENT OF THE PROBLEM

That human beings have particular abilities and disabilities varying more or less-- and frequently varying greatly from the level of normal capacity, is a fact of much psychological interest as well as of great practical educational and social significance. The purpose of this study is to determine some of the characteristic differences between inferior and superior children. In recent years psychologists have concerned themselves quite as much with individual differences as with the formulation of general laws. Mental testing has been used in many schools and the reasons for this testing are obvious. The test results have a significance in the educational program of the pupils. Inferior intelligence and superior intelligence are very different from average intelligence. These differences are usually expressed in the vocabulary of intelligence tests such as mental age, I. Q. or letter ratings.

Although teachers have accepted these terminologies, yet that acceptance has not solved their educational problems with regard to inferior and superior pupils. In a general way, teachers have known that dull pupils do not

respond to the usual teaching procedures. They have also felt a pride in seeing the results of their efforts richly rewarded in bright pupils. How these results were actually brought about could not be revealed, through the use of intelligence tests, but the teachers were usually convinced that their impressions were confirmed by the test results.

In this study the writer has attempted to interpret differences in general intelligence in terms of the psychology of learning. The general differences in mental response is discussed; the modifications of procedures in the field of Junior High School education is treated. Only the bright and dull groups are considered in this problem. The bright comprise the upper four of a class of forty eighth grade pupils on the basis of class work and the dull the lower four of the class.

The problem is presented in four main divisions:

1. Various differences in the nature of the intelligence of dull and bright pupils as revealed by a detailed study of the results of the Stanford Revision of the Binet- Simon test.

2. Differences between bright and dull pupils as expressed in terms of the types and quantities of subject matter mastered.

3. Differences evident in their methods of learn-

ing.

4. Suggestions concerning the adjustments of school organization and class treatment which will enable teachers, more effectively to carry out the type of instructional program which is needed.

The test selected to discover the various differences in intelligence of the superior and inferior group, was the Stanford Revision of the Binet-Simon test, an individual intelligence test. By its use one individual is tested at a time. The entire attention of the examiner is required with each subject. It is composed of ninety tests or stunts arranged in groups, each of which contains six or eight tests of increasing difficulty. Each group contains material that is suitable for a definite mental age-level. The simplest group of tests is suitable for three year-olds, while the most difficult group is designed to test the intelligence of superior adults.

Each test in a group is assigned a value in months and each group of tests a value in years. When an individual is tested by this scale, therefore, his performance is scored in terms of years and months, from which his mental age and intelligence quotient may be found.

The writer tested four superior pupils of Irish descent and four inferior pupils of the same nationality of Junior High school level grade eight. The superior children

ranged in years chronologically from twelve and a half to fourteen, and the inferior children ranged in years from fifteen to seventeen.

All tests were given by the writer personally in Saint Gabriel School in Chicago. The results of the tests are shown in a later section.

In the second main division of this thesis, the writer presents the difference between the above two groups in their achievement in English, Spelling and Arithmetic.

The differences in English were determined by giving several standardized tests. The results were studied with regard to vocabulary, good grammar and the appreciation of literature. Sample copies of the tests given are included in this thesis. The tests were given at bi-weekly intervals over a period of ten weeks.

The differences in spelling were likewise studied through tests based upon the Ayres Spelling Scale.

Reasoning Problem Tests by Stone and the Woody McCall test in Arithmetic Fundamentals were used to discover differences in Arithmetic in each group in the same manner as above.

The third main division is an attempt to determine the differences between the two groups of pupils in their methods of learning with respect to such factors as judg-

ment, association, memory, reasoning, attention and the like. It is obvious that the conclusions drawn in this part of the experiment are of a subjective nature.

In the last main division the writer presents her suggestions as to procedures in teaching, and classroom organization, which may provide greater efficiency in learning for both types of pupil.

The experiment follow the methods usually employed in case studies. The writer has concerned herself only with the mental and educational equipment as it may be revealed through the use of standard tests and observation.

CHAPTER II

A SURVEY OF RELATED STUDIES

This chapter contains a survey of comparative studies which have been made by different workers of superior and inferior pupils. The following problems are discussed:

1. Mental Differences
2. Differences in Achievement
3. Differences in Learning Process
4. Suggestive Procedures in Teaching

I. MENTAL DIFFERENCES.

Among the studies which have been made to discover the nature of the differences in the mental abilities of bright and dull pupils, a number have stressed the evidences of "unevenness" in the abilities of superior and inferior pupils. That is, children at different levels of brightness do not show the same degree of specialization. The dull or mentally deficient child is frequently regarded as being more irregular in his abilities than the average or bright child.

Norsworthy's pioneer investigation is characteristic of these studies. She raises the question of the

relationship between traits in children at a low level as compared with bright children, but admits that her data are insufficient to give a reliable answer. She says:

"The question as to whether there is any correlation between the traits observed among idiots might be raised. But the matter of correlation is rather difficult to handle when dealing with such extreme cases. However, the results seem to show the same lack of correlation as is found when the question is investigated with regard to ordinary people" (10:84-5).

Tredgold gives many instances from his own observation and the observation of others, of the extreme unevenness of development in one ability or another in so-called idiots savants. He says:

"We have seen that amentia is often characterized by an irregular as well as defective mental development, and in a small number of patients this is so marked as to result in special aptitudes which are quite phenomenal, not merely in comparison with aments, but often with the acquirements of ordinary persons" (32:520-22).

He cites the case of a Cretin imbecile who made drawings of cats of such fine artistic quality as to be purchased by King George IV. "In a considerable portion of these idiots savants the gift is one of memory in some form or other" (32:520-22). In this connection Tredgold describes the case of a man sixty-five years of age in the Earlswood Asylum, suffering from high grade amentia, whose

"penchant" was biographical history. "It is only necessary to mention to him the name of any prominent personage in early or ancient history, and out there flows in a steady unhesitating stream a full account" of his birth, life, and death. His knowledge has been acquired by pouring over biographical details in such books as were available, and is, of course, simply a matter of memory. It is not, however, merely repetitive for he stands cross-questioning in a manner which shows that he has some knowledge, although not full understanding, of the occurrences he is talking about" (32:520-22).

Tredgold further says:

"That in marked contradiction to the general failing of aments in this respect, a few of these persons have an extraordinary capacity for arithmetic and calculations"

and he proceeds to describe cases of persons who could multiply, divide, and extract square root in a phenomenal fashion. The most interesting case that Tredgold describes is one whom he calls the "Genius of Earlswood Asylum". This idiot savant seemed to have a very highly specialized mechanical ability. One of the most wonderful of his many works was a full rigged model steamship. The model was ten feet long, eighteen inches wide and thirteen inches in depth. Every detail, including brass anchors, screw, pulley blocks, and copper paddles, was actually made by the patient

from careful drawings and plans which he had prepared beforehand. Space will not permit a full description of this extraordinary special development. But from Tredgold's description of this case, there is little wonder that the question has been raised as to the diagnosis of this individual as an "idiot", or even as a feeble-minded individual, as these terms are understood today.

Few comparisons of the sensory capacity of dull and bright children have been made, due to the difficulty of isolating pure sensory capacity from other mental processes; but where there have been careful objective studies of a number of cases, instead of observation of one or two, no such unevenness of development of the sense organs as Tredgold describes has been reported (32:520-22).

Wylie in his study of the senses of the feeble-minded found that the touch, pain, muscle, and visual senses of these unfortunate deviates were less sensitive than the same senses in normal individuals. He says:

"Our results show on the whole a marked sense of dullness on the part of the feeble-minded, with a high variation".

Later, however, he says:

"We are confirmed in the opinion that the chief lesion of idiocy is central and not peripheral" (36:37-50).

Hollingworth has also found cases of dull children and adults who show some particular ability to a remarkable extent. She describes four cases of idiots savants who have come within her experience. The mental age of the first was not known. His specialized ability was that of being able to give the day of the week for any given day of the month and year. The second case had a mental level of six years and a life age of seventeen. He could play many difficult pieces on the piano, and could reproduce by ear complicated music which he heard played. The third boy was a boy of eighteen years whose mental level was eight years. His special gift was the ability to draw pictures of mechanical objects, especially locomotives. He occupied himself for hours during his detention in this fashion. Hollingworth concludes, however, that it should be emphasized that these cases of phenomenal special ability occurring in the mental defective are extremely rare. Practically no scientific study has been made of such persons, and remarks touching on them are limited to mere descriptions of their idiosyncrosies(13:624-40).

Pinther thinks it is quite misleading to classify those individuals who show such extraordinary special ability in arithmetic, memory, mechanics, and the like, as idiots savants. He says:

"they are not idiots and they are far from being savants".

He believes that their extraordinary achievements are due to what any child with a mentality of seven to ten can accomplish, plus the results to be obtained by much practice. To the psychologists, thinking in quantitative amounts of intelligence, it is no surprise to find individuals of mental age from seven to ten doing those or similar things, when he considers what a mentality of seven to ten can accomplish plus the results to be obtained by much practice, and making allowance for the presence of special abilities in limited amount among the feeble-minded, just as we find special abilities among the bright". He says, further that one suspects in many cases that they were not technically feeble-minded at all, being rather psychopathic as mildly insane types, such as are to be found in most institutions for the feeble-minded (22:189-91).

Binet and Simon claim there are two conceptions of a totally different nature relating to the amount of correspondence between abilities in dull and bright children, and believe that a solution of this problem either one way or the other is necessary for sound educational procedure with defective children. They state these theories thus: "According to the first, the defective child is practically the same as the normal child several years younger; or, in

other words, he is a child who has been retarded in his development. To the cursory reader it may seem that we adopt this theory ourselves, for we shall frequently use such phrases as "defective of eleven who is at the age of a child of nine." But the sense in which we use such an expression must not be understood, because it is only intended to imply that a certain standard has been attained.

A second and totally different theory is tenable, and this one appears to be much nearer the truth. It is that a defective child does not resemble in any way a normal one whose development has been retarded or arrested. He is inferior, not in degree but in kind. The retardation of his development has not been uniform. Obstructed in one direction, his development has progressed in others. To some extent he has cultivated substitutes for what is lacking. Consequently, such a child is not strictly comparable to a normal child younger than himself. So far as certain faculties are concerned, he remains at the level of the younger child; but in respect to others, he is on a level with normal children of his own age. An unequal and imperfect development is consequently his specific characteristic. The inequalities of development may vary to any degree in different subjects. They always produce a want of equilibrium, and this want is the differentiating at-

tribute of the defective child. To interpret this statistically, Binet would say that the low correlation between abilities in backward and defective children is one of the important characteristics which distinguishes them from the normal child (4:50-55).

Doll in his endeavor to work out a more satisfactory criterion for the selection of the potentially feeble-minded, follows the lead of Binet and Simon. He assumes, or takes for granted with Binet, that the defective child shows greater unevenness of development among traits than do normal children and claims that this greater lack of correspondence between traits should be used as a means of detecting potential feeble-mindedness.

In general, a normal child develops intellectually more consistently than a potential defective. The component mental processes which determine the intellectual capacity develop uniformly in the former and not so uniformly in mental defectives. Doll bases these conclusions on the relative amount of scatter of the bright and dull children on Binet tests. He found that the defective child scatters more on the Binet tests than does the normal child. He says:

"In the Binet tests the typical normal child has a basal year not more than one year below his chronological age and passes but a

few tests beyond his chronological age. The potential feeble-minded, on the other hand, has the basal year more than one year below the chronological age or at least seriously below the total mental age rating and may have more than one basal year, that is to say, he scatters, failing in tests one would expect a normal child at that age to pass, and succeeding in others not expected. Thus a normal child testing eight may have a basal year of seven and passes three tests at eight whereas the potential feeble-minded testing eight may have a basal year of five" (10:96-103).

Doll admits that these conclusions are by no means final. It is at present only the result of observation that such differences exist and experiment has too often demonstrated that observation is mistaken.

Pressey in his study of the irregularity of subjects measured by the Binet examination is not sure that there is any difference at all between the bright, and the dull child in unevenness of intelligence. The figures which he gives show a tendency for the unevenness to increase with an increase in I. Q. but because of the small amount of difference and the few cases, he cautiously reserves final judgment. Pressey's method of measuring the amount of irregularity may be stated in his own words as follows: "Briefly this method consisted in adding together the number of months failed below the mental age (each failure being multiplied by the number of years away from the

mental age at which the failure occurred) and the number of months passed above the mental age (each success, again, being multiplied by its distance, on the scale, from the mental age" (23:236-40). His results were based on the irregularity, thus figured, of one hundred forty-one white children. They range in age from four through fifteen. Many were tested as special cases at each level, and the median amount of irregularity computed as stated above, he found to be as follows:

I.Q.	76	76-90	90-110	110-125	125
No. of Cases	23	37	42	24	15
Median	9	8	9	10	14

From these figures Pressey draws this conclusion: Clearly irregularity is, as thus stated, not distinctive of sub-normality. A greater scattering or scores in examination from superior children might seem suggested. But the increase is slight, individual differences are great; the slightly greater irregularity can hardly, when everything is considered, be thought of any practical importance. In fact, it is hard to see any value in such a measure of irregularity-- unless, possibly, as a special method in the study of examinations from insane patients.

Commenting on the possible cause of the large amount of irregularity found at each level, Pressey concludes that a high irregularity indicates the presence in

the examination (and in the score) of some more or less irrelevant factor, preventing a standard measurement of the "general intelligence" of the individual. A very unusual education or environment, marked sensory defect, physical illness, poor cooperation, possible age, and racial peculiarity, may thus operate to prevent a satisfactory rating. And when they do thus operate, they show their presence most distinctively by increasing the irregularity. Irregularity might thus be said to give a measure of the reliability of an examination--of its freedom from such factors (23:236-40).

Wallin in his comparison of the amount of irregularity in intelligence in normal and defective children as measured by scattering on the Stanford Binet Scale, finds little to support this theory of Binet's and Doll's. The relative amount of scattering of either group depends to some degree on the scale that is used. When the Stanford Binet scale is used, he finds the greatest amount of unevenness in the normal children. Without defining in this article just what his range of intelligence is for differentiating the groups, he gives these figures: 55/5 percent of normal children pass eleven or more tests above their basal year over the Stanford Binet tests; 42/3 percent of backward children pass eleven or more tests above their

basal year; 43/6 percent of the border-line subjects pass eleven or more tests above their basal year; 43/4 percent of the morons and 26/2 percent of the imbeciles pass eleven or more above their basal year (35:140-51).

While Healy does not say specifically that dull or feeble-minded children have more special abilities than do normal or bright children; he implies that this is so. He says,

"One does not go very far in the study of feeble-mindedness without observing most marked and interesting variations displayed in different mental functions. Many of these should have much significance for psychologists. Some curious examples of the disproportionate growth of certain mental abilities in the feeble-minded could be cited from literature or from our own experience. One of the commonest abilities to be exaggerated above the general level is that of musical talent"(12:768-69).

Healy claims that the defective individual is likely to show special motor and mechanical abilities. He mentions one other interesting type of specialization, which he calls the "verbalist type of defective". It has frequently been claimed that a person may have little verbal ability and be perhaps better than the average in other types. Healy, however, reverses this. He says,

"We ourselves have to confess to being utterly surprised at finding the low mental grade of some members of this class (the verbalist), so ingrained in human judgment is the idea that if an

individual can talk well he is, ipso facto, of normal mentality. It is more generally appreciated that brilliant conversational powers are not incompatible with mental observations, including insanity. Here we may set forth that there is a like combination of affairs to be met with in mental defectives. If the human mind is thought of in terms of partially separated faculties and abilities, then why should we not recognize the possibility of language ability overtopping the other mental powers, even when the general level of ability is far below the social par? Other instances of mental unevenness, such as the musical, mechanical, and calculating geniuses, we have spoken of above" (12:768-69).

As Binet and Doll think this unevenness is a symptom of feeble-mindedness, so Healy believes that the unevenness is sometimes a cause of delinquency. "In a few instances of adolescent offenders we have seen much proof of the fact that the possession of unusual general ability, or of some special ability, which would not fit in with the environment, was apparently a considerable factor toward the development of criminalism" (12:768-69).

Healy in other places emphasizes the extreme unevenness of development among mental defectives and laments that these have not been more carefully studied by psychologists. In his article on Normalities of the Feeble-Minded, he points out that the mentally deficient frequently reach the normal in "mental energy", "appreciation powers" and

"language". He cites several individual cases as illustrations of feeble-minded individuals who were normal in one or another of these "powers" (11:175-84).

Merrill has made an extensive comparison of the amount of unevenness of abilities in retarded, normal, and bright children on the Sanford tests. Her results do not agree with those of Pressey or Wallin. Her method is quite different from that of either. She uses a "measure of precision" "h" as the index of the amount of scattering on the Binet. This is a measure used by the psychophysicists in determining a limen by the method of "right and wrong" cases. Her figures show that there are more of the superior group with low "h" than of either the normal or retarded group and more of the retarded group with low "h" than the normal group. In other words, the unevenness is greatest for the superior group, less for the retarded group, and least for the normal group. Merrill says that her results show substantial agreement with Doll's conclusions in indicating that the retarded cases scatter slightly more than the normals on Binet tests. She says,

"The results differ from the findings of Wallin and Pressey in that respect. Pressey's method of weighting is unwarranted. Wallin's results are obscure by failure to differentiate mental levels" (17:131-32).

Thurstone, using data from Burt's study of London School children, has by a new method which he has devised scaled a large number of the tests in the Binet series. He finds that the questions and tests are "unduly bunched at certain ranges and rather scarce at other ranges." This may partly explain the difference in the findings of Merrill and Doll, on one hand, and Pressey and Wallin, on the other. Unless the groups being compared by the different students would be secured if the tests themselves had different scale values at different levels. Thurstone in this same study gives curves for the growth in "Binet test intelligence" of children, from three to fourteen years of age who rank ± 1 S. D. with reference to children of their own age, and of those who rank $- 1$ S. D. with reference to children of their own age. These two curves tend to diverge. "The interpretation of this fact," Thurstone says, "is that the absolute variability of intelligence increases with age" (31:433-51).

Kelley has devised some important statistical formulae for testing the reliability of differences in excess of chance between different abilities. Applying these devices to the difference in the abilities measured by the Stanford Achievement Test, he finds that the most important feature of his results is that there are no two functions

which do not show substantial disparity. When using the Stanford Achievement Tests, two-thirds of the children reveal one or more significant inequalities in levels of attainment in different subjects, and there are undoubtedly still other important mental differences not as yet revealed (14:321-33).

In studying the individual equated scores of his ninety-six cases, Kelley discovered that extreme inequalities of development occurred frequently enough to raise the question whether there are not in truth "multiple types" such as Thorndike, utilizing such experimental data as the tests of ten years ago made possible, found no evidence to support. Thorndike has long held that there is unevenness in development, but it now seems quite possible that the unevenness will be found not to be random but to fall into types (29:141-51).

Kelley's group of ninety-six pupils was composed of unselected eighth grade pupils. He does not make any inference as to the relative amount of unevenness in the dull, the bright, and the normal group. His conclusions, therefore, cannot be said to agree or disagree with those of Merrill's, Wallin's, or Pressey's.

Baker who has made a careful study and comparison of the unevenness of abilities in bright and dull children

says, "There are certain ways in which the general intelligence of a dull pupil is similar to that of a bright pupil" (2:16-21). As Baker's study is more closely related to the present one than are some of the others, it is described at some length. He says,

"Bright and dull pupils are similar to each other in the simpler forms of intelligent response. That is, they are similar in those mental activities which are just above the level of instinct or of reflexes"

When a simple mental response is evoked, there is very little difference between the manner in which bright minds and dull minds respond. For example, the flash of a gun stimulates the eye, the sound of a report stimulates the ear. A simple bond is formed between the optic regions and the auditory regions of the brain. In this very elementary form, there is little difference between the responses of the bright and of the dull mind. In fact, the entire action is hardly any more than a reflex action. There are probably some actual differences between the character of responses at this basic level of mental activity, but fundamentally they are very much alike. Other illustrations of comparatively simple mental response are: the ability to copy or say the same letter of the alphabet many times, the ability to repeat two numbers, such as three and eight, after the examiner pronounces them. These basic

responses are so similar in all types of intellect that they are quite confusing to those who do not understand the fundamental nature of intelligence. In the field of mental responses of a slightly higher order the same confusion may result, but to a lesser degree. If a bright pupil and a dull pupil are both asked to cancel out every letter "a" which they find in a page of letters arranged at random, the dull pupil is apt to equal or excel the bright pupil. To the dull pupil the task is so simple that he finds it a "natural" mental activity. For the bright pupil it is so easy an activity that he may scarcely bother to keep it in the level of consciousness; he transfers his attention to chance combination of letters which spell words, or he becomes interested in how frequently the letter "a" occurs, and on account of these disturbing factors he may not make a very high score. Dull pupils usually think of nothing but the letter "a" and make good progress. Many things of this sort could be combined into a series of tests which would not show real difference in intelligence, although they might have all the appearance of being valid measures of mental activity. There are certain mental tasks of a very simple routine that really do not make any great demand upon intelligence, but which might erroneously be deemed valid evidence of ability. These tendencies are fre-

quently mistaken for high ability. For example, a dull pupil is sometimes able to read difficult words orally in a fluent way, but a careful analysis may show that his reading was merely "word calling" with little or no comprehension of the meaning. Intelligence may be of a very elementary nature and involve the exercise of one simple bond, or mental connection. At this stage, bright pupils and dull pupils may appear to be equal in intelligence, or, indeed, the dull pupils may sometimes excel (2:16-21).

This same author points out fundamental differences in general intelligence of the dull and bright pupil. The essential factor discloses those differences in the multiplicity of associations or of learning bonds that are called into action. In a simple association the blast of the gun provokes a visual impression which becomes associated with the expected auditory impression. A more complex association of the same kind would be illustrated in the case of being able to open any door after having learned to open one particular door. In very simple learning the successful solution may be confined to one special door, whereas average or bright intelligence can bring enough association bonds to apply to all doors. Superior intelligence is characterized by the ability to create and to successfully manipulate many associations in order to solve

its problems. Inferior intelligence lacks these abilities in a very striking way. A dull individual probably attempts to recall the name of a new acquaintance by the simple act of recall. If this direct bond of learning does not function, he is quite at loss. But superior intelligence is not rebuffed if the direct bond does not work. The superior mind immediately begins to search for other bonds to make the recall. The new acquaintance is remembered as resembling some other person with a similar name or he is associated with the street or building in which the meeting first occurred. If these ideas fail, recall is attempted by reviewing certain letters of the alphabet which are likely to be the initial letter of the name. First one association and then another is tried until one of them produces the desired result. There is a great resourcefulness of the superior mind in seeking the solution of its problems.

Dull pupils are deficient in many abilities which require the proper co-ordination of two or more mental functions. They are doubly weak when these functions must work in combination. The more complex the mental faculties involved are in a mental activity, the greater is the excellence of the bright pupil and the more restricted are the abilities of dull pupils. Complex mental activities disclose greater contrasts between bright and dull pupils

than do simple mental activities. Therefore, complex mental problems and activities are the favorite types of material for general intelligence tests. Successful psychological examinations date from a comparatively recent time when this principle was first conceived by Alfred Binet. Before his time, the measure of intelligence was confined chiefly to simple mental tasks, such as rote memory for a span of unrelated numbers (2:17-18).

Another characteristic trait of dull pupils according to Baker is their inability to detect their own errors. They make such absurd mistakes that their lack of ability in self-correction is sometimes mistaken for deliberate disobedience. The dull pupil does not know that he is wrong, and is quite confident that he is right. He is very lacking in the power of self-analysis. In trying to check his work he merely repeats the same processes in the same way. He gives high sounding definitions of words which he does not actually know, nevertheless he is well pleased with his efforts although they are obviously inaccurate.

Inadequate powers of analysis and of general reasoning ability are also marked in the case of dull pupils. They find it difficult to detect the absurdity in an illogical statement. The meaning or content of an absurd

statement is not comprehended. The words of the statement may all be familiar to the dull pupil and he allows his mental curiosity to stop at that point, rather than to go into the meaning itself.

In forming associations between words or ideas, the dull pupil is characteristically weak. If the dull pupil is asked to name off at random a series of words, he usually mentions one word of a kind only, whereas the bright pupil exhausts the list of that particular group.

Dull pupils usually have poor social intelligence and bright pupils excel in that respect. Bright pupils are able to reason and rationalize their personal feelings out of many situations and hence are able to take a greater interest in other people. Dull pupils are inclined to have an individualistic point of view, though in trying to satisfy their own needs, they naturally encounter many situations where there is a definite need of considering the welfare of someone else (2:19-21).

DeVoss who has made a study of gifted children says,

"Superior children are unique individuals and they are superior in all abilities"(8:41-45).

It is evident from this brief historical survey that studies of the unevenness of abilities of superior and inferior children show considerable disagreement. Some

reasons for this disagreement will be considered after a presentation of results of this study. A brief summary of this section will be found at the end of Chapter II.

II - DIFFERENCES IN ACHIEVEMENT

The second main division of this thesis is a comparison of the bright and dull pupils in the following subjects: English, Spelling and Arithmetic. The writer will treat each subject separately.

ENGLISH

Language is the chief means of communication of the human race and the most effective vehicle of intelligence. It is one of the best means of determining the abilities of bright and dull pupils.

According to Baker's study in this subject dull pupils use language in its simplest forms. They have a limited vocabulary, adequate enough to give expression to their relatively simple thoughts and expressions. At the lowest level of intelligence, the idiot is able to use only grunts and cries; the imbecile uses simple words or very short phrases; morons, the highest type of feeble-minded are capable of using simple sentences. If the opportunities for the use of language are equal, the intelligence of a pupil may be judged with a fair degree of accuracy by his mastery of language.

The vocabulary of dull pupils is so limited that they are at a distinct disadvantage in traditional school procedures. The words of printed texts and courses of study, as well as the vocabulary of the teacher, are often beyond their ability. The surprisingly small number of words in the vocabulary of the dull pupils are co-ordinated into phrases or into sentences whose construction is of a decidedly elementary character. If a careful examination is made of the structure of their composition, this tendency toward short units will be disclosed, even when these units are not separated in a logical manner, but are written into one very long and unpunctuated sentence-- one which might be classified as several sentences.

Dull pupils have a great difficulty with the rules of grammar. Rules have been developed to such a point that grammar easily becomes an abstract science. There is an inherent difficulty for dull pupils when they struggle with abstract conceptions. They have not mastered the concrete experiences to such a degree that the abstract can become symbols of the concrete, as have bright pupils. The constructions of simple sentences may be readily understood, but the use of modifiers especially when more than one simple modifier is inserted, is exceedingly difficult for dull pupils. Grammar is such a complex subject that, al-

though bright pupils have studied it in the elementary school, even they often declare that they do not really understand it until they take up the grammar incident to foreign language study in the high school. For dull pupils, these later aids are seldom realized.

The appreciation of literature is an important educational problem for dull pupils owing to their limitations of vocabulary and of comprehension (2:56-58).

Baker says language is the chief medium in which bright pupils disclose their mental superiority. They acquire rich vocabularies and comprehensive units of thought and of expression. Grammar is readily understood and its usefulness is thoroughly appreciated. The rules of grammar are correctly applied to composition with effective results. In the field of composition bright pupils show many evidences of excellence. They are competent to devise an outline for a story, and place the steps in a logical order.

Literature is a source of value for bright pupils. It represents the results of mental achievement of a very high order, and therefore, has a message of real merit for superior minds. Bright pupils have keen powers of imagination, so that they can live in the scenes that are described. They enjoy writing original stories and produce clever original poems (2:58-59).

Stedman in his study of superior pupils gives many poems, original stories and even plays, written by children of ten, eleven and twelve years of age (27:149-59).

SPELLING

Bronner says all writers on this subject have agreed that many persons well educated are unable to spell correctly (6:88-9). The studies of Rice lead to the conclusion that the amount of time devoted to the teaching of spelling and the methods used have little correlation with the results achieved (24:824-25).

Baker is convinced that a high positive correlation exists between general spelling ability and general intelligence. The evidence in the following discussion testifies to the correctness of this conviction:

The fact that dull pupils can be induced to engage in routine drill upon words which bright pupils refuse to undertake should not be confused with ability to spell. Dull pupils enjoy routine drill and bright pupils find little intellectual or practical value in it. Dull pupils learn to spell by rote. They depend upon frequent repetition as their chief tool of learning. Since this method requires a great deal of time and patience, the number of words which dull pupils may be expected to learn to spell is quite limited.

Dull pupils find rules or exceptions to rules of little assistance in learning to spell. They cannot make the proper applications, and hence such aids do not really assist them. Special rules, little "devices", short rhymes and the like, may be confusing. The association cues themselves are liable to be misunderstood, and therefore, produce erroneous results. For example, a bright pupil may hit upon the spelling of "Chicago" as the cue to the correct spelling of "chief" but if the dull pupil tries this plan he may forget that word is the cue, and if he does recall the cue word, he may not remember how it is spelled, so a great deal of energy is wasted.

Bright pupils like to spell correctly for the sake of doing things correctly. They feel that incorrect spelling in social correspondence is somewhat of a disgrace. These motives are powerful incentives for the spelling of bright pupils. They do not find the routine methods, which are used for dull pupils, suited to their needs. There is little mental content in doing things by rote. In the process of learning to spell they are very much interested in numerous devices, rules and associations which enable them to remember different words. A bright pupil writes a word once; he then studies the relationship of the letters, inspects the word for its possible similarity to other words,

thinks of the meaning of the word, knows what part of it offers the greatest difficulty and adjusts his attention to the task of remembering it in accordance with the very best judgment he is capable of making. A certain minimum of rote drill may be required of bright pupils but they are apt to feel a mental revolt against too much insistence upon a method which is unnatural for them and out of harmony with their ways of thinking. Bright pupils will be found drilling themselves on difficult words at unexpected times when they find that drill is necessary (2:45-51).

ARITHMETIC

The concept of number is a characteristic development of human intelligence, though, except in elementary forms, it was probably not understood or employed by the human race until a comparatively recent period. The simple process of distinguishing between one and two represents one extreme in mathematics; such abstractions as the theory of the fourth dimension represent the other extreme. While numbers may have meaning for very concrete and simple situations, they also lend themselves to abstractions so complicated as to baffle the genius.

Somewhere between these extremes according to Baker, the minds of dull pupils reach their limit in comprehending arithmetic. This limit is probably somewhat

lower on the arithmetical scale than is generally supposed. An indication of the "breaking point" between success and failure is the fact that dull pupils may master the tables of the fundamental operations of rote learning, yet immediately afterward fail in reasoning out for themselves the procedures in problem solving.

Dull pupils, in dealing with fundamental operations, show many unique methods of work which are not characteristic of other levels of intelligence. They break numbers up into smaller units and lose track of what they are doing. They are observed to jot down many small sub-totals here and there, and become confused as to the correct one to apply. They use "crutches" such as counting on their fingers. They are very apt to be confused on steps in the fundamental operations. They subtract "down" instead of "up". They are at a loss to estimate quotients. They do not master the treatment of partial products in two-place multiplication.

In problem solving dull pupils disclose their greatest arithmetical weaknesses. One reason lies in the fact that their inadequate imaginations do not permit them to translate the conditions of a situation into a concrete and practical problem. A further reason lies in their limited powers of analysis. They add together all the

numbers in a problem without reference to the terms that are involved. They frequently multiply, giving as a reason that they "need a larger number for an answer". The uses of special devices, short cuts, etc., are of doubtful value in teaching dull pupils, since these very devices themselves may not be understood or their application comprehended. As a result, there is only added confusion.

The desire and the ability to check up on the correctness of their processes are the birthright of superior minds. Bright pupils find that these qualities are of great value in arithmetic. Problem solving and fundamental operations are both benefited by ideas of accuracy. In problem-solving, bright pupils show marked superiority in their ability to reason. Reasoning is one of the most important functions of higher intelligence. The ability to generalize and to deal with the abstract are also characteristic of gifted minds, and these qualities are traits of basic importance in mathematics, in mastering the fundamental operations it would seem rather logical to require rote drilling to a very great extent, but rote drill does not carry enough mental ability to appeal to the bright pupil (2:66-67).

Bronner says that individuals with general mental defect may have unusual ability in number work although they

show great disability in all other respects. Considering the fact that the correct manipulation of the four fundamental processes, adding, subtracting, multiplying and dividing depends largely upon rote memory, a function often extremely good even in the feeble-minded; it is not at all surprising that even feeble-minded children may be accurate and often fairly rapid in such performances. Of course it is quite a different story when the dull pupil reaches the more difficult phases of number work which are concerned with problems in which reasoning is involved (6:200-201).

A summary of Topic 2 will be found at the end of Chapter II.

III. DIFFERENCES IN THE LEARNING PROCESS.

In addition to the field of general intelligence, special psychological abilities and disabilities form an important field for the better understanding of bright and dull pupils. Special abilities or special mental traits are given a very important place in popular opinion. There is a general belief that every individual has some special trait or talent that, even in the case of general deficiency, it compensates to a very great extent for mental backwardness.

According to Baker these beliefs are not substantiated by facts. There is a fairly high positive co-

relation between degree of general intelligence and the degree to which special ability or special mental faculty is possessed. That is, high general intelligence usually carries high special abilities and low general intelligence low ability in special mental faculties. A few cases exhibit exceptions to these general rules, but their number is much less than is commonly supposed. Contrary to opinion, the power of such special defect or special talent as may exist to offset the effect of general intelligence is comparatively insignificant. There are, in this connection, four types of special talents or defects.

The first type is the bright pupil who has a special mental disability--that is, some line of activity which is definitely below the level of his general intelligence. In such a case the pupil usually seems to suffer very little from this special deficiency. In fact, instead of being handicapped, he often uses his other mental faculties to circumvent the weak spot in his mental armor. For example, if a defect occurs in visual rote memory, the pupil translates the visual units into auditory units by repeating aloud what has been presented to him visually, and thus gets an impression upon his mental "field" where it is more easily and more clearly received. Adults of average or of superior intelligence use this device con-

stantly. They learn by experience in what ways their special defect may be overcome. The bright mind is able to find means of circumvention by the very fact of its great resourcefulness and versatility.

The second type is the dull pupil with special defect--the special disability is much below the general low level of the dull pupil's mind. In this case, the disability is a serious handicap, for the dull mind lacks the resourcefulness to circumvent the weakness. If the weak trait in question is called upon, the dull pupil is at a complete loss; he does not know how to substitute some other faculty and thus to proceed successfully.

The dull pupil with a special talent above his general level is a third type which merits consideration. The talent is both an asset and liability to the dull child. It is an asset in that it gives him confidence to an unusual degree. Dull pupils who are especially good in rote memory make very good progress with the fundamentals of learning that are not much above the rote level. The special talent is often a liability to the dull pupil because he uses it indiscriminately to the detriment of his general mental and educational progress. It is a frequent observation of teachers that dull pupils seem to excel other pupils in the early elementary grades, but come to a

sudden standstill when the schoolwork requires general powers of reasoning and association. On account of lack of judgment, the special talent is exploited in ways which built up the present at the expense of the future.

The fourth type is the bright pupil with a special talent. This combination furnishes very excellent results. Superior minds do not tend to branch out in any direction to excess, and therefore, seldom abuse the advantages which they have. The special talent is used by the bright pupil to explore and to scout for into new fields, but the building up of workable lines of communication to the settled and familiar fields is not neglected (2:22-3).

The average man, without training in psychology, believes that general intelligence is composed of a series of special mental faculties which function either in combination or by themselves. Intelligent responses are derived from the general coordination of all the special faculties, and these special faculties, in the opinion of Thorndike have many points in common (30:227-35).

Another view held by Burt is that general intelligence is composed of a central factor which operates in all mental activities, and in special abilities (5:167-168).

Baker says mental faculties are in reality second-

ary factors in successful learning such as judgment, association, memory, reasoning and attention.

Judgment is related to brightness and dullness in a very significant manner. Dull pupils are required to pass judgments and in doing so may leave out some very important items which should enter into the decision. It is the opposite with bright pupils they give the proper decision. Bright pupils are very adept at associating ideas because they are able to bring all their other faculties to bear upon it. They form associations out of a vast reservoir of experiences, which has been the result of close observation and of accurate memory. They are able to generalize upon new topics and upon strange and unfamiliar experiences and understand them, so they are said to be good in association. The dull pupil is apt to be as poor in association as he is in general intelligence. His poor memory is a hindrance rather than a help in making correct associations. He does not recognize and attach meaning to strange and unfamiliar situations, because he cannot associate them with other familiar objects. Thus, he has many association limitations.

The bright pupil generally excels the dull pupil in logical memory. Complex associations and large units of meaning are favorite types of material for bright pupils.

Simple rote memory makes no great demands upon abstract intelligence and is more adapted to the dull pupil. Bright pupils surpass dull pupils in delayed recall, especially when they can associate many other factors to assist them.

Bright minds get a vivid picture of what would occur in the concrete. Bright pupils are able to reason, to anticipate results of new situations, without going through the concrete experience. Dull pupils lack these powers of accurate reasoning, and therefore, feel the need of the actual material. Mental action is a great time-saver for persons of superior intelligence, but is not a very effective instrument for inferior intelligence. On account of this fact, dull pupils tend to avoid certain fields of thought which require reasoning and proceed through concrete experience to their desired ends. Bright pupils are on the alert for opportunities to reason, and thus to find a short cut to results. Reason is a faculty by which marked mental differences are plainly disclosed.

Attention is a factor commonly used in characterizing intelligence. Good attention involves steady concentration on the purpose, whereas in poor attention, the object of attention may pass entirely from the mind. The attention of dull pupils is often described as "poor", that of the bright pupils as "good". It is very doubtful whether

these observations correctly indicate the natural tendencies of bright and dull pupils. Dull pupils have frequently been subjected to school work beyond their mental abilities, so that they pay little attention to what they do not understand or cannot comprehend. Bright pupils are most attentive and eager to grasp the new situation when it is presented to them (2:25-29).

A summary of Topic 3 will be found at the end of Chapter II.

IV. SUGGESTIVE PROCEDURES IN LEARNING.

Vincent says, too often the gifted child is praised because he simply does the best work in class. Here it ends so far as he is concerned. The special help is given to the slow pupil in order that he may "pass" so to speak. As a result he gets more service from the school in proportion to his ability than does the gifted child. So long as the latter leads the class the tendency is to let him go on year after year setting the pace for the slower members of the group. There is always hope that the slower pupil will "speed up" but this seldom happens with any degree of satisfaction compared with the gifted child. Then a standardized test suddenly offers proof that certain members of the class are sufficiently superior to warrant special promotion,

It may be encouraging to the teacher to instruct pupils who are possessed with superior ability, but it is not justifiable to hold pupils back when they are capable of doing work of a higher grade. Supernormal children are out of place just as much as the subnormal and, accordingly provision should be made to satisfy the need of proper instruction for all concerned. Since it is, or should be, the business of the principal to know his school and to see that every pupil is given an opportunity to advance according to his ability, it would seem that the salvation of the gifted child rests with the principal. The question, then, might well follow: How is the principal to break away from past methods and bring about the desired results? How is he to discover his brightest pupils with some degree of accuracy in order that he may make suitable provision for them? Thanks to Binet, Monroe, McCall, Stone, Pinter, and many others, there is a way (34:450-451).

Baker says there are general differences in the teaching of dull and bright pupils. The teacher who has a group of bright pupils must proceed along different lines from the teacher of dull pupils. In dealing with bright pupils the teacher must specialize upon main issues, and direct the general policies. She must be able to shortcut minor details in the interest of making rapid progress.

The teacher of dull pupils must be able to make herself a foreman who is primarily concerned with the administration of details. She must have infinite patience to wait for results. Both types of teaching require resourcefulness, intelligence and adaptability.

The bright and dull pupils are so fundamentally different that no teacher who teaches several subjects can hope to do full justice to both groups (2:98-100).

In teaching the dull pupils a great amount of drill and learning by rote is necessary. The teacher must supervise and conduct these drills. The drills should be frequent enough so that learning is effective, and should be repeated often enough so that material is retained. The teacher will find it necessary to explain many things which seem so obvious to her that explanation seems entirely superfluous.

The teacher of dull pupils must be analytical, resourceful, and patient and her point of view should be such that there is no suggestion to the pupils or to herself that they are inferior to other pupils. Nothing can change or improve their mental status to any extent; the function of the teacher is to make the most that she can out of the raw material at hand.

The teacher of bright pupils should outline the

different plans for the course. Although the work of any lesson should be definite, the plans should cover several days or weeks, instead of the next lesson only. A large number of topics must be prepared, or the class will not be busy all the time. There should not be too much insistence upon attention to the mastery of details apart from their use or relation to mastery of the whole subject. Bright pupils are capable of working independently. Teacher domination must be reduced to minimum. Bright pupils are fundamentally interested in what education has to offer them under its most favorable conditions. The successful education of the dull and bright pupil depends directly on the teacher. Her training, her attitude and her adaptability are factors of extreme importance (2:100-101).

Woodrew says, From the point of view of society, each child should be trained to his maximal usefulness, and he should be prepared to fit into his proper place in the social world (37:254-63).

I. SUMMARY

1. General intelligence is not to be determined from external symptoms. It is something which comes from within.

2. A person is not bright or dull because he looks the part, but because of the quality of his thinking. If he is a clear, resourceful thinker, he is said to be bright in intelligence. If he is a vague and inadequate thinker, he is of poor intelligence.

3. General intelligence may be defined in terms of the ability to respond to situations in a logical manner. By such a definition all shades or degrees of intelligence are to be found in the human race. At one extreme, the lowest type of idiot is so lacking in general intelligence that he responds only to his bodily needs, and these responses are so simple that instinct, rather than reason, is the guiding principle. From these lowest types, there are found all degrees of greater and greater excellence, until at the other extreme is the genius whose actions are governed in a very logical manner. All the other degrees of human intelligence are to be found between these limits. They are well scattered along the way, with a few more imbeciles than idiots, and a few more superior than true geniuses.

II. DIFFERENCES IN ACHIEVEMENT.

1. The minds of subnormal children operate in a slowed up or retarded manner.
2. The machinery of their thought processes is very simple and scanty.
3. Bright pupils are capable of self-directed work. They are resourceful in finding aids and suggestions in their work.
4. The minimal requirements seldom furnish bright pupils a satisfactory course of study.

III. DIFFERENCES IN LEARNING PROCESS.

1. The bright pupil shows great judgment whereas the dull pupil lacks it very much.
2. The results of memory tests show that the dull pupil falls considerably below the bright pupil.
3. Bright pupils form associations where dull pupils fail to see any.
4. Reasoning is a distinguishing characteristic of the bright pupil. The dull pupil possesses very little reasoning ability.
5. In dull children, the degree of attention is weak; power of concentration is lacking.

Bright children are most attentive because they are on the alert for opportunities to reason, and thus

to find short cuts to results.

IV. SUGGESTIVE PROCEDURES IN TEACHING.

1. Education must accept the capacities of a child, as it finds them, and, by affording them every exercise possible, make them fit to render their greatest service.

2. The exceptionally bright child is capable of turning to advantage a very great variety of knowledge.

3. The bright child's education should be broader than that of the dull child.

4. The capacities of most valuable service to the dull child are not those which form the most valuable assets of the superior child.

5. A properly organized school must therefore make provision not only for different rates of progress, but must at the same time arrange for the adaptation of training to the kind of child receiving it.

GENERAL SUMMARY

In this psychological and pedagogical study investigators have clearly demonstrated the fact that children of the same age and the same amount of schooling may vary much in mental capacity.

That brightness and dullness refer merely to a child's comparative intelligence.

That a bright child is one with more than ordinary intelligence, and a dull child one with less than ordinary intelligence.

That it should not be assumed that intelligence is considered to be the only factor which operates in the psychology of learning.

That good teaching, effort and personality exercise their influence upon scholarship.

That the effect of these factors may be studied much more scientifically if more complete control and knowledge of the intellectual factors have been secured.

The last topic, "Procedures in Teaching" shows that special education of the supernormal child is very important, and therefore, the superior child's education should be broader than the inferior child's education.

CHAPTER III

MENTAL DIFFERENCES

In this study an attempt has been made by the writer to determine some of the mental and educational differences between bright and dull pupils of Junior High School level. The differences as shown by an individual intelligence test will be treated first.

A - The Intelligence Test.

The Standard procedure was followed in administering the individual tests. In this study the Stanford Revision of the Binet-Simon Test was used. The writer gave the tests personally.

The Binet-Simon scale is made up of an extended series of tests in the nature of "stunts" or problems, success in which demands the exercise of intelligence. The scale consists of fifty-four tests, so graded in difficulty that the easiest lie well within the range of normal three-year old children, while the hardest tax the intelligence of the average adult. The problems are designed primarily to test native intelligence, not school knowledge or home training. They try to answer the question, "How intelligent is this child?" How much the child has learned is of significance only in so far as it throws light on his ability to learn more.

Binet's intelligence scale includes many different types of tests, some designed to display differences of memory, power of comprehension, time orientation, facility in the use of number concepts, power to combine ideas into a meaningful whole, the maturity of apprehension, wealth of ideas, the knowledge of common objects.

The significance of the tests, lies in their standardization, in the comparison of the results with norms, with the kinds of performances which groups having different known degrees of intelligence can attain.

The method of standardization which seems to have for most people the greatest amount of significance is that based on age. Tests are arranged in the order of difficulty. A record is made of how far each child can go, and each test in a group is assigned a value in months and each group of tests a value in years. When an individual is tested by this scale, therefore, his performance is scored in terms of years and months. For example, if he completes satisfactorily all the tests for year IX and only two of the tests for year X, his score is nine years, four months, two months being the value of each test in the tenth-year group.

This score in years and months is the mental age of the individual. Mental age is not a measure of a child's

brightness, but indicates merely that he has arrived at that stage of mental development which is found in normal children of the equivalent chronological age. In the example noted above the child's mental age was nine years, four months, which means that his accomplishment in the scale was equivalent to that of normal children who are nine years, four months old chronologically. In this case we do not yet know whether or not the child is of normal ability. We only know that his mental development is at nine years, four month level.

Only by comparing the child's mental age with his chronological age can we determine whether he is of limited, average, or superior ability. By dividing the mental age by the chronological age, both in months, we get a quotient, or index of brightness, known as the intelligence quotient (IQ). If, then, in the above case, the child's chronological age is nine years, four months, his IQ will be 100, (9 yr., 4 mo. divided by 9 yr., 4 mo. equals 100 IQ), which means that his performance in the test is exactly standard or normal to his life age. If, however, this child whose mental age is 9 years, 4 months, has a chronological age of 11 years, 6 months, his IQ will be 81, (9 yr., 4 mo. divided by 11 yr., 6 mo. equals 81

IQ), indicating that his mental development is below the standard of normal children of his chronological age, and that his ability is below normal. On the other hand, if his chronological age is less than his mental age, for example, 8 years, 7 months, his IQ will be more than a 100 (108), which indicates that his performance in the tests was better than standard, and that he is somewhat above the average in mentality. Mental age, then, does not indicate ability until compared with chronological age. The IQ which results from this comparison is an index of ability; from it we know whether the child has inferior, average, or superior capacity to learn.

Table I gives the chronological age, mental age, and intelligence quotient of the eight children who were the subjects of this study. These children were selected from a class of forty children on the basis of the teacher's opinion based on classwork. Four of them may be considered superior pupils, and four inferior pupils.

TABLE - - I

Mental Status of Subjects of This Study

Subjects	Stanford Revision of Binet-Simon Test		
	Chronological Age	Mental Age	Intelligence Quotient
1	12-6	19-1	152
2	12-9	17-8	138
3	13-8	17-9	129
4	14	17-5	124
5	15	13-2	87
6	16-7	13-10	83
7	16-9	14	83
8	17	11-4	66

Subjects 1, 2, 3 and 4 Represent the Superior Group
subjects 5, 6, 7 and 8 Represent the Inferior Group

Mental Differences

In the above table the range of IQ's for the bright and dull pupils is from 66 to 152 which, according to Terman (28:78-9) would include the extreme classifications of "near genius" and "mental defectives". A comparison of the mental age grade distribution with the chronological age grade distribution found in the above table is interesting. It is evident that there is a greater variation among pupils in mental ages than in chronological ages. While there is four years six months chronologically between the youngest and oldest child in the grade, there is a difference of seven years and nine months between these same pupils in mental age.

Records of Psychological Examination

Subjects I to IV Superior Students.

Subject I: B. D. passed every test of the fourteen year level, every test of the sixteen-year level, except the code test, and every test of the eighteen-year level.

Subject II: C. H. passed all tests through the fourteen-year with the exception of the clock test. The ball and field test was passed in a superior way. In the sixteen-year group she performed the interpretation of fables excellently, solved the problem of enclosed boxes,

and repeated six digits backward. She could not reproduce the code at all. In the eighteen-year group she repeated eight digits in order. The writer feels she did not do herself justice in the vocabulary test, through lack of effort, although she excelled the fourteen score by three words.

Subject III: N. M. in the first test defined correctly sixty-nine words, thus surpassing the average adult score. Her definitions were right to the point and were given very promptly. She made no attempt to define words with which she was unfamiliar. She passed the paper-cutting test and the induction test, giving the rule on the third folding. The ingenuity test was solved slowly and carefully, each answer being given correctly the first time. All the tests with the exception of the code test were performed thoughtfully.

Subject IV: M. G. passed all the tests through the sixteen-year level excepting the code test. She defined correctly seventy-two words, just missing the superior adult score by three. In the superior adult test she repeated the digits forward and backward and repeated almost verbatim the thought of both abstract passages.

Summary

1. Subject I has an unusually high IQ which according to

Terman (28:78-9) is near genius. She is the youngest of the group chronologically and the oldest mentally.

2. Subjects 2, 3 and 4 are according to Terman (28:78-9) of superior intelligence.

3. The writer believes that these four children should ordinarily make higher marks in school subjects, and are capable of making more rapid progress than the strictly average child.

Subjects 5 to 8 Inferior Students.

Subject V: H. K. was correct through twelve years. She could not interpret the lesson taught by each fable. The sixteen-year test was a complete failure with the exception of the problem of enclosed boxes.

Subject VI: A. R. did well in the first seven tests. She answered two in the ball and field test; could not interpret fables in twelve-year test. In the fourteen-year test failed in arithmetical reasoning and in clock test. She passed the code test.

Subject VII: M. S. passed all the ten-year tests defining twenty words; answered four in twelve-year test including ball and field test. She was very successful in interpretation of fables, and in the problem of enclosed boxes.

Subject VIII: M. H. passed seven-year test. Failed in Eighth-year test (2) and (4); nine-year test failed in (2) and (4). She did very well in ten-year test; answered two in twelve-year test and one in the sixteen-year test.

Summary

1. According to the IQ's of subjects 5, 6 and 7 they are inferior pupils, and subject 8 is feeble-minded. Terman (28:78-9).
2. The writer believes that these four inferior children, for their own good and that of other pupils, should be kept out of regular classes. They will rarely be equal to the work of sixth grade, however long they attend school.
3. They will make little progress in a well managed special class. This is the writer's opinion.
4. Subject 8 is the oldest in the group chronologically and the youngest mentally.

Discussion of Results of Intelligence Test

The above records show distinct differences in mental abilities in the two groups; the four dull and the four bright pupils. Although subjects 1, 2, 3 and 4 did remarkably well in all tests, yet not one performed the "code" test. Two of the dull group succeeded in this test. The writer believes the bright failed because of want of

attention, and not keeping diagrams of letters in imagination. Subjects 5 and 6 may have succeeded through previous information from pupils who were already tested.

The writer, in giving the above tests discovered that subjects 1, 2, 3 and 4 were decidedly better in arithmetical reasoning, giving difference between president and king, solving the "induction test", drawing designs from memory, comparing objects from memory, answering the "comprehension questions", repeating digits and sentences and finding rhymes than were the inferior subjects 5, 6, 7 and 8. The inferior group failed in memory tests; tests of language comprehension; tests of orientation in time and space; tests requiring ability to see likenesses and differences; tests in arithmetical reasoning; and tests involving generalizations.

The above data show that the teacher of classes which include both types is working at a difficult task. She is frequently expected to present the same subject matter, in the same amount of time and by the same methods and devices to children of sixth grade ability and ninth grade ability. This problem which the writer, and many others in the educational system are dealing with is a difficult one. No matter how conscientious and capable a teacher may be, she can rarely do justice to children of

such great differences in mentality under the usual classroom conditions.

Summary

Conclusion reached: In this phase of the study the writer learned:

1. That the brighter students in a class are also younger chronologically than the pupils of less ability.
2. That there is a wide range of chronological ages in pupils on the junior high school level.
3. The dispersion in mental ages exceeds the dispersion found in the chronological ages in these pupils.
4. The inferior group failed in language comprehension and arithmetical reasoning-types of ability essential to success in school.
5. The superior group in intelligence is evidently capable of doing work beyond that required of the grade.
6. The differences revealed in mental ability indicate that pupils of similar mental abilities should be grouped together in order to benefit most by instruction.
7. In general one outstanding conclusion may be drawn from these facts. They demonstrate that conditions as they exist are unjust to the teacher and pupils of each group. They show clearly that an organization providing no further classification of children than the so-called grades

is only a superficial classification at best. They lead the writer to believe that our graded schools are not truly graded after all.

What is needed is some scheme of classification together with an adjustment of the subject-matter of the various curricula to more nearly fit the needs and abilities of the pupils of adolescent ages.

B - The Educational Tests.

Several well known standardized educational tests were given at weekly intervals over a period of ten weeks to the same bright and dull pupils who were tested in the Stanford Revision of the Binet-Simon test. In every case the procedure prescribed by the author for giving and scoring the tests were adhered to strictly.

The miscellaneous tests other than the Stanford Achievement Test included the following.

1. Charter's Diagnostic Language Tests, Form I, II, III, IV.
2. New York English Survey Tests in Grammar, Language, Usage, Sentence Structure, and Literature Information.
3. Jacob S. Orleans Achievement Test, Language Usage, Form I.
4. Walter S. Monroe's Timed Sentence Spelling Tests.

Test I, Test II and Test III.

5. Woody-McCall's Mixed Fundamentals, Forms I, II, III and IV.

6. New Stone Reasoning Test Form II.

(I) Results of Educational Tests.

Table II represents the results of nine Educational tests in English. One was given each week over a period of nine weeks by the writer to the same pupils before mentioned, four who showed superior ability and four who showed inferior ability. These pupils are of the Junior High School level. In this table subjects 1, 2, 3 and 4 represent the bright group and subjects 5, 6, 7 and 8 the dull group.

TABLE II

Scores on Educational Tests in English

Pupils 1 to 4 - Superior Group

Pupils 5 to 8 - Inferior Group

Subjects	Charter's Diagnostic Tests				New York English Survey Tests				Orleans Language Usage Test
					Weeks				
	1	2	3	4	5	6	7	8	9
	Form I	Form II	Form III	Form IV	Gram mar	Language Usage	Sentence Structure	Literary Information	Language Usage
1	40	40	39	37	45	46	48	96	58
2	38	37	40	38	43	47	44	91	56
3	36	38	40	36	40	46	47	96	58
4	36	36	38	37	39	40	45	95	59
5	23	21	25	28	18	34	17	50	27
6	23	22	17	24	16	22	19	52	26
7	19	25	20	24	15	32	16	45	20
8	18	24	14	15	7	16	11	30	19

The above table contains the scores for four of Charter's Diagnostic Tests, the scores for four New York English Survey Tests, and the scores of Orleans Language Usage Test.

The results of these tests correlate highly with the mental tests. The very high scores of subjects 1, 2, 3, and 4, and the very low scores of subjects 5, 6, 7, and 8 portray the mental ability of each group.

The weakness and limitations of the dull group are quickly discovered in English. In the four Charter's Diagnostic Tests this group failed in the correct use of the pronoun and the correct use of the verb. Invariably the pronoun in the nominative case was used for the pronoun in the objective case and vice versa. In the test which called for verb usage, the present tense of the verb was used for the past tense; when the past tense was called for, the present tense was used. The writer observed in the scoring of these tests that many answers were guesses. This group evidently did not apply any rules to obtain the correct word.

The English Survey tests called for grammar, language usage, sentence structure and literature information.

The dull group failed continually in the grammar test. They had not mastered the parts of speech; were not

able to distinguish a transitive from an intransitive verb, and did not know a singular from a plural noun.

The language usage test is divided into two parts. One consists of thirty incorrect sentences, with the incorrect word or words underlined in each sentence. The student is to select and underline the correct word, four words being given to choose from.

The second part of this test consists of filling in words so that the sentence will make good sense and be correct.

The knowledge of language usage of the dull pupils as shown by this test, seemed to the writer to be a hit or miss variety. Thus in some instances some of the underlined words were correct, yet the same pupil would also underline words or phrases which had repeatedly been corrected in class, such as "that there" and "this here". For example in the sentence, "That there picture is pretty" with the following words given to underline correct one, (this here) (those) (that here) (that) two in the above group underlined "this here" and two underlined "that here".

In the second part of the above test the dull group was at sea. One of the four attempted to insert words in a few sentences, but these were incorrect while the other three did not attempt any.

The third English Survey Test called for essential structure, spelling, technical correctness, grammar and language usage.

The pupils in the dull group obtained low scores because some of their sentences had no beginning capitalization, others had no predicates. This group used "to" for "too", "their" for "there" and "no" for "know". They frequently failed to comprehend the nature of the sequence of ideas desired. The sentences or paragraphs which they wrote did not follow in the suggested topics. Even the thoughts which were expressed by the dull pupils were frequently not related for a given story.

The last of the English Survey tests called for Literature information. This test asked for the authors of several poems and books. The dull group did fairly well in discerning the author of the given poems, but failed to recall the prose writers. It is the writer's opinion that the above mentioned group had no interest in the Literature test because of their little desire and interest in reading.

The Orleans Language Usage was very much like "The English Survey Test" which called for correct use of words. Again the results from the dull group were very poor.

The bright group showed remarkable intelligence in the Charter's Diagnostic tests which called for correct

use of the pronoun and verb. The scores were high, and carelessness was probably the cause of the few mistakes that were made. This is the belief of the writer from her experience in teaching this bright group.

In the English Survey tests, "Subject One" had a perfect score in the Literature test and lost only nine points in the other three English Survey tests. The rest of the group rated high and displayed exceptional ability.

The Orleans Language Usage Test was easy for this group owing to their knowledge of grammar. There were some mistakes made by this group through an apparent lack of time to proof read their work.

Summary

1. Table II clearly shows that there are four pupils of doubtful ability in English work who have found their way into Junior High School.
2. Their presence there may not indicate that they have not completed the work of the grades and are, therefore, ready for Junior High School work, but rather that they are there because grade teachers have labored in vain with them for years until it was finally concluded that the grade school had done all for them that it was possible to do. These four pupils of inferior ability have been repeaters in the Elementary and Grammar grades which is self

evident from their chronological age.

3. The results of the English tests show that 1, 2, 3, and 4 had almost perfect scores in all nine tests.

4. The bright group showed a real desire and joy in taking the above tests in English whereas the dull group showed a dislike for them.

5. The dull group according to norms failed in every test.

(II) Results of Spelling Tests.

Table III presents the scores of six Monroe Timed Sentence Spelling Tests. The words were selected from Ayre's List. The eight children who were tested in English were likewise tested in Spelling by the writer. Subjects 1, 2, 3, and 4 represent the superior group and subjects 5, 6, 7, and 8, the inferior group.

TABLE III

Scores on Achievement Test in Spelling

Pupils 1 to 4 - Superior Group

Pupils 5 to 8 - Inferior Group

Subjects	Results of Monroe Tests in Spelling					
	Week					
	1	2	3	4	5	6
	Test and Grade					
	I-3rd	I-4th	II-5th	II-6th	III-7th	III-8th
1	98	100	94	100	100	100
2	100	100	98	98	96	100
3	96	100	96	98	90	100
4	100	100	92	100	98	100
5	56	60	28	62	50	40
6	62	64	50	60	44	60
7	74	70	68	64	38	62
8	78	76	72	68	60	58

Table III shows the records of Walter S. Monroe's Timed Sentence Spelling Tests I, II and III. Test I contains two divisions. The first division consists of twenty-two sentences, each of which must be written within a certain time. These sentences are designed to test the ability in Spelling of third grade pupils. The second division of Test I also contains twenty-two sentences, each of which must be written within a certain time. These sentences are designed to test the ability in Spelling of fourth grade pupils.

Test II consists of two parts. The first part is designed to test the ability in Spelling of fifth grade pupils, and contains twenty-three sentences, each of which must be written within a certain time. The second part of Test II is designed to test the ability of sixth grade children and contains twenty-three sentences which must be written within a certain period of time.

Test III contains two parts. The first part contains eleven sentences each of which must be written within a certain time, and is designed to test the ability of seventh grade children. The second part of test III contains eleven sentences, each of which has a time limit and is designed to test the ability of eighth grade children.

In these tests the words to be scored are embedded in sentences which have been arranged so that pupils will write at their normal rate. The standard score according to Ayre's Scale for part one of Test I is 56 per cent. All in the dull group passed this test. In the second part of this test, the score is 78 per cent and not one in the above group reached the score. Therefore all in the dull group failed in fourth grade spelling.

The standard score for Test II part I is 66 per cent. Two of the dull group reached this score. In the second part of this test the standard score is 80 per cent. All in the dull group failed in this test, which shows they failed in sixth grade spelling.

The standard score for Test III part I is 70 per cent. All in the dull group failed in this test. The standard score for the second part of this test is 84 per cent. All in the dull group failed in this test.

The writer believes that the dull pupils failed in these tests because of want of speed, as well as want of knowing how to spell accurately. This group also failed in not knowing the sounds of words, in not knowing certain rules or little devices for spelling certain words as "received". This group also failed in not being able to form associations or cues as helps in spelling. Two of

this dull group of four pupils have a fifth grade ability in spelling and two have a third grade ability in spelling according to Ayres' Scale.

The bright group, according to the standard scores of the Ayres' Scale has the ability in Spelling of grade twelve. The writer observed in scoring the tests that the words misspelled in one test, by this group and repeated in another test were spelled accurately the second time. This showed to the writer, that the bright group was on the alert, and anxious to correct mistakes that were made previously.

Surveying these tests in spelling for both dull and bright groups, and observing that the ability of the bright group in scores is nearly twice that of the dull group, the writer believes that if defective children are entitled to special educational treatment, and special study for the purpose of discovering what methods of instruction are best adapted to them, the children who are far advanced from the average but in the other direction, are just as much entitled to special educational opportunity and special pedagogy.

Summary.

1. The dull group made very low scores in Spelling because of not knowing the sounds of different words, of want

of speed, and of carelessness.

2. The scores of the dull group in Spelling correlate with the scores of the dull group in English.

3. The bright group had perfect scores in two of the tests and displayed unusual intellectual ability in Spelling in all six tests.

4. According to Ayres' Scale the bright group showed ability in Spelling for Grade Twelve.

(III) Results in Arithmetic

The same group of inferior and superior pupils were also tested by the writer with the Woody McCall Mixed Fundamentals Test, Forms I, II, III and IV, and the New Stone Reasoning Test Form II. The scores of each pupil will be found in Table IV. As in the previous tables subjects 1, 2, 3 and 4 represent the bright group and subjects 5, 6, 7 and 8 the dull group. These Arithmetic tests of Woody McCall stress the fundamentals: -- addition, subtraction, multiplication, and division. The pupil's score in the number of problems is the number absolutely correct. The New Stone Reasoning Test contains twenty-one reasoning problems, which also require correct reading and comprehension for the solution. The problems increase in difficulty. The tests were given every week over a period of five weeks by the writer.

TABLE - IV

Scores on Arithmetic Tests
 Pupils 1 to 4 - Superior Group
 Pupils 5 to 8 - Inferior Group

Subjects	Woody McCall Mixed Fundamentals				New Stone Reasoning Test
	Week Number				
	1	2	3	4	5
	Form I	Form II	Form III	Form IV	Form 2
1	35	34	34	33	21
2	34	34	35	31	19
3	34	31	32	30	18
4	34	33	33	31	21
5	21	22	20	19	9
6	20	21	21	20	7
7	17	19	19	16	8
8	12	17	18	15	6

The above table shows very poor results for the dull group. The writer has found that dull pupils show the least ability in Arithmetic as compared with the other school subjects. Their reasoning powers seem to be least evident when confronted with reasoning problems in arithmetic. Because of the accuracy required and the reasoning involved, arithmetic has probably caused more failures than any other subject taught in our schools.

Not one of the dull group reached the standard which is 29 examples correct. This group failed in the four fundamentals and showed little accuracy in their work. They did not place decimal points in the examples which called for them. Subjects 7 and 8 in this group failed in the examples which called for a knowledge of fractions. Subject 8 had in Test I there are nine twos in thirteen. It is evident that subject 8 has done the poorest work of the group in all of the tests in arithmetic. In the New Stone Reasoning Test of twenty-one problems, the inferior group failed to reach the norm which is 15. This group failed in the above test because they were not able to tell what facts were given in the problems; they were not able to determine what was to be found; they were not able to estimate the answer; and they were not able to state what process should be used in solving the given problems. This

group informed the writer that they found the vocabulary of the problems a serious difficulty, and were unable to comprehend the conditions of the problems through lack of reading ability. The range for the "dull group of correct problems was from six to twelve examples.

It is useless for teachers to spend long hours of tedious effort in trying to induce mentally defective children to comprehend complicated principles and their application. The above table shows the great need for differentiation of work in arithmetic which may be obtained by giving work which is suitable to the mentality of children.

The bright group, according to results in Table IV of the Woody McCall Test, ranged from 30 to 35 examples correct. This group revealed excellently their knowledge of fundamentals. Hurry and want of proof reading work were the causes of errors. These were found to be the true causes when the writer conferred with these pupils in the classroom. The few mistakes made were not serious. Subject I lost four points in the four tests. She forgot to reduce the fraction to its lowest terms in one example, and in two others she was wrong in addition. The other three in this group made trivial mistakes of the same nature as subject I.

In the New Stone Reasoning Test, two of the

bright group had perfect scores, subject 3 lost three points due to inaccurate work, and subject 2 lost two points, for not copying an example properly. However the reasoning and computations were correct. The above group, according to the scores received in the arithmetic tests, displayed ability to reason and solve problems of a complex nature. The bright pupils knew just what question was asked in each problem, knew just what facts should be used to answer the question, and knew how to use these facts in the right relations.

Summary

1. The dull group failed in all five tests in arithmetic, according to standards given for each test.
2. The dull group were unable to master the facts given in problem tests, to determine what the problems in tests asked for, to estimate the answers to the problems in tests, and to state what process should be used in solving problems.
3. The bright group showed unusual ability in problem solving.
4. This group displayed comprehension by correct reading of problems; reasoning by correct solving of problems; and accuracy by doing correct work.

Summary of Conclusions: Educational Tests.

1. The results of the Educational Tests correlate highly with the results of the Intelligence Test.
2. Based on the results in standardized tests: English, Spelling, and Arithmetic subjects 1, 2, 3 and 4 of the given tables show superior ability and subjects 5, 6, 7 and 8 inferior ability.
3. Subjects 5, 6, 7 and 8 according to standards for English tests, failed in grammar, language usage, technical grammar, and literature information.
4. According to the Ayres Spelling scale subjects 1, 2, 3 and 4 have the spelling ability of Twelfth Grade, subjects 5 and 6 the ability of Third Grade, and subjects 7 and 8 the ability of Fifth Grade.
5. The inferior group failed in Arithmetic in the use of the fundamentals in not being able to add, multiply, subtract and divide correctly; in problem solving in not being able to reason and estimate the answer, and know what process should be used to determine correct answer.
6. The dull group were far below the standards for their grades in every one of the Educational tests whereas the superior group showed ability in every test which exceeded the grade norms.

7. The children of superior ability should not be doing the same grade work as the children of inferior ability, for the reason that gifted and dull children are better able to receive adequate mental training, when work is so organized as to provide for individual differences in ability.

CHAPTER IV

DIFFERENCES FOUND IN LEARNING PROCESS.

Through intelligence and educational tests, the writer has presented some of the differences in general intelligence and in school abilities between four bright and four dull pupils.

In this part of the study an effort will be made to determine the underlying reasons for the differences found in these superior and inferior pupils in the school subjects. Certain phases as mentality or special abilities will be studied. The writer will consider only differences between the two groups in such abilities as the ability to form judgments, to form associations, to memorize, to reason, and the ability to give attention. The differences in the extent to which the dull and bright pupils succeed in learning the school subjects may be studied in the light of the methods of study which they use--the extent to which these more special abilities are in evidence.

Judgment is the mental ability of deciding correctly by the comparison of facts and ideas. It is related to dullness and brightness in a very significant way. The dull group showed a lack of judgment in the educational

tests by omitting important steps in the solving of the situations presented. For example in the Stone's Reasoning test in Arithmetic this group left out important steps which were essential to the solution of the problems. Thus in the problem which called for the change from a dollar after paying for three ice-cream cones at five cents each, and a watermelon for forty-five cents, one of the inferior group simply added the forty-five cents and the five cents, and gave the change as fifty cents.

The bright group showed judgment by properly selecting the necessary facts in the reasoning problems and selecting the proper operations for their solution. Checking and proving their answers were further evidences of judgment on the part of the superior group--and which were lacking on the whole in the inferior pupils.

Association is closely related to memory and reasoning. The dull pupils because of lack of memory were not able to form correct associations in the educational tests. They failed in the arithmetic reasoning test because they did not associate the cost of one thing with the cost of more than one in the problems given in the test.

The bright pupils on the contrary because of their close observation, and accurate memory and training in giving attention were very alert in forming associations in the

answering of the given tests as is evident from their high scores in each test.

The importance of memory in all activities of life is very essential but more so in educational work. It is commonly recognized, however, that memory is not a functional unit, it would be more accurate to speak of memories since the ability to remember in one field, and by one avenue of approach is not always closely related with memory powers in other fields. The writer has observed in the teaching of the dull group, that these pupils have a very good memory for rote material but a very poor memory for logical material. Two of this group passed the "Code" test in the Binet-Simon test and yet failed in other tests which called for logical memory to form correct answers. The writer has observed through her teaching of spelling to the dull pupils, that they depend upon frequent repetition as their chief tool of learning, and because they did not go through these routine drills before taking the standardized tests in spelling their results were below grade.

The bright pupils were excellent in logical memory as is evident from results of this group in problem solving. Rote memory does not appeal to this group as there is little mental content in doing things by rote. Their results in the English Survey tests showed that they were far superior

to the dull group in delayed recall.

Lack of ability to reason seemed to be the greatest drawback to the dull pupils. These pupils showed that they did not possess this ability in many of the intelligent and educational tests. This was particularly evident in the tests of reasoning in arithmetic and language usage.

The bright pupils seemed to enjoy the tests which called for reasoning. The harder the problem the more these pupils seemed to like them. This group as observed by the writer were on the alert for opportunities to reason, and thus to find a short cut to results. Reason is a faculty by which marked mental differences are plainly disclosed between dull and bright pupils.

Like judgment, association, memory, and reasoning, attention is a factor which is used frequently in characterizing intelligence. The power of attention very often distinguishes the bright pupils from the dull pupils. The dull pupils failed in many of the intelligent and educational tests because of inattention during school hours, lack of concentration and mental wandering during the time devoted to study and instruction. It is the writer's belief that these pupils were inattentive because the work was not interesting. They did not understand or comprehend the parts of the tests which required thought or analysis. Dull pupils

have frequently been made dull by being subjected to school work beyond their mental abilities, so that they pay little attention to what they do not understand or cannot comprehend. Work of proper difficulty, and methods of teaching adapted to inferior minds should be given thorough trial before it may be safely inferred that the attention of dull pupils is poor. The writer also believes that inattention among pupils is brought by inexperienced teachers who fail to train pupils in the lower grades to pay attention and the result sometimes is dull or sub-normal children.

The bright group on the contrary seem most attentive to any new work. The only time they fail to be inattentive is when they know all about the new situation, and are held back by the teacher, while she is presenting work that they know all about to the new group. The curriculum should be so organized as to provide for bright pupils to progress as for dull pupils to improve or attain required standards.

The following paragraph is quoted from the letter of a teacher of a special room for bright children in the Bigelow School, of Boston.

"In presenting a subject I have been able to dispense with detailed explanations which I have found necessary in regular grade work. The children are quick to grasp a new idea, and to apply previously taught principles.

Also the children do more, and less, of the work than is possible in a regular grade. For instance, in the matter of history-- after the children have been trained how to study, I assign a subject. The child studies the subject as a whole, selects what to him are the essentials, and presents them to the class. He must have reasons for his selection, and knowledge enough to answer any question. Dependence on self is the thing we strive to cultivate."

Summary

1. The results of the tests described in Chapter III go to show that bright children excel ordinary ones in such things as logical memory, and selective judgment, as well as in performance in the school subjects. In other words, the differences between the dull and bright group, are differences which to a great extent depend upon heredity, rather than upon training.
2. The results of the mental and educational tests indicate that gifted children have mental powers which are sufficiently different from those of inferior children to make it probable that the pedagogy of gifted children must include a special adaptation of method to their peculiar needs.
3. The bright group enjoyed work which called for reasoning process.

4. It is evident from test results that the bright group showed that they possessed judgment, association, memory, reasoning and attention.
5. Some of the dull group may be "dull because they were not made to pay attention in the lower grades.
6. The dull group lost interest and attention in tests because work was too difficult for them.
7. It is the writer's opinion that the curriculum should be so arranged as to provide for individual differences.

CHAPTER V

SUGGESTIVE PROCEDURES IN TEACHING

One of the most significant tendencies in the educational administration is revealed in the widespread attempts which are being made to adjust the subject matter and methods of the school to the varying needs and capabilities of the children whom it is the purpose of the school to serve. Instead of holding to a rigid scheme of graduation, adjusted to the theoretical average child to which all children must be made to conform, those who are in charge of schools are coming to see the advisability of making a more flexible arrangement and a more careful adjustment to the varying aptitudes and capacities of the school children.

Naturally enough, in the movement to adjust the school to the individual child, as well as to the needs of society, deficient, defective, and subnormal children first come in for attention. It was evident that at best they would be more or less of a burden upon society after their schooldays, as well as in their childhood, and that, therefore, whatever the school might do toward better fitting them to make their own living would be a distinct service to society. As a result of the interest aroused in the

education of such children, there has developed a distinctive pedagogy of subnormal children, which has assumed quite respectable proportions.

The subnormal children are provided with a special course of study which contain tasks that lie within the scope of their meager capacities.

A division of classes which is made merely by separating from the average those who fall below it is a step in the right direction, but in order to bring about a proper balance, provision should also be made for those more fortunate individuals, who, by reason of better and larger gifts, stand at the upper end of the scale. This phase of schooling has only lately begun to receive the attention of education.

The arguments in favor of special educational provision for bright children are both social and individualistic. From the former standpoint, society cannot afford the loss entailed upon it by the incomplete development of its most able and competent members. On the individualistic side, every child, whether subnormal or supernormal, has a right to that kind of education which is best suited to his power and his needs. There is a moral question involved also. It is just as important for the bright child to ac-

quire correct habits of work as it is for the dull to do so, whereas in the ordinary class the brightest children are likely to have from a fourth to a half of their time to loaf; and never or rarely have the opportunity of knowing what it means to work up to the limit of their powers. The consequent habits of indolence, carelessness, and inattention which are so likely to be formed under such conditions, might be avoided by the provision, for such children, of special courses of such an nature as to fit their particular characteristics.

Mort says, that there should be two types of ability grouping in Junior High School; -- (1) Grouping the pupils in such a manner that the members of a class will fall as nearly as possible together in their achievement in school subjects and will remain as nearly as possible together during the term; and (2) grouping according to innate ability for the purpose of adjusting the breath of the entire curriculum, or the rate of progress through the given curriculum, more or less regardless of the nearness to which pupils fall together in a given subject (16:323).

The teacher is the most important factor to be considered in adjusting the schools to the needs of the dull and bright pupils. The courses of study may be properly modified, and the classification of pupils may be carefully

made, but if the teacher is not trained to meet these problems, the program is apt to be ineffective. Teacher-training institutions have a real duty to meet here. The modern teacher receives a thorough training in the techniques of subject matter. She also studies the psychology of the average pupil, but the problems of bright pupils and of dull pupils usually go practically untouched. The study of these groups is neglected, not only in the field of general and educational psychology, but also in the adaptations of subject matter and of methods in the teacher's field of specialization. For these reasons, inexperienced teachers are quite unprepared to meet such problems.

The common attitude of the inexperienced teacher is that of decided preference for teaching bright pupils. "Dull pupils are so slow and dumb; bright pupils learn so much and it is easy to teach them." When such reasons are cited it is evident that the nature of the problem of either group has not been understood.

In order that bright and dull pupils will accomplish as much as they are capable of acquiring in knowledge during their school term, the school must discriminate between the subnormal and the supernormal children. The only way to get this is by ability grouping. The ablest pupils should be placed in the same class with special work design-

ed for them. Likewise the children of less ability should be grouped together with a special course of study suitable to their mental capacity.

In the actual process of curriculum building, teachers will offer the greatest contributions. Many excellent teachers who have been teaching bright pupils or dull pupils for several years have built up a wealth of material entirely by their own originality and resourcefulness.

In every school there should be a special room for gifted children. The enrollment in the special room should be limited to children who possess an intelligence quotient of at least 115. This would comprise the segregation of the top tenth per cent of the grades. The method of selecting gifted pupils may involve the use of mental and educational tests or other combinations of estimates of ability and industry. Health, emotional stability and the like must also be considered.

An examination of the tables of results of the educational tests in Chapter III will show that the bright pupils as shown by the educational tests consistently made high scores. These same individuals made high scores in mental tests. Mental tests furnish an impersonal and probably the most reliable single method for classification.

Especially is this true if the Stanford Revision of the Binet-Simon Test is used for this purpose. Unfortunately this is rarely practical for large numbers of pupils.

Since mental age indicates "the level of mental development and the I. Q. indicate the rate of mental development, it is obvious that children can be very easily formed into ability groups when these two values have been found. Using grouping: M. A. and I Q. Group children first on basis of M. A. Hence all are at the same starting point. Then split each M. A. group into groups of approximately the same I. Q's. Children of an M. A. of 12 and an I. Q. of 75 will be at the end of the year mentally $12 \frac{75}{100}$ years or 12 years 9 months. I. Q. - rate of mental growth as compared with chronological age.

When the ability groups are formed, courses of study should be provided to suit the abilities of the different divisions. A much enriched curriculum should be provided for children of more than average ability. A simplified course of study should be provided for those whose ability is below the average, and a course of study midway between the course of the dull and bright children will suit the abilities of the average child. Mort in the last chapter of his book gives three very good ways of adjustments and organizations affecting all pupils; -- The Winnetka Plan,

The Central City Plan, and the Dalton Plan (15: 356-63).

The teacher of the special room for bright children need pay but little attention to discipline, beyond seeing to it that the pupils have work enough to keep them busy. Less attention should be given to details of secondary importance, and more attention to necessary principles. Much of the purely explanatory matter in the textbooks may be passed over lightly or even omitted. Children know much of the matter ahead of them in the course of study, and this makes it possible for material to be passed over. In this way the bright children have an opportunity for extensive reading, and visiting places of educational interest.

Since gifted children grasp principles and concepts more quickly than ordinary children do, not so much drill is necessary in their education as in that of dull children. While gifted children must have a certain amount of drill in the skill subjects, care must be taken that they are not required to drudge through long lists of grammatical or arithmetical exercises in order to fasten principles which are already well understood and known by them. The very fact that bright children are quicker to see things than dull children, goes to indicate that the superior child needs less drill than the inferior child does.

The chief purpose in the establishing of special rooms for gifted children should be that they be given the opportunity to work as diligently as ordinary children should have to work to get their tasks accomplished. A common form of over-explanation consists in giving too much attention to illustration. The danger of this, even in an ordinary room, is that some teachers seem to regard it as an established principle that every point that arises must be illustrated, whether it offers any difficulty or not. What is perfectly clear already needs no illustration as a matter of exposition. A straight forward statement of fact dealing with elements that come well within the pupil's range should not be illustrated, so long as the teacher's purpose at the time is only to get the pupil to understand. Indeed, it is possible that by illustrating what requires no illustration the teacher may cause needless difficulties to arise, especially in the minds of the more eager and attentive pupils. Accustomed to attach a meaning to all that the teacher says, such pupils are apt to think that since the teacher makes so much of the point he is laboring, there must be something in it which they do not yet perceive and they may grope about for a meaning that is not there.

Summary

1. Education based on individual differences, permits the child to take his own place, to work to the maximum of his capacity, to develop habits of industry and mental alertness, and in every way to make the most of his abilities and talents.
2. Teachers should have special training for the education of supernormal children.
3. In order to develop in bright pupils the necessary habit of self-reliance, industry and initiative, the teacher on her part, must exhibit energy and enthusiasm, and must have a personality such as to inspire her pupils to put forth their best efforts and to challenge them to summon all their powers.
4. The most important considerations for the gifted child is the curriculum. If it is not to be a "speeding up" process merely, special curricula must be written or the usual curriculum must be greatly enriched. This enrichment may be accomplished in the following ways:
 - (a) Reduction of drill, explanation, and development.
 - (b) Definite instruction on how to study independently.
 - (c) Development in the child of a scientific attitude toward his own progress and of a scientific method

of attacking problems.

- (d) Opportunities to visit libraries, art galleries, and museums.
- (e) Provision for symmetrical⁴ development by permitting the child to abandon for a time work in which he excels in order to concentrate on skills in which he is lacking.

CHAPTER VI

GENERAL CONCLUSIONS AND APPLICATIONS

1. The limitations of this study in regard to the comparison of the unevenness of abilities in dull and in bright children are fully recognized. The study might have included many other abilities. But taking the results as they stand, there is a general agreement with Baker (2: 102-03). Wallin (35: 140-51) Terman (28: 36-51) in revealing a great difference between the abilities of each group. If the writer may accept De Voss's conclusion that bright and dull children differ greatly in ability. The only conclusions which it seems possible to arrive at logically are that dull and bright pupils are very unequal in all the abilities considered in this thesis, and that each group should be considered as a unique one which needs individual educational and vocational guidance.

It is the opinion of the writer that the scientific study of educational reactions is in its infancy. With the further development of mental tests, with greater ability to interpret these results, with more knowledge of the correlations that exist between mental functions; as well as between these and educational pursuits, there is a hope for a vastly greater understanding of the varied

problems of mental disabilities and for a wiser utilization of special abilities.

2. The general use of mental and educational tests have demonstrated clearly that individuals differ not only in rate of working, but also in intelligence, capacity, and ability. The tests have proved not only that there exists differences in this undefinable something which we call intelligence, but that they can measure the degree to which this quality exists. Some individuals can learn much, while others can learn but little. Therefore, the writer believes that teachers must present to children of little capacity subject-matter that they can grasp, and to children of unusual ability, subject-matter which will stimulate and exercise their mental faculties.

3. The best, and so far as the writer knows, the only systematic way in which a teacher can determine the native mental endowment of her pupils is by means of mental and educational tests.

4. It is also the writer's opinion that Intelligence tests not only show the numerous grades of intelligence actually found in any unselected group of individuals, but show that those who fall below a certain level will never be able to succeed with certain types of school work no matter how much or how long they try. These should be

segregated for special educational treatment.

5. Nothing contributes more directly to the progress of society and the state than the conservation and proper cultivation of the mental capacities and abilities of the most gifted individuals belonging to each succeeding generation. It is these superior individuals who become the leaders of the race, in government, in industry, in religion, in science, and in art. Therefore, their abilities should be carefully conserved and fully cultivated.

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R E F E R E E S ' R E P O R T S

It is the practice of the Graduate School to have theses read by three referees. If the first two votes are favorable, the third reading is sometimes omitted. The Graduate Council regularly recommends for the degree all students who have a majority of favorable votes.

Students are frequently required to rewrite portions of their theses because of the referees' criticisms. This will explain why references to pages are sometimes inaccurate and why shortcomings concerning which comment is made in the reports are found not to exist.

THESIS: A COMPARATIVE STUDY OF INFERIOR AND SUPERIOR PUPILS
ON THE JUNIOR HIGH SCHOOL LEVEL

This thesis fails to convey the literature of its subject thoroughly, and also reveals a lack of grasp of the technique of research. However, the writer's own experiment involves a great deal of work, and makes a contribution which, while limited, is not without value. In view of these facts I recommend that the thesis be accepted.

Austin G. Schmidt, S.J.

THESIS: A COMPARATIVE STUDY OF INFERIOR AND SUPERIOR PUPILS
ON THE JUNIOR HIGH SCHOOL LEVEL

Criticisms

A. Unfavorable

1. Title does not "fit" content of thesis. J.H.S. level includes 6th, 7th and 8th grades. The thesis limits its study to a certain grade of the J.H.S. level, therefore, the title does not fit so restricted a study.
2. The sampling of four superior and four inferior pupils selected from same class is too limited
3. Writer of this thesis does not define her use of the term inferior pupils. No distinction made throughout thesis between mentally slow, dull, or the mentally afflicted, sub-normal (cite especially p. 7-10) confused use of terms. Cases cited and quotations used, p. 7-8 refer to "idiots" (Norsworthy), "imbecile" (Cretin) etc. It would seem to this critic that the writer of the thesis is confused regarding the generally accepted terminology.
4. Inaccurate use of "Summary" p. 46 and subsequent chapter endings. Should read - "Summary on

-2-

Survey of Related Subjects." Others accordingly.

5. Writer of thesis accepts too easily statements which merit challenge.

Examples:-

page 27 - "Superior Children are unique individuals and they are superior in all abilities" quoted from De Voss.

page 94 - "Nothing can change or improve their mental status to any extent." (This quotation is in conflict with the writer's statements on p. 84 and 86. Cited in Criticism #9).

page 48 - "Education must accept the capacities of a child as it finds them," etc.

Even a limited experience in the teaching profession and a brief survey of literature in the field would indicate that the above statements and others of a similar nature, used in this thesis, have not been carefully analysed or they would not so easily be accepted.

6. A question of validity of the tests and their results is raised by this critic, based upon the thesis writers' statement p. 59 - "Subjects 5 and 6 may have succeeded through previous information from pupils who were already tested." Might not the same be true of subjects 1 and 2? (Critic's question).

7. There is an apparent inconsistency in conflicting statements. page 58-59 - "The writer believes the bright failed because of want of attention," etc. not in agreement with statement on p. 41 - "The attention of the dull pupils is often described as "poor", that of the bright as "good". Also disagrees with previous statement as presented on p. 42 - "Bright pupils are most attentive." Farther on in the thesis the writer charges the "bright" pupils with "the consequent habits of indolence, carelessness and inattention which are so likely to" etc. p. 89. See also p. 58-59 - "Want of attention on part of bright" etc.

This critic also calls attention to a grave discrepancy appearing on p. 77 last line - "accuracy by doing correct work" is surely not in accord with the statement that "subject 2 lost two points, for not copying example properly." (Thus 50% of the superior groups failed to do work accurately yet are credited above for "accuracy by doing correct work." p. 77).

8. Does the thesis writer deny the statement quoted on p. 94--"Nothing can change their mental status" etc? There are at least two places where the writer lays a direct charge in the school and shifts the responsibility of the

"dull" pupil on the teacher, thus proving that the mental status was changed.

Examples:--

p. 84 - "teachers fail to train pupils in the lower grades to pay attention and the result sometimes is dull or subnormal children." and again on p. 86 - "Some of the dull group may be dull because they were not made to pay attention in the lower grades." These statements not only are in conflict with other opinions as stated by the writer but they verify this critic's challenge of a confusion in the use of terms (See #3).

- 9. This thesis purports to be a comparative study, such a subject should be written without bias yet this reader felt the "weight" of the study leaned markedly towards the superior pupil. This undercurrent of prejudice favoring one group, detracts from the scientific value of a comparative study.

Example:-

page 95, P2. The critic raises the following questions: Is it not equally essential to have teachers especially trained for the instruction of sub-normal children? Another example p. 99 - How about the conservation of the other group, the inferior, who become the

workers, should they not be conserved? Does society not owe the "dull", too, an opportunity to become social assets rather than social liabilities? They, too, are of the Kingdom of God.

10. A few chapter titles indicate that not enough exactitude entered into the selection of the "headings."

Example -

p. 80 - "Differences Found in Learning Process." This title is not fulfilled, since no testing of specific and direct learning abilities were tested and recorded for analysis. General and purely theoretical conclusions have been drawn. It would be advisable to change the chapter head to fit the content of the chapter. Another example might be cited by noting p. 87 - "Suggested Procedures in Teaching." Range of content of chapter covers administrative problems of, (1) apparent need of change of technique, courses of study and special rooms rather than the professional problems of teaching. Procedures in teaching would necessarily embody teaching methods - this would be indeed a contribution. Since the chapter entirely omits one of the essentials in teaching technique, this critic suggests a re-draft of the chapter or

a change of title to cover the scope of the content already embodied in the chapter.

- 11. The reader of this thesis calls attention to a dangerous materialistic philosophy, which has crept into the content of this thesis. Note (a) p. 98 - paragraph 2 - "while these can learn but little." This critic raises the question, "Can the writer of the thesis prove the statement? Is it not rather that when the inferior pupil "learns but little" the teacher and theorist hastily conclude that he "can" learn but little? Biography proves this is often a false conclusion, (b) paragraph 4 line 5 - "will never be able to succeed with certain types of school work." What assurance has the writer that the "dawn of intelligence" will never light the minds of the so called "dull" or inferior pupils? This critic calls attention to the "rating" of St. Thomas as compared with his real scholarly attainment, beginning after forty years of age. Scientific education has contributed nothing to prove the assumption of a "saturation point" mentally.
- 12. Omission - p. 90 last paragraph - not specific as to how "ability grouping is to be accomplished" or what can be done about solving the problem until ability grouping is accomplished.
- 13. Minor errors -

(a) p. 85 paragraph 2 line 3 "inattentive" should read attentive.

(b) p. 84 paragraph 2 line 3 set. - rhetorically incorrect.

B. Favorable:

1. The writer of the thesis has evidently seriously studied the problem within its limitations.
2. Results of tests have been carefully tabulated.
3. The bibliography indicates a wide range of reading, although it is to be regretted that a wider use of the reading material was not applied in the study.
4. The vocabulary as well as the rhetoric of the thesis shows careful planning.

Recommendations:

1. That the following revisions be requested:
 - a) Change title to fit content.
 - b) Careful editing of chapter headings.
 - c) "Summary" at end of chapters to indicate just what is summarized.
 - d) Make a careful check for agreement of statements embodied in the thesis
 - e) Seriously ponder the philosophy underlying the problem and test the merits of statements. This critic feels keenly that the writer of the thesis accepted doctrines too easily and did not make a careful analytical study of statements) (already

indicated in this critique.)

f) Check omissions and minor errors.

Respectfully submitted,

Helen M. Ganey

