The Relation Between Fertility of Imagination and the Ability to Read as Manifested By 2-B Pupils

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THE RELATION BETWEEN FERTILITY OF IMAGINATION
AND THE ABILITY TO READ AS MANIFESTED
BY 2-B PUPILS

BY

JOSEPHINE AGNES FLANNERY

A Thesis Submitted in Partial Fulfillment
of the Requirements for the Degree of
Master of Arts
in
Loyola University

1933
VITA

CHICAGO NORMAL COLLEGE, 1917-19

PH.B LOYOLA UNIVERSITY, 1926

TEACHER IN CHICAGO PUBLIC

ELEMENTARY SCHOOLS
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CHAPTER I

INTRODUCTION AND STATEMENT OF PROBLEM

Since the days of Aristotle it is known that there cannot be any thought without images. In his treatise on the soul, he said, "the soul cannot think without images and these images are the basis of conceptual thought (1:123). St. Thomas who took the theories of Aristotle and crystallized them also held that the phantasm, by which he described the acts of the imagination is necessary for the completion of thought.

With the advent of experimental psychology, and the attempt to define the nature of thought, the question arose as to whether there could be any thought without images. This question of imageless thought also dates back to Aristotle. Aristotle contended that if the soul was separate from the body, and could exist without the body, then thought which is an act of function of the soul, did not require or need any external stimulus. But, thought in itself, he concluded, did not demand a bodily organ, yet, thought, actually was never without an image. Since images depend upon sense percept, and therefore, sense organs, then thought is not actually carried on without bodily organs. This is in keeping with the philosophical axiom, "there is nothing in the intellect which was not previously in the senses." This problem of imageless thought has been the subject of much experimentation. Psychologists since Aristotle have tried
to explain it, but have not been very successful because their explanations are vague (5:236).

Hollingworth's explanation is an example of this vagueness. He mentions experimenters who have attempted to observe what goes on in their minds when they are thinking and who have reported results of their introspection. Their results were contrary to the theory held by Binet. Binet held reasoning to be "a succession of three images, the first invoking the second by similarity, the second suggesting the third by contiguity" (14:140).

The results of the experimenters described by Hollingworth brought out the point that no sensory images of any kind were present (14:140). This suggested according to the author "that there is such a thing as a 'naked thought', an imageless consciousness, and that thought does not always move in terms of images" (14:140).

But even Binet in an earlier account of his theory of thinking admitted that the "image corresponding to the middle term of the syllogism was not usually discoverable". It was an "invisible image", a hypothetical or fictitious image, not an actual one; it might indeed be better described as an imageless thought" (14:140).

The associationists used the term "unconscious image" which image is regarded as 'perhaps the direct forerunner of the imageless thought' or the 'pure thought' of more
recent years. In a sense it corresponds also to the "universals" of the scholastic and idealistic logic (14:142).

Pyne uses the word "thought" as that which denotes 'an apprehensive act of supra-sensuous character' (24:40)
But the original stimulus of the thought was external. The difficulty for many experimenters lies in their theory regarding the thought and its stimulus. They cannot reconcile the chasm between a supra-sensuous and sensuous. Experience has taught us the dependence of the former on the latter as is plainly shown in the reading process. The relation between the imagination and reading could also be considered, in a sense, the relation between the image and the thought. The image is the product of the imagination. The thought is the product of the intellect.

Now, since reading is an intellectual process, how great or how little is it influenced by the imagination?

Munsterberg, in speaking of the imagination, said that "the true scholar needs the stimulus of imagination and no one can attain high goals in any sphere of life who is not lifted by a constructive imagination" (20:172). Is the stimulus of imagination involved in reading? Are the children endowed with a vivid imagination the best readers?

This investigation is a study in reading and imagination, the purpose of which is to show the relationship between a good imagination and reading.
CHAPTER II
SURVEY OF EXPERIMENTS IN THE READING FIELD

There has been abundant material written on Imagination and reading, consequently, only the outstanding men who have investigated different phases of reading and contributed valuable information on both subjects will be included in this resume.

Professor Javel, of the University of Paris, according to Huey, was the first scientist to discover in 1879, that in reading a line of print the eye does not move smoothly across the page. It moves in a series of jerks and pauses, which he observed as reflected in a mirror. He thought that the eye makes a pause about every ten letters, and that the fixation point moves along between the middle and the top of the letters. However, his results were not conclusive, because his method of observation was not adequate and he lacked sufficient data to verify them (15:16-19).

This discovery of Javal was the stimulus for similar studies on perception and the position of the eye in reading. Erdman and Dodge, in 1898, while experimenting at the University of Halle, found that in perceptual reading the total word form is more fundamental than the individual letter or letter groups (15:20-23).

Goldscheider and Mueller in their study, found that the
perceptual process of reading is not purely that of letters or total words, but is a variation of both. Sometimes reading takes place by letters, and sometimes by wordwholes, and sometimes by phrases. This variation depends upon the familiarity of the reading material and the difficulties encountered while reading (15:80-82).

Zeitler, at the University of Leipzig, found results that agree with those of Goldscheider and Mueller. He, too, found that the letter or letter-forms rather than the total word is important. He thought that visual imagery rather than auditory imagery aids in completing the perceptual process (15:64-65, 82-93).

Messmer, in 1903, was also interested in the perceptual process in reading. He had four adults and six children and used words which were exposed for a very short time. His results agree with those of Goldscheider, Mueller and Zeitler, but add that the fluctuating of attention and dominant letter and letter forms influence perception. He found the characteristics of the different letters to be of a quantitative and qualitative nature. The quantitative characteristics are geometric form and color. These characteristics tend to fuse when the letters are combined into words (15:90-96).

The investigation of these German scientists stimulated American scientists to carry on similar studies in America.
In 1888, Sanford made a careful study of the legibility of letters. His aim was "to find out the order of legibility of the letters among themselves by showing which letters needed improvement and to determine which groups of letters were most confusable." He measured the legibility of the letters by the distance from the eye at which they could be recognized and also by the time required to perceive them. Five university men were used as subjects. Four were graduate student and one was a doctor. A standard alphabet supplied the material necessary to carry on the experiment.

The results of his experiment revealed that such letters as w, m, q, p, v, y, j, and f, were good letters and h, r, d, g, k, b, x, l, n, and u were considered fair and a, t, i, z, o, c, s, and e were poor. The order of legibility for time "was in substantial agreement with that for distance" (26:402).

Griffing and Franz working in the psychological laboratory of Columbia University in 1896, made a study of the conditions that caused visual fatigue. Some of the problems they investigated were the size and quality of the type, the intensity of illumination, the color and quality of the paper, the length of the lines and letters. They experimented with different sizes of type, different kinds of paper and different kinds of illumination. They
found that the size of the type is one of the chief causes of fatigue and that when the size of the type decreases fatigue increases and, consequently, the reading rate slows up. Legibility was increased when the distance between the lines was increased. Poor illumination increased fatigue more than small type. The experimenters suggested the use of a white light instead of a yellow light for artificial illumination and the use of white paper (13:513-520).

In the following year, Quantz, tested fifty university students at the University of Wisconsin to determine their normal and maximal reading rate and to investigate the factors upon which the speed of reading depends. To do this he studied visual perception with color, isolated words and words in content. He found that colors are more readily perceived than geometric forms and that isolated words are more readily perceived than colors. He further found that words in connected material are more readily perceived than disconnected words. He also found that fast readers excel at normal and maximal speed and the slow readers were slow at both. The visual type of persons are slightly better than the auditory type. The rapid readers retain and interpret what they read better than the slow readers. The factors that the speed of reading depend upon are "practice in reading from childhood on,"
power of concentration, mental alertness and scholarly ability as decided by college marks" (25:1-5).

In 1898, Professor Delabarre of Harvard University attempted to photograph the movements of the eye by an apparatus containing a plaster-of-paris cup which he attached to the cornea of the eye. His results were not conclusive because his method needed improvement and his results lacked sufficient research to verify them (7:572-573).

Huey made many investigations in reading, among which was the speed of the movements of the eye which he tried to measure in 1898 at Clark University. He used an apparatus similar to that used by Professor Delabarre. He disagreed with the results of Javal that the eye moved along the line between the middle and top of the letters, and that it paused about every ten letters. Huey was of the opinion that the fixation point was more varied but added that it did not stray far above or below the line. In the reading of a magazine article the eye made about three or four pauses per line, and in a newspaper article the eye made "3.8 pauses per line for one reader and 3.4 for another" (15:25).

The duration of the reading pauses was varied. Increased speed in reading decreased the number and the duration of the pauses (15:25).
A thorough study of the movements of the eye in reading was made by Dearborn in 1905. He worked in the psychological laboratory of Columbia University. He used eleven subjects, eight were students at the university and three were children obtained from a public school. He found a great difference in the way people moved their eyes in reading. Some people moved their eyes more regularly than others. Slow readers make longer and more frequent pauses than the fast readers. Rapid readers have a wider span of attention than slow readers. Fatigue of the eye is evident by a slowing up of speed and reading and also by a decrease in speed of movement. Short lines of a uniform size are better than longer lines because, in a short line the motor habits are more frequent and motor habits promote speed in reading (9:7-132).

In 1910, Dockeray conducted an experiment in the psychological laboratory at the University of Michigan to test the span of vision in normal reading and the relative legibility of the letters of the alphabet. He accomplished his object by the use of the Dodge mirror tachistoscope and exposed a series of cards on which were printed two letters, at equal distance from the fixation point. The subjects of the experiment were three university men. The results of the experiment indicated that in ordinary reading all the letters come within the field of distinct vision which
may overlap in successive fixations. Also the broad letters were more legible than the tall and narrow letters (10:123-131).

In the course of the same year Whipple worked at Cornell University to determine the effects of practice on visual attention and visual apprehension. His experiment consisted of two tests. The first test was nonsense words of five, six and seven letters exposed for three seconds with a tachistoscope. His results showed that the range of attention was not effected by practice.

The second part of his experiment consisted of sense material such as dots, drawings, stanzas of poetry, and pictures, some of which were exposed in the tachistoscope for three seconds and some of which were exposed without an instrument. In the sense material the effect of practice resulted in a great improvement, which Whipple explained by saying that the sense material represented possibilities for grouping, and the grouping schemes were aided by practice (33:249-262).

The more recent investigations in reading were conducted in the laboratory of Chicago University. Schmidt, in 1917, performed an experiment to supply further data on the psychology of reading for a more varied group and to determine the influence of age and accomplishment on the reading process. He used university students, high school students, elementary pupils and primary pupils. The
material used, in keeping with the variety of students, was also varied. It included passages from James' psychology for the adults, passages from Irving's Sketch Book for the high school students, passages from the Riverside Literature Series and Fables for the Primary group. Each subject was requested to read two passages, one orally and the other silently. As each subject read, the movements of his eye were photographed by means of a modified Dodge photographic apparatus, which enabled the experimenter to photograph the horizontal and vertical eye movements. Schmidt was especially interested in the number, nature, duration and location of the fixation pauses as well as in the total perception or reading time. His investigation showed that in oral and silent reading the number of pauses is the same. The elementary group had the least number of pauses. Individuals have about the same number of pauses in reading if they have the mechanics of reading mastered and if the material is within their comprehension, regardless of age and accomplishment. In the duration of pauses, the experimenter found that all his subjects were about the same, with, of course, a few variations. Age and ability did not effect the duration of the pauses. The reading rate was found to be the same for all the groups. In silent reading the adult group was second. In oral reading the adult group was first.
The elementary group was first in silent reading and third in oral reading. The high school group was third in silent reading and second in oral reading. There was no correlation between age and rank. The rapid silent readers read three times as fast as the slowest silent readers and the rapid oral readers read twice as fast as the slowest oral readers (27:1-123).

Another experiment conducted at the University of Chicago, was one performed by Buswell in 1921. He attempted to show the relation between eye voice span in reading. He tested fifty four subjects. Twenty four of these were elementary pupils, twenty four were high school students, and six were college students. The group was divided into an equal number of good and poor readers. As each subject read a selection the movements of his eyes were photographed and the sound of his voice was recorded by a dictaphone. An electrical device enabled the experimenter to synchronize the dictaphone and film records and thus show the position of the eye and voice at different places in the reading.

He found that the mature readers had a wider eye voice span than the poor readers. The span was widest at the beginning of the sentence and narrowest at the end. In all grades the rapid readers had a wider span than the slower readers. A wide eye voice span is essential to rapid
reading and is an aid to the interpretation (2:217-222).

In 1932, Munroe made a thorough investigation of the reading disabilities of four hundred and fifteen children obtained at the Institute for Juvenile Research. She divided the four hundred and fifteen subjects into three groups. The first group was called the clinic group and included those children examined at the Institute. The second group consisted of those children who had been referred for examination by their parents, teachers and psychologists. The third group was composed of borderline and mental defectives. As a control group Munroe used one hundred and one children of an average American school. In this group each subject was examined individually and his special difficulty or difficulties were discovered. Then the proper remedial treatment was given to correct the same. The causative factors that were found to be an impediment to reading are listed and discussed in a chapter in Miss Munroe's book (19:1-60).

In summarizing the above, it was found that the outstanding men who have conducted experimental investigations in reading are Javal, Sanford, Griffing and Franz, Quantz, Delabarre, Huey, Erdman and Dodge, Goldscheider and Mueller, Zeitler, Schmidt, Buswell, and Munroe. That none of them attempted to relate reading with imagination is very evident from the nature of their literature.
CHAPTER II

THE FIELD OF IMAGINATION

The preceding chapter summarized the important investigations in reading, and since both reading and imagination are the subjects under discussion in this investigation, this chapter will be devoted to the important investigations in the field of imagination.

The fertility of the visual imagination has been measured by means of the "ink blot" experiment. The first investigators to perform this experiment and to suggest that visual imagination could be measured by means of the ink blot were Binet and Henri in 1895 (34:253-270).

In 1897 Dearborn constructed a series of ink blots and in the following year, he gave the ink blot test in the psychological laboratory at Harvard University. His subjects were students and professors and their wives, whose ages ranged from eighteen to sixty two years. His results showed a variety of responses which he explained were the result of experience and especially early experience. The artist saw picturesque and fanciful things in the blot and the subject interested in domestics was reminded of domestic things. Similarly the country bred subjects were reminded of things that were in keeping with their past environment (8:183-190)
Kirkpatrick in 1900, tested five hundred children of all ages from the first to the seventh grade. He used only four blots and allowed one minute to each subject to name as many associations as possible. He found that the younger children were superior to the older children. This he considered as striking because the smaller children possessed fewer mental images than the older children. (16:274-280).

In the same year, Stella Sharpe also gave the ink blot test to seven advanced students in the Sage School of Philosophy. This test was one of many she gave in her studies of Individual Psychology. She constructed ten blots and requested each subject to name as many objects as possible in the five minutes allotted. The results were of a qualitative and quantitative nature and her subjects showed a constructive and matter-of-fact type of imagination. (29:329-339).

In a series of experimental investigations with Negro children in 1913, Pyle found that the negro children were nearly as good as the white children in the ink blot test (23:357-360).

F.C. Bartlett in 1916, also used ink blots as a part of his experimental work. He used thirty six subjects, four of which were children. He prepared thirty six ink blots which were variously shaded and instructed his
subjects to see what they could make out of them. The results showed (1) "variety of responses, (2) the special interests of the subjects were manifested in their responses and (3) the tendency of a certain type of imagery when once suggested to persist when one object after another was presented to the same subject" (4:222-226).

Parsons in 1917, examined fifty two boys and forty seven girls, ranging in age from seven to seven and one half years of age. She obtained her subjects from the Infants Department of two elementary schools in Cardiff. Her aim in conducting this experiment was to see what results might be obtained from young children and to see "what relation these would bear to those obtained from the adult results of Dearborn, Kirkpatrick, Sharpe and Bartlett." Her results show a tendency to use active imagination and non-constructive rather than constructive associations. Also, she found, that children, like adults are interested in animals and living things (21:74-82).

R.M. Simpson, in 1921, reports an experiment which he gave to four hundred and seven children in the public schools of Oyster Bay, Long Island. The subjects ranged in age from seven to sixteen years and were taken from grades 3B to 8 inclusive. His aim was to determine the creative capacity of an individual. Four small dots representing the four corners of a square were printed
five times on a sheet of white paper. Ten similar sheets were prepared and distributed to each subject who was instructed to add two more dots to the four at any position, and to connect these dots with as many straight or crooked lines as were necessary. The object was to make as many different drawings as possible in the fifteen minutes which was allotted as the time in which to perform the test. The results of this experiment showed that the advance group of each grade was more creative than the B group of the same grade. He also suggested that by this same method children who possessed creative ability could be singled out and should be given special opportunity to direct this ability toward fruitful channels (30:234-238).

Before summarizing the outstanding work done with the ink blot in experiments which have been designed to test the imagination, it may be well to explain the different types of imagination as listed by reputable investigators in this field. It has never been claimed that the ink blot measures all that can be measured in the imagination, nor has it been presented as an adequate measurement of any particular type. It does, however, measure results that are products of the imagination, and so far there has been no better substitute for bringing out any particular feature of the imagination. The difficulty of devising new and improved tests is suggested from a brief survey of
the different types of imagination.

There are many types of imagination as there are senses, namely, visual, auditory, motor and tactile. The vast majority of people possess visual, auditory and motor imagery. Of these types, the visual is the most common of all.

Individuals of the visual type of imagery are known as "visiles." They employ visual imagery in their thinking. The vast majority of people belong to this group.

"Individuals, who are of the auditory type and who use auditory imagery are called "audiles." This type is not as common as the visual type, yet, there are many people who have poor visual imagery who possess good auditory memories.

In the motor type of imagery, images of movement prevail. Individuals of this type are known as "motiles." It is rather hard to say just how many people possess this type of imagery. Children belong to this group because they say the words as they read them and also the blind depend upon this kind of imagery.

There is another group in which images of touch predominate. These are called "tactiles." The best and only examples of this type of imagery are found among the blind (11:83)."
No one person uses imagery that is strictly or purely of one type. A certain type may predominate, but not to the exclusion of all other types. This predominating type of imagery is usually influenced or tinged by other type elements.

Seashore enumerates the different types of imagination as the sensuous, the intellectual, the sentimental, the impulsive, the motor, and the balanced.

The sensuous type is "characterized by luxuriant and realistic imagery in terms of which experiences are created and recreated. Instead of recalling experience in a matter-of-fact way one endowed with this imagination at once reconstructs experience images more or less fantastic, conventionalized, idealized and enriched, and often so molded as to embody his feelings, biases and aspirations or fears. He lives in a world of the senses and enjoys a sort of abandon and luxurious freedom from restrictions of the commonplace. It is the life of the impressionist, an effervescent life of the moment, reverberant in sensations and images" (28:268).

The intellectual type is the highest type. This is also known as the scientific or philosophical imagination. Individuals of this type do a great deal of abstract thinking, hence their imagery is substituted for theories and symbols. Individuals possessing this type of imagination are scientific
men and they are of a cold calculating and deliberate nature.

The sentimental imagination "is often called the artistic and is characterized by its tendency to idealize experience in terms of the higher sentiments. Objects and events assume meaning with reference to remote ideals or sanctions, such as harmony, unity, pleasure or the opposite of these. The world is a world of truth, goodness and beauty, or their opposites, rather than the humdrum of the common man's experience" (28:268).

The impulsive imagination is the result "of display of feeling and the arousal of emotions in others." The individual possessing this kind of imagination acts upon a quickly passing mental feeling rather than upon reflection. This type is characterized by a lack of logic and continuous effort. Yet, if the stimulus of emotion is great enough it may result, and often does, in great creations.

The motor type of imagination is found in persons who work out situations by doing. They achieve success because of their continuous effort, and their desire to achieve practical success. The plodder belongs to this group.

The balanced imagination is that which includes all of the traits of the above types in a proportionate degree. An individual instead of being possessed of one specific type of imagination, may possess certain elements of all the above types (28:269).
In summarizing the above, it was found that work in imagination was done by Dearborn, Kirkpatrick, Sharpe, pyle, Bartlett, Parsons and Simpson.

Of all the above investigators Parsons was the only one who used very small children exclusively as subjects for experimentation and none of the above investigators have aimed to use imagination in the same way as that attempted in this present investigation.
CHAPTER III
PROCEDURE AND METHOD OF INVESTIGATION

This investigation consisted of two experiments. The first experiment was an imagination test and the second was a silent reading test.

The experiment was given with the aid of 28 pupils who had just completed the first semester of the second grade work. Two hundred and sixty four pupils acted as the subjects and were obtained from four public schools and two parochial schools. Of the total number one hundred and twenty two were boys and one hundred and forty two were girls. With but a few exceptions the subjects ranged in age from seven to eight years.

The material used for the imagination test was ink blots which had been standardized by Whipple in 1910. Five blots known as numbers 11, 12, 13, 14 and 15 of the series 1-20 were used. As the blots are not of graded difficulty any of the series could have been used. The time allotment for each blot was one minute. This gave each subject five minutes for concentration and recitation of what was seen in the five blots. This time is the same as that which was used by Kirkpatrick in his investigation. Thirty seconds of that one minute was used for concentration and the remaining thirty seconds was used for naming the associations. Each blot was held by the subject at a normal reading
distance. The position of the blot could be changed if the subject wished. This element was neither mentioned nor forbidden. However, it was noticed during the examination that very few subjects changed the position of the blot. This test was an individual test in which the experimenter recorded all the responses of the subjects because they were too young to write all the names that were involved in their associations.

The directions were simple, and as follows, "I am going to show you an ink blot. I want you to look at it and when I say 'ready', you may begin to tell me all the things you think it looks like."

Test 2 was a silent reading test. The material used was "Gates Primary Reading Test." This test was selected in preference to others because "it is the most recent of the numerous and widely used reading tests" (32:200).

The reading test is available in two forms and its purpose is to reveal strength and weaknesses of individual pupils, therefore, it is of a diagnostic nature. If one wished to measure the reading ability of one group with that of another group or groups the two forms could be used, but since the experimenter only desired to measure the reading ability of one group with the imagination of that same group, only one form was used. This was Form 2, Type 3.

This form consists of a series of pictures, each of which
is accompanied by a short paragraph. Each paragraph contains descriptive matter pertaining to the picture, and also a direction to put a further mark in the picture. It is the placing of this mark that shows whether or not the subject has comprehended the entire paragraph. There are twenty six such directions and they are of graded difficulty. Several practice exercises are printed on the front page. It was necessary for the experimenter to prepare large drawings of the sample exercises on the blackboard.

This was a group test but in order to prevent copying and to give such assistance as turning the page and to make certain that the subjects read the test in its entirety, only twenty five subjects were permitted to take it at one time. The time allotment required for completion of the test was twenty minutes.
CHAPTER IV

RESULTS OF TEST I

Although there were several nationalities among the subjects examined no attempt was made to classify the results according to racial groups, because (1) there was not a fair representation of each group and (2) the experience and interests of most children are similar and about the same things appeal to all of them.

The associations were classified into groups according to their nature. The aim was to see which group or groups were selected the most by the boys or by the girls.

Group A included all the associations of animals such as a cat, or a dog or any parts of animals such as a tail or a cat's head.

In Group B were all the associations of things that fly such as a bee, a butterfly or a bird.

Group C included all things that swim such as a fish or a crab.

Group D included all persons such as a boy, a girl, a lady or a man, and all parts of persons such as hair, hands, or teeth.

Group E included any kind of vegetation such as flowers, grass, or trees.

Group F included all landscape phenomena such as the sky, the clouds, rocks, hills and lakes.
Group G included all inanimate objects such as chairs, baskets and houses.

The above data is illustrated in Table I on the following pages. The letter "B" stands for boys and the letter "G" stands for girls. The number of responses for each of these, namely, the boys and the girls is recorded also in Table I. The total percent of the boys and girls selections in each group is also recorded in the same table.

The five blots used for the imagination test are numbers 11, 12, 13, 14, and 15 of the Whipple series. The results given for each of these blots were classified into seven groups and are designated as A, B, C, D, E, F, and G in Table I.

Blot II received the maximum number of associations of any of the blots, which was four hundred and eighty nine. Blot 14 received the least number of associations of any of the blots, which was almost one hundred less than Blot II. This great difference in number of associations was due to the fact that the shape of Blot II suggested objects that were in a child's experience while the shape of Blot 14 was more difficult to diagnose and consequently was quite foreign to the child, therefore, it was difficult for him to name any associations regarding it.

Of the four hundred and eighty nine maximum number of associations for Blot II, two hundred and twenty three or
# TABLE I

**INK BLOT or IMAGINATION RESULTS**

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<td>G 100</td>
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<td>6</td>
<td>50 %</td>
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forty five per cent of the total centered in Group E which included trees. Ninety one or forty one per cent was given by the boys and one hundred and twenty one or fifty four per cent was given by the girls. This group received the most responses because the general outline of the blot suggested a tree. The objective evidence was such that the subjects could readily discern the shape of a tree by the outline of the blot.

There was a slight difference of thirteen responses between the boys and the girls in favor of the girls.

The remaining two hundred and sixty responses were distributed among the other groups which were insignificant and proportionately less. Therefore, the group or groups only which received the most responses for each blot have been considered.

Blot 12 received four hundred and twenty two associations. The bulk of this number fell into two groups, Group D and Group E. Group D, which included persons, received one hundred and forty four responses or thirty four per cent of the sum total for all the groups. Sixty six or forty five per cent was given by the boys, and seventy eight or fifty four per cent was given by the girls.

Group "E", which included trees, received one hundred and nine responses or twenty five per cent of the total four hundred and twenty two. Forty three associations
or thirty nine per cent was given by the boys and sixty six associations or sixty per cent was given by the girls. Here again in both groups, there is a slight difference in favor of the girls, which would lead one to conclude that girls more than boys are interested in trees and persons.

These two groups received such a large number of associations because the shape of the blot was such that it suggested both a tree and a person sitting under a tree.

Blot 13 received four hundred and seventy three responses which, like Blot 12, fell into two groups, namely, Group A and Group D. Group A, which included animals received two hundred and five responses or forty three per cent of the total number four hundred and seventy three. One hundred and six responses or fifty one per cent was given by the boys and one hundred responses or forty eight per cent was given by the girls. In this group the slight difference of six was in favor of the boys.

Group D, which included persons, received one hundred and three associations or twenty one per cent of the total of four hundred and seventy three. Forty two responses or forty per cent was given by the boys and sixty one or fifty nine per cent was given by the girls. The difference of nineteen was in favor of the girls. The associations fell into these two groups, because the general shape of the blot suggested an animal and persons on the animal.
Blot 14 received three hundred and ninety one responses, the least number received by any of the other blots. One hundred and two responses or twenty six per cent of the maximum number centered in Group A, which included animals. The subjects had more difficulty with this blot than any other blot, and although Group A which included animals, received more responses than any of the other groups, yet many of the subjects said, "It looks like some kind of an animal, but I don't know what it is." Just what animal it resembled they were unable to say.

Blot 15, received the total number of three hundred and ninety five responses. One hundred and eighty or forty five per cent of the sum total fell into Group G or the group of inanimate objects. Eighty two responses or forty five per cent were given by the boys and ninety eight or fifty four per cent were given by the girls. The difference of sixteen was in favor of the girls.

Another group which received quite a number of associations was Group D, which included persons. This group received the total of ninety six associations or twenty four per cent of the maximum number. Forty two responses or forty three per cent was given by the boys and fifty four responses or fifty six per cent was given by the girls. The difference of twelve was in favor of the girls.
These two groups were selected because of the peculiar shape of the blot. It was so peculiar that it suggested an inanimate object to some of the group and persons to others in the group.

To sum up the above, it was found that (1) boys more than girls are reminded of animals, (2) girls more than boys are reminded of trees and plants, and (3) girls more than boys are reminded of persons. This is as it should be, because boys, by their very nature would be attracted to animals which suggest the adventurous, and girls, because of their nature, would be interested in plants and the more beautiful things of life.

That children are interested in animals and living things was manifested by the responses given, which responses agree with the results found by Parsons in her investigation (21:92).

There were a few subjects who named less than five associations, that is, they were unable to give one association for each of the five blots. Of this group there were thirteen who named four associations, one association each for each of the four blots, and another group of six, who also named four associations but their associations were for one and two blots.
This group of thirteen I would say possessed a better imagination than the group of six, because each of the thirteen named a different association for each of the four blots, whereas, the other group of six named two or three associations but those two or three associations were of the same nature and were for the same blot. Although it could not be said that they possessed a fertile or vivid imagination, yet, the very fact that they were able to name a different object for each of the blots presented was an indication that their imagination was more creative than the group of six who named two objects of the same class for the same blot.

Five subjects, four girls and one boy gave no responses to any of the blots. Seven subjects of which four were boys and three were girls gave only one response to all of the five blots. Are these subjects totally deficient in imagination? Hardly so, because other types of imagination as the auditory were not examined, which might be found to be well developed in these subjects. But, inasmuch as the ink blot only measures a certain phase of imagination, namely, the quickness of associations, then, in that only which the ink blot measures they are deficient.

One of the above subjects, a boy, who gave no response to any of the blots said, "It looks like something but I
can't tell what it is." To him it was just a spot. He could not form any associations about it, or else, he might have been trying to tell what the blot was instead of what it resembled.

The responses of one of the subjects, a little girl, were most interesting. They were interesting because there were no other responses like them among all the answers of the subjects examined. Although there was no variation in the directions given this particular subject, after naming an association, also gave a story about the association. Her exact responses were as follows: For Blot II, she said, "It looks like a girl. I have a sister. I play with her." For Blot 12, she said, "It looks like a lady sitting on a tree. I saw a lady. The lady is nice. I love the lady." For Blot 13, she said, "It looks like a cow with children on his back. I saw a cow. I saw some children. I saw the cow on the farm. The cow is nice." For Blot 14, she gave no response and consequently no story. For Blot 15, she said, "It looks like an electric toaster. I have a toaster. I use my toaster. My mother makes toast on the toaster."

This child probably did this because she may have possessed a creative imagination which was manifested in story form or, she may have had much training in oral composition and in telling stories about objects which she
had observed, or else, that might have been the way in which she interpreted the directions.

The variety of responses was due to the fact that at first the subject's attention was centered on the blot as a whole which suggested an object or objects and that later, his attention shifted to different portions of the blot which suggested other things.

The variety of responses had been due also to the fact that most of the subjects named more than one object belonging to the same class, such as two kinds of animals, a dog and a cat, or two kinds of trees, a little tree and a pine tree. This is in agreement with Kirkpatrick who also found in his investigation that "the presence of one idea of a group made others of that same group more suggestible" (16:280).

In general, the associations given were of a matter-of-fact type. There was not much detail nor elaboration, nor a combination of associations. In fact, the tendency was more or less, among all subjects to give a single association.
CHAPTER V

RESULTS OF TEST II

The reading test was scored according to the directions indicated in the "Manual of Directions" for the Gates Primary Reading Test. The score was the number of exercises correct. There were twenty six exercises and if a subject had twenty six exercises correct, he would receive a score of twenty six. However, no one subject had a score of twenty six, which was probably due to the fact that the directions increased in difficulty toward the end of the test. Moreover, there was one exercise, exercise fourteen, which had to be scored very rigidly. In all cases, the scoring was to be rigid although reasonable allowance was made for the subject's motor limitations and what his probable intention was. Exercise fourteen was an exception to this rule. If the direction was not followed exactly as it should have been, it was marked incorrect. Consequently no one had exercise fourteen correct.

Eleven subjects received a score of twenty five, which means that these eleven subjects had twenty five exercises correct. Twenty four subjects received a score of 24, because they had 24 exercises correct. The remaining scores and the number of subjects who received them are as follows: Twenty seven subjects had a score of 22; thirty subjects had a score of 21; twenty eight subjects had a score of 20; twenty
seven had a score of 19; nineteen had a score of 18; fourteen had a score of 17; six had a score of 16; eight had a score of 15; sixteen had a score of 14; five had a score of 13; eleven had a score of 12; eight had a score of 11; one had a score of 10; five had a score of 9; one had a score of 8; one had a score of 5, and one had a score of 2.

This data is illustrated in Table 2 on the following page. The numbers 25, 24 and so forth all across the top row represent the reading scores. The numbers in the second row indicate the number of frequencies, that is, 11 subjects had a score of 25, 26 subjects had a score of 24 and so forth. The rest of the table is read in the same manner.

These subjects had just completed the first semester which is equivalent to five months of second grade. The score for 2B would come between the range of 14 and 19, which meant that a subject would be required to have fourteen and nineteen exercises correct, if he was to be graded as reading within his grade. Any subject having less than fourteen exercises correct, was a poor reader because his low score would indicate his reading achievement as being below the standard requirement for his grade.

Results showed that out of the total number of two hundred and sixty four there were two hundred and thirty one who were graded good readers. They had the required number of exercises correct. Their reading attainment was equal to
TABLE II
READING SCORES

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the requirements for their grade.

In this group of two hundred thirty one was a group of one hundred forty one who could be really considered as superior readers because their score was five points above that which is required for their grade. Their reading ability was equal to that of pupils in an advanced division.

Thirty three subjects were graded as poor readers because they had less than fourteen exercises correct. Their low score was below the standard for their grade.

The poor reading ability of these children could not have been the result of an unsuitable method of teaching, because all things being equal, a normal child will learn to read under any method.

The low scores received by these subjects may have been due to one of the following causes which were found by Gray to retard progress in reading. They are inferior learning capacity, congenital word blindness, poor auditory memory, defective vision, narrow span of perception, ineffective eye movements, inadequate training in phonics, inadequate attention to the content, inadequate speaking vocabulary, lack of interest and guessing.

The group with inferior learning capacity includes children that are mentally defective and are unable to learn or it includes children of low native intelligence who have sufficient capacity to learn to read but who do not because they are not given appropriate instructions.

In the congenital word blindness group there are children who are normally endowed but who have extreme
difficulty in learning to recognize printed or written language.

The group of children who have poor auditory memory cannot hear at all and must be instructed in the same manner as deaf children. Included in this group are children who because of seating positions fail to hear the words pronounced correctly, and children who do not remember what they hear.

There are many failures in reading which are due to defective vision.

In another group are those who recognize a short unit of a printed line at each fixation of the eye, which slows up their rate of silent reading and makes oral reading very inaccurate. These subjects have a narrow span of recognition.

Some children have ineffective eye movements. They fail to move the eye from left to right and from the end of one sentence to the beginning of another. This condition may be due to several causes, namely, poor instruction, carelessness, guessing, poor coordination of the eyes, and to word or meaning difficulty.

Inadequate training in phonics, results in failure to recognize words independently. There is also a group of children who have a small meaning vocabulary. These are the ones who come from homes where only a speaking vocabulary is used and when they come to words in reading they may be able to pronounce them, but they are not able to understand them.

Lack of interest or an unfavorable attitude toward reading is a common cause of failure in reading. This lack of interest may be due to several causes as poor auditory and visual defects or to congenital word blindness, or it may be due to a combination of causes.

Guessing plays a part in poor reading. Children sometimes have difficulty in learning to read and so memorize what they hear from other children and consequently fail in independent reading (12:12-30).

These factors enumerated by Gray as possible causes of failure in reading agree fairly well with those found by
Miss Munroe who also made an extensive investigation of reading disabilities. Her classifications are arranged a little differently, yet, in general, they agree fairly well with the reasons quoted above.

There might have been influences out of school that have retarded the subject's reading, as a foreign home where a foreign language is spoken. A child reared in such an environment would have little opportunity to hear English spoken fluently and, of course, would have little access to reading literature as newspapers, magazines or anything that would enhance his opportunities.

Then, too, lack of cooperation of the parents is another outside factor that would retard a child's reading. A child having difficulty in reading might have improved had he received the proper attention and help from the parents (3:15).

Now just what factor or factors caused the poor reading of the thirty three subjects in this investigation is not known, because the examiner did not examine each subject individually to diagnose his special difficulty. Lack of opportunity and access to the children prevented this. All that can be done is to generalize and say that this cause or that cause may have impeded reading.

These causes, anyway, apply more or less in a general way, because of individual differences in the different subjects. No two individuals are alike. The range of
ability, the capacity and emotional makeup is pronounced even in a slow group.

To summarize the results of this test showed that of the total number of two hundred sixty four subjects examined, two hundred thirty one or 87.5 per cent were found to be good readers and 33 or 12.4 per cent were poor readers.
CHAPTER VI

THE RELATION BETWEEN TEST ONE AND TEST TWO

In order to get the relationship between the reading and the imagination it was necessary to grade in some way the results of the imagination test. There could be no comparison between the two subjects unless the grading of each was similar, or as nearly similar as was possible to obtain. As no one had made any attempt to grade imagination results, the experimenter devised a way. The greatest number of associations given for the ink blots down to five associations were considered as good and vice versa, any number from five up to the maximum number was considered as good, because that was one response for each of the blots. Any number of responses less than five was poor. This classification was general, and since there were different degrees of good as some responses were better than others, the results had to be graded more closely, which was done in the following manner. A survey of the results showed that the total number of associations given by any of the subjects was fourteen and the least number was zero. Fourteen was given a grade of one hundred, the highest grade. The relation of fourteen to one hundred is 7-1/7. In order to make a perfect calculation, the fraction was dropped and ninety eight instead of one hundred was used. Then seven deducted from ninety eight leaves ninety one. Therefore, each response was given a grade of seven. So, a subject naming
thirteen associations was graded as having an imagination of ninety one. A subject naming twelve associations was graded as having an imagination of eighty four. A subject naming eleven associations was graded as having an imagination of seventy seven. This manner of grading was continued down to one association.

The following explanation will help to clarify the scale used. Fourteen associations were graded ninety eight; thirteen associations were graded ninety one; twelve associations were graded eighty four; eleven associations were graded seventy seven; ten associations were graded seventy; nine associations were graded sixty three; eight associations were graded fifty six; seven associations were graded forty nine; six associations were graded forty two; five associations were graded thirty five; four associations were graded twenty eight; three associations were graded twenty one; two associations were graded fourteen; one association was graded seven. The objective was to adhere as closely as possible to the reading score and to keep the range between the two subjects uniform.

Thirty four subjects received a score of ninety eight; ten subjects received a score of ninety one; eight subjects had a score of eighty four; eighteen subjects had a score of seventy seven; twenty subjects had a score of seventy; twenty three subjects had a score of fifty six; twenty three
subjects had a score of forty nine; thirty four subjects had a score of forty two; eighteen subjects had a score of thirty five; twenty three subjects had a score of twenty eight; eleven subjects had a score of twenty one; seven subjects had a score of fourteen; seven subjects had a score of fourteen; seven subjects had a score of fourteen; seven subjects had a score of fourteen; seven subjects had a score of fourteen; seven subjects had a score of fourteen.

This data is illustrated in Table III on the following page. The numbers ninety eight, ninety one, eighty four and so forth all across the top row represent the imagination scores. The numbers in the second row indicate the number of frequencies, that is, thirty four subjects had a score of ninety eight, ten subjects had a score of ninety one and so forth. The rest of the table is read in the same manner.

All responses of five which were graded thirty five and so on up the scale were considered a good imagination and all responses less than five, and, consequently, less than grade thirty five were poor. In the reading the score was fourteen points to twenty five points. Any score between fourteen and twenty five was good and any score below fourteen was poor. Therefore, the ratio between the two subjects was fourteen to twenty five points for the reading, and fourteen to five points for the imagination.

In comparing the results of the two subjects, namely, the reading results and the imagination results, it was found that two hundred and thirty one good readers or eighty
### TABLE III
**IMAGINATION SCORES**

<table>
<thead>
<tr>
<th>SCORES</th>
<th>98</th>
<th>91</th>
<th>84</th>
<th>77</th>
<th>70</th>
<th>63</th>
<th>56</th>
<th>49</th>
<th>42</th>
<th>35</th>
<th>28</th>
<th>21</th>
<th>14</th>
<th>7</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>FREQUENCIES</td>
<td>34</td>
<td>10</td>
<td>8</td>
<td>18</td>
<td>20</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>34</td>
<td>18</td>
<td>23</td>
<td>11</td>
<td>7</td>
<td>7</td>
<td>5</td>
</tr>
</tbody>
</table>
and five tenths per cent had a good imagination and forty-five or nineteen and four tenths per cent of this same group had a poor imagination.

Included in this group of two hundred and thirty one good readers was another group of one hundred and forty one who could be considered as better readers, and, it was found that of this group of one hundred and forty one, there were one hundred and fourteen or eighty and eight tenths per cent who had a good imagination. Thirty eight or 26.9 per cent of this better group of good readers were also of a better imagination. Their imagination was graded higher than the rest of the same group. The remaining twenty seven or nineteen and one tenth per cent of the good readers were found to have a poor imagination.

In the group of thirty three poor readers, twenty five or seventy five and seven tenths per cent had a good imagination and eight subjects or 24.2 per cent of the poor readers were also of a poor imagination.

Observation of the data on the following page will illustrate the above findings. The upper left hand section gives the number of good readers. This section is divided into the number and per cent of good readers who had a good imagination and those who were found to have a poor imagination.
TABLE IV
RELATION of READING and IMAGINATION

<table>
<thead>
<tr>
<th>GOOD READERS</th>
<th>GOOD IMAGINATION</th>
<th>186</th>
<th>80.5%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>POOR IMAGINATION</td>
<td>45</td>
<td>19.4%</td>
</tr>
<tr>
<td>POOR READERS</td>
<td>GOOD IMAGINATION</td>
<td>25</td>
<td>75.7%</td>
</tr>
<tr>
<td></td>
<td>POOR IMAGINATION</td>
<td>8</td>
<td>24.2%</td>
</tr>
</tbody>
</table>
The lower left hand section gives the number of poor readers. This section is also divided into the number and per cent of poor readers who were found to have a good imagination, and those who were found to have a poor imagination.

Before illustrating the relationship of imagination and reading in graphic form, it may help to clarify the matter by inserting and explaining the individual graph of reading and imagination.

The reading graph represents the reading curve. The numbers 5, 10, 15, 20, and 25 on the horizontal axis represents the different scores in reading. Each large square on this axis is equal to five points, then one fifth of this square would equal one point. The numbers 5, 10, 15, and so forth on the vertical axis represent the number of frequencies. These frequencies represents the number of children who received certain scores in reading. Each large square on this axis is equivalent to five children, therefore, one fifth of the square would represent one frequency. Observation of this graph shows that the lowest scores in reading were made by a small percentage of the group. As the frequencies increased there was a corresponding increase in the number of the reading scores, which shows that the greatest number of high points in reading represent the scores of the greatest
The imagination graph shows the imagination curve. The figures 20, 40, 60, 80 and 100 on the horizontal axis indicate the different scores in imagination. Each large square on this axis is equal to twenty points, therefore, one twentieth of the square would equal one point. The figures 5, 10, 15, 20, 25, 30 and 34 on the vertical axis indicate the number of frequencies. These frequencies represent the number of children who received different scores in imagination. Each large square is equivalent to five children, therefore, one fifth of the square would represent one frequency. Observation of this graph shows a consistent rise and fall of the graph until it again reaches its highest point on the right, showing that the majority of the group had a high score in imagination. The highest scores in imagination were for the greatest number of frequencies.

The relation between the two subjects is illustrated by a third graph. The solid line indicates the reading curve and the broken line indicates the imagination curve. The figures just above and below the horizontal axis indicate the scores of both subjects. The figures 5, 10, 15, 20 and 25 above the horizontal axis represent the different scores in reading. The figures 20, 40, 60, 80 and 100 below the horizontal axis represent the different
scores in imagination. The figures 5, 10, 15, 20, 25, 30 and 34 on the vertical axis correspond to the number of frequencies for both subjects.

As was mentioned above the solid line represents the reading score and the broken line represents the imagination scores. The graph shows that the highest scores in reading and in imagination are for the greatest number of frequencies. These graphs are shown on pages 53, 54 and 55.

This relationship is further illustrated by independent graphs on pages 56, 57, 58 and 59. The graph on page 56 shows the good readers with good imagination. As the figures on this graph and the following graphs indicate the same data as explained in the graph for the whole group no further explanation is necessary.

The graph on page 57 shows the poor readers with good imagination.

The graph on page 58 shows the poor readers with poor imagination.

The graph on page 59 shows the good readers with poor imagination.
Figure 1. — Reading Curve.
Figure 2. -- Imagination curve.
Figure 3.—Relation of Reading and Imagination.
Figure 4. Good Readers With Good Imagination.
Figure 5. — Poor Readers With Good Imagination.
Figure 6.—Poor Readers With Poor Imagination.
Figure 7.-- Good Readers With Poor Imagination.
This investigation was conducted to see if there was a relationship between good reading and good imagination.

To accomplish this, two tests were used. The first test was an individual test in which the imagination of the subject was measured by ink blots 11, 12, 13, 14 and 15 of the series of twenty devised by Whipple. The results showed a similarity of the responses of both the boys and the girls, and that, in general, the subjects possessed a good imagination.

The second test was a silent reading group test in which the reading ability of the subjects was measured by means of the Gates Primary Reading Test. Of the two hundred and sixty four subjects examined two hundred and thirty one or 87.5 per cent were found to be good readers, and thirty three or 12.4 per cent were poor readers.

The comparison of the results of the above tests, namely, the imagination test and the reading test showed that two hundred and thirty one good readers or eighty and five tenths per cent had a good imagination and forty five or nineteen and four tenths per cent of the same group had a poor imagination.

A graphic representation of the results showed this relationship. This investigation seemed to indicate that
there was a relation between good reading and good imagination. A good imagination is an essential factor in reading because it gives color or life to the material read.
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The thesis "The Relation between Fertility of Imagination and the Ability to Read as Manifested by 2-b Pupils," written Josephine Agnes Flannery, has been accepted by the Graduate School of Loyola University, with reference to form, and by the readers whose names appear below, with reference to content. It is, therefore, accepted as a partial fulfillment of the requirements of the degree conferred.

Leonard H. Otting, S.J. July, 1933
Valeria K. Huppeler July, 1933