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A study of children's imagery in visual and auditory comprehension

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BOSTON UNIVERSITY

GRADUATE SCHOOL

Thesis

A STUDY OF CHILDREN'S IMAGERY IN VISUAL
AND AUDITORY COMPREHENSION

by

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Marjorie C. Brennan.

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CHAPTER I
INTRODUCTION

The study of imagery goes back as far as Aristotle. "Since the days of Locke, we may say, the notion of memory as a faint likeness of perception, and of 'reproduction' as a revival through imagery, has been a common one in psychology. In view of the present limitations of 'associationism,' criticism of such a notion is hardly to be avoided where rigid analysis takes its place alongside logical arrangement in psychological work. As early as Aristotle, 'laws of association' were formulated which were intended to state the conditions under which ideas are brought again to the mind. Aristotle's formulation was so successful that it has passed current, with but minor modifications, until modern times."^{1/}

THE PROBLEM: There has been much current discussion in the educational field as to the presence or lack of imagery, (imagery connoting meaning) in the teaching of the social studies. The writers of the present day text books, in their zeal, in many instances, to curtail pon-

^{1/} I. Madison Bentley: "The Memory Image and Its Qualitative Fidelity," American Journal of Psychology, Vol. XI, No. 1, Oct. 1899.

derous detail and present the subject in as concise terms as possible have robbed it of the very essence that is needed for understanding on the part of the pupil. Facts minus real experiences as part of one's background often degenerate into ideas completely foreign to the original definition. According to Horn ^{1/}a child born and bred in Florida has no experience as background to understand a description of the northern blizzards along the New England coast, and our texts are simply filled with analogous situations.

This present study has attempted to portray the differences in children's imagery, the wide range found in their mental constructs even in the same classroom where the children are homogeneously grouped and exposed daily to the brief statements of facts given by their authors. The explanation of these facts are given by the teacher, who gives them an interpretation based on her own mature background of experience, the majority of the class forming very inadequate constructs as a result of this teaching. Everyone is acquainted with the boners found every year on examination papers and these are due to the failure on the part of the author and the teacher to define explicitly the ideas which are to be conveyed. As

^{1/} Ernest Horn: Report of the Commission on Social Studies, Part XV.

a result the pupil is hopelessly confused and erroneous concepts are perpetuated often throughout the entire school life of the individual.

The writer has approached this subject from the historical side in order to clarify her own thinking and to show the relationship between the present work and that of the past.

CHAPTER II
HISTORICAL BACKGROUND

Francis Galton became interested in the mental imagery of people especially the visual presentation and began inquiring among his friends to find out the differences in their mode of imagery. His premise was that most people were visually minded. His statement which follows describes his experiments: "Anecdotes find their way into print, from time to time, of persons whose visual memory is so clear and sharp as to present mental pictures that may be scrutinized with nearly as much ease and prolonged attention as if they were real objects. I became interested in the subject and made a rather extensive inquiry into the mode of visual presentation in different persons, so far as could be gathered from their respective statements. It seemed to me that the results might illustrate the essential differences between the mental operations of different men, that they might give some clue to the origin of visions, and that the course of the inquiry might reveal some previously unnoticed facts.

"After the inquiry had been fairly started I took the form of submitting a certain number of printed ques-

tions to a large number of persons. There is hardly any more difficult task than that of framing questions which are not likely to be misunderstood, which admit of easy reply, and which cover the ground of inquiry. I did my best in these respects, without forgetting the most important part of all--namely, to tempt my correspondents to write freely in fuller explanation of their replies, and on cognate topics as well. These separate letters have proven more instructive and interesting by far than the replies to the set questions.

"The first group of the rather long series of queries related to the illumination, definition, and coloring of the mental image, and were framed thus:

'Before addressing yourself to any of the questions on the opposite page, think of some definite object--suppose it is your breakfast-table as you sat down to it this morning--and consider carefully the picture that rises before your mind's eye.

1. Illumination. - Is the image dim or fairly clear? Is its brightness comparable to that of the actual scene?

2. Definition. - Are all the objects pretty well defined at the same time, or is the place of sharpest definition at any one moment more contracted than it is in a real scene?

3. Coloring. - Are the colors of the china, of the toast, bread-crust, mustard, meat, parsley, or whatever

may have been on the table, quite distinct and natural?'

"The earliest results of my inquiry amazed me. I had begun by questioning friends in the scientific world, as they were the most likely class of men to give accurate answers concerning this faculty of visualizing, to which novelists and poets continually allude, which has left an abiding mark on the vocabularies of every language, and which supplies the material out of which dreams and the well-known hallucinations of sick people are built.

"To my astonishment, I found that the great majority of the men of science to whom I first applied protested that mental imagery was unknown to them, and they looked on me as fanciful and fantastic in supposing that the words 'mental imagery' really expressed what I believed everybody supposed them to mean. They had no more notion of its true nature than a color-blind man, who has not discerned his defect, has of the nature of color. They had a mental deficiency of which they were unaware, and naturally enough supposed that those who affirmed they possessed it, were romancing.

"On the other hand, when I spoke to persons whom I met in general society, I found an entirely different disposition to prevail. Many men and a yet larger number of women, and many boys and girls, declared that they habitually saw mental imagery, and that it was perfectly distinct to them and full of color. The more I

pressed and cross-questioned them, professing myself to be incredulous, the more obvious was the truth of their first assertions. They described their imagery in minute detail, and they spoke in a tone of surprise at my apparent hesitation in accepting what they said.

"I have also received batches of answers from various educational establishments both in England and in America. Considerable statistical similarity was, however, observed between the sets of returns furnished by the school-boys and those sent by my separate correspondents, and I may add that they accord in this respect with the oral information I have elsewhere obtained.

"Here, then, are two rather notable results: the one is the proved facility of obtaining statistical insight into the processes of other persons' minds; and the other is that scientific men, as a class, have feeble powers of visual representation. There is no doubt whatever on the latter point, however it may be accounted for. My own conclusion is that an over-ready perception of sharp mental pictures is antagonistic to the acquirement of habits of highly-generalized and abstract thought, especially when the steps of reasoning are carried on by words as symbols, and that if the faculty of seeing the pictures was ever possessed by men who think hard, it is very apt to be lost by disuse. The highest minds are probably those in which it is not lost, but subordinated

and is ready for use on suitable occasions." ^{1/}

"Imagery may be classified according to the various modes, such as visual, auditory, gustatory, olfactory, cutaneous, kinaesthetic imagery, organic imagery, or it may be described under the more general categories, concrete and verbal. In concrete ideation, a person 'pictures' the object itself, while in verbal ideation he thinks of the words which symbolize the object. Thus you may think of a rose by seeing in your mind's eye a pink flower (Concrete Visual), or by visualizing the word r-o-s-e (Verbal Visual), or by hearing the word as it is spoken (Verbal Auditory), or by speaking it yourself (Verbal Vocal Motor), or by writing it (Verbal Manual Motor). There are many varieties and combinations of Concrete and Verbal imagery.

"When imagery is predominantly visual, another mode of presentation must be translated into visual terms before the situation can be grasped adequately. In listening to the description of a football game over the radio, such a person is likely to convert the verbal auditory images into concrete visual images. It is most difficult for such an individual to transact business over the telephone since no scope is given his visual-

^{1/} Francis Galton: Inquiries into Human Faculty and Its Development "Mental Imagery." London, Macmillan 1883, pp. 57 - 61.

ization. He remembers a melody not in terms of tones, since his auditory imagery is deficient, but in visual images of the notes on the music sheet or of the keys to be played on the piano keyboard. If a foreign tongue is spoken to him the auditory images are translated into visual ones before he can grasp the meaning, since unfortunately he has probably learned the language in the classroom through reading.

"An extraordinary sort of visual imagery has been investigated in recent years--eidetic imagery--which is a special concrete visual imagery. In a typical experiment, a silhouette picture with a number of items is exposed to the view of the observer who fixates it for 15 seconds. The picture is presented against a gray mat for a background. The picture is removed and the observer stares at the gray mat. If the observer is an eidetic he will see the picture on the background, and will be able to describe the most minute details of the scene, such as the precise number of buttons on a pedestrian's jacket, or the number of whiskers on a cat's lip." 1/

"During the years 1919-24 researches into visual memory image have issued from Marburg Institute for Psychology, under the direction of E.R. Jaensch claim-

1/ Wayland F. Vaughan: General Psychology, pp. 388 - 390.

ing to investigate certain unique and hitherto unrecognized characteristics of imagery in children. The work is of practical importance, both to practical pedagogy and to theoretical psychology.

"Urbantschitsch was first to consider eidetic imagery as a phenomenon of unique significance: Among optical memory images we find in addition to the customary visual image an Eidetic Image or Anschauungsbild. In the one case, a former visual perception is merely imagined; in the other case, the original object is actually seen. In this definition, pathological hallucinations and dream images are excluded while spontaneous images of phantasy are admitted.

"This special type of psychical after image is probably in essence the same phenomenon that has been at various times mentioned as 'subjective vision', 'memory after image', 'primary memory image', 'projected memory image', and 'imaginary perception.'

"The studies which have been made of the extent of eidetic powers show that approximately 60% of all children between the ages of 10 and 15 are able to produce eidetic images." ^{1/}

"It is above all essential, in dealing with mem-

^{1/} Gordon W. Allport: "Eidetic Imagery," British Journal of Psychology, 1924, Vol. 15, pp. 99 - 120.

orial imagery, to supply conditions which shall assure the presence of images. As we have before indicated, retention and even recognition do not themselves give such assurance except under certain definite conditions. It will be seen at once that there is a limited range of imagery from which to choose. Images of taste and smell are comparatively rare. Olfactory and gustatory memories usually reduce to peripherally 'reproduced' or to imaged puckers, smacks, swallowings, salivary excitations, inhalations, and feelings. Smell and taste imagery proper is too scanty and too uncertain to turn to account in a preliminary study of imagery. There is an evident biological reason for the paucity of images from these two senses, in civilized man at least. Names, colors, general appearance, etc., have been of more service in the memory than direct images of taste and smell could have been. It is very probable, however, that in primitive conditions these had a much more important function. Haptical images, beside being vague and ill-defined, offer peculiar difficulties. There is, in the first place, a strong liability of confusing images of the memory with sensations excited in the terminal organs. The sensory-motor connection is especially strong between muscular and tendinous images and innervations. A concentration of attention on an imaged movement is pretty certain to become the adequate stimulus to periph-

erally initiated strain sensations. The difficulty of isolating 'muscular' images is shared by smells and more especially by tastes. Since the adequate stimuli to the last two senses are not definitely known, it often occurs that one is not sure whether one has a bona fide image or an actual excitation in the end organ. Of haptical images it may again be said that various factors--pressures, pains, temperature, strains and joint-pulls--are so indissolubly interwoven that the isolation of any one sense image is well-nigh impossible. To this may be added the fact that skin sensations, because of their functional, external reference, are overgrown with visual associations.

"Organic images elude so successfully the usual incentives to reproduction, and are so vague, as to put their employment out of the question.

"There remain the two most highly developed special senses--audition and vision. Here we find a wide range of stimulus qualities and intensities, paralleled to some degree by a wealth of memorial imagery. Here, if anywhere, we ought to be able to isolate the image. to study its nature and function, and to determine its qualitative fidelity by close comparison with sensation." ^{1/}

"The 'occurrence' of any act of perception, the

^{1/} I. Madison Bentley: op. cit.

occasioning condition of its 'existence' as a state of mental life is, undoubtedly traced to the physiological event of bodily stimulation; its character or nature on the other hand, is not thus to be accounted for, but is explicable only by viewing it from within and as in relation to that upon which it is directed. The distinction between existence and essence or content is as old as Aristotle.

"In the perception of an object two concrete facts are involved--on the one hand, the given object, and on the other hand, the act or process of perceiving it. Each of these concrete facts exhibits, then, the two aspects, of existence and content. But in view of the gradual discrimination, ^{namely} by the conscious subject, of the content of the object--a further distinction is requisite. The 'content apprehended' must be distinguished both from the content of the object, and from the content of the mental act. To bring out the import of this distinction, Prof. Ward's well chosen illustration of bestowing in the course of a few minutes, half a dozen glances at a strange and curious flower will serve. Assuming that the act of apprehension is directed upon the actual flower, as a concrete fact in an external world, we may assert that the cognising subject will gradually discriminate a multiplicity of its features--at first the general outline, next the disposition of the

petals, stamen, etc.--he will in other words become aware by degrees of a variety of features constituting the content of the flower. And this 'awareness' of the features of the flower is not something that can be severed from the act of being aware--i.e. the act of apprehending.

"In contrast with this the 'content apprehended' is that which is frequently designated the 'appearance' of the object to the perceiver.

"Clearly then, the sum of the apprehended features (the content apprehended, or the 'appearance' of the object) is distinguishable from the larger sum of characteristics constituting the whole content of the object." ^{1/}

"The perception and reading of words must be dealt with apart from the perception of other visual objects, since of necessity it involves processes which are not essential to the latter. Much experimental work has been devoted to it partly because it has been closely linked with the work on 'imageless thought' of the Wurzburg school and its American followers.

"Two factors of essential importance which must be taken into consideration in studying the perception of words:

1. Words are primarily speech units; the words as

^{1/} G. Dawes Hicks: "On the Nature of Images." British Journal of Psychology, 1924, Vol. 15. pp. 121 - 148.

as written and read derives directly from the word as spoken, and its origin is always implicit--hence some traces of auditory and vocal processes always occur during reading.

2. The perception of a word is not completed by a mere apprehension of its visual and its auditory form or structure. Every word is a symbol, and awareness of its meaning necessitates at least some awareness of the idea or experience it connotes.

"The means by which the full 'meaning' of the symbolized idea or experience designated by the words is associated with its perceived visual form has been much studied and disputed. The 'imageless thought' school consider that meaning is an experience 'sui generis' that cannot be further analyzed into any sensory or imaginal processes. Titchener, on the other hand, holds that no other categories of experience than these can occur, and hence endeavours to equate meaning to 'imagery'." ^{1/}
His statement which follows typifies his point of view:
"In large measure I think, that is, I mean and I understand, in visual pictures. I doubt whether particularity or abstractness of meaning has anything essentially to do with the degree of definiteness of my images. In my own experience, attentional clearness seems to be

^{1/} M.A. Vernon: Visual Perception, pp. 17 - 19.

the one thing needful to qualify a process for meaning." ^{1/}

Later experiments by Jacobson upheld Titchener's theory. His observers were presented with words, asked to repeat them, and give their meanings while observing their conscious processes. The meanings were given in the shape of associations to the word, and were carried by visual, auditory and kinaesthetic processes. As the associations varied they varied they varied the associations to the words. The associations were always relevant to the total word meaning, when interpreted as meaning. The correlated processes and meanings were two renderings from different points of view, of one and the same experience; whenever there was meaning there were processes. Jacobson's statement of his results are as follows:

"Experiments were given on the perception of single letters, the understanding of words, the understanding of sentences. The findings were:

1. The perception of a particular letter usually depends upon arousal of contextual associates. The direct visual apprehension of the stimulus, does not suffice as a rule, under condition of our experiment.

2. The conscious 'meaning' brought out in words is

^{1/} Titchener: Lectures on Experimental Psychology of Thought Processes, 1909. p. 16. Macmillan 1909.

not the perfect and static logical meaning of definition but rather partial meaning, particular exemplification, touched off under the given instruction by the habit or momentary disposition of the observer. Logically the representation of meaning is inadequate; psychologically it is adequate to demands of the occasion.

3. Meaning of a sentence is often entirely lacking at first reading, i.e. the initial perception of it, and appears later, borne by processes representative of its content or of some response to that content made by the observer." 1/

Moore, on the basis of his own experiments in the laboratory of Prof. Kupfe at Munich, disagrees with Jacobson's results on the ground that Jacobson's observers meant by meaning simply imaginal representation. In previous investigations the entire evidence in most of the cases resulted from the introspective reports of their observers as to the mental processes which occurred during apprehension of meaning. Moore in his experimental work varied the usual procedure by requiring his observers to react to the words in one series by pressing a Morse key as soon as they had apprehended the meaning; and in a second series the reaction was recorded as soon as they obtained a visual image of any object or event

1/ E. Jacobson: "On Meaning and Understanding." American Journal of Psychology. Vol. 22, pp. 555 - 577. (1911)

suggested by the word. His own statement of his results is as follows: "The first thing in consciousness was reported as meaning, the second some kind of imagery. The reaction time to imagery is always longer than to meaning. A careful consideration of the results will show that the difference between meaning and visual imagery does not consist in any possible difference in the original imagery itself.

"If meaning were at an early stage in the development of the visual imagery it might be possible to explain in this way the difference in the reaction times to the two events. The universality of the meaning cannot be pictured and is something quite different from the schematism of the image. The incompleteness of the image with a fragmentary character and washed out coloring differs profoundly from the imperfect unanalyzed embryonic stage of the meaning. The image has sensory characters which are utterly foreign to the image. The meaning is a 'knowing' sui generis; the image is a sensational element with its own specific character." ^{1/}

Two years later Moore reviewed his findings of 1915 that meaning preceded visual and kinaesthetic imagery in the perception of printed words and in further experimentation found that in memory, imagery precedes meaning

^{1/} T.V. Moore: "The Temporal Relations of Meaning and Imagery." Psychological Review. 1915 - 22. p. 177.

and adopts this position: "One might say that while the image is frequently very useful, nevertheless, a thought process can be present to the mind without simultaneous imagery and that it is not necessary for us to draw all our meanings and thought from the contemplations of imagery." 1/

Tolman questioning Moore's results because of his own dependence on visual imagery for meaning repeated these experiments and obtained similar results for most of his observers. In some cases he found the reaction time for imagery was the same as, or shorter than, the reaction time for meaning. Of this group some reported that the image and the meaning were separate, though the former might occur first, and seemed to be a prerequisite for meaning. His statement is as follows: "A compromise position therefore, which assumes that 'meaning' depends upon image but is itself distinct from the latter is the one most nearly suggested by our results. Let us emphasize that the value of the present investigation has lain not so much in the direction of a positive proof of one (imagery) or the other (imageless) theory, as in showing that, if a large enough sample of subjects be

1/ T.V. Moore: "Discussion of Meaning and Imagery" Psychological Review, 1917 - 24.

taken, Dr. Moore's method in no way lends support to the "out-and-out imageless position." ^{1/}

Cantril reviewed the experiments done in 1911 by Clarke and Jacobson, the conclusions of which totally disagreed with each other. Clarke ^{2/} maintained that meaning and imagery were not identical, while Jacobson concluded that there are always sensations and images where there are meanings as we have seen above. He criticizes Jacobson's neglect in determining exactly what "meaning" meant to his observers and continues "..... that one is led to believe that 'meaning' had no other connotation for the observers (as well as for Jacobson) than the accrument of an imaginal context core." ^{3/}

He feels that both Moore and Tolman made a great contribution to the field but according to G. W. Allport in his foreword in this monograph, had these previous investigators, including Titchener and the Wurzburgers, observed the differences as Dr. Cantril did, between the reports secured in immediate and in delayed introspection,

^{1/} E.C. Tolman: Psychological Review. (1917) p. 114

^{2/} H. Clarke: "Conscious Attitudes." American Journal of Psychology, 1911. p. 214.

^{3/} H. Cantril: "The Apprehension of Meaning." Psychological Review Monograph, 1932. No. 5.

some of the controversy would have been avoided.

Cantril's statement of his results is as follows:

1. "Temporal relationships of meaning and association. In the case of every 0 it was found that the time required for the comprehension of the meaning of a word was significantly less than the association time for that word.

2. "The reaction time to the meaning of words is significantly longer than the reaction time to the known stimulus word.

3. "That there are individual differences in respect to the amount of facility of imagery employed is a matter of general empirical knowledge.

4. "Delayed introspections were more abundant in the number of images and references which they contained than those introspections reported immediately upon the comprehension of the word." 1/

Thus we are led to infer that most individuals are able to understand the meaning of the perceived words without any resort to imagery; but that certain ones seem to be incapable of completed imageless perception.

It is natural, of course, that the kind of imagery would depend on the type of word used as the stimulus. Words designating more readily concrete objects, events or

1/ H. Cantril: "The Apprehension of Meaning" op. cit.

experiences, will arouse imagery more readily than will abstract words and parts of speech such as prepositions and conjunctions, though the latter, according to Kakise might give rise to verbal images, representation of associated words, conceptual associations, and the like, which could be independent of any object imagery. In his own statement: "Abstractness in the stimulus words had little or no influence on the frequency of the imagery (Memory-images) in passive reactions to easy stimuli, or, if any, tended more toward inducing recent memory images than did the concrete words." ^{1/}

A constant resort to imagery was found when the observers were presented with material difficult enough to baffle their understanding of its meaning. According to MacLennan ^{2/} another proof of the close dependence of meaning upon imagery is found in the constant resort to imagery when thought is baffled. So long as we use symbols which are quite familiar and so long as the combinations made from them fall within the beaten tracks of experience and habit we pay little attention to the flight of imagery which brings home the significance of our thought. The moment, however, that some new thought

^{1/} H. Kakise: "A Preliminary Experimental Study of the Conscious Concomitants of Understanding." American Journal of Psychology. 1911. p. 14.

^{2/} MacLennan: "The Image and the Idea." Psychology Review 1902 p. 69. Vol. IX

arises we search for concrete imagery in which the conception may be appropriately embodied."

Kakise also found that imagery followed awareness of meaning in the perception of easy and familiar words. McDonough presented to his observers unfamiliar words together with drawings of the objects which they designated. As in Moore's experiment the words were exposed tachistoscopically and the observer instructed to react in one series to the first appearance of imagery, and in another to the first appearance of meaning. The findings were as follows: "Sometimes the presence of the image contributes to the understanding of a word inasmuch as it helps to fixate the attention. In the early stages of learning, especially where 'meaning' is really given through the printed picture--this tendency to appeal to the image for aid is apparent. In later stages, however, the image seems unessential for comprehension; frequently it is not present at all, or is subsequent to 'meaning'." ^{1/}

In order to demonstrate the necessity of imagery for the attainment of meaning, the preliminary presentation of the drawings with the words is particularly apt to suggest to the observer that the meaning is the image of that drawing, according to McDonough. And in fact there was a

^{1/} A.R. McDonough: "Development of Meaning." Psychology Review Monograph, 1919. Vol.27 - No.6.

strong tendency to equate the two; nevertheless most observers experienced the presence of something else besides the imagery, and this something was thought to be the meaning. Conclusions along this line had previously been found by Weld; the meaning and the image were two separate phenomena although meaning sometimes preceded and to some extent was mediated by the image. With practice the image became less and less important and sometimes dropped out altogether as the words became more familiar. Weld's statement is as follows: "All of these considerations point to the conclusion that Moore did not realize the difference between the image-of-object and the image-as-object; he did not see that the first is a particular meaning of the stimulus-word, whereas the latter designates a psychological process." ^{1/}

"Thus experimental evidence seems to point to one of three possible conclusions:

1. A bare meaning can be attained without the resort to any imagery of whatever it is the word symbolizes.

2. Some trace of imagery is antecedent and necessary to a full appreciation of meaning.

3. The meaning is made up entirely of sensations and imagery and contains no component which cannot be ana-

^{1/} H.P. Weld: "Meaning and Process as Distinguished by the Reaction Method." Titchener Commemorative. Vol. 1917 p. 181.

lysed into these processes." 1/

The first of these propositions is supported by the 'imageless thought' school; the third exemplifies the Titchenerian viewpoint. Ogden has shown that only the followers of the latter school have been successful, in the analysis necessary to obtain the third conclusion. His statement reads as follows: "We may say that the instruction leads to the formation of a mental state, the nucleus is the primary dispositional reaction to the word. It may evidence itself in consciousness as a generalized meaning, as contents of an imageless nature, or as a mere attitude of familiarity. It may also be quite unconscious so far as introspection can show, and yet evidence itself in its control over the associated imagery and notions of meaning that subsequently appear. It is this relational control which constitutes the meaning of the word." 2/ It is only for exceptional persons that the meaning can truly be said to be the image as was clearly shown both by Tolman and Cantril.

"The necessity of some type of imagery to the appreciation of meaning, and the amount of such imagery which

1/ M.A.Vernon: "Visual Perception" p.22. Cambridge University Press, 1937.

2/ R.M.Ogden: Titchener Commemorative Volume p.79
Wilson Co., Worcester.

actually appears, seems to Vernon to depend to a very considerable degree upon what is understood by meaning. It appears extremely doubtful that the apprehension of the immediate type of meaning which we employ normally in our everyday life, the type expressed by Moore in the phrase, 'I know what you are,' necessitates any imagery or associated sensations. Certainly, it does not require imagery of the vivid and illustrative kind which we report when studying imagery introspectively and voluntarily. If we try to discover Schaefer's rudimentary type of imagery we seem to be driven up against the limits of accuracy of introspection. But as Moore himself points out, the primary and unitary meaning experience tends spontaneously to elaboration and dissociation into various categories of experience connected with the utility of the object designated, and its relationship to the other facts of experience. Until this process has been completed we cannot perhaps arrive at the full meaning of the word (the full meaning for the ordinary individual, not for the Cambridge logician !) It is during these later stages that imagery is prominent, and possibly essential. In Moore's reaction time experiments, primary and immediate meaning was reacted to. In the purely introspective experiments, time was allowed for full meaning to develop, and judging from the reported introspections, this development was given full scope. Indeed, Cantril compared the

results obtained when introspection was reported immediately after reacting to the appearance of meaning, and when it was delayed for a time, and found that imagery was definitely more elaborate in the second case, and sometimes did not develop at all unless there was this delay. Thus in experiments in which such a delay normally occurred, there would be a tendency for certain individuals, carried away by the interest and vividness of their imagery, to report it almost exclusively, neglecting other aspects of the apprehension of meaning, and hence giving the impression that here could be no meaning without this imagery as at best a form of supplementary illustration, and at worst an irrelevant complication." 1/

1/ M.A.Vernon: op.cit. pp. 22-23

CHAPTER III

PROCEDURE

A. FREE WRITTEN ASSOCIATION TECHNIQUE:- The main purpose of this investigation was to study differences in children's imagery from the auditory and visual presentation of written passages.

Three passages, which were colorful and filled with action, were selected from third and fourth grade readers. The first "How a Thistle Saved Scotland," a legend, in the "Winston Third Reader;" the second and third, chosen from "Magic Hours," the fourth reader in "The Work-Play" series by Gates, entitled "The Cat and Susannah" and "A Letter From A Pioneer," were the selections used.

The method employed was the written free association technique.

The passages were read to 65 fifth and sixth grade children and were followed by a series of stimulus words, which were placed on the board after having been read to the class. The directions given were: "Write on your paper all the words which the stimulus words make you think of."

The first paragraph read was the following:

How a Thistle Saved Scotland

Just before daybreak, the daring robbers began to steal up the hill to surprise the sleeping men. At that same time the sun peeped over the hill top and saw the danger to the Scots. It shone in the eyes of the sleeping men and tried to waken them; but they slept as soundly as before. Silently the Northmen came on, until they had almost reached the sleeping Scots. Then one of the Northmen stepped on a thistle with his bare foot and his cry of pain awakened the sleepers. The Scots sprang to their feet shouting, "The Northmen are coming." They soon drove the robber band back to their ships.

The stimulus words placed on the board for the children were:

Sky

Temperature

Sunrise

Appearance of robbers

Sleeping men

Height of hill

Amount of trees, bushes, etc.

Kind of ground

Distance to the water

View from top of hill

Harbor for the ships

Appearance of ships

The second paragraph read was:

The Cat and Susannah

The door into the kitchen was open a little; so in walked the Cat carrying the mouse. He went to Susannah and dropped the mouse carefully right on her foot. Some cats think that a mouse makes a nice present for the person they love, but this cat knew how Susannah felt about mice. He knew she was terribly afraid of them.

"Help ! Fire ! Murder ! Police !" yelled Susannah, climbing onto a kitchen chair as fast as she could scramble.

The stimulus words placed on the board for the children were:

Appearance of the kitchen

Color of the cat

Size of the cat

Appearance of Susannah

Susannah's age

What was she doing before the cat walked in?

Kitchen odors if any

The third paragraph read was:

A Letter From a Pioneer

We had a woman teacher in the summer. One day, while this teacher had the school, something extremely startling happened. The father of one of the boys had come to the school to leave some lunch for his son. While he was there his dog chased a young panther up a tree. The man shot the animal and dragged it over to the schoolhouse door. He told his son to bring it home that night so that they could save the skin.

Shortly after school opened for the afternoon, the teacher and children heard an awful scream. The mother panther had come out of the woods and found the body of her dead kitten.

The stimulus words placed on the board for the children were:

Appearance of teacher
Appearance of the father
School building
Time of day
Kind of gun
Location of schoolhouse
Panther's skin
Appearance of countryside

Approach of mother panther

Dead kitten

No time limit was set for the responses. The children wrote them and handed them in as soon as they were finished.

The above passages were then mimeographed and a copy given to each pupil in the same fifth and sixth grades. The written passages were followed by a list of the same stimulus words. The selections were this time read by the children and the following direction which was written above the stimulus words was given: "Write all the words that the stimulus words make you think of."

The page was so arranged that the pupils could easily write after each stimulus word. 1/

B. CONTROLLED RESPONSE TECHNIQUE:- Mimeographed papers were prepared and given to the fourth, fifth and sixth grades containing the sentence "He ran quickly out of the building." Under this sentence the following direction appeared, "Underline any of the words given below that describe "him" and his surroundings." Below this the word "He" came with multiple choice answers and each and every word that was in the stimulus sentence appeared in the same form. 2/

1/ See appendix

2/ See appendix

No time limit was set for these responses.

"He"

tall	short	fat	thin
old	man	young	boy
no hat	brown hat	blue hat	green hat
			gray hat
blue suit	gray suit	brown suit	black suit
no overcoat	long heavy one	top coat	on him
			on his arm
laughing	crying	smiling	grim looking

CHAPTER IV
FINDINGS

A. FREE WRITTEN ASSOCIATION TECHNIQUE:- A tabulation of the responses to the stimulus words was made and wide differences were found in the individual visualization of the children in both fifth and sixth grades. The following is the tabulated series of the responses given to each stimulus word ranging from one extreme to the other.

How a Thistle Saved Scotland

Sky

1. Sun shone
2. Sun bright and air cool
3. A summer sky without a cloud in sight
4. Very blue sky with a golden sun
5. Light blue with white fluffy clouds
6. A few clouds
7. The sun came up
8. A few big clouds with the sun above the horizon
9. Red sun coming up
10. Rose red
11. Pretty sky--the sun was just coming up
12. Pinkish blue with the sun coming up behind the mountain

13. Sun just coming over the hill
14. A bluish gray with red and yellow stripes
15. Sun peeping over the hill
16. Dark on one side and light on the other
17. With streaks of sun glaring over it
18. Dark with the sun shining on it
19. Gray with some red and yellow
20. Cloudy
21. Sky was gray
22. Light a little after dawn
23. Almost light
24. A very dark one with a very little ray of light over
horizon
25. Dark blue
26. Quite dark
27. Blackish blue
28. Very dark

The responses ranging from the extreme of 'bright sun' to 'very dark' show the wide range in the imagery found in this group of fifth and sixth grade children.

Temperature

1. 100 degrees
2. Hot
3. Summer heat
4. Quite hot

5. It was a summer degree
6. About 85 degrees
7. 80 degrees
8. 70 degrees
9. About sixty above
10. About 56--it wasn't too cold
11. 49 degrees--warmer every minute
12. 40 degrees
13. Above 39
14. Cool
15. Chilly
16. 32 above
17. Very cold
18. Very cold and very brisk
19. About 10
20. The late fall--about 10 above
21. 5 degrees
22. Cold--far below zero

The responses to 'temperature' as a stimulus word range from '100 degrees hot summer heat' to 'cold--far below zero.'

Appearance of Robbers

It would seem that the responses to these stimulus words could be divided into several categories: physical appearance; emotional expression; actions.

Physical appearance

1. Skins on--no shoes
2. Barefooted--not much clothing
3. A few skins as coats
4. Bound up in a cloth
5. No shoes--a piece of cloth around the waist
6. Raggedly dressed, barefooted, a bandana around head
7. Tattered and torn with little clothing
8. Dressed as the North People dress
9. Bearded men with strong bodies and swords at sides
10. Gruff, unshaven with curiasses
11. In white robes with guns
12. Colored robes--guns and swords
13. Robes like dresses with guns and knives
14. They had swords, shields, spears and steel helmets
15. An armored breast plate with helmet and a long sword

One feels when reading the next responses that the children were thinking of men of the present day:

1. Tough men with black beards
2. Shabbily dressed with no shoes
3. Ragged clothes, no shoes, handkerchiefs over mouth
and old hats
4. Grouchy faces with black coats
5. Very wicked looking
6. They had tricky faces and shabby clothes

7. Eight of them clad in plain suits with rifles
8. They needed a shave
9. In old clothes not at all neat
10. Long beards and rough clothes

The following responses seem to portray emotional expression:

1. Angry and mad after they were driven back to the ships
2. Eyes that look like cats eyes
3. Very wicked looking
4. Frightened
5. Very queer
6. Daring
7. Their minds were dark and grim

Actions of men

1. Creeping up a hill
2. Just climbing up the hill
3. Creeping up on the enemy
4. Creeping through the grass
5. Creeping through the bushes and looking everywhere
6. Robbers came through the dark, green grass
7. All crouched low
8. Just ready to get them
9. Ready to fight

As the above series shows, the responses to the stimulus words, "Appearance of Robbers" varied greatly.

In the first category attempted the range was from the men being visualized as dressed in animal skins to armored plate, and it was obvious that the children thought of the robbers in the latter section as analogous to present day criminals.

Sleeping Men

These responses seemed to divide easily into three categories: the men, asleep or awake; lying on the ground or under shelter; number of men.

Asleep or awake

1. Sound asleep
2. Sleeping peacefully
3. All asleep
4. Won't awake
5. They were sleeping hard
6. Sound asleep with the sun shining in on them
7. In various positions, some snoring loudly others dozing softly
8. Sleeping soundly huddled together in bags of animal skins
9. Sleeping in bed-bags--half asleep
10. Snoring and about half awake
11. Lazy but always ready for everything
12. Just lying there
13. Very tired

14. Awoke with a start and wide awake
15. Lying down among the bushes
16. Everything quiet
17. Couldn't hear the robbers

Lying on the ground or under shelter

1. Sleeping on the hillside and waking up
2. Lying on the ground
3. Using a stump or a mound for a pillow
4. Dressed in their clothes and rolled in a blanket on the ground
5. On a cot
6. On a cot in a tent in pajamas
7. Men sleeping in low bunks
8. Sleeping with great big quilts
9. In a big house in their beds

Number of men

1. Three or four men with blanket over them
2. Many in one room
3. An army in tents

Height of hill

1. A big mound
2. A low hill
3. Not very high but hard to climb due to loose soil
4. Small gradually sloping

4. Trees numerous with bushes here and there
5. Many trees and bushes for the robbers to hide behind
6. A lot
7. Lots of trees like a forest
8. An ample supply of them
9. Many bushes and plants but few trees
10. Tree and bushes and bushes swinging in the wind
11. The house had many trees and bushes around it
12. Yes, there were some
13. Trees high--bushes low
14. Not many tall trees, mostly low trees and bushes
15. Very few trees, quite a few bushes and shrubbery
16. Jagged rocks with small bushes and a small grove of
pines
17. Trees and bushes growing on the hillside
18. Many shrubs with vines around them
19. A long line of branches
20. Bare ground--except on the right a bush of thistles

Kind of ground

1. Soft
2. Very soft and marshy
3. Soft green grass
4. Nice and warm and dark green
5. Rather soggy and covered with grass
6. Rich soil with green grass

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7. Very green grass
8. Lots of grass with dew on it
9. Flat with green grass
10. Muddy--something like quick sand
11. Damp and wet until the sun came out
12. Nice and smooth
13. Little grass
14. Bad
15. Dusty
16. Coarse grass
17. Between a hard and a soft
18. Covered with pine needles and stones
19. Lots of thorns
20. Ground was covered from head to foot with stickers
21. Sloping with thistles on it
22. Thistles and rock
23. Not very level
24. Hilly
25. Very rough
26. Hard packed ground with many rocks around
27. Hard--caky like
28. Hard, cold, rocky
29. Rough, stony and slopish
30. Rough with many sticks and sharp stones
31. Rough, stony and uncleared

32. Rough stony with ditches here and there

33. Very sandy and barren

Distance to the water

1. Quite near

2. Very short

3. At the bottom of the hill

4. There was a spring near by

5. It was a little way from the house to a well

6. Down hill

7. Not very far

8. Water in the background

9. Not out of hearing reach

10. A long way

11. From the water to the huts its about five minutes
walk

12. Ten feet

13. About 1/8 mile

14. About 500 ft.

15. 100 yards

16. 125 rds.

17. 1/4 mile down in a valley

18. 1/2 mile or less

19. 1/2 mile and rough water

20. About a mile; 1 mile

21. Two or three miles of flat ground

22. 25 miles

These responses show a variation in the imagery of the water. Some considered 'the water' referred to as a 'well,' while others thought of it as a 'rough body of water.'

In the arrangement from one extreme to the other the actual concept of distance cannot be analysed as previous experience has shown to the writer that in many children number concepts are not developed.

A view from the hilltop

1. Beautiful trees, waving grass and cars moving
2. You can see far away
3. The white capped foam of the waves dashing upon rocks
4. Blue where water meets sky in the distance
5. You can see the water, bushes and trees
6. All trees and mountains and water
7. You can see all over the bay
8. Very clear
9. Pretty with sun on the grass which has dew on it
10. Like on a lake only you can't see the otherside
11. Not very good
12. Great
13. You can see all over the bay
14. Very clear
15. Pretty with sun on the grass which has dew on it

16. Pretty with trees, land, lights sky
17. A good commanding view of the land
18. There was a stream
19. A winding brook, wild flowers, roofs of houses and
many green trees
20. A few huts here and there
21. Houses, boats and sea
22. You can see away off
23. Just a natural view from hill-top with water at bottom
24. Water a little way from them with trees around it
and a river running by
25. Trees by the water
26. Two or three miles of flat ground
27. Water all around
28. A pretty sight
29. Long ways off
30. A beautiful landscape
31. You could see for miles around as no other hills
were in sight
32. The open sea
33. Beautiful view sighting deep blue water and a town
34. Water at a distance with ships in the harbor
35. Pretty green pasture lands
36. You could not see because the trees and bushes were
too high
37. Not very good

Harbor for the ships

1. Large tall buildings
2. Quite a large broad harbor
3. Big with a few boats
4. There were a few ships in the harbor
5. Deep and rough
6. A place for a ship to stay
7. Deep and very blue
8. A deep river inlet
9. Large and deep
10. A fairly good one
11. Muddy water
12. Deep and quiet
13. A nice bluish green color
14. A big bay
15. A large harbor on a rock bound coast
16. Not very clear
17. Not very large
18. Very ragged and not wide
19. Small inland waterway surrounded by trees
20. Very narrow with many bushes around
21. Small and crude
22. Just an inlet
23. Small and just like a fiord
24. No harbor--just a beach
25. Not a very good harbor

26. No harbor in sight

27. None

These responses show a variation from the time of the Vikings to a modern harbor of today surrounded with tall buildings.

Appearance of Ships

It appears here that the responses should be again divided into three categories: Type of ship; size of ship; number of ships.

Type of ship

1. Like the Viking ships
2. Many Northmen boats
3. They had men to row them
4. Clipper named after a great Norseman, Charles III
5. Old sailing ships with a high stern
6. Big white sails and a black lady on the prow
7. Sailing vessels--kind used by pirates
8. Pirate ship with black sails
9. A large one with strange carving at one end
10. Like in the early days
11. Old with rugged sails
12. Mostly fishing schooners
13. Stolen fishing schooners with sail and cross bone flag
14. Old time wooden warships

15. Not good ships
16. American ships
17. A motor launch
18. A warship painted gray
19. There are big ocean liners, fishing vessels and sail boats
20. The Queen Mary is just coming into dock with me on it and a few passengers--many tugs are puffing with the burden of the ships

Size of the ships

1. Only a few rowboats and canoes
2. It looks like an overgrown row boat with sails
3. They looked very small and very far away
4. About fifty feet long with one sail
5. Fairly large vessels with two masts
6. Long ships with a lot of towers and one big sail in the middle
7. Large and colorful pirate ships
8. Warships with guns, ammunition and men

Number of ships

1. There were no ships in sight
2. One to be seen--the ship in which the robbers came
3. A warship
4. Two ships with two masts
5. Three ships with bright colored sails

5. A few

6. Quite a few

7. The ships come in very fast every hour

THE CAT AND SUSANNAH

The appearance of the kitchen

1. A stool near Susannah--the wall yellow and the furniture arranged neatly
2. It was very clean and cheerful
3. Rich looking kitchen
4. Tidy
5. A nice neat kitchen
6. White table, stove, icebox and ironingboard with clothes on it beside a red chair
7. Black with yellow trimming
8. I see a white sink, cupboard and table with red curtains hanging at the windows
9. Green walls with a black stove
10. The kitchen had a black stove, long brown draperies and Susannah was cooking some food on the stove
11. A yellow kitchen
12. There were three chairs, a table, sink and a stove
13. Two windows, table by one window and sink by the other
14. A stove, a chair, a sink and a washing machine
15. A stove on the north, a table beside it, an icebox on the east, a table in the middle with two chairs.
16. Straight in front of the door is table, chair to the side with sink.
17. Table in the corner near the door--a white sink and

a gas stove

18. White enamel sink and white gas stove
19. A medium sized kitchen with a few appliances
20. The kitchen was all lighted up
21. Door was open a crack
22. The door was open--Susannah was standing on the chair
with the mouse on the floor
23. Summertime and the doors and windows were open
24. Door was open and the cook was cooking
25. There were some pans on the table
26. A stove and an old dirty sink
27. Table is upside down and the chair is the same way
28. Very messy
29. The kitchen was a sight
30. It was all a wreck

The above responses show a variation from a pretty, well-arranged kitchen to one that was considered to be a 'sight'.

Color of the cat

1. Black
2. a middle sized black cat with green eyes
3. Black and white
4. Gray back
5. Grey with black stripes in her fur
6. A gray tiger cat

7. A beautiful pandora cat--all gray and just a little bit of white on her left foot
8. Brown
9. A tiger cat with yellow and black stripes
10. Yellow and black
11. Yellow and white
12. Yellow sandy color
13. Middle-sized yellow cat
14. Fairly large angora cat with green and yellow eyes

Size of the cat

1. As big as a mouse--just a little kitten
2. Just a tiny kitten
3. About the size of a puppy
4. $3\frac{1}{2}$ inches long
5. Fairly young cat
6. A big kitten very fat and walked very slowly
7. About as big as a woodchuck
8. A middle sized cat
9. A good sized cat with lots of fur
10. An old cat
11. About a foot long
12. 12 inches long
13. Half a foot tall
14. 1 foot 4 inches
15. 14 inches long and 4 inches high

16. 8 inches high
17. Ordinary size for full grown cat
18. Fairly large
19. Big, fluffy and fat
20. Big
21. Large
22. Very large
23. About the size of a hat box
24. Just about a yard long

The varied responses to the size of the cat are from a tiny kitten to a very large one.

Appearance of Susannah

1. A little girl with long brown curls, soft brown eyes and a sweet face
2. She might have pig-tails with light hair
3. Red curly hair, blue hair ribbon, height four feet, blue dress, blue socks, black patten leather shoes
4. Yellow silk dress, black shoes, pink socks, yellow hair
5. Pretty and young
6. Yellow curly hair and blue eyes--she jumped and hollered
7. She wears her hair parted in the middle with braids
8. She was very short and plump and sort of old maidish with pigtails
9. Dark curly hair with brown eyes and a flowered dress

10. Dressed in a dress of her mothers and her shoes
11. A light haired girl very afraid of mice
12. She had an apron on and a spotted red and white dress
13. A little girl with a cheerful dress, and straight hair
14. A light red dress and blue sweater
15. Black haired girl with checked apron
16. She had on a spotted dress
17. About five feet
18. A girl of about 20, stout with a smock and a cap on
19. Scrawny and scared
20. She was scared stiff
21. Terrified
22. A queer look on her face when she saw the mouse
23. She was so frightened she ran under the table screaming
24. An old lady and quite small
25. Fat old cook washing the dishes
26. Lying on a couch all a-flutter
27. An old negro working for Mr. and Mrs. Yates--she weighed about 180 pounds and was very large and fat--her hair was coal black

Susannah's age

1. About two years old
2. About five years old
3. Six or seven
4. Seven years old

5. Seven or eight
6. Eight
7. About 9 or 10 years
8. 11 years and 5 months
9. 11 years and 8 months
10. 12 years old
11. About 15
12. About 20 years old
13. About 23
14. About 25
15. About 30
16. About 31
17. Her age was 33
18. She was 40
19. Quite old
20. About 55

The above responses vary from two years to fifty-five years. Such a response as 'quite old' is very indefinite because we do not know what old means to a child. Nevertheless it would tend to indicate that Susannah was visualized from a very young child to an elderly woman.

What she was doing before the cat walked in

1. She was asleep
2. She was playing
3. Parading up and down in front of a glass

4. Sitting on a chair
5. Reading a book about cats that leave mice around
6. Reading a book and seeing that the dinner was ok.
7. Reading a recipe book
8. Reading a newspaper
9. She was looking at a magazine
10. Knitting
11. Standing by the door
12. Getting dressed
13. Unwilling ironing her dresses with a vision of a book
on her mind
14. Getting a drink of water
15. Setting the table for lunch
16. Looking for some food
17. Eating
18. She was at the cookie jar getting some cookies
19. Making herself some cookies
20. Trying to cook
21. She was standing before the stove trying to make fudge
22. Helping her mother bake a cake
23. Baking a cake because her mother was sick
24. Cooking the dinner
25. She was frying potatoes
26. Making supper
27. She was cooking peas and beans
28. Washing and wiping the dishes

29. She was washing the dishes when the cat came in and
and then she got up on a chair

Kitchen odors if any

1. None
2. No, she had finished her meal about three hours ago
3. No cooking odor
4. The smell of the mouse
5. A hot stuffy odor
6. An odor of gas
7. The smell of the cleansing fluid she was using
8. The dishwater with the soap in it
9. The kitchen smelled very nice
10. Good
11. Always a good smell
12. The flowers on the table were very pretty and smelled
nice
13. Soap and pies
14. Stringbeans, corn, carrots, beet soup, and steak
15. Ham, pudding and salad
16. The odor of cooking fudge
17. Nut cake
18. The odors were roast beef, peas and beans
19. Gingerbread
20. Smell of chocolate cake
21. Smell of cookies

22. Pork chops frying in a pan on the stove with gravy
which smelled like bacon
23. Odor of fresh ham sizzling in a skillet
24. Fresh bread just out of the stove
25. Odor of baking apple pie
26. Meat
27. Chicken in the oven

A LETTER FROM A PIONEER

Time--today or long ago

1. A long time ago
2. Long ago
3. 1638
4. 1829
5. 1856
6. 1880
7. Not very long ago
8. 1937
9. Today

Appearance of father

1. Old and ragged pioneer
2. Tall, dark and handsome
3. Tall and strong
4. Bold looking man
5. Big, strong wearing coonskin cap
6. Buckskin clothes and beaver hat
7. Long pants,, buckskin cap, fur skin coat and musket
8. Tall, slender, young, shattered clothing
9. Quite young
10. Strong
11. Long, lanky with black eyes--worried lines on his
face showing signs of hardship and endurance
12. Skunkskin cap, fur pants and no shoes

13. Very cross
14. Crudely dressed and like every pioneer father brave
15. Big and husky
16. A lofty pioneer of long ago
17. Tall, long face, glasses and moustache
18. Dressed in rough farm clothes
19. A mean face and eyes
20. Funny looking
21. Dark hair to his ears and a little bit of whiskers
22. 6 ft. 5 in.
23. He looked scared for a minute
24. Frightened
25. Bringing his boy's lunch
26. Shoot tiger cat
27. Stout, short and very dark
28. In regular clothes
29. White hair and well dressed
30. A sport coat (brown) with light brown pants and a yellow tie

School building

1. Large log cabin
2. Just a cabin
3. Made of logs
4. Made of wood
5. It was in the forest

6. A clearance in the woods
7. Very little
8. Was old
9. Small one room building
10. A rickety old shack
11. Small, cold, tattered and torn
12. Wooden, one door, six windows
13. Red, with trees around it
14. Two doors on both sides of the building with a big one in front
15. A little wooden school with a stove and eight grades
16. Small, white, old
17. Small with about five rooms
18. Building is red brick
19. It was white and red.
20. Safer than long ago

Time of day

1. It was in the morning
2. About nine-thirty
3. Ten o'clock
4. 11 o'clock
5. Quarter of twelve
6. Near lunch
7. 12 o'clock
8. After lunch

9. Afternoon

10. About five

Kind of gun

1. An old shot gun

2. Brown rusty gun

3. The end was funny

4. A flint lock rifle

5. Musket

6. A shot gun

7. Long fearful to look at

8. About 24 inches long

9. Long, wide and brown

10. Double shot gun

11. Two barrelled

12. A large 45 barrelled

13. 22 caliber

14. Long single rifle hard to manage

15. 22 rifle

16. 38 revolver

17. Pistol

18. 32 colt automatic

19. Bebee gun

Location of schoolhouse

1. In the woods

2. Out West

3. In a hollow in the woods
4. Edge of the woods
5. In a large pine grove like ours
6. A low thickly wooded hill behind it with a thin woods about it.
7. It is in the center of a square piece of land with four acres of land
8. In a lonely spot
9. Miles away from town or houses
10. On a dusty road with forest in back
11. In a clearing
12. Side of a field
13. Near a river
14. On a hill
15. On a hill in the western part of our country
16. On an island
17. In the midst of trees with a small playground
18. Center of a village
19. Seven feet high and 90 feet wide
20. Down in Mexico
21. On some street named School Street
22. Two miles south of Chicago
23. North of Weston

Panther's skin

1. Silky black
2. Black
3. Brownish color
4. Heavy brown soft skin
5. Yellow and black
6. Yellow and brown
7. With black dots
8. Orange brown
9. A dotted one
10. Spotted tawny color
11. Yellowish white
12. Furry
13. Rough and a little furry
14. Tough

Appearance of countryside

1. Wooded wilderness
2. Mostly forest
3. From the school house all you could see was forest
except for a little road winding around here and there
4. Full of woods and wild animals
5. Wooded and lonely, backed by a mountain
6. Long wooded roads
7. Many hard wood trees, bushes, fir, pines--no houses
8. Many trees on a hill

9. Lot of trees on a hill
10. Bad
11. Woods and bushes
12. Very dull and tall pines towering overhead
13. Very lonely
14. Mountainous
15. Rugged
16. It was very bare
17. Green grass with a lot of stumps
18. Near a stream
19. In the country
20. Lots of shrubbery
21. Horses and carriages covering the narrow winding paths
22. Lots of grass
23. Green bushes and clearings
24. A stone wall with flowers along the other side and
fields farther over
25. Little flowers blooming
26. Beautiful flowers
27. Pretty
28. Very attractive in the fall
29. Pretty well chopped down and houses going up
30. A town

Approach of mother panther

1. Creeping slowly
2. She crept up on the baby
3. Stealthily
4. She approached the kitten slowly
5. A big animal creeping up behind the bushes
6. Her eyes were opened very wide
7. Sleek and quiet
8. She came slowly out of the forest
9. Crouching
10. Scared
11. Frightened to see her baby
12. Terrified
13. A scream
14. She let out a loud cry
15. Very angry
16. She was mad
17. Silently but quickly
18. Wild and fierce
19. A great leap landing in front of the school
20. Running fast to the baby
21. She came rushing wildly out of the woods

Dog

1. Just a puppy
2. A little half-grown dog

3. A little black dog with hardly any tail
4. He was smart
5. He caught a skunk
6. The dog chased the kitten up a tree
7. The dog was serious
8. He was black
9. He was brown
10. Rusty colored fur
11. Dog was spotted, black and white
12. Hunting dog
13. An Irish Terrier
14. English Setter
15. Beg red setter
16. Mad and growling
17. The dog barked at the panther
18. A police dog
19. Large black and brown one
20. Dead

Dead kitten

1. Very small
2. Smaller than a mother cat
3. Pretty
4. Yellow and cunning
5. Laying on the ground very limp and loose but cute
6. Lying silently on the ground

7. Hanging over step of school
8. Limp, lifeless
9. Lying across the path of the door
10. On her back
11. Lay outside of the school
12. All in a ball
13. Killed by the man's gun
14. Lying on its side by the door
15. Bleeding pitifully
16. Blood oozing from neck all over the doorstep
17. Crumpled and blood stained
18. A hole in his side, his eyes closed and very squashy
19. Bloody
20. Very ugly
21. All insects on skin
22. Large

TABULATION OF CONTROLLED RESPONSES

Stimulus: "He ran quickly out of the building."

He

	Tall	Short	Fat	Thin
Grade IV	12	13	6	19
Grade V	16	7	7	11
Grade VI	29	5	3	29
	57	25	16	59

	Old	Man	Young	Boy
Grade IV	2	3	27	19
Grade V	3	13	15	8
Grade VI	2	3	27	35
	7	19	69	62

	No hat	Brown	Blue	Gray	Green
Grade IV	18	1	1	10	0
Grade V	11	6	6	4	0
Grade VI	25	6	3	1	0
	54	13	10	15	0

	Blue suit	Brown	Black	Gray
Grade IV	7	5	7	11
Grade V	7	5	5	8
Grade VI	12	13	1	10
	26	23	13	29

	No overcoat	Long heavy	Top	On him	On arm
Grade IV	10	4	7	2	5
Grade V	8	2	9	7	6
Grade VI	25	1	6	1	3
	43	7	22	10	14

	Laughing	Crying	Smiling	Grim
Grade IV	5	3	14	9
Grade V	1	2	12	9
Grade VI	6	2	17	13
	12	7	43	31

Ran

	To left	To right	Across	To back
Grade IV	4	3	19	2
Grade V	1	8	10	3
Grade VI	3	4	20	1
	8	15	49	6

	Alone	After someone	Beside someone
Grade IV	18	8	1
Grade V	13	8	2
Grade VI	21	8	3
	52	24	6

	Looking ahead	Behind	Head down	Up
Grade IV	21	2	3	3
Grade V	11	1	2	2
Grade VI	12	4		3
	44	7	5	8

Out

	In rain	In sun	In snow	In wind
Grade IV	5	19	1	4
Grade V	1	16	1	7
Grade VI		25		6
	6	60	2	17

Building

	Skyscraper	Office	Apartment	Cottage	Store
Grade IV	1	11	14		
Grade V	4	11	5	3	
Grade VI		11	11	6	4
	5	33	30	9	4

	Brick	Wood	White	Brown
Grade IV	17	2	3	1
Grade V	11	3	4	
Grade VI	13	7	5	3
	41	12	12	4

	Yellow	Gray	Brickred	Brickyellow
Grade IV	1	8	14	
Grade V	1	2	12	4
Grade VI	2	7	16	1
	4	17	42	5

	Middle	Corner	Stand alone
Grade IV	7	10	7
Grade V	5	11	6
Grade VI	9	12	9
	21	33	22

	Near street	Set back	sidewalk	Hill
Grade IV	20	2	8	3
Grade V	12	5	4	4
Grade VI	16	9	6	10
	48	16	18	17

	Shrubbery	Tall trees	Grass	No trees
Grade IV	5	5	13	6
Grade V	9	9	12	8
Grade VI	10	11	17	15
	24	25	42	29

CHAPTER V
SUGGESTIONS FOR TEACHING

Vagueness which according to Dewey is "the aboriginal logical sin--the source from which flow most bad intellectual consequences," ^{1/} is more to be combatted than actual misunderstanding of the concepts presented in the classroom.

The material used for testing in this experiment was taken from ordinary reading texts. After the last presentation of the material in the written form, the pupils discussed their answers among themselves and came to the writer for the correct solutions. Interest and enthusiasm ran high and individual opinions were upheld in hot argument in several cases. "Understanding and interest are reciprocal in their influence." ^{2/}

This would seem to indicate that daily procedures in the classroom could be patterned on like exercises to assist in developing the different modalities of imagery.

Since we understand today that learning is not a

^{1/} John Dewey: How We Think (new edition) p. 160

^{2/} Ernest Horn: Report of Commission on Social Studies
(Part XV)

mere matter of passive impression and memorization, but a creative process, the ideas constructed by the pupil must be based on his experience. Although today with the new broader curriculums, many and various visual aids are employed in teaching, a relatively small part of what is taught can be represented by such means. Most of the children's ideas of foreign places, distant times and conditions differing from their own must be constructed chiefly out of what they read and hear.

The exercises used in this experiment tended to group in the experimenter's mind the children who apparently were devoid of strong visual imagery. The great range in the imagery shown in the chapter devoted to the "Findings" appears to show that there was no great similarity of response although a simple short selection had been presented to a fairly homogenous group.

Would it not be possible to attempt to develop the various modalities of imagery so that a child would not find it necessary to translate everything presented in any modality into his particularly strongest one? And if this were to be attempted would not teachers be made more conscious that there are different modalities and that many of the individual differences that they find existing in the children are due to this variation in their imagery. The child then who was strongly inclined toward

the auditory modality could be approached through this modality when attempts along the visual line have apparently failed and vice versa.

So often in a typical schoolroom situation children are required to form mental constructs from words alone and from words that convey entirely new ideas far beyond the experiences of even the most gifted of the group. It is no wonder then that children learn by pure verbal memorizing or from erroneous concepts.

"Erroneous ideas, it must be kept in mind, are built up in the same way as are correct ideas; that is, out of the reader's experience and by the exercise of constructive imagination, and are most as satisfying as right ideas, so long as he is unaware of their deficiencies." 1/

1/ Ernest Horn: op.cit. p. 195

CHAPTER VI
SUMMARY AND CONCLUSIONS

Three descriptive paragraphs taken from third and fourth grade readers were presented, both orally and in written form, to fifty-three fifth and sixth grade children.

Stimulus words were used for each paragraph according to the free written association technique.

The responses were analyzed and arranged showing the extremes and the wide individual range.

A stimulus sentence was then presented to a fourth, fifth and sixth grade, followed by controlled responses in multiple choice form. These responses were tabulated and the range noted.

Conclusions

In the written descriptions the findings would seem to indicate wide ranges in the imagery of this particular group of children.

From the stimulus words which would tend to evoke definite color responses, various colors ranging from brilliant to dull hues, repeatedly appeared.

In the section where the responses to the stimulus

sentence were controlled a definite preference was shown for gray, blue and brown. These were descriptive words for wearing apparel. The color apparently preferred for "the building" was brick red with gray holding second place.

The stimulus word "time" showed a wide range from the identification of the event happening a long time ago, in 1638 to the present day.

In the descriptions of the appearance of people and their accoutrement it was evident in the range that the characters were identified from people of the past ages up to modern man.

Size as a quality varied greatly in all instances ranging from very small to extremely large.

In the controlled response group preference seemed to be given to "tall man" instead of "short" man or boy. In the choice of a building, an office and apartment building were preferred to the smaller structures.

Size used in the sense of space showed the same variation; the same stimulus word evoking responses, from wide open areas with long distances involved, to small enclosures.

In both the free association and controlled responses the age of the characters was identified with the actual ages of the group reporting. Preference in both instances, where a definite preference could be chosen, showed this

result.

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APPENDIX

Name.....Grade.....Age.....

HOW A THISTLE SAVED SCOTLAND.

Just before daybreak, the daring robbers began to steal up the hill to surprise the sleeping men. At that same time the sun peeped over the hill top and saw the danger to the Scots. It shone in the eyes of the sleeping men and tried to waken them; but they slept as soundly as before. Silently the Northmen came on, until they had almost reached the sleeping Scots. Then one of the Northmen stopped on a thistle with his bare foot and his cry of pain awakened the sleepers. The Scots sprang to their feet shouting, "The Northmen are coming!" They soon drove the robbers back to their ships.

DIRECTIONS: Write all the words the stimulus words make you think of.

1. Sky _____
2. Temperature _____
3. Appearance of robbers _____
4. Sleeping men _____
5. Amount of trees, bushes etc. _____
6. Kind of ground _____
7. Distance to the water _____
8. View from hill-top _____
9. Harbor for the ships _____
10. Appearance of ships _____

ame.....Grade.....Age.....

THE CAT AND SUSANNAH.

The door into the kitchen was open a little; so in walked the Cat carrying the mouse. He went to Susannah and dropped the mouse carefully right on her foot. Some cats think that a mouse makes a nice present for the person they love, but this cat knew how Susannah felt about mice. He knew she was terribly a afraid of them.

"Help! Fire! Murder! Police!" yelled Susannah, climbing onto a kitchen chair as fast as she could scramble.

DIRECTIONS: Write all the words the stimulus words make you think of.

- 1. Appearance of kitchen _____
- 2. Color of the cat _____
- 3. Size of cat _____
- 4. Appearance of Susannah _____
- 5. Susannah's age _____
- 6. What was she doing before the cat walked in _____
- 7. Kitchen odors if any _____

Name.....Grade.....Age.....

A LETTER FROM A PIONEER.

We had a woman teacher in the summer. One day, while this teacher had the school, something extremely startling happened. The father of one of the boys had come to the school to leave some lunch for his son. While he was there his dog chased a young panther up a tree. The man shot the animal and dragged it over to the schoolhouse door. He told his son to bring it home that night so that they could save the skin.

Shortly after school opened for the afternoon, the teacher and children heard an awful scream. The mother panther had come out of the woods and found the body of her dead kitten.

EXERCISES: Write all words the stimulus words make you think of.

1. Time (today or long ago)_____
2. Appearance of father_____
3. School_____
4. Time of day_____
5. Kind of gun_____
6. Location of schoolhouse_____
7. Panther's skin_____
8. Appearance of countryside_____
9. Approach of Mother Panther_____
10. Dog_____
11. Dead kitten_____

Read the following sentence:

He ran quickly out of the building.

Underline any of the words given below that describe "him," and his surroundings.

"He"

tall short fat thin

old man young boy

No hat brown hat blue hat green hat gray hat

Blue suit gray suit brown suit black suit

No overcoat long heavy one top coat on him on his arm

Laughing crying smiling grim looking

"Man"

To the left to the right across the street to the back

Alone after someone beside someone

Looking ahead looking behind head down head up

"Out"

In the rain in the sun in the snow in the wind

"Building"

Skyscraper low office building apartment house

Cottage garage store brick wooden white brown

Yellow gray brickred brickyellow

In the middle of the block on the corner standing alone

Near the street set back in on the sidewalk on a hill

Shrubbery in front tall trees around it green grass

No trees near