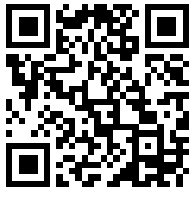

A Study in Imagination

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A STUDY IN IMAGINATION.[1]

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A. HISTORICAL INTRODUCTION.

PART I. MENTAL IMAGERY.

The scientific study of the imagination has been limited practically to the last half century, or even the last thirty years. A discussion going back to an earlier date would be merely a matter of erudition and not of great scientific interest.

The first works dealing with the subject from a modern standpoint were written about the first of the nineteenth century, but dealt with mental imagery rather than imagination. In fact, from 1825 until 1890, nearly all of value written in the field of imagination was on the topic of imagery.

This topic will therefore be considered first, because, in the first place, although it is distinct from the imagination proper, the image, as Philippe says, is the "simple substrate" of the imagination as well as of the memory (48:2); and, in the second place, because the type of mental imagery profoundly affects the character of the imagination. Queyrat asserts that "the aptitude of preserving more specially one order of sensations, and consequently of keeping the memory of them, creates the variety of minds." (49:38.)

As early as 1826, in a philosophical work, Bonald made some interesting observations on mental imagery. As would be expected, these are based entirely or almost entirely on personal introspection, and attribute to all men what the writer finds in himself.

[1] Books in the bibliography are referred to by number. (1:52) means page 52 of the first book in the bibliography.

He writes: " . . . . just as a man cannot think of material objects without having in him the image which is the expression or representation of these objects, so he cannot think of incorporeal objects, and those which do not fall directly under his senses, without having in himself and mentally the words which are the expression or representation of these thoughts, and which become discourse when one makes others hear them." (13:125.)

He states in another place that "the word within us is an imitation or a repetition of the word which we have heard." (13:123.)

Although Bonald limits the word image to an auditory representation, he gives a place to the representations of all the special senses. Thus: "man thinks of material objects by the impression which he is actually receiving or which he has received, an impression which is an image, a sound, an odor, or a taste, etc., according to the organs by which these impressions reach the soul. . . . ." (13:385.)

In Cardaillac's writings we find the germ of the idea of kinæsthetic imagery. His "Elementary Philosophical Studies" appear to be the original inspiration of those numerous French monographs on "La Parole Intérieure." Like all the early writers in this field, he generalizes from his own introspection. Nevertheless his work is valuable as a good description of one type.

"For what," he asks, "is reflection, meditation if not talking to ourselves? And as we can talk to our fellows only by means of the word, in the same way it is only by the word that we can talk to ourselves. It is by the external word that we express our ideas to others, and it is by the internal word that we express them to ourselves. Deprive us of the *means of articulation*, and we are incapable of showing our feelings, our affections, ideas, opinions, beliefs, our thoughts of every kind. Deprived of the internal word we can neither reflect nor meditate. (15:285.)

Cardaillac is acquainted with visual imagery, but regards it as subordinate. Thus: " . . . who can represent to himself a color in a manner as exact and as distinct as when it is before his eyes? The memory of the word on the contrary is as exact, as precise, and as rigorously determined as the sensations we hear can be." (15:304.)

But the memory image for him is not auditory; it is articulatory. "In the memory which constitutes the internal word, the sound which is its (the word's) substance has disappeared. There remains only the articulation." (15:305.)

Between 1830 and 1880 very little advance was made. But about the latter date investigations in imagery were being carried on by Galton, V. Egger, and Stricker.

Galton's classic study by means of the questionnaire it is unnecessary to describe. It is sufficient to say that it was concerned chiefly with visual imagery, and was aimed primarily to discover differences in extensity and intensity rather than quality. He found that men of science were comparatively deficient in visual imagery, that females were superior to males, and public school boys to men. (28:99.) He suggested that there might be analogous representations of other senses which might take the place of visual images. He writes: "I am, however, bound to say that the missing faculty seems to be replaced so serviceably by other modes of conception, chiefly I believe connected with the incipient motor sense, not of the eyeballs only, but of the muscles generally, that men who declare themselves entirely deficient in the power of seeing mental pictures can nevertheless give life-like descriptions of what they have seen . . . ." (28:88.)

Galton found that the field of mental vision was often greater than that of actual vision, and that this was more frequent among men than among boys. (29:314, 315.) He also compared the "generic image" to a composite photograph, an idea adopted by many succeeding authors.

Bain, in criticising Galton's work shortly after the latter's first essays appeared, states that "an observation of high or low visualizing memory becomes psychology the minute the property is connected with some second property, as cause, consequence, condition, concomitant, and not till then." (7:566.) This, he thought, Galton had failed to do. He himself suggested emotion (7:569) and artistic ability (7:570) as being possibly connected with the visualizing power in the ways above mentioned.

"The ear," he says, "plays a part in our intellectual being only second to sight." He suggests that in this we may find an explanation for the fact that one may be deficient in visual imagery and yet get through life creditably.

Bain was acquainted with kinæsthetic imagery also. What description could be better than this? "When we recall the impression of a word or sentence, if we do not speak it out, we feel the twitter of the organs just about to come to that point. The articulatory parts—the larynx, the tongue, the lips—are all sensibly excited; a suppressed articulation is in fact the material of our recollection, the intellectual manifestation, the idea of speech." (6:357.)

As early as 1880, therefore, Bain was familiar with the three chief forms of mental imagery now recognized. In fact he believed that "all the sensations of the senses can be sustained in like manner, some more and some less easily; and they can afterwards be revived as ideas by means of associative forces; (6:355.)

Several investigations have been undertaken on lines similar to Galton's. Although out of chronological order, Armstrong's study of 1894, using the same syllabus, may be here mentioned. In general, its results were the same as Galton's. He found a sort of rhythm in the imagery of his subjects. (3:504.) He says that "the most striking phenomenon shown is the intimate relation of imagery and attention, and the effect of the latter on the various phases and characteristics of the former." (3:505.) A little lower average of imagining power was found among those who stood highest in their respectivc classes than among their classmates.

Perhaps there should be mentioned here French's study of the "Mental Imagery of Students" (1902) by means of Titchener's questionnaire on "Ideational Type." He found among Vassar students that individual differences were almost entirely a matter of degree. All could call up visual, auditory and tactile images, while only one or two lacked either taste, smell, temperature or motor images. This, however, he thought, might be due partly to the fact that all the subjects were young women. (25:55.)

In 1880 appeared Stricker's "Studien über die Sprachvorstellungen." Thinking silently (das stille Denken) and word ideation (das Wortvorstellen) are for him the same thing. (58:9.)

The sound image forms no part of his word image. (58:20.) He also excludes all visual images of printed or written forms. (58:20.) To him it is self-evident that taste, smell or touch images do not enter into the word image. He therefore concludes that "word images are motor images." (58:33.) He believes, moreover, that anatomical considerations make probable "the hypothesis that the word images consist in the consciousness of impulse which are sent out from the speech centre to the muscles." (58:30.)

Stricker's "Studien über die Bewegungsvorstellungen" (1882) is, like his study of word images, mostly the result of personal introspection. His general standpoint is the same. Muscle-feeling is a prerequisite to motion, and by muscle-feeling one is to understand the feeling, or the perception, which we receive from our own muscles. (57:7.) He can image to himself no movement without muscle-feeling. (57:24.) He distinctly changes his attitude as to the substrate of these "Muskelgefühle," however. He says that whether the muscle-feelings arise from motor nerves, or from sensory nerves, or from both at the same time may be permitted to remain uncertain. (57:9.)

At the same time that these investigations were going on in England and Germany, V. Egger, in France, was studying

what he calls "La Parole Intérieure." His book with this title is a lucid exposition of the auditory type of verbal imagery. It is prefaced with a good historical introduction going back to Plato and Socrates, and quoting among others Bossuet, Locke, Leibnitz, Bonald, Maine de Biran, and Cardaillac.

He writes that "la parole intérieure" is more feeble than "la parole extérieure," but is much more rapid. (24:67, 69.) The following deserves reproduction verbatim. "In the internal word it suffices that we understand ourselves; we can then speak very low, very quickly, with little distinctness, abridge phrases, replace usual turns and expressions by others more simple or more expressive to our taste, modify the syntax, enrich the vocabulary by neologisms or borrowing from foreign terms; we can express to ourselves the entire personal 'nuance' of our feelings by terms of which we can create the sense and usage. . . . The internal language is our affair; we use it according to our fancy. It is in great part personal, a thing not permitted to the audible language which is essentially an instrument of society." (24:71.)

To Egger "the internal word is a simple image, an image purely of sound." (24:75.) Except in abnormal and pathological cases, the tactile (buccal) image is reduced to an image that the observation cannot grasp, if not to absolutely nothing. (24:76.)

The sonorous character of the word image is to him of general application, although he admits the possibility of individual variation, presupposed by the law of habit which he invokes elsewhere to explain the general sonorous character of the image. (24:81.) Egger thinks that the buccal-tactile elements had not yet been eliminated from the word image at the time that the Egyptians invented their ideographic form of writing. (24:84.)

Egger classifies the internal word into the calm and the lively form. (24:183.) The internal language becomes lively under the influence of passion and the imagination. (24:165.)

Just as the auditory elements drove out the tactile, they also drove out the visual from the word image. "The sound images have driven out, little by little, the visual images from their legitimate pre-eminence. Sound images have become the principal ones for the consciousness, *because they alone can serve as a model for a material expression of the thought*, which is at the same time *prompt and easy*."

The sign in language is always the most intense state in a given group. (24:281.) It is the image which carries the meaning. Egger admits the possibility of other forms of internal language. A man both blind and deaf would have a tactile language. (24:288.)

He holds that the existence of an internal language is universal but not proved to be absolutely necessary. (24:289.)

Paulhan, in his "Le Langage Intérieur et la Pensée" of 1886, shows that the investigation of mental language imagery has got beyond the personal stage. For "la parole intérieure" he substitutes "le langage intérieur," and he puts the sense fields more nearly on a parity. He says that "the internal language is a complex phenomenon, comprising visual, auditory, motor, tactile, and abstract representations. This last expression is particularly noteworthy. Some French authors, writing later, have not hesitated to use the term "abstract images." (48:1.) By abstract representations Paulhan means "residues of sensations and tendencies; organized and systematized. They can represent, without resembling, acts, sensations, complexes of sensations, signs, or words." (48:4).

As to individual differences, he writes: "each class of representations (visual, auditory, motor, or abstract) may predominate with varying vivacity in different individuals, and even in certain cases may constitute the only noticeable part of the signs which compose the internal word." (48:2.)

To Paulhan "thought is a 'langage intérieur,' and cannot be reduced to words or images of words: the abstract idea exists by itself under the form of a residue of an abstract representation: thought is a 'langage' not a 'parole.'" (48:5.)

In 1887, appeared an article by A. Binet on the "Intensity of Mental Images." He writes: "the world of images, which each one of us carries in his soul, has its laws like the material world which surrounds us; these laws are throughout analogous to those of organized matter, for the images are living elements which are born, transform themselves, and die." (9:473.)

One factor influencing the intensity of images is the strength of excitation which accompanied the original sensation. He thinks that the physiological process that corresponds to a strong image must be very different from that which accompanies a weak one, and that in the former case there must be disintegration of a greater quantity of nervous matter.

The study of the intensity of images is a study of the origin of our beliefs. (9:474.) Suggestion in the case of a normal person produces an idea only, in the case of the abnormal it produces sometimes an hallucination. This is due partly, (9:479) but not wholly, to hyperexcitability which lends energy to the idea. (9:475.) "That which gives intensity to the idea suggested is the manner in which one suggests it; it is the tone of the voice, the authority of the person, the mode of affirmation."

The personal equation is a large factor, into which the sex-

ual element largely enters. One man succeeds in suggestion where another fails because "he is the one loved." (9:478.)

The force of suggestion by resemblance depends upon the amount of resemblance. (9:481.) Binet conducted experiments which seemed to prove that in the case of hyperexcitables peripheral excitations produced a general increase of power (motor) and even led to the revival of memory images which could not otherwise be recalled. (9:482.)

Factors weakening the intensity of the suggested image, were resistance on the part of the subject (9:486), skepticism (9:488), and a counter suggestion of paralysis. (9:488.)

Binet and Féré the year previously noted in the case of hallucination, "the external projection not only of the (suggested) images, but beside of the bond of association. . . . . If the image furnishes the materials of the hallucination, the associative bond gives it its form." (11:162.) "Association produces a belief, a belief in the reality of the association. (9:477.)

M. E. Egger, in 1887, considered incidentally the place of the imagination in the development of the intelligence and of the image in the development of language. (25.)

In 1888, in his "Le Langage Intérieur," Ballet analyzes the word image into (a) the auditive image, corresponding to the heard word; (b) the visual image, corresponding to the read word; (c) the motor image of articulation, corresponding to the spoken word; and (d) the motor graphic image, corresponding to the written word. (8:14.)

Ballet aims to explain morbid phenomena by the study of the normal, and so first discusses the development of the function of language in the individual. For this purpose he divides persons into three classes:—the auditive, the visual, and two classes of motors as indicated above.

The latter part of the book, which need not be discussed here, is concerned with a discussion of diseases of language based on investigations in the normal fields. (8:172.)

Oelzelt-Newin (1889) distinguishes between "a function of the imagination which Meinong calls 'generative' and a second which he calls 'constructive.' The 'generative' brings forth component parts, the 'constructive' unites them." He says that "both processes take part in the production of images, but also can be separated clearly in fact." (46:15.)

His aim is æsthetic and he draws examples from music and the lives of artists as well as from psychiatry. He discusses the origin of the image, its properties, conditions, development and bodily substrate, as well as imagination in animals. At the end of the volume (46) there is a voluminous bibliography.

Taine in his work on the intelligence (1889) treats the mental image with great detail and great wealth of illustration, and with greater insight than other authors of his period. (60:35,41.) He considers the nature and reduction of images, and the laws of their revival and obliteration. The connection of general names and vague images; the existence of sensations in the mind as tendencies without express images; abnormal phenomena, such as obliteration of whole groups of images, loss of memory, and double personality, are treated under the general head of images. He defines the image as "a spontaneously reviving sensation, usually less energetic and precise than the sensation proper." He recognizes images of sight, hearing, smell, taste, touch, *i. e.*, images of all the special senses. Taine also discusses illusion in connection with the sense image. (60:219, 264.) In illusion the image to some degree acquires the energy and precision of sensation.

Queyrat defines similarly the image. In his study of the imagination of children (1893), he says that "the image is a reproduction of sensation, a reproduction fainter and more general than the original, but always capable . . . . of acquiring under certain conditions an intensity such that one would yet believe in the reality of the object." (50:8.)

Van Biervliet in his "Images Sensitives et Images Motrices" (1897) through introspection and consideration of the results of anatomy reaches the following conclusions:

"It is necessary to conceive every sensation, every cerebral image (representation, hallucination, or memory) as *a quantity of movement.* Every cerebral image is sensory: the images which represent movements represent them as completed, that is, as seen, heard, or felt."

Every cerebral image is motor, because being a quantity of movement introduced into the organism from without, it must leave the organism under the form of muscular activity."

Every image originating at the level of the centre of projection, however feeble it may be, is drained by the descending motor fibres, which connect the centres to certain groups of muscles."

Every image which has reached the level of the association centres is drawn off by the descending paths in the centres of projection and by the motor paths."

One cannot make a radical distinction, a distinction of nature, between motor and sensory images." (62:128.)

The idea that every image tends to objectify itself will be met later on in a discussion of the works of Ribot and others.

In 1898, W. Lay made a study of the mental imagery of 100 students of Columbia College and of 120 artists. He combines this with results of his personal introspection.

He distinguishes between imagery and the imagination, saying that "the possession of creative imagination implies mental imagery but not *vice versa*. (38:2.)

Lay recognizes very many more kinds of mental imagery than had been considered commonly before this by writers on the subject of mental imagery. As the result of five series of experiments and of personal introspection, he differentiates ten groups which are as follows:—(1) visual, (2) auditory, (3) tactual, (4) gustatory, (5) olfactory, (6) thermal, (7) motor, (8) those of pain, (9) organic, (10) those of emotion. (38:4 and following.)

Lay brings out the great range of individual differences, and gives several curious instances, such as that of the sculptor who arranged his images according to their vividness in the following order:—touch, organic images, sounds and sight. (38:22.)

Macdougal in his discussion of music imagery states that "the function of music is to indicate or produce a mood rather than to communicate a set of images." (42:463.) This suggests Ribot's affective imagination and his ideas as to the nature of musical composition. A piece of music, says Macdougal, may suggest a vast number of things, but it does not mean these things "as a word does the object for which it stands." (42:463.) He believes that the symbols of music might perfectly well be employed to express particular images by means of the three forms of association, which he calls association by convention, by composition and by analogy. (42:464.) He recognizes the close connection between the imagination and the affective processes. (42:476.)

Philippe's "L' Image Mentale" (1903) treats of the evolution and dissolution of the image. The image is the common substrate of the imagination and the memory. He writes: "the image is neither a memory nor an invention, it is a simple representation. . . . " (49:3.) And again, of images, he asks, "What is in fact their true rôle in our memory?" and answers, "that of a simple substrate." (49:2.) "In reality," he says, "the imagination in the mental organism has three distinct functions: reproductive, creative, and representative. The last, beside, is the only one which is autonomous. It constitutes, indeed, the foundation of its (the imagination's) activity. (49:1.)

The image, "the psychological cell is in reality as complex as the physiological cell." (49:5.)

A distinction is made between fixed memories and mobile and unstable images. (49:131.) Of the latter he says that "by a constant application of the law of economy, useless de-

tails disappear to make place for what is necessary to the whole. All normal life so develops." (49:132.)

The image is the resultant of forces external and internal, forces which act upon the individual not only as an individual but also as a part of society. So there are, so to speak, not only personal but social images common to all individuals of the same tribe or race. It is by these social images that mental communion is possible. (49:132.)

This study is based on answers to questions given by two physicians, a painter, a doctor and two students of philosophy.

Lemaitre in his "Le Langage Intéreur des Enfants" (1904) divided his subjects into six classes: verbo-visual, symbolo-visual, auditivo-visual, visual-motor, verbo-auditive, and verbo-motor. (39:8.) He also recognizes an equilibrated type where all the usual types of mental imagery are found in fairly equal degree.

He tested these various types for memory as to time required for recall and degree of accuracy of recall. He found the auditivo-visual and the equilibrated types to clearly predominate in both respects, while the motor type was distinctly inferior. The auditive and the visual types were about on the same footing. (39:35.)

Lemaitre makes the interesting observation that the quarrels of the scholastics as to universals was caused by individual differences in endophasy. (39:42.)

He examined twenty-eight children as to their ideas of the infinite. Six could make no answer. The visual type excel the others. Two of these saw the starry heavens, two a closed circle, and one a black point on a white background. The motors could not represent infinity to themselves. Among the auditive is noticed a disagreeable feeling of contraction, choking oppression.

In a test of ideas of space the results were similar, except that among the auditive no mention is made of any feeling of oppression.

With regard to this feeling of constriction, Lemaitre says he has noticed it five or six times and always with the auditive. He is tempted to believe that "the psychophysical relation in this group is more intense than with the visual and motor." The fact that sound representations seem to have more affective tone than sight or motor representations has been noted before, and might be considered in connection with Macdougal's and Ribot's ideas as to the nature of musical imagination.

Lemaitre thinks that the motor escapes these oppressive feelings by his ability to give external expression to them, while the visual find relief on account of greater imaginative re-

sources which tend to induce him to explore the new rather than search into the depths of what is already known.

Wallaschek's "Psychologie und Pathologie der Vorstellung" (1905), attempts to give a physiological explanation of the image. His whole work is supported by the "psychology of exceptions" upon the importance of which he insists. (64:187.) The first division of his work discusses speech-paths, singing, reading, writing, mimicry, gesture, and tone and music centres. The material used is largely pathological. In the second part he discusses what he calls secondary phenomena, which are divided into secondary sensations and secondary images. As an example of secondary sensations he mentions colored hearing, which is due to "unequal extensibility of the blood vessels of the brain." (64:187.) Thus the auditory centre on stimulation receives an increased flow of blood, which flows over into any other centres whose blood-vessels are easily extensible, sufficiently so as not to need actual peripheral stimulation in order to be awakened to a state of activity sufficient for real sensation. Wallaschek asserts that all secondary phenomena are of vasomotor origin. Even instinct is due to the anticipatory function of secondary sensations. That is the vasomotor system of the brain is from the first such as to allow certain blood overflows, the basis of instinctive action.

Wallaschek notices the close correlation of the emotions and the imagination (64:194), and refers particularly to the "associative feeling effect of music." (64:247.)

Meumann in "die Experimentelle Pädagogik," 1906, gives a résumé of the methods for the determination of types of imagery.

He distinguishes between pure and mixed types and types where the images of words and the images of things predominate. He points out that even the pure types are not fixed and unchangeable, but that the elements of the image varies with the character of the object imaged. "Sachvorstellungstypen" and "Wortvorstellungstypen" are the main divisions, each of which contain pure and mixed types. Beside these there are combination of the "Wortvorstellungstypen" and the "Sachvorstellungstypen." (45a:34.)

He describes also carefully various methods in use for the determination of types. He groups them under the following heads:

A. Methods of secondary stimuli, opposing, or supporting.

B. Methods of offering memory stuff with the adequate or inadequate means.

C. Reproduction methods.

D. Kraepelin's method.

E. Indirect methods.

F. Individual artifices for the discovery of types of imagery.

Meumann points out that any of these, to give exact results, must yield themselves to a process of measurement. (45a:37.) As he hopes, this review of methods will undoubtedly be of great service to the experimenter in the field of experimental pedagogy. (45a:62.)

It will be seen that in the last thirty years some progress has been made in the study of mental imagery. The early investigators emphasized one form of imagery at the expense of the others. Thus, with Galton the visual image was the main thing; other forms of representation were hardly more than incidental, or at most, supplementary. With Lay we have at least ten forms of mental imagery. We also see a great change of attitude in this respect, that whereas at first each writer thought that his imagery was practically the only imagery, that now all recognize that variations in imagery are as numerous as individuals.

It will be noticed that French psychologists have been largely interested in language imagery. But here a change is evident in this, that while at first they spoke of "La Parole Intéreure," now they speak of "Le Langage Intéreur." Any image, whether verbal or not, belongs to language imagery if it serves as a bearer of meaning.

Since the time of Galton much has been done to explain the causes of those variations in the intensity of images which he noticed; so that Bain's criticism of his work has had its effect.

The influence of the feeling and the emotions in this respect has been frequently noticed, as well as their power of calling up and associating various sorts of images. This is especially noticeable in the auditory field.

In connection with mental imagery there still remain to be considered several discussions as to the connection between the image and the idea, and the image and thought.

Stout in his "Analytical Psychology" (1896) maintains the existence of "presentational" forms of consciousness apart from imagery (55).

Angell denies this (2:650). He writes: our positive ground for assuming the presence of the image is two-fold; first the very origin of the cognitive consciousness through the action of the senses; second, the fact that accurate introspection always reveals the image explicit or implicit." To which, of course, it may be and is replied that an implicit image, if by this is meant one not actually present in consciousness, is no image at all.

Thought without imagery is to Angell as distressing as "a

Kantian 'noumenon' turned up in the midst of a well-behaved lot of 'phenomena.'" (2: 65.)

Stout's "Manual of Psychology" (1899) states that "an idea can no more exist without an image than perception can exist without sensation. But the *image is no more identical with the idea* than sensation is identical with perception. The image is only one constituent of the idea; the other and more important constituent is the meaning which the image conveys." (56:394.)

James in his "Principles" (1896) also distinguishes sharply between the image, especially the blurred generic image, and the concept. He states that a blurred picture is just as much a single mental fact as a sharp picture is; and the use of either picture by the mind to symbolize a whole class of individuals is a new mental function." French psychologists have written much on the same topic.

Taine in his work previously cited (1889) states that "a general and abstract idea is a name, nothing but a name; the significant and comprehended name of a series of similar facts, or of a class of similar individuals, *usually accompanied* by the sensible, though vague representation of some one of these facts or individuals." (60:138.)

Queyrat (1893) says: "we do not think without the image. Every idea even the most abstract and the most immaterial is incarnated in the word which is already a sensible form." (50:39.)

Weber (1896) distinguishes between images and ideas. He writes: "real objects are not only objects of perception, and they do not correspond to mental images only; they are also objects of thought; they correspond to ideas, concrete ideas." (65:34.) Between different people the objects of thought are identical, the images are not. (65:37.) This should be considered in connection with Philippe's doctrine of social images mentioned above.

"When one thinks of a particular thing, he considers it also in a general way as a substrate of general relations, and the important thing is not the image but the bundle of relations." (65:38.) "The name is more than a mere sign of images, else different minds could not be united." (65:43.) "An image in itself is neither true nor false. The external world is neither an illusion nor a real existence. The idea that is engendered by the image is alone susceptible of truth or error. (65:47, 48.)

Ribot in his "Evolution of General Ideas" (1899) makes the image intermediate between the percept and the concept (51:5.) It is all a matter of gradual reduction to essentials.

"The percept," he says, "is pre-eminently a practical opera-

tion, . . . its mainspring is interest or utility, . . . in consequence we neglect . . . whatever at the moment concerns neither our desire nor our purposes." (54:4.)

In the image "the reduction of the object represented to a few fundamental features is still more marked." (51: 6.)

The genesis of the generic image depends on experience, on affective dispositions of the subject, on interest and on utility. (51:22.)

The concept is the image freed of all sense elements but still able to represent and carry meaning. The concept is reduced to a mere notion of value. (52:292.)

Ribot represents the progress of percept to concept by a diagram similar to the following, which is self-explanatory.

(Percept.]	Middle Threshold.	Generic Image.	Schematic Image.	Concept.
x	x	x	x	x

A. Binet in his "Pensée sans Images" (1903) acknowledges the difficulty of distinguishing between ideation and imagery (12:138); but concludes like Stout that "the image is only a small part of the complex phenomenon to which one gives the name of thought." (12:149.)

Binet makes this rather mistifying statement: "Consequently we can suppose that where images fail the thought is composed essentially of the internal language, it is a monologue." If this internal language is not sensory in character as Queyrat says, it is very hard to understand what it is.

In his "L'Etude Experimentale de l'Intelligence," Binet writes as follows: "we have determined that the work of thought is not sufficiently explained by the mechanism of the association of ideas: it is a mechanism more complex, which constantly suppose operations of choice, of direction. We have seen also that imagery is less rich than thought; the thought on the one side interprets the image, which is often unformed, indefinite; on the other hand the thought often contradicts the image, is often more complete than the image, and sometimes also is formed and developed *without the aid of any appreciable image.* These are some of its operations where the image cannot follow it. In generalization it is intention, that is to say in substance the direction of the thought which constitutes the 'general,' and not the image; the image may lend itself to generalization if it be indeterminate. Sometimes it does not lend itself to it, but for all that cannot prevent the flight of thought toward the general. In fine this is the fecund thought, fecund in philosophical consequences; all the logic of thought escapes imagery."

It will be seen that there are two opinions on this subject, which are diametrically opposed. Might not the solution of

the difficulty be found by studying the office in thought of the imagery of general sensation? Does not this correspond, in a measure at least, to the "direction of thought" which is made so much of by the champions of thought without imagery?

PART II. IMAGINATION.

It would be impossible to mention here even the titles of all the books and articles that have been written on the imagination during the last twenty-five years. Neither would it be consonant with the purpose of this introduction, *i. e.*, to give an orientation into the field of psychological discussion on this topic. The vast number of literary, philosophical and pedagogical discussions must be passed over without notice; although many of these contain flashes of psychological insight, and will be cited occasionally in the empirical section of this study. Pathological studies have been included to a very limited extent, as in the first part of the introduction. This has been done for two reasons: first, the immense amount of literature in this field, much of doubtful value; second, the empirical part of this paper is a study in normal psychology, so that only representative pathological studies which bear directly on its results need be considered.

In the eighteenth century, Malebranche discussed the imagination and its physical substrate. He writes: "the agitation of the fibres (nerves) cannot be communicated to the brain without the soul perceiving something; if the agitation begins with the impressions which objects make on the exterior surface of the nerve fibres, and which are communicated to the brain, then the soul feels and judges that that which the soul senses is outside; that is to say it perceives an object as present. But if it is internal fibres which are slightly excited by the course of the animal spirits, or in some other manner, the soul imagines and judges that that which it imagines is not outside but within lhe brain, that is that it perceives an object as absent. This is the distinction between sensation and imagination. (4:38.)

Malebranche draws from pathology to show that they differ only in degree. He also distinguishes between two forms of the imagination, "the active imagination of the soul" and the "passive imagination of the body." (43:40.)

The retention of sensory impressions is thus spoken of: "So fibres of the brain having once received certain impressions, by the course of the animal spirits, and by the action of objects keep sufficiently long some facility to receive again these same impressions." (43:59.)

Malebranche also treats of sex differences. Women, he says, "cannot use their imaginations to resolve composite and

difficult questions. They consider only the outside of things, and their imagination has not sufficient force and extent to pierce the bottom, and to compare all the parts without being distracted." (43:67.)

Malebranche recognizes the rôle of the imagination in invention, discovery and the formation of the new systems (43:113), and treats of individual differences in the quality and power of the imagination.

The influence of Cartesianism upon the psychology of Malebranche is clearly shown. His anatomy and psychological concepts are of course antiquated; but one cannot but notice the similarity of method between his work and that of the modern French school.

So much to give an idea of the state of psychological opinion previous to the nineteenth century. It is true of the imagination proper, even more than of mental imagery, that little of scientific value was written concerning it until the last twenty-five years of the nineteenth century.

One cannot pass by Frohschammer's work, "Die Phantasie als Grundprincip des Weltprocesses" (1877), for two reasons: first, because, although it is philosophy and not psychology, it does give an idea of the ubiquity of the imaginative processes in the life of man, and second, because it must have given an impetus to the scientific study of the imagination.

Frohschammer discusses the imagination under three main heads: first, the subjective phantasy; second, the objective phantasy and its developments to the subjective phantasy in the nature process; and third, the development of the subjective phantasy, or, phantasy become subject to the self-conscious spirit, to human personality.

He writes: "One can indeed assert that the soul is inspired, limited, and determined principally by the subjective products of the power of imagination." (27:143.)

In 1877, Dilthey published an article on the imagination of the poet, occasioned by Grimm's "Goethe," then just published. The point of view may be obtained from his "die Einbildungskraft der Dichter, Bausteine zu einer Poetik" (1887), and his "Dichterische Einbildungskraft und Wahnsinn." (1886.) In the latter study he proceeds as a physician would to seek for symptoms of the alleged pathological state which is called poetic genius. He notices that "the poet has extraordinary energy and facility in mental processes, therefore, lively pleasure in them." (22:9.) Dilthey asserts that the poet "lives with his own creations as real persons, and feels their pains as real pains. He changes his own ego into that of his hero, feels, thinks and acts through them." (22:11.)

That which is common, says Dilthey, to the dreamer, the

hypnotic, the insane, as well as the artist and poet, is "a free formation of images and their composition unlimited by the conditions of reality." (22:12.) Here the similarity ends. The cause of the free formation of images is different in the case of the poet and artist from that in the case of pathological subjects.

The true differentium of the poet is the "exceptional energy of feeling, of emotion, which has as its result the free evolution of the image beyond the boundaries of the real." (22:13.) A genius so distinguished is not pathological, but the sound, the perfect man.

Dilthey discusses the growth and decay of the image. It is changed by the dropping out of constituent parts, and the entrance into its innermost core of new elements and compounds. Pictures are also changed by extension or shrinkage, according as the intensity of the sensation of which they are composed is increased or lessened. (22:24, 25.)

V. Egger, in his work previously quoted (1881), refers to the old classification of forms of the imagination between reproduction with innovation, involving two varieties, reproductions of sensations and reproductions of other states; and production pure and simple, also including two forms, reproduction of sensations and reproduction of other conscious states. (24:191.)

"It is better, however," he says, "in the classification of elementary psychic facts, to reserve the word imagination for facts which are new in some degree, and to characterize the memory by the absence of all innovation." (24:191.)

Unlike Philippe (49:1), he regards the memory as the substrate of the imagination. He writes: "Memory being the reproduction of the facts of experience, imagination is experimental innovation, but the foundation of all this innovating activity is the memory; if we suppose the imagination to be at its maximum and to penetrate the most profound depths of our mental phenomena, memory is an irreducible basis, more deeply placed still, and upon which is necessarily constructed the edifice of the imagination. (49:193.)

Meinong, in his "Phantasie-vorstellungen und Phantasie" (1889), defines Phantasie-vorstellungen as all those "Vorstellungen" with which the imagination busies itself, whether they be old or new. (44:236.)

He differentiates between the generative and the constructive imagination, and sees in the imagination nothing but the union of the generative and constructive dispositions of the mind. (44:239). "The value of . . . . separation," he states, "lies above all in this that both functions with regard to their appearance are not connected with one another, but in their

isolated occurrence are conceived as functions of the imagination." (44:239.)

Adam, in his discussion of the "Use of Imagination in Scientific Discovery according to Bacon" (1890), says that scientific investigation consists of two parts; first, the collection of facts (1:170), and, second, in extracting from the mass of observations and experiments some axiom or some law. This it is necessary to invent or imagine. Spencer was equally insistent on the place of the imagination in science, even, as is well known, defending the day-dream as propedeutic to purposeful imagination. In fact it is now a commonplace to say that the scientist must have imagination.

Queyrat in "L'Imagination et ses Variétés chez l' Enfant," as has been noted previously, insists that the type of mental imagery is a strong factor in determining the character of the imagination, in fact in determining the varieties of mind. (50:38.)

He distinguishes four varieties of individuals according to their habit of mental imagery: the normal or mean type (the equilibrated type of Lemaitre), the visual, the auditory and the motor. (50:40.)

The aim of Queyrat's book is pedagogical, so we find him discussing such topics as the different aptitudes of children, the danger of creating but one order of images, superiority of the normal type, and methods of assuring equilibration of imagery.

Burnham in his "Individual Differences in the Imagination of Children" distinguishes between the reproductive imagination, which merely reproduces *ideally* sense impressions, and the productive imagination, which combines impressions to make new wholes. (14:204.) He recognizes the same types of imagery as Queyrat, but adds the tactile. (14:211.)

Bain does not hardly consider imagination as a separate activity. What he has to say concerning it is under the head of constructive association. He declares that "the so-called power of imagination, which, in its peculiar sphere, rivals in amplitude the domain of the reason, would be bereft of all its force and character, but for the workings of similarity as developed in the rarest examples of its endowment." Speaking of such creations as those of mathematics and of the fine arts he writes: "the intellectual forces operating in these creations are no other than the associating forces already discussed. (6:606.)

Bain treats constructiveness under the following heads: mechanical constructiveness, verbal constructiveness, feelings of movement, constructiveness in the sensations, construction of new emotions, concreting the abstract, realizing representation or description, constructiveness in science, practical construct-

iveness, and fine art construction, which alone he dignifies with the name imagination.

The distinguishing characteristic of fine art construction is the presence of an emotional element in the combinations. (6:635.)

The construction of a building is not the work of the imagination, according to Bain, because no feeling or emotion enters in as an element, except the one feeling of answering a practical end. But may not this feeling be as intense as any other? Is not the pleasure of being a cause, enlarged upon by Groos (30:185), very potent? May not, as Ribot asserts, any feeling or emotion whatever conduce to imaginative activity?

Bain asserts that only when, beside the practical end the desire to gratify the æsthetic sensibilities is in evidence, does imagination enter into such construction. He notes, however, the effects of such emotions as fear, terror, anger, the egoistic feelings, etc., upon the imagination.

At the close of his discussion of constructiveness, Bain discusses the artist's regard for truth, and makes the characteristic statement that "we ought not to look to an artist to guide us to truth; it is enough for him that he does misguide us." (6:646.) Bain limits the imagination to those forms of constructiveness not concerned in the pursuit of truth.

Arréat, in his "Mémoire et Imagination" (1895), has drawn material from letters and biographies. He recognized that such material is apt to lead one into error, however careful he may be, and contents himself with making suggestions to be worked up later by others in the laboratory. (5: Introduc. VIII.)

He notices that in imaginative work the physiological tone is raised, and that positive pleasure accompanies execution. (5: 133.) Arréat makes the statement that "the specialization of our images corresponds to different modes in which the living being manifests itself; it has its origin in the relation of the subject to the object, of the physiological organism to the environment. Man is an instrument in tune with the diapason of things" (5:163).

Peculiarities of imagination are due to a definite constitution of the memory, to the system of images of affective (see Ribot) and sensory origin; to heredity and to temperament. (5:168.)

James in his "Principles" states that "fantasy, or imagination, are the names given to the faculty of reproducing copies of originals once felt. The imagination is called 'reproductive' when the copies are literal; 'productive,' when elements from different originals are recombined so as to make new wholes." And again: "the phenomena ordinarily ascribes to imagination —are those mental pictures of possible sensible experiences to

which the ordinary process of associative thought gives rise." (36:44,45.)

Where the details of the image are sufficiently concrete as to constitute a date, the image is a recollection (36:45.) As an opponent of the atomistic theory, James is bound to say that "an imagined object, however complex, is at one moment thought in one idea, which is aware of all its qualities together." (36:45.) James thinks that "the subjective difference between imagined and felt objects is less absolute than has been claimed, and that the cortical processes which underlie imagination and sensation are not quite as discrete as one at first is tempted to suppose. That peripheral sensory processes are ordinarily involved in imagination seems improbable; that they may be sometimes aroused from the cortex downward cannot, however, be dogmatically denied (36:72).

James states that "the difference between sensation and imagination is not in localization but rather in intensity. (36:72.)

Zahlfleisch, in his "Über Analogie und Phantasie," regards mathematics as the best example of what the imagination has done for science (67:160.) He cites the discovery of the properties of similar triangles by Thales of Miletus as an example (67:162, 163). The historical connection between imagination, as embodied in religion, and the mathematics is also pointed out. Thus Philolaus dedicated the corners of certain figures to certain gods, and Plato always made the gods go to work in a geometrical fashion. (67:168.)

In 1898, Dearborn made what claims to be a study of the reproductive imagination by means of ink blots. It is much more a study of association by similarity, which is of course basal to imagination, than a study of reproductive imagination. Dearborn's subjects were adults. The results were inconspicuous. About the only thing in the way of conclusion that the study contains is the rather trite statement that "experience and especially early experience of the subject, has important influence." (20:190.) Dearborn also observes that "the difference between the imagination of the country and city bred is clear."

Chase, in his paper on "The Imagination in Relation to Mental Disease" (1899), writes: "it may be said that there are always two streams in consciousness . . . of which one now prevails and then the other; one flows in the current of sensuous perception; and the other in that of representative consciousness, *i. e.*, in the current of memory and imagination. Between the two currents, the presentative and representative, and also between the two elements in the latter, memory and imagination, there is an inverse ratio. (18:286.) (*Cf.* Binet,

10:308.) Chase believes that the harmonious blending of these two opposite tendencies is requisite for the building up of a symmetrical character. (18:287.) That is, sanity is the result of proper blending of the presentative and representative processes. Like so many others, Chase notices the close connection between the imagination and the feelings. (18:292.)

"Studies in Imagination" (1900), by Lillian H. Chalmers, is based upon 282 returns, 70 from female teachers, 91 from female students, and 121 from male students. The study deals with literary tastes, dolls, number forms, etc. As to tastes, the female students show less difference between their childhood likes and their mature approvals. (16:115.) Miss Chalmers writes: "the answers show that our informants do not value the exercise of the imagination as highly from their adult standpoint as they experience in their childhood's reading." (16:117.) She finds that those who like and approve fanciful reading are generally those with a more literary taste, while the more practical people, that is those who like mathematics and the deeper studies, see less value and pleasure in fanciful reading, but like something real."

Ribot, having previously established to his own satisfaction the existence of an affective memory, in his "L'Imagination Créatrice Affective" (1902), proceeded to do the same for the affective imagination. In it he answers the question: "Is there a form of the creative imagination, which forming new relations, assembles and combines affective states of different kinds and nothing but them?" (53:598.)

Ribot presents two fundamentally opposed theories of music, viz.:—first, that music treats of sounds,—"c'est un chant intérieur non un sentiment intérieur, qui pousse le musicien à composer;" second, that emotion is the substance and raison d'etre of music.

Ribot does not think that the opposition between these theories is irreducible; they correspond rather to two distinct classes of music. The second, he says, is a manifestation of the affective creative imagination. He makes it the basis of his study.

The three conditions necessary for such creation are: first, the innate habit of living in the world of sound sensations; second, the spontaneous tendency to translate everything musically, and express exterior and interior events in the language of sounds, and . . . . to transform all into affective dispositions, into states felt, which are immediately incarnated and developed in a sonorous vestment" (53:605); third, the predominance of feeling states. (Sentiments.) (53:606.)

These last, to fully support Ribot's theory, should so pre-

dominate as to shut out plastic images. He finds them, however, with some people even in the case of music of the internal type. For himself there are suggested by music no such images. There is "complete confiscation of the consciousness for the profit of the affective life."

The primitive dance expresses emotions. It is their motor objectification and expansion under the condition of rhythm. (53:613.) It is the most elementary form of the affective creative imagination. (53:614.)

Among primitive peoples insufficient material (few notes) and technique prevent the development of affective imagination. Since the right conditions of material and technique have been evolved the chief problem is "to give to that which is by nature vague and fleeting relative precision and stability." (53:615.)

The affective imagination creates personages and develops characters "by creating, grouping, and putting in action 'êtres sonores' each one of which has its own life and expresses a state of the soul." (53:616.) It has two forms: one dependent, usually adapted to a dramatic work; the other free, disassociated from words and purely instrumental. The musician is in much better case than the literary symbolist, who faces the task of translating affective states into words. (53:620.) Symbolism must remain an incomplete type of the affective imagination.

To the mystics Ribot denies affective creative imagination save in the case of "romans d'amour," mostly produced by the female sex. (56:625.) Among the greater parts of the mystics there is an exaltation of the memory rather than of the imagination. (53:624.) The "romans d'amour mystiques" are, however, impure examples of the affective imagination.

Ribot explains the neglect of the affective imagination ni the past by psychologists by three facts:

1. The creative imagination has been studied too long as a complex faculty. In fact, the term affective imagination is only an abstraction. There is no imagination in general. There are men who imagine. There are several types to which men conform, of one of which, the diffluent, characterized by the vague contours of images, the affective imagination is a species.

2. The insufficiency of our knowledge of the psychology of the feelings.

3. The power of creating has shown itself first clearly in forms using plastic images, *i. e.*, visual, tactile and motor. (53 : 629, 630.)

Meyer prefaces his "Das Wesen der Einbildungskraft" by a discussion of views of the imagination in philosophy. He dis-

tinguishes two views: one holding this power to be the most original faculty of the soul which unites mind and body; the other denying to this power its originality and declaring that that which is called the power of the imagination is a compound product of other primal psychic forces. (45:26.)

He shows that the idea that the image is the cause of motion led to the idea that the image might cause the growth of vegetation. The philosophy of Hartmann is a sort of somnambulistic ideation. But if the way the soul of the artist works is the way the soul of Nature works, then Nature's work is half conscious. That the artist works unconsciously is only half true. Imagination is the mid-station in the soul of the artist between the conscious and the unconscious. So the philosophical theories which introduce the image to explain world processes are transition philosophies attempting to bridge the gulf between materialism and idealism.

Leaving philosophy, Meyer says that the memory, the elementary form of the imagination, is nothing else than the holding fast of inner pictures of sense perceptions. (45:37.) Our soul has, beside, the capacity from the memory elements by the processes of analysis and synthesis to produce new images. The memory is reproductive, the imagination is productive. (45:38.)

The generic image is a schematic image developed from the images of many individuals (*cf.* Galton), and is not a mere reproduction, since it involves something that one has never seen. (45:38.) It is a new "structure of analytic thought, and the beginning of thought proper." (45:39.)

There are involuntary image associations producing really new single forms. "Related elements from different memory impressions associate to form new compound images, which our soul never saw." (45:39.)

The mixture of the free play of association and of thought and will controlling the attention, produce from the memory the new psychic power which we call the power of the imagination or phantasy. (45:40.)

Dugas, in his "L'Imagination" (1903), considers imagination as mental and motor suggestion, as the principle of faith and action. It may be related to the will of which it is the initial form. The tendency of the image to produce belief or motion is a favorite thesis of the French school.

Dugas says that "the imagination is not sufficiently characterized by the nature, origin, or special character of its representations: it should not be considered as the 'ensemble' of representations, or mental imagery. It is further and above all the art, spontaneous and reflective, of forming mental syntheses or combinations, what Bain calls by the word construct-

iveness." (24: Introduc. 2.) Its two essential qualities are originality and power. (24 : 3.)

His final definition is this: "The imagination is . . . the concourse . . . of two distinct qualities, the power of objectification and the force of combination. (24 : 4.)

Binet's "L'Étude Experimentale de l'Intelligence" (1903), although not ostensibly a study of the imagination, deals so largely with this topic that it must be mentioned here. It is an intensive study of twenty persons, among whom both sexes and young and adult are represented. Among the eight chief topics considered, five touch on the imagination either directly or indirectly. Binet conducted experiments on ideation made with words and with phrases, on the measure of the memory, on the opposition between the interior and the exterior life, and as to the rôle of the image in thought, on thought without image, and on abstract thought and its images.

The most valuable part of the study is that part which deals with experiments upon and the introspection of two sisters one aged fourteen and a half and the other thirteen. The obvious criticism on the study is that too great dependence is placed upon the introspection of such young and inexperienced subjects.

Binet says that "the creations of the imagination resemble memory in that they are detailed and precise, and they resemble abstractions in that they do not correspond to any fact or external object, which has been previously perceived. On the other hand one may say that imaginations are not memories because they are false, and are not abstractions because they are detailed." (10:41.)

He gets the following results expressed in mathematical form from experiments on the two sisters:

	Marguerite.	Armande.
Coefficient of Observation, ...	37·5	10
" Self-consciousness, . . .	4.6	28
" Memory, ...	53·7	29·3
" Abstraction, ...	3·7	23·3
" Imagination, ...	.0	7.6

The interpretation of this table is best given in Binet's own words. "We find in the case of one of our subjects precision of thought, ability to render account, constancy of attention, the practical spirit, mediocre development of the voluntary imagination, and above all the attention directed to the external world. Is this 'ensemble' of qualities not opposed in curious contrast to that other mind with whom the spirit of external observation less developed, a thought less precise, less methodical, less

conscientious, an attention less sustained, is allied to a development of the imagination in a sense poetic, vivacious, unlooked for and capricious?" (10:308.) Binet seems to think that there may be some necessary connection of the qualities in each group. (*Cf.* Chase.)

Ribot's "Essay on the Creative Imagination" (1906), while a very suggestive work is not and does not claim to be of great scientific value in itself. Some of the main contentions of the author, however, must be noted.

Ribot proposes to extend the formula "the representation of a movement is a movement begun," and show that it explains, in a large measure at least, the origin of the creative imagination (52:3). He believes that all representations contain motor elements since they are the remnants of past perception. It is the motor element of the image which tends to cause it to lose its purely inner character, to objectify itself. (51:5.) Ribot also posits "the existence, beside images, of another factor, instinctive in form, . . . which will lead us to the ultimate source of the creative imagination."

There are two chief forms of imagination; the purely representative power, and *the power of creation by means of the intermediation of images.* Imagination proper, in the intellectual order, is the equivalent of will in the realm of movements. Ribot distinguishes between the reason and the imagination by saying that imagination is subjective and personal, its movement being from within outward, while the understanding is objective, impersonal, and receives from outside. (52:10.) Just as imagination and will are analogous, so revery is the equivalent of weak desire. (52:10.)

Imagination is a tertiary formation and is, therefore, complex. Ribot discusses its four chief factors; the intellectual, the emotional, the unconscious, and the synthetic.

The image is, of course, the intellectual element. As to the emotional factor he says that it is the ferment without which no creation is possible," and again, "all forms of creative imagination involve elements of feeling." (52:32.)

While Oelzelt-Newin limits the action of the emotions on the imagination to the sthenic type, Ribot thinks that all emotional dispositions whatever may influence the creative imagination. (52:33.)

Self-feeling, or the pleasure of exerting one's power, leads to the motor elements, which are the fundamental condition of invention.

The interesting parts of experience revive best, and by interesting is meant, what *affects us in some way under a pleasing or painful form.* (52:36.) Emotional resemblance reunites and links disparate images. (52:37.)

Ribot insists on the necessity of mental forms, knowledge, for continuous invention. (52:163, 173.) Images are the raw materials of invention.

He treats of the plastic imagination; diffluent imagination in general, having vague images; the rational imagination, dealing with schemas or only slightly concrete images; affective imagination; mystic imagination, etc.

He thinks that, mathematics aside, all forms of invention have three moments, *i. e.*, observation, conjecture, verification. The second depends on the creative imagination, the third on rational operations. (52:239.) Reason is preventive, imagination is inventive. The latter "provides the rational faculties with their materials, their position, and even the solution of their problem."

Scientific imagination arises from the need of a partial explanation; metaphysics from the need of a total explanation. Metaphysics is rationalized myth. (52:251.) There is no creative instinct in general. *All invention arises from particular needs* (52:270), from the emotional nature of the inventor. (52:290.)

In his "Volkerpsychologie" (1905) Wundt has an excellent discussion of the imagination. He contrasts the old view of the faculty psychology of Wolff, which made imagination the basis of memory, with the modern view which distinguishes between changed and unchanged reproduction, and makes the latter basal.

He discusses the ostensible properties of the imagination, *i. e.*, "Anschaulichkeit," "Productivität," and "Spontaneität," none of which does he consider to be true distinctive marks. (66:8-13.)

The active phantasy is only a modification of the passive phantasy through complication with will functions.

Wundt holds that the elementary functions of the phantasy is an experimental problem, and therefore proceeds to the experimental analysis of "Phantasievorstellungen." He studies first space imagination through the medium of pseudoptic illusions and illusions of memory associations. Then he proceeds to time imagination. He finds feeling elements as constituent parts both of space and time imagery.

The true nature of phantasy rests upon two principles, which are, enlivening apperception and the feeling-heightening power of illusion. By the former he means the power of an observer to project himself into the object so that he feels himself one with it. (66:62-63.)

Wundt treats the imagination of children under the headings, imagination and play, the poetic imagination of the child (Erzählung und Märchendichtung), free fancy and child art.

Play and fancy are products of the child's voluntary activity. "Märchen" are food for the imagination introduced from the outside. Play is bound to some definite object; free fancy is not. (64:74, 75.)

He treats the imagination of the childhood of the race under the general topics of myths and religion.

L. William Stern and others, in "Beiträge zur Psychologie der Aussage," give the results of a large number of carefully conducted experiments on memory and evidence. These studies show very clearly that memory and reproductive imagination shade very gradually into the productive imagination, and while being ostensibly studies in memory, throw many side lights on the problems of the imagination. (68.)

In addition to the literature which deals avowedly with the imagination, there has been written a great deal, especially in the field of child and adolescent psychology, which contains much of value to the student of the imagination. Such are Preyer's "The Mind of the Child," Hall's "Adolescence," Chamberlain's "The Child," Groos' "The Play of Man," the child study publications of G. Stanley Hall, and Miss T. L. Smith, Jewell's "Psychology of Dreams," Lobsien's "Kind und Kunst," Sully's "Studies of Childhood." Most of these and others will be freely quoted in the empirical part of this study, so that further mention will be unnecessary here.

The chief points to be noted in this section are these:

I. There has been a gradual extension of the field of the imagination. At first it was limited practically to what we should now call the artistic imagination. Now it is recognized that the imagination holds sway in mathematics, science, and invention in all its forms.

II. The conception of the imagination as a sort of psychic entity, faculty, or even metaphysical principle has given place to the view that the word imagination is a convenient term to express those processes by which the soul (using this term of course in the psychological sense) working through the medium of images by individual acts seeks to satisfy its individual needs. There is no imagination, save as a convenient abstraction,—there are imaginations.

III. The imaginative processes are interrelated with the affective processes. Imagination is always accompanied by a very distinct affective tone, and affective dispositions control largely the character of the imaginings.

B. Empirical Study in the Imagination of Youth.

I. Definition, delimitation of the subject, and statement of methods.

For the sake of clearness it will be necessary to define the

meaning of imagination *as used in the empirical study which follows.*

The fundamental distinction between imagination and memory is this, that memory comes with such concrete relations as to constitute a date or place of occurrence, or at least to make the subject certain of the existence of some date or place in connection with the experience. This is a modification of the statement of James.

The distinction between imagination and reason lies in their aims. Imagination seeks to discover new uses and meanings. Reason seeks to establish the truth or consistency with reality of these uses and meanings. Use and meaning are respectively the subjective and objective sides of the same fact. A thing's use constitutes its meaning *for us.* A word's meaning determines its use. All manifestations of the folk imagination as myth and religion have aimed at meaning. All manifestations of personal imagination aim at the discovery of meaning, or its objective aspect, use. Imagination springs from those intellectual, emotional, or physical needs, which may be subsumed under the terms use and meaning.

There can be no sharp line drawn between the reason and imagination. Both use images, the first, perhaps, faint or schematic; the second, more distinct and particular. Indeed, reason itself springs from a need, *but a particular need*, the intellectual need of internal or external consistency. Hence the imagination reaches flower first, the need from which reason springs developing late.

As to the distinction between fancy and the imagination, it seems to be chiefly one of degree. Fancy corresponds rather to association by resemblance, imagination to association by similarity, that is by a greater degree of resemblance,—essential resemblance. Introspection will show that the difference is not one of complication with voluntary processes. Neither can quantum of emotion or feeling be used as a test of differentiation.

Various writers have distinguished two forms of imagination; reproductive and productive (Spencer, etc.), generative and constructive (Meinong, Oelzelt-Newin), passive and active (Wundt), representative and creative (Ribot). These are, of course, not exactly equivalent terms, but may be regarded as sufficiently so for the purposes of this study. Where necessary the terms productive and reproductive will be used. When not otherwise specified, the word imagination will mean productive imagination. The chief distinction between the two forms is the element of novelty; novelty in the grouping of image elements. This has been used as the sole test in the following study.

That no absolute line of demarcation can be drawn between the two forms is evident. Instead of considering memory, reproductive imagination, and productive imagination as successive stages of elaboration, it seems preferable to consider the image as the substrate of all three. By image is not here meant a psychic atom or cell (Philippe), in the strict sense of the word, but a relatively stable process. Imagination would then be a process of processes.

Heretofore, imagination has been left largely to arm-chair discussions, often fine examples of what they are supposed to study. Most scientific studies have been in the field of reproductive imagination. In imagination proper most of the work has been done in the field of æsthetics or pathology.

It seems to the writer that the time has not yet come to make a purely analytical study of the imagination or even to undertake monographs in different fields of the general subject, as propedeutic to a general discussion. To be of great value, monographs must be based on something approaching a scientific classification. This, as Ribot says, we do not possess. Before it can be obtained a vast amount of descriptive work will be necessary. This study aims to describe in a concrete way the imaginative processes in a number of normal youths ranging in age between thirteen and twenty. The imaginative processes will be considered in their psychic setting, in relation to the other mental processes.

The subjects of this study were nineteen boys ranging in age from thirteen to twenty, and twenty-one girls with the same range of ages. The average age was practically the same for both sexes. Among the subjects were no children without brothers and sisters. The smallest family represented had two children and the largest ten. The average number was about five. There were only two orphans,—sisters, who, however, lived with their uncle and aunt and were surrounded by normal home influences.

All were submitted to the following series of tests:

1. Tests of interests and preferences by means of questions addressed to the subjects individually.
2. Tests of interests by favorite books.
3. Test of interest by titles of stories.
4. Tests of interest by favorite poems.
5. Tests of memory.
6. Tests for types of mental imagery.
7. Test of imagination by a series of stories the subjects of which were chosen by the pupils.
8. Test of imagination by a series of stories suggested by pictures presented to the pupils.

II. Tests and the Consideration and Analysis of Results.

1. Test of interest by means of questions.

The following questions were given orally to each subject and the answers, where definite, noted down. These were revised throughout a period of six months by repeated questioning and answers.

a. What is your favorite study?

b. Have you been advanced each year in school?

c. If not, at what age did you fail?

d. When endeavoring to recall a scene or to imagine an historical event, how far are you conscious of your surroundings?

c. Have you ever had day-dreams?

f. If so, what about?

g. Have you ever written verse?

h. If so, at what age?

i. Do you ever imagine you hear a voice calling you, and find afterward that you are mistaken?

j. Did you ever play with an imaginary companion?

k. If so, at what age?

l. Can you remember anything about these imaginery companions?

m. At what season is your imagination most active?

n. Do music, pastoral scenery, twilight, darkness or works of art affect your imagination?

o. When you were between the ages of six and twelve were you fond of fairy stories?

p. Are you still?

q. Did you then prefer fiction to history?

r. Do you now?

s. Do you prefer a true story to one equally good but not true?

a. From this question the following general results were obtained:

Favorite Subjects.	Number of boys choosing them.
Geography	5
Mathematics	5
History	3
Physiology and Hygiene	1
History and Geography	2
History and English Literature	1
Physiology and Hygiene, and Mathematics	1
History, Physiology and Hygiene, and Mathematics	1

Fourteen boys chose one definite subject as their favorite, while five were unable to do so.

Favorite Subjects.	Number of girls choosing them.
Mathematics	5
History	1
Geography, Music and Mathematics	1
History, Reading, Mathematics, Spelling, and Latin	1
History, Geography, Grammar and Mathematics	1
History, English Literature and Mathematics	1
Mathematics and Geography	1
Mathematics, History and Geography	1
Mathematics, Grammar, Physiology and Hygiene	1
Mathematics, History, and English Literature	1
Mathematics, Geography and History	1
Music and Spelling	1
Music and Drawing	1
Music and English Literature	3

Six girls chose one definite subject as their favorite. Fifteen are unable to do so. One of these had no preference whatever, and so is not included in the above table.

These tables show some very marked sex differences for these particular subjects. The first is the much greater specialization of the boys in interests. This will be noted in succeeding tests and need not be commented on further here.

Another point is this, that while each sex choose mathematics five times as *the* favorite, twelve girls to seven boys mention it as *a* favorite. No doubt here as elsewhere the answers were influenced by the marks made in the different subjects, although all were warned not to allow this. It is comparatively easy to make large marks in elementary school mathematics if one has sufficient application. This quality was where the boys were most lacking. The best mathematicians were boys, while the girls had a much higher average of proficiency.

Each sex choose history six times, but the boys make three exclusive choices, the girls but one of this subject.

The boys choose geography six times, the girls five times; but no girl makes it her sole favorite, while five boys do.

The comparison of the sexes in history and geography is especially instructive, when taken in connection with the results of succeeding tests, which bring out the superior motor mindedness of the boys, their love of action and hazardous adventure.

Three of the girls have a preference for English Literature to one of the boys; while four of the girls to none of the boys prefer music to some degree. One of the girls and none of the

boys choose drawing. All this would seem to indicate greater artistic sensibility among the girls.

b. and c. Answers to these questions give the following results.

Of the boys eleven were advanced in grade each year. Four failed at thirteen, three at twelve and one at ten. The average age of failure was 12.25.

Of the girls fifteen were advanced in age continuously. Four failed at twelve, one at ten, and one at eight. The average age of failure was eleven.

These results cannot, of course, be of an application any wider than the particular individuals that furnish them. They do, however, suggest the period of prepubertal retardation and stupidity noticed by so many. It will be noticed that the average for the boys exceeds that for the girls by a year and a quarter. This is somewhere near the difference one would expect on the supposition that failure to be advanced depended on developmental changes.

d. Six boys state that, while trying to recall a scene or imagine an historical event, they are entirely oblivious of their surroundings. Three are dimly conscious of surroundings, but say that they are undisturbed by them. Three say that they are bothered by their surroundings. Two say they are disturbed by noises and one by sights. Two say that they are entirely unable to concentrate, if there is any strange stimulus whatever in their environment.

Of the girls only one is able to entirely ignore her surroundings. Three, while conscious of environment, are undisturbed by it. Four say that they can forget their surroundings when the subject of thought is very interesting. Seven are hindered greatly in concentration by factors in the environment. Three say that concentration is impossible where there is a noise of any kind. Three are unable to tell whether they are affected by their surroundings or not.

These boys are evidently superior in capacity of giving attention to the girls. As a matter of fact they did not in practice attend any better, on the whole, but in cases of emergency or where there was great interest they certainly surpassed the girls. This corresponds with the fact that the boys have fewer but deeper interests than the girls. If attention be fundamentally motor, may not the superior motor training of the boys offer a partial explanation?

e. Fifteen boys say they have had day-dreams. In general it may be said that they dream of the present or immediate future and rarely of the past. Hunting, fishing and work are prominent in the subjects mentioned. Only one dreams of his future calling.

Nineteen girls say they have day-dreams. Ten say they dream of the future, five of future profession. One mentions adventure and another travel.

f, g and h. Seven boys plead guilty to having written poetry. Two wrote at about twelve years of age and one at thirteen. One began at fourteen and has done so continuously up to the present. Two say they write poetry right along. One does not remember when he passed through the poet stage.

Nearly all the boys' poems are lampoons or are of an otherwise alleged humorous nature. The following is characteristic:

THE COLONEL.

Who wears brown bloomers
The cheapest that can be bought,
Cheaper than he could import?
The Colonel.

Yass (the Colonel's father) says his things are extra fine,
From the turnip patch to the cucumber vine,
But one is extra, please bear in mind,—
That's the Colonel.

Who comes around when school is out,
Knocks at your door and gives a shout,
And tries to run, but is too stout?
The Colonel.

Who tries at school his geometry to shirk,
Because only one side of him will work,
And looks like a Sir David Kirk?
The Colonel.

One of the boys wrote poetry of an avowedly serious nature.

Five girls only admit having written poetry, and two of these say it only happened once or twice. One wrote at thirteen and two at fourteen. One, now twenty years of age, has destroyed all her poetry. Two of the girls wrote poetry, of a serious nature; the rest wrote poetry of a humorous or libelous turn.

i. Fifteen boys have had auditory hallucinations, while only ten girls have any recollection of such experiences.

It is certain that the hearing of imaginary voices has little or no connection with the habitual type of mental imagery. For example, the girls are somewhat more auditory than the boys. Again, all but one of the four boys who have not had auditory hallucinations have more or less definite auditory images. Of the eleven girls who have not had auditory hallucinations, two only appear to be deficient in auditory imagery, while with two of them auditory imagery predominates.

The apparent sex difference may very probably be due to a greater number of transgressions and a consequently more evil conscience on the part of the boys. At any rate it is the father's or mother's voice in tones of reproof that is most frequently heard.

j. k. and l. Five of the boys and six of the girls remember having had imaginary companions. The results as to age are unsatisfactory. One of the boys remembers having had the same companion for several years. Another imagined a different one for each day. The details are very meagre.

There seems to be a general correspondence between the results of this question and of the story test, in that on the whole those who have had imaginary companions have been above the average in the imaginative quality of their stories. At the same time, it should be said, that the most highly imaginative of the boys does not remember having had an imaginary companion.

m. Six boys state that their imagination is most active in the spring; one, in spring and summer; six, in summer; one, at Christmas time. To six the season is indifferent.

Of the girls, ten say that their imaginations are most active in the spring; one, in spring and summer; two, in winter; one, in winter with an open fire; to seven the season is indifferent. One of the last class says her imagination is like Vesuvius,—liable to break out at any time.

Spring and summer greatly preponderate over the other seasons for both sexes. Spring and summer are on a parity with the boys, while spring is much more favorable to the imagination in the case of the girls. These are the seasons when great physical activity is possible, or rather most easy. The boys, however, have some outlet for their activity in the winter, so that there is not so great a vernal outburst; while the girls, more confined indoors during the winter months, rejoice in the freedom of movement which spring brings, and, as a result of the changed affective tone and of possibility for motor expression, there results an outburst of imaginative activity. The heat of summer boys have ways of overcoming. They still find action possible and pleasurable, and imagination does not flag. With the girls different conditions bring about different results.

There is a possibility that the different physiological ages of the boys and girls may have something to do with the difference here. More of the girls have reached the age of puberty and more, therefore, will be affected by the universal awakening of spring. Among the boys spring is mentioned more often by the older boys.

n. Three boys state that their imagination is quickened

by music, pastoral scenery, twilight, darkness, and works of art; two by twilight and music; one by twilight and works of art; one by twilight and darkness; two by darkness and pastoral scenery; one by music; one by music, pastoral scenery, and works of art; one by works of art; one by music and pastoral scenery. Four say they are not affected by any of these agencies.

Of the girls, eight are affected by all of the agencies mentioned above; one by music; one by music, pastoral scenery and art; one by music, twilight and darkness; two by music, pastoral scenery and twilight; one by pastoral scenery; one by darkness and twilight; one by darkness and pastoral scenery. Five are unaffected by any of these agencies.

It will be seen that about 75% of both sexes and of the total number are affected by one or more of these influences, but that the proportion of girls *affected by all or nearly all* is much greater than with the boys. This is in line with the results of other tests, which show a greater spread of interest among the girls, and a greater specialization among the boys.

It is only a commonplace to state that music, pastoral scenery, works of art, twilight and darkness, strongly affect the emotional life. Is it not through the feelings and emotions that they influence the imagination?

o. and p. Thirteen of the boys state that, when they were between the ages of six and twelve, they were fond of fairy stories. Of these ten say that they still are. The older pupils have their full proportion in this class.

The results with the girls were identical. Fairy stories seem to have a perennial interest, and with respect to them there seems to be no appreciable sex difference. The liking for fairy stories seems to have no relation to imaginative activity.

Miss Chalmers found 24% of her female teachers, 48% of her female students, and 23% of her male students put fairy stories first in their youthful reading. This would seem to show some sex difference. It will be noticed that there is not much difference between the statements of the female teachers and the male students. (16.)

Lobsien found that almost 40% more girls than boys preferred fairy stories. These were, however, younger than the subjects of this study. Lobsien's figures indicate that the sexes approximate in this respect as they get older. (41:52.)

q, r, and s. Five boys say that at the period between the ages of six and twelve they preferred fiction to history. All of these still do. Four say that they preferred history and still do; but one of these said he did so because a novel was too long and had to be read at once, while a history could be read

in sections. One formerly preferred history but now prefers fiction.

Two have always preferred the history of their own country, but fiction of foreign lands. One prefers the exact opposite. One chooses fiction "with a touch of history." Three prefer the historical novel.

Ten boys prefer a true story, yet four of these say that they prefer fiction to history. This apparent contradiction is due to the dullness of the school history and its lack of well told narratives, combined with the fact that they are compelled to learn it. Many of the boys were very eager to get hold of the histories loaned by the teacher outside of the regular course.

Three boys say they prefer an untrue story to one equally good but true. Six state no preference.

Of the girls ten unequivocally preferred fiction to history. Of these eight still prefer it. The taste of one changed when she was about twelve years of age. Three others preferred fiction concerning foreign lands, but history of their own country. One prefers the history of great men or the historical novel. Two prefer the historical novel. One does not like either fiction or history. Four express no preference.

Of the girls twelve prefer true stories. Of these seven prefer fiction to history, probably for the reason mentioned above. One prefers a true story in case of an adventure. One prefers a story "half and half." One prefers a true story in most cases. One chooses the true story unless some one is represented as being in danger. Another says she prefers the story to be untrue if it is sad, as then she doesn't feel so badly. These last two statements tally with the results of other tests which show a predominance of emotional interests with girls.

Two girls choose the untrue story. Two express no preference.

It will be seen that no marked sex differences appear. The preference for the historical novel, or mixed fact and fiction, is quite prominent. Perhaps the psychological basis for this is the same as that sometimes given for wit,—a feeling of contrast brought about by the sharp juxtaposition of the real and the unreal. Or it may be a compromise between our passion for the true and real and our desire to get away occasionally from the workaday world.

The school history used by these pupils, one about like the average of historical text-books, is evidently condemned.

The choice by five of the subjects of the history of their own country but fiction concerning foreign lands is evidently based on a notion of relative values and indicates the influence of the moral judgment. Perhaps there is a moral element in the case of the girls who wish to avoid true stories which involve pain or suffering.

BOYS.

No.	FIRST CHOICE.	SECOND CHOICE.	THIRD CHOICE.
1	Buffalo Bill	Young Wild West	Robinson Crusoe
2	———	———	———
3	The Young Midshipman	The Fire at the Farm	Robinson Crusoe
4	Indian Chief	That Scholarship Boy	Fast in the Ice
5	The Stolen Bracelet	Kidnapped	Uncle Tom's Cabin
6	Treasure Island	An Inland Voyage	The Young Midshipman
7	Buffalo Bill	Try Again	Among the Malay
8	Evangeline	The Boy Knight	The Young Virginian
9	By Conduct and Courage	The Man from Glengarry	Frank Merriweather's Prosperity
10	Treasure Island	Joe's Luck	Life of Buffalo Bill
11	The Man from Glengarry	The Return of Sherlock Holmes	The Young Midshipman
12	Among Malay Pirates	Hi, Lo, Jack	The Jay from Maine
13	The Prospector	Mr. Midshipman Easy	Captain Eri
14	The Blazed Trail	Captain Eri	Mr. Midshipman Easy
15	The Prospector	Allen Quartermain	Mr. Midshipman Easy
16	The Indian Horror	What can a Woman do?	Robinson Crusoe
17	Man from Glengarry	Thelma	Silence of Dean Maitland
18	Ivanhoe	The Hound of the Baskervilles	The White Company
19	The Wild West	The Bradys	Buffalo Bill

GIRLS.

No.	First Choice.	Second Choice.	Third Choice.
1	Beautiful Joe	The Lamplighter	Ishmael
2	Ten Nights in a Bar-Room	Settlers in Canada	Gold Hunters of Alaska
3	The Wide, Wide World	———	———
4	Ishmael	Thelma	Berenice
5	Poor and Proud	Thorn and Orange Blossoms	Stepping Heaven Way
6	Wild Kitty	Mildred at Home	Jack Ward at Weston
7	With Clive in India	Ruyub the Juggler	Little Men
8	The Lamplighter	John Halifax, Gentleman	Ishmael
9	At the Mercy of Tiberius	Refugees	No Place Like Home
10	The Wide, Wide World	Oliver Twist	The Storm Children
11	St. Elmo	At the Mercy of Tiberius	Les Miserables
12	Ishmael	Black Beauty	Dora Thorne
13	Lena Rivers	Half the Truth	Elaine Delaine
14	Little Wives and Little Women	A Girl in a Thousand	Thorns and Orange Blossoms
15	Little Wives and Little Women	Wide, Wide World	Black Beauty
16	Esther Reid	Esther Reid Yet Speaking	Black Rock
17	Children of the Abbey	Lord Lynne's Choice	His Heart's Queen
18	In His Steps	Uncle Tom's Cabin	Only the Governess
19	Thelma	Out on the Pampas	Dora Deane
20	The Lost Heir	Little Women and Little Wives	Among the Malay Pirates
21	Gentle and Brave	Uncle Tom's Cabin	Three Nights in a Bar-room

In neither sex does there seem to be any relation between a preference for fiction and the possession of imaginative power.

2. Test of Interest by Favorite Authors.

The results of this test are best presented in tabular form. Each subject was required to write down three favorite books in the order of preference. (See pp. 173-174.)

The following table presents comparatively the choice of authors, as gathered from the above lists of books.

Authors.	Number of times chosen by boys.	Number of times chosen by girls.
Stevenson,	4	0
Stewart Edward White,	1	0
H. D. Northrop,	1	0
Sir Walter Scott,	1	0
Brady,	2	0
J. C. Lincoln,	2	0
H. Rider Haggard,	1	0
DeFoe,	2	0
Burt L. Standish,	1	0
Grey,	1	0
Longfellow,	1	0
Mrs. M. L. Rayne,	1	0
Emma Leslie,	1	0
G. A. Henty,	9	5
Marryat,	3	1
Ralph Connor,	5	1
Conan Doyle,	3	1
Mrs. H. B. Stowe,	1	2
Marie Corelli,	1	2
Laura Saunders,	0	1
Mrs. E. D. E. N. Southworth,	0	4
Maria Cummings,	0	2
A. J. Evans Wilson	0	2
Elizabeth Wetherell	0	3
Mary Holmes,	0	2
Louisa M. Alcott,	0	4
Pansy,	0	2
Martha Finley,	0	1
Mulock,	0	1
Anna Sewell,	0	2
Antoinette Graham,	0	1
C. M. Breame,	0	1
Rosa N. Cary,	0	1
Mrs. Georgie Sheldon,	0	1
Bertha Cobb,	0	1

Authors.	Number of times chosen by boys.	Number of times chosen by girls.
Thesba Stretton,	0	1
R. M. Roche,	0	1
Meade,	0	1
Sheldon,	0	1
Sylvanus Cobb,	0	1
Victor Hugo,	0	1
Charles Garvice,	0	1
Charles Dickens.	0	1

The contrast between the two lists of favorite books is very evident, especially between the columns of first favorites.

With but few exceptions the books chosen by the boys deal with physical activities of various sorts. Religion, love, home-life, are practically ignored. Courage and daring are almost the only moral qualities which appeal to the boys. The emotions concerned are those connected with quick and daring action.

The girls, on the other hand, choose books which appeal to the emotions, especially the sombre emotions, as pity; to the social, religious, and moral interests. On the whole, the boys' list appeals to one as more wholesome.

In the girls' list ten male authors are represented: Henty having five books, the others one each. In the boys' list are found but four female authors, with one book each. The girls' list contains 29 authors; the boys 19. In both respects the boys' tastes are less catholic, or rather, perhaps, more specialized.

Lobsien, in his "Kind und Kunst," obtains similar results. He had his subjects write down the names of the books they had read and also the names of their favorite books. In both lists he finds that the girls surpass the boys considerably in the number of books. (44:61.)

He showed his subjects a picture of a boy with a bird and its young ones. The girls were *touched* because the boy does not harm the bird, because he looks so *pitifully*, because the mother bird begs so hard for its poor young ones, because they *are not able to see the anxiety of the mother bird*. The boys are rather enthusiastic because the little bird has *courage*, that it defends the little ones from the big boy, that it does not fly away, that it dares to abuse the enemy. (41:85.)

In the same picture the girls see a bird begging; and the boys, a bird abusing. The difference is evidently one of habitual apperception, based probably on the fundamental emotional life.

The following is his list of favorite books, leaving out those which received only one or two choices and do not seem sig-

nificant. The figures for the different grades will be left out except where they seem specially significant. The figures for the girls are to be found on the right; for the boys on the left.

	I	II	III	IV	V	Summe	I	II	III	IV	V	Summe
Robinson						20						28
Indiangeschichte	16	11	7	3	2	29						0
Realienbuch						15						0
Bibel						4						12
Märchenbuch	3	13	18	25	22	81	12	17	33	28	28	118
Sagen						4						0
Burenkrieg						3						0
Seeabenteur						4						0

The German children are younger than the children or rather youths of this study, so we cannot expect to find exact correspondence. It will be noticed that Robinson Crusoe is a greater favorite with the former. It might seem surprising that the girls here surpass the boys. The liking is, however, probably based on different interests, the boys probably on love of adventure and travel to distant countries, the girls, perhaps, to their pity for one left alone. It will be seen that this is a strong feminine trait. "Seeabenteur," it will be noted, appeals to four boys, but none of the girls.

The love of the "Märchenbuch" is stronger with the girls than the boys and decreases much faster with age in the case of the latter. Is interest in the occult, mysterious, the differentiating factor?

The love of "Indiangeschichte" increases as preference for "Märchen" decreases with the boys. The girls show no liking for "Indiangeschichte." It is the same with "Sagen," "Burenkrieg," and "Seeabenteur."

Three times as many girls as boys prefer the Bible.

In general it will be seen that the interests of the boys are predominantly motor, and strenuously so. The love of "Realienbuch" would also seem to be characteristic. (41:52.)

Lillian H. Chalmers, in her question as to the favorite literature in childhood, got the following results, leaving out non-essentials. (16.)

Female Teachers.		Female Students.		Male Students.	
Favorite Subjects	%	Favorite Subjects	%	Favorite Subjects	%
Natural Stories	42	Fairy Stories	48	Adventure Stories	40
Fairy Stories	24	Natural Stories	36	Fairy Stories	23
Adventure Stories	13	Poetry	5	Natural Stories	12

Titles of Stories Selected by the Boys.

Subjects.	No.	First Story.	Second Story.	Third Story.	Totals
	1	Driven from Home	Mining in Colorado	A Runaway	
	2	A Wreck at Sea	A Hunt	A Boat Sail [Afloat	
	3	The Shipwreck	When Tom was at War	The Man that was sent	
	4	A Perilous Adventure	A Narrow Escape	The Burning House	
	5	Trapping the Bear	Hunting Moose	Down South	
	6	Fishing on the Moon Dam Rapids	Hunting the Tiger	The Voyage	
	7	Hunting	Games	———	
	8	Moose Hunting	———	———	
	9	Fishing Excursion in Blackwood Lake	The Dutch and French War	The Wreck of the Petitcodiac	
	10	The Midnight Wreck	The Notable Train Robbery	The Murder of Mayor Brown	
	11	With Sir John Moore in Spain	A Week in the Woods of New Brunswick	Captured by Indians	
	12	Fishing in the Salmon River	Lost in the Jungle	Back from War	
	13	A Moose Hunt	Fishing	The Country Fair	
	14	A Stag Hunt	A Raid on the Hurons	A Lucky Strike	
	15	Fighting Unknown Worlds	Adrift	The Great Chief	
	16	Hunting	Fishing	A Picnic	
	17	The Bore (Tidal Wave)	The Advance of Time	A Canoe Trip	
	18	Our Great Fright	The Swimming Match	Tenting	
	19	Fishing	Hunting	A Boat Sail	
Hunting		6	5		11
Fishing		4	2		6
Sea		3	1	3	7
Narrow Escapes		2	1		3
War		3	3	3	9
Left Alone or Lost		—	1	1	2
Picnic [etc.,				1	1
Canoeing, Boating, Tenting,				4	4
Crime			1	1	2
Unclassified		1	4	5	10

Titles of Stories Selected by the Girls.

Subjects.	No.	First Story.	Second Story.	Third Story.	Totals.
	1	Rescued	A Strange Adventure	Lost and Found	
	2	The Lost Found	The Prisoner's Escape	A Journey in a Wilderness	
	3	The Man Attacked by Wolves	The Lost Child	The Dishonest Man	
	4	The Wreck	How Helen Spent her Holidays	The Soldier's Return	
	5	Caught by Indians	Lost in the Woods	Boat Sailing	
	6	An Adventure	The Troublesome Crow	A Trip to the Country	
	7	Lost on the Farm	Harry's Escape	Dora Grey	
	8	Lost at Sea	A Strange Adventure	Saved	
	9	Lost in a Storm	Chased by Robbers	A Visit to a Foreign Land	
	10	The Stolen Treasure	At the Picnic	Lost in the Woods	
	11	With the Mermaids	In the Enchanted Castle of the Woods	A Trip through Fairyland	
	12	Shipwrecked	"Winnifred"	The Landlord's Daughter	
	13	Alone	Gladys' Adventure	Lost on the Prairie	
	14	Out in the Cold, Cold World	A Hunting Expedition	A Voyage at Sea	
	15	Among the Mountains	A Hunting Expedition	By the Seashore	
	16	A Day at the Mount	A True Hero	An Excursion	
	17	A Tour by Sea	Weary Gleaners	Fishing Excursion	
	18	Success	Out in a Desert	Thunderstorm	
	19	True Courage	A Battle for Life	Victor Somerville	
	20	Hunting	The Brave Girl	Canoeing Party	
	21	Lost in the Mountains	The Lost Child	Left alone without a Mother	
Hunting		1	2		3
Fishing		0	0	1	1
Sea		4		1	5
Narrow Escapes		1	1		2
War		1			1
Left Alone or Lost		7	4	5	16
Holiday or Picnic		2	2	3	7
Canoeing, Boating, Tenting				2	2
Crime		1	1		2
Supernatural or Mysterious			3		3
Unclassified		5	8	9	22

The motor character of the boys' interests is here evident. It is hard to explain the preponderance of nature stories in the girls' selections. The entire absence of adventure stories from the girls' list may have something to do with it.

3. Tests of Interests by Titles of Stories.

In this test each subject was asked to write out a list of three titles for stories they would like to write. This was given after they had written two series of stories, in the expectation that stories would be written with these titles.

The results are presented above in tabular form (pp. 178-179): The main points gleaned from these tables may be stated thus:

1. The boys' interests centre largely about hunting, fishing, war and the sea. Under these rubrics the boys have 33 titles, the girls, 10.

2. The girls' interests centre about subjects under the rubrics lost, left alone, picnics. Here they surpass the boys 23 to 3. Other stories should be classed with this, such as those headed "Escaped."

3. The girls have a tendency to use proper names of persons as titles for their stories. In these lists they do so six times, the boys, once.

In general the boys' interests centre about action. Bravery is the moral quality that appeals to them. The girls' interests centre about such emotions as pity and joy after sorrow, about moral questions and social pleasures. The boys are much more specialized than the girls.

For the purposes of comparison a list of the titles of stories actually written, throughout a period of six months, and on subjects chosen by the pupils themselves, is given below:

	Subjects.	Boys.	Girls.
1.	Hunting,	21	3
2.	Fishing,	11	3
3.	Sea,	6	3
4.	Narrow Escapes,	5	1
5.	Moral,	2	4
6.	Pioneering,	2	1
7.	Heroism,	2	3
8.	Career,	2	1
9.	Accident,	2	0
10.	Mining,	2	0
11.	Animals,	2	3
12.	Games,	1	0
13.	Left to own resources,	2	6
14.	Lost or stolen child,	1	8

	Subjects.	Boys.	Girls.
15.	Robbery,	1	6
16.	Travel,	1	4
17.	Other Activities,	5	0
18.	Picnic,	0	11
19.	School,	0	2
20.	Holidays,	0	3
21.	Clothes,	0	(3)
22.	Mysterious and Supernatural,	0	6
23.	Love,	0	1(1)
24.	Other Activities,	0	7(1)
25.	Other non-active Subjects,	0	1

The predominance of the girls under rubrics 5, 13, 14, 15, 18 and 23 should be noted as that of the boys in 1, 2, 3 and 4. The girls wrote more on travel, but it was eminently respectable and civilized travel.

Lobsien found in answer to his question,—"Where would you like to make a journey?" that no trip was too long for the boys, while the girls, except in the lower grades, limited themselves to the home province. (41 : 96.)

4. Tests of Interests by Means of Favorite Poems.

Once a week for eleven weeks a number of selected poems were read to the subjects, and each one required to choose a favorite. They were encouraged but not compelled to give a reason for the choice made, as many judgments were simple intuitions entirely inexplicable by the subjects themselves.

The results will be given in tabular form with notes where necessary under each table. The tables will be numbered alphabetically.

A.

	Sweet and Low, Tennyson.		The Friar of Orders Gray. Percy.		The Reaper and the Flowers. Longfellow.		The Bells of Shandon. Mahoney.	
	Number of Choices.	Average Age.	Number of Choices.	Average Age.	Number of Choices.	Average Age.	Number of Choices.	Average Age.
Boys	1	18	8	14.8	1	19	2	16
Girls	0	—	10	15	9	16.2	0	

It will be noticed that the girls choose either the second or third poems, one a love story and the other a story of death. "The Friar of Orders Gray" was also the favorite of the boys. Those who gave a reason for their choice said it was because it

had a good end. Those who chose the first and fourth poems did so on account of their rhythm.

B.

	The Smack in School. J. W. Palmer.		The Sleeping Beauty Departs. Tennyson.		Robert of Lincoln. Bryant.		Hohenlinden. Thos. Campbell,	
B	Number of Choices.	Average Age.	Number of Choices.	Average Age.	Number of Choices.	Average Age.	Number of Choices.	Average Age.
Boys	5	14.6	1	14	5	16.2	4	17.2
Girls	6	15.3	2	16	2	14	7	16.5

The humor of "The Smack in School" accounted for its popularity with the boys. "Robert of Lincoln" also appealed to the boys as humorous. The boys who chose "Hohenlinden" did so because it was martial, the girls because of its literary style or the element of sadness.

"The Smack in School" appealed to the girls partly on account of its ludicrousness. The sexual element probably, however, had some effect. The average of the ages of the girls choosing it is greater than that of the boys absolutely and of course much more so physiologically.

Only the younger girls chose "Robert of Lincoln." They did so because it was funny. Their age average is two years less than that of the boys who chose the same poem.

C.

	She Walks in Beauty. Byron.		The Pauper's Drive. Thomas Noel.		A Mighty Fortress is our God. Luther.		The Yarn of the Nancy Bell. W. S. Gilbert.	
	Number of Choices.	Average Age.	Number of Choices.	Average Age.	Number of Choices.	Average Age.	Number of Choices.	Average Age.
Boys	1	19	2	15	0		12	15.6
Girls	1	15	6	15.6	2	17.5	8	15.6

Both sexes showed a decided preference for the fourth poem, on account of its humorous character.

The girls who chose the second poem did so because it was pitiful, or because it taught "to be kind to the poor." Of the two boys who chose this piece, one did so because it was "true and funny," the other because it was "sort of comical." This

is characteristic. Two girls, whose average age was 17½ years, chose Luther's hymn.

D.

	For a' That and a' That. Burns.		To Heaven Approached a Sufi Saint. Rumi.		Bingen on the Rhine. Caroline Norton.		The Jackdaw of Rheims. Richard Harris Barham.	
	Number of Choices.	Average Age.	Number of Choices.	Average Age.	Number of Choices.	Average Age.	Number of Choices.	Average Age.
Boys	1	19	0	—	8	15.1	5	15.2
Girls	0		0		16	15.7	2	16

The largest number of choices, by both boys and girls, is given to Bingen on the Rhine, and for the same reason in all cases, *i. e.*, because it is pathetic. It is noteworthy, however, that while 8 out of 14 boys chose this poem, 16 out of 18 girls do so.

The first appealed to one boy, one of the oldest. Those who chose the Jackdaw of Rheims did so because it was "funny." The religious poem got no votes.

E

	Thanatopsis. Bryant.		The Bells. Poe.		The Raven. Poe.		Echo. Saxe.	
	Number of Choices.	Average Age.	Number of Choices.	Average Age.	Number of Choices.	Average Age.	Number of Choices.	Average Age.
Boys	1	18	0		3	16.6	10	14.7
Girls	3	16.3	1	17	7	15.8	5	14.6

The number of boys who chose the humorous poem, "Echo," is noteworthy. As would be expected from previous tests, "The Raven" is the favorite with the girls. One girl said it gave her a funny, weird feeling. The other girls said it gave them a feeling they could n't describe.

The boys who chose it could not give an explanation. Judging by the smiles on their faces while it was being read, it appealed to them as being humorous.

One girl chose "Thanatopsis" on account of its moral teaching. The other two gave no reason.

As shown in table F, the girls seem to appreciate most the craft of Thorberg Skafting. The literary form may, however,

F.

	Rabbi Ben Levi. Longfellow.		Thora, Longfellow.		The Build'g of the Long Serpent. Longfellow.	
	Number of Choices.	Average Age.	Number of Choices.	Average Age.	Number of Choices.	Average Age.
Boys	4	17.2	6	14.4	6	14.1
Girls	3	15	3	15.3	12	15.3

have been the controlling factor. None were able to analyze the reasons for their choice.

The war-like atmosphere probably accounts for the boys' choices of the last two poems.

G.

	The Skeleton in Armor. Longfellow.		The Slave's Dream. Longfellow.		The Norman Baron. Longfellow.	
	Number of Choices.	Average Age.	Number of Choices.	Average Age.	Number of Choices.	Average Age.
Boys	6	15.5	3	16	6	15.3
Girls	3	14	8	15.7	9	16.2

The preference of the boys for the first and the third poems is consistent with results from previous tests, as also that for the second and third by the girls.

H.

	The Goose. Tennyson.		Godiva. Tennyson.		Amphion. Tennyson.	
	Number of Choices.	Average Age.	Number of Choices.	Average Age.	Number of Choices.	Average Age.
Boys	10	14.3	5	16.4	2	19.5
Girls	0		11	15.9	6	16.3

The boys prefer the first because it appeals to them as humorous. Only two of the boys chose the third, the fantastic and light humor of which appeals to six of the girls. Godiva, as would be expected, is the girls' favorite. The figures for average age perhaps is worth noticing.

I.

	The Bridge of Sighs. Hood.		The Song of the Shirt. Hood.		How the Sailor Got his Bowlegs. Hood.	
	Number of Choices.	Average Age.	Number of Choices.	Average Age.	Number of Choices.	Average Age.
Boys	3	17.6	1	20	14	14.3
Girls	6	16.1	7	16	7	14.7

Nothing could be clearer, in the light of other tests, than the general meaning of these results. Thirteen of the girls to four boys chose the first two poems which are pathetic in their nature. Fourteen boys to seven girls chose the third. Both the boys and girls who chose the third average in age much less than the other subjects, while the boys who chose the first and second are older than the girls who do so.

J.

	Hervé Riel. Browning.		Incident of the French Camp. Browning.		The Glove. Browning.	
	Number of Choices.	Average Age.	Number of Choices.	Average Age.	Number of Choices.	Average Age.
Boys	12	14.9	3	16	1	18
Girls	8	14.5	8	16.7	2	16.5

"The Glove" was read only to the incident of throwing the glove in the lady's face. This displeased both boys and girls. The boys liked Hervé Riel on account of its action, the girls, on account of the hero's character. That more girls than boys chose the second is consistent with past results.

K.

	Belts. Rudyard Kipling.	Mandalay. Kipling.	Clampherdown. Kipling.
	Number of Choices.	Number of Choices.	Number of Choices.
Boys	9	6	0
Girls	10	1	7

"Belts" and "Mandalay" pleased the boys immensely. In the latter the stanza describing the meeting of the "Burmah girl" and her soldier lover, and the stanza beginning "ship me somewhere east of Suez," met with most favor. The attraction of the piece to the boys seemed to consist in its humor and unconventionality.

Considering its fine rhythm, it is somewhat surprising that only one girl chose "Mandalay." The whole poem seemed shocking to them, especially the parts the boys liked. Their choice of the war-like poems was therefore compulsory. The touch of humor in the first secured for it the larger number of choices.

The only new point of importance brought out by this series of tests is the importance of the interest in the humorous in both sexes, but especially among the boys. Even in this field, among the boys, the humor must be of an active type with human interest. The humor preferred by the girls is of a more refined nature. In both sexes the strongest sense of humor is found usually in the younger subjects.

The attractiveness of the sad and pitiful for the girls is well brought out, as well as their moral interests. Where the boys betray any interest in these directions, they are the older boys.

The general conclusion of all the interest tests may be summed up as follows:

The interests of the boys are predominantly active, embracing such subjects as hunting, fishing, seafaring, war, etc. The boys' sense of practical humor is strong.

The interests of the girls are largely emotional, centering especially about such emotions as pity and fear. They have strong moral and social interests. They have a leaning toward the mysterious and supernatural. They have a strong sense of humor, somewhat refined and fanciful. They do not show the same specialization of interests as the boys. Their motor interests are not of so strenuous a type. The picnic figures largely in their lists instead of the hunting and fishing of the boys.

Many have noted the motor interests of boys. Sully says that "Robinson Crusoe is probably for the boyish imagination, more than anything else the goer and the doer." (59:26, 27.) Hall and Smith, in their study of "Curiosity and Interest," state that "nearly twice as many boys as girls, according to the present data, show special interest in mechanics. . . ." (33:335.)

Miss T. L. Smith writes: "With the average healthy boy from ten to fifteen a large part of his day dreams appear to be connected with sports and athletics. . . . Dreams of hunting, fishing, swimming, being a cowboy and living on horse-

back, travelling in unexplored countries are characteristics throughout the teens. (54:472.)

And again: "Girls dream of travel as much as boys, but when details are given, they are of comfortably civilized travel and rarely include elements of adventure." (54:472.)

A parallel exists between the interests of our subjects and their actual activities. In the playground the boys were always jumping, running, wrestling, playing ball and indulging in other very active games. The girls would walk together arm in arm, play ball with a soft rubber ball, or engage in some other form of mild activity, when not talking over lessons or some other topic. On holidays the boys went hunting or fishing whenever they could. The girls were fond of picnics, fresh water pearl fishing, etc.

Lobsien, in his "Kind und Kunst," declares that the boys prefer games which demand courage, skill and strength, the girls, those which are soberly ordered. (41:97.)

In "Showing off and Bashfulness as Phases of Self-consciousness," Hall and Smith found that "differences of sex, so far as they appear, seem to lie in the superior motor activities of boys, though how far this is due to inherent sex differences or to cumulative effects of environment is uncertain. Boys show off chiefly by exhibitions of muscular activity; girls by dress and accomplishments; boys brag of what they can do, girls of their possessions." (34:32.)

We have seen that the activities of the girls were less strenuous than those of the boys. Perhaps it would be a better statement of the sex difference to say that boys delight in activities which require the exercise of the massive muscles as well as the others, while the girls engage in activities which mostly involve the accessory muscles. In this regard the above mentioned study contains the following passage: "The products of training on the finer accessory and muscles and movements are almost a class by themselves for our purpose. Imitation on the part of children and the young are often a form of flattery that is abject and gross. *Here girls are more plastic than the boys*, more apt in putting on and off vivacity, languishing moods, drawling speech, fine ladyism, superior ways, accents and airs of many kinds; their penmanship, pronunciation, choice of words and style are all subject to affectation." (34:33.)

We have, then, a certain parallelism between the physical activities and the motor interests natural to youth. Dr. Hall says that "interest and play are one and inseparable as body and soul." (32:I, 233.)

A sort of reciprocal relation seems to exist between physical activities and the emotions. Great physical activity seems to

go with comparative poverty of emotions, and *vice versa*. The emotions which appeal to the boys are those which accompany physical action, of which joy in being a cause is most prominent. (30 : 384, 385.) (*Cf.* also 33: 227.) This emotion does not tend to inhibit action. The emotional life of the girls, while including this, includes many others, such as pity, fear, etc., which may be aroused without the intervention of activity, and which, in great stress, tend to inhibit action. The whole question of interest is bound up with the emotions. There is no particular feeling of interest, although interest is at bottom affective. There are interests. Every object which inspires feeling in the subject is an interesting object, positively or negatively. That is positively interesting which gives rise to a feeling which one would like to experience again. The girl, with her richer emotional life may find gratification without great physical activity. The boy, with his emotional poverty, specializes on those of which he is most capable, *i. e.*, those arising from active exploitation of the physical self.

The theory of interest advocated here is of course not universally accepted. Arnold, in his article on the psychology of interest, shows clearly that the weight of psychological opinion leans toward the view that interest is essentially affective.

This he himself denies. To him it is essentially conative or cognitive. Feeling is regarded as, where present, simply a concomitant. Conation, however, he defines as "felt body attitude tending serially to realize a future situation." (4 : 305.)

But a bodily attitude is not a psychical but a physical phenomenon. To be intelligible psychologically, the phrase would have to be translated into something like this—"the feelings that go with body attitude." This of course makes interest essentially affective.

The comparatively dynamic character of boys' interests and emotions, and the comparative static character of girls' interests and emotions has been too generally observed to need further amplification. It is due in part no doubt to the effects of social environment, but that it has a physical and physiological basis is undoubted.

Thomas finds associated in males high specific gravity, red corpuscles, plentiful hæmoglobin, and a katabolic disposition. In females he finds a lower specific gravity (except in old women), fewer red corpuscles, less hæmoglobin, and an anabolic disposition. (61 : 33.) He also quotes Wagner and Huschke to show that the brain of woman is in a more or less embryonic condition. (61 : 19.) If emotional psychic processes are more original than cognitive processes, this comparatively embryonic condition of the brain might explain in part the greater emotionalism of the sex. Thomas quotes Ranke to show that the female sex has relatively longer bodies, and

therefore shorter limbs, *i. e.*, poor conditions for the expenditure of energy through motor action. (61 : 21.) This greater length of body coupled with greater abdominal prominence and greater volume of the sexual organs, on one commonly accepted theory of the emotions, would account for the emotionalism of females.

5. Memory Tests.

These were not conducted as absolute tests of memory, but were meant simply to give data for comparison of memory power between different sexes and subjects. They were relative memory tests. In the first group (a) passages from various authors were written on a blackboard, and kept covered until the beginning of the test. A definite time was given for committing each passage to memory. Then each subject was required to write down what he or she could remember in the words of the selection if possible, if not in the subject's own words. In the second group (b) passages were read over carefully to the subjects a certain number of times. In the third series (c) eight hours a month were given for drawing some map in the presence of the writer. The best map produced by copying from the book was kept. Then each subject was required to draw the map from memory. The two maps from each subject were then compared with one another and with the maps of others.

a. The results of this test as they related to sex differences of the subjects tested are given below.

	Average percentage of correct words.	Average percentage of words left out.	Average percentage of words replaced by equivalents.	Average percentage of words replaced wrongly.	Average percentage of words transposed.	Average percentage of words inserted.
Boys	71.5	20	4.4	4	0	.2
Girls	78.5	16	2.2	.3	0	3

This seems to show a slight superiority of the girls over the boys. A comparison of individuals shows no connection whatever of memory with imaginative power.

b. Below are similarly given the results of these tests.

The girls very considerably surpass the boys in verbal memory in these auditory tests. The boys, however, are fully equal in their memory of the ideas contained in the passages selected as will be made evident by adding the figures in the first and third columns. Perhaps the superior verbal memory for spoken words, possessed by the girls, is connected with the fact that they surpass the boys in auditory imagery.

	Average percentage of correct words.	Average percentage of words left out.	Average percentage of words replaced by equivalents.	Average percentage of words replaced wrongly.	Average percentage of words transposed.	Average percentage of words inserted.
Boys	17.4	18.9	63	—	.3	1
Girls	37	20.7	40.9	.5	(.5)	1

c. For the purpose of evaluation the maps were divided into eight groups. Those in the lowest group were valued from 20 to 30, and so on up to 100.

On maps drawn from book the boys averaged 72 and the girls 76. On maps from memory the boys averaged 58 and the girls 65. The girls not only surpass the boys in both, but there is less difference between their copied maps and their memory maps. Whether this is due to superior eye mindedness on the part of the girls, or inferior interest and attention on the part of the boys, is a question. The superior training of the girls in accessory movements and muscles may have something to do with this. Finally, the girls seem to be superior in memory to the boys. Differences between the sexes or individuals of the same sex seem to have no connection with differences in quality of the imagination. Binet reached similar results in his "Étude Experimentale de l' Intelligence," quoted above.

6. Tests of Mental Imagery.

These were conducted on the lines of Lemaitre's study of mental imagery in children, and were confirmed by repeated questioning and observation extending over six months. The general results are given in the table below.

	Visual imagery predominant.	Auditory imagery predominant.	Kinæsthetic imagery predominant.	Visual imagery in second position.	Auditory imagery in second position.	Kinæsthetic imagery in second position.	Visual imagery in third position.	Auditory imagery in third position.	Kinæsthetic imagery in third position.	Equilibrated.	Auditory and Visual balanced in first place.	Visual and Kinæsthetic balanced in first place.	Auditory and Kinæsthetic in second place.	Auditory and Visual in second place.
Boys	8	1	4	1	4	3	2	1	1	5	1	0	3	1
Girls	15	2	0	6	9	4	0	2	2	0	1	2	5	0

The girls excel in visual and auditory imagery; the boys, in motor. The boys afforded five examples of the equilibrated type; the girls none. It is likely, however, that in some of the five marked equilibrated, the motor images really predominate. Owing to the difficulty of introspection in this field, especially for young and unpractised subjects, it was impossible to get data sufficiently definite to warrant giving kinæsthetic imagery the first place in these cases. These tests were aimed to determine the order of importance of the imagery as habitually used, not the ability voluntarily to control it.

The predominance of the boys in the motor imagery is probably due to their physical activity. Even among the boys, those most active are almost without exception those which have the clearest kinæsthetic imagery. Of the six most active boys, two belong to the equilibrated type, in two the Kinæsthetic imagery predominates, and in one it h olds the second place. The same relation holds with the girls in less degree.

7 and 8. Succeeding these somewhat detailed preliminary tests, came the imagination tests proper, a series of stories written by the subjects of this investigation. They were fourteen in number, divided into two groups, viz., one of five, the subjects of which were chosen by the subjects, and one of nine, in which the subjects were presented with pictures upon which the stories written were to be based. Stern and others have made use of pictures in a similar way as a test of the imagination. The method here corresponds to the "Bericht" of Stern's stories. The "Verhör" was not used consistently throughout, but only to throw light upon the character of the materials used in the stories. (68.) The stories of both series were analyzed according to (a) their use of names of persons or animals, (b) is the use of the first person, (c) use of details of pictures in the second group, (c) imaginative quality, (d) unity, (e) number of pages, (f) explanatory power, (g) religious, moral and social elements, (h) other elements.

The pictures employed in the second group were as follows:

1. The Runaway. Dupré. Large level field, with boy chasing a cow in foreground. Women milking in background, with several cows standing and lying around.

2. The Moose. In the foreground is a small stream, on the bank of which is a man crouching behind an upturned birch canoe. Beside and around him are his camping outfit. He is reaching for his rifle. At about the middle of the picture is a large bull moose standing in a mass of low bushes and looking toward the canoe. In the background is the forest.

3. Indian on Broncho. In the left foreground, on an eminence, an Indian in war paint and feathers, rifle in hand, seated on a broncho with large brown and white spots. The

ground slopes away gradually to right background, where are the indistinct figures of three people.

4. Saved. In foreground a shelving beach. A large dog sitting down with a child across its front paws. The remains of a wharf on the edge of the beach. Sail in background. Seabirds flying about in distance.

5. Adrift. In foreground a man and boy on a raft adrift on the ocean. The man is waving a signal with his left hand while he supports the boy with his right. A sail in the distance.

6. Friend or foe. Burton Barber. In foreground, a toad. Watching it, a little girl on her hands and knees, with a cat and dog on either side. House in background.

7. Mouse-trap. A man clad in night shirt; hair standing on end; holding up one foot on the great toe of which is a mouse-trap. From the hole of the mouse-trap opposite the toe protrudes the hind quarters and tail of a mouse.

8. End of journey. C. B. D'Entraigues. In foreground, a brook from which a horse is drinking. On his back are two boys. Beside stands a young woman without boots or stockings.

9. Stag at Bay. Landseer. In foreground, a stag beset by dogs, one of which is struggling on his back. A sheet of water in the background. A sullen sky.

During the writing of the stories the pictures were kept in full view of the subjects. No opportunity was given for conversation or comparing notes.

(A.) Use of Proper Names.

In the series of five stories, the subjects of which were selected by the subjects, each one for himself or herself, there were 68 written by boys. Of these, 23 used the names of persons, none used the names of animals, and 45 used no proper names. None of the boys used proper names as the titles of stories.

In the same series the girls had 77 stories. Of these 39 used names of persons while 38 did not. In five cases proper names were used as the titles of stories and two other titles contained proper names. These titles were as follows: Rhoda, Grace Darling, Lord Portmercy's Daughter, Nellie's Convulsion, Helena, Jack Black, and Snowdrop.

In the series where the subjects were suggested by pictures, the boys had 138 stories. Of these 31 used names of persons and 16 the names of persons and animals. No proper names were found in 79 stories. Three used proper names in titles. These titles are, Fido and the Toad, Jessie's Toad,

How Billy Lost his Toe. The percentage of those using proper names rose from 33 in the first series to 42.7 in the second.

In the second series the girls have 159 stories. Of these 51 use the names of persons, 16 the names of persons and animals, and 4 the names of animals. Proper names are used for the titles of six and in the titles of nine stories. These are,—Fly-away, Bill Riley, Jack, How Carlos Saved his Master's Life, Faithful Fido, Daisy's Pets, Helen's Friends, Laura's Pets, Freda's Pets, Helena's Toad, Mr. Jones's Investment, Brownie, The Three Joneses.

We would naturally expect to find less interest on the part of the subjects in the second group than the first, and consequently a decrease in the manifestation of any impulse to name, since with youth as with primitive people interests centre about or tend to centre about individuals. This we find to be the case with the girls, whose percentage falls from 50 to 44.6. With the boys, as we have seen, the reverse happens. For this there are two reasons, one of which will appear when we come to consider the use of the first person. The other possible partial explanation is this, that in the first series the motor interests of the boys had full scope, while in the second, the presentation of the picture throws kinæsthetic imagery into the background, while not visual images but direct vision takes its place. As the sight of individuals habitually calls up their names, so the sight of the figures in the pictures tend to suggest names. The girls, owing to the weakness of their kinæsthetic and the predominance of their visual imagery, would not be so strongly influenced by this tendency as the boys. It contributed to counterbalance the effect of loss of interest.

Even in the second series the predominant interest of girls in names of individuals is stronger than that of the boys. This is seen clearly in the use of proper names in titles. In the two groups there are twenty such cases in the girls' stories and only three in the boys'. In the story on the picture entitled "Friend or Foe," three of the girls name the dog, the cat, *and the toad*, as well as the child. One names two toads. This is in marked contrast with the practice of the boys.

This interest in names means more than an interest in individuals. There is interest in names as names, witness the peculiar character of some used by the girls. They like fancy names, names with titles, and picturesque names. They even invent names. One girl calls her heroine, Lady Barbarity. Bill or Jim is usually sufficient for the boys. The family name is rarely used, titles never.

Like that of primitive man the thinking of boys and girls is particular rather than general. Children are more interested in feats of heroes than in the advance of nations. Fairy stories,

folk tales, myths are concretionary in character, with some great name as the centre of the concretion. (63 : 278.)

Names have a sort of mystical power to primitive races. Davidson writes: "It is difficult for us, moderns, to realize how concept and sensible symbol were related to each other in the mind of the savage. We may perhaps say that, for him, the symbol, instead of representing the object, contained its essence or concept. . . . . In uttering the name of a thing, he was breathing forth its essence, for good or for evil. . . . (19 : 19.) Davidson quotes Sydney F. Smith's statement that "sacramental words, according to Catholic doctrine, are words of power." (19 : 18.) All this survives even among enlightened peoples to the present day, in an emasculated form. The ceremony of naming the baby is still a momentous one, and differences as to the name to be chosen have led to the divorce court.

With young children a person's name is not clearly distinguished from the person. The writer knows a child of four years and a half who, since his second year, has persisted in asking "who is his name?" On one occasion in speaking of an absent person, he remarked, "I can't remember her to see her, but I can remember her to hear her," meaning that he could remember the name.

Stern finds that girls give a larger place than do boys in their stories to persons and their actions, in the proportion of four to three. (68 : Vol. I, p. 408.)

(B). The Use of the First Person.

In the free choice series 31 out of 68 boys' stories were written in the first person. In the second series 29 out of 138 were written in the first person. This use of the first person, then, by the boys, is in a general way inversely proportional to the use of names of persons. Where the boy is greatly interested he tends to write in the first person, while names of others take a secondary position. So in the first series we find a greater use of the first person than of proper names, while in the second we find a greater use of proper names than of the first person. A partial explanation, then, of why the boys in the second series increased their use of names, while the girls did not, may be that with decreased interest, the boys allowed other people to be the heroes of the stories. In both sexes when interest is at the lowest point, neither proper names nor the first person is used, but the story is written impersonally. That difference in interest is the true explanation is shown not only by contrast between the two series, but by comparison of results within the second series. In this the only picture which directly suggests hunting, is the moose picture. Of the fifteen

boys' stories written on this picture, *eight* were written in the first person, while only two contained proper names.

In the first series, out of 77 girls' stories, only twelve were written in the first person. Out of 159 in the second series, only seven were written in the first person. Here, also, the use of the first person drops with decrease in spontaneous interest. That 60 boys' stories out of 206, and only 19 girls' stories out of 236 were written in the first person, is significant.

Taking together the results of tests a and b, it might be said that the sex difference, inherent or the result of education, consists in this, not that boys are less interested in persons, but that while the imagination of the girls is third-personal, that of the boys is first-personal.

This ego-centric characteristic of the boys has been noted in Miss T. L. Smith's study of day-dreams. She says, " . . . the boys dreamed of all sorts of wonderful flying machines, sometimes mentioning the rate per hour of trips in a balloon or by means of mechanical wings of which they were in some cases the inventors." (54 : 469.) And again, in quoting from a boy's day-dream,—"Once *I dreamed that I and some other boys were racing*. We had to go around the track three times, and *I won the race*."

Now, why should boys use the first person more than girls? It would seem to lie in the difference of physical activities. In boys' games, every joint and muscle, especially every large muscle, is brought into active play The boy becomes very conscious of his physical self. His kinæsthetic sensations are very clear and his self-feeling well developed. The sensations and feelings which go to make up the idea of self, especially the physical self, are thoroughly developed and organized. The boy becomes *physically*, largely unconsciously or sub-consciously egoistic. The "I" appears naturally in his stories.

The girl's life is more psychic, and especially more emotional. Her egoism, where present, is of central rather than of peripheral origin. This form of egoism is *self-conscious*. It may even suppress in writing the "I" uppermost in consciousness.

C. Use of Details of Pictures in the Second Series.

Throughout the whole series the stories of the girls contain by far the greater number of details, but with regard to the use of the details of the pictures the case is reversed.

The boys not only make more use of the picture's details, but work them up more effectually as organic parts of the story. Thus in the "Indian on Broncho" story, only two, both boys, noticed a bird soaring high in the air. To one it was a vulture awaiting the outcome of battle to feast on the bodies of the slain. In the "Saved" story two boys notice the gulls and

bring them naturally into the story. A leaf on the walk in the "Friend or Foe" story is noticed by only one, a boy. He says that it is a maple leaf that the cat has just stopped playing with.

Again, the girls while using large numbers of details not in the picture, are prone to leave out even prominent details of the picture. Thus in "Adrift" one girl does not mention the raft. In "Friend or Foe" the cat is not mentioned in one of the girl's stories. Two girls omit the mouse in the "Mouse-trap" story.

The stories were divided into three groups according as they had (a) all or nearly all the details of the of the picture, (b) some details, (c) few or no details. Of the 138 stories written by boys, 80 were in the first group, 40 in the second, and 18 in the third; while of the 159 stories written by girls, 43 were in the first, 53 in the second, and 63 in the third.

This may be partly due to the more varied interests and psychic material of the girls. The presentation of the picture was immediately followed, perhaps, by a flood of suggestions and associations which found their place in the story often to the exclusion of what was contained immediately in the picture. Often the picture did nothing more than suggest a title for the story. The boys were more dependent on the picture for material for their stories.

It would seem, however, since the boys work up the details better into an organic whole, that, having a greater power of constructiveness, they are capable of using the material ready to hand, while the girls find it easier to use materials more habitually worked over in their thought or experience. Both follow the path of least resistance.

Stern, in an early study, came to the conclusion that women forget less but make more mistakes. If the total amount of material, irrespective of its origin, is taken as the measure of general memory, this statement agrees very well with the results of this study. But in Stern's experiments the subjects were confined to the materials provided by the picture. In a later study of children, he found that the girls were inferior to the boys in receptivity, in the taking in of knowledge, but still more in spontaneity, in independent reproduction (without suggestion) of the acquired knowledge. If the subjects of the present study had been limited to the picture material, similar results might have been obtained; at any rate the girls reproduced fewer details *of the picture*, and made more mistakes. (68: Vol. I, pp. 399, 400.) Perhaps Stern's results would indicate not so much a poorer receptivity as a greater tendency to *wandering imagination*.

Marie Borst, in a study on the fidelity of testimony, the sub-

jects being adults, found that "l'entendue du témoinage" of men was but 76% of that of women in free reproduction, and 83% when questioning was resorted to. The relative accuracy of the sexes was found to be in the proportion of 96 for men to 100 for women. An analysis of the figures in detail shows that men make about the same number of mistakes, but make fewer correct statements. (13a: 306, 307.) These results do not correspond with the results of this study. The methods are, however, quite different, as well as the ends in view, and the ages of the subjects.

D. Imaginative Quality of the Stories.

Imagination is here used, of course, in the sense of productive imagination. For this purpose the test was that suggested by Ribot, does the story contain anything new to the writer's experience?

Of course, here, new means, not new as to psychic elements, but new as to combination of these elements.

The stories were grouped as carefully as possible into four divisions, (a) highly imaginative, (b) imaginative, (c) having some imagination, (d) unimaginative.

The following table shows the general result.

	a	b	c	d
Boys	5.82%	68.45%	14.08%	11.65%
Girls	2.12%	73.31%	16.95%	7.62%

Among the boys there are both a large number who excel and a larger number who fall behind than among the girls, while more girls are of average imaginative power.

E. Unity.

By unity is here meant structural unity. Wherever there is productive imagination some degree of constructiveness is involved. But there may be some degree of constructiveness without unity of the whole. A story may consist of a series of incidents, each in itself involving productive imagination, and yet such parts may be disconnected or but loosely connected. Here there is evident lack of structure, not within the constituent parts but between them. Such a story would be said to lack unity. Where all these incidents are subsidiary and tributary to a main incident, the story would be said to possess unity.

In the first series 51.4% of the boys' stories possess unity.

In the second series 68.1%. The pictorial unity was apparently reflected in the stories.

In the first series of girls' stories 45.4% had unity, while in the second 49.6 had unity. Here the improvement was not nearly so conspicuous as among the boys.

The cause of this is probably to be found in the greater variety of imaginative material on the part of the girls, and a greater specialization on the part of the boys. The pictures would call up a greater number of associations of the girls. This of course would tend to operate against unity.

But how explain the fact that in both series the boys surpassed the girls in this quality? Partly, probably, on account of the girls' great richness of imaginative material. But the boys show more constructive ability in the fields where their interests lie, and therefore where their imaginative material is greatest, than the girls do in their favorite fields. There is probably a greater power of construction among the boys.

Miss Smith, in her study of day-dreams, found that a large number of children were familiar with the story of "Alladin's Lamp and the Magic Carpet." In the day-dreams of the girls it remained practically unchanged, while in those of the boys the motive power instead of remaining a magic carpet became a flying machine of some wonderfnl sort. Certainly here the boys showed as much power of working up extraneous material into the story.

History might be brought to witness that the male sex has produced the greatest number and the best quality of poets, novelists, architects, painters, sculptors; in fine that man has excelled in all activities where constructive ability is required. This would not of course prove any innate superiority any more than in our present study is proved any innate superiority of boys over girls in power of giving constructive unity to their stories. Nevertheless the parallel is suggestive.

As we have seen the interests of girls are more passive than those of the boys. Passive is often preferable to active motion. Swings, boating, etc., are very popular with girls. The physical structure of the sex as well as their habitual activities in the home, which are so multifarious and tend to dispersion of interest and attention, and which develop particularly the subsidiary muscles, tend against such general muscular activity as would unify the physical structure and bring about proper subordination in the parts.

If it be assumed that biological organization began with action, and that growth of complexity in unity has increased phylogenetically with the development of activity and has been produced by it; then it would appear that ontogenetically differentiation, organization, and unification would proceed *par*

passu with the activities, and in the early stages with the physical activities, of the individual. With boys the natural order of fundamental before accessory is carried out more clearly than with girls. The large fundamental activities develop the fundamental muscles and the fundamental motor and sensory centres. To these are added from time to time developed accessory muscles and their corresponding centres. The result under ideal conditions is a unified physical and neural organism, with a parallel psychic life, having due proportion between its parts. May not a unified physical organism be more likely to be characterized by a psychic life which produces unified structures, than one which is not itself a unity?

That there is a close connection between physical activity and psychic constructiveness is shown not only by a comparison of the sexes, but by a comparison of individuals of the same sex. In this study the stories of those who are most active physically are, with few exceptions, characterized by unity. The most active girl and the most active boy wrote stories 100% of which were classified as having unity. The parallel holds with greater or less exactness right through the list, being most marked where the physical activity is very great or very little.

In the stories of these tests, unity was found to be destroyed in several typical ways. Wherever the composition (a) was not a narrative, (b) was made up of a series of disconnected incidents, (c) was topheavy, *i. e.*, made great preparations for a small dénouement, (d) contained irrelevant details, (e) was a mere series of sentences without clear meaning, (f) betrayed general lack of structure, involving two or more of the above or following defects, (g) was entirely descriptive of some actual event or of the picture presented, (h) was a reproduction of something read, (i) was clearly a case of plagiarism, and was considered to fall under the heading, "lacking unity."

The following table shows the general results of the above classification. The figures represent the number of stories lacking in unity in the several ways.

	a	b	c	d	e	f	g	h	i
Boys	13	17	—	2	1	28	14	1	1
Girls	10	12	16	28	1	38	12	2	2

The boys wrote a slightly greater number of compositions that were not stories. These were not purely descriptive like those under rubric (g). Of the 13 compositions under (a) 8

were written by the oldest two boys. These productions were neither narrative nor purely descriptive, but rather essays or lay sermons, containing views of life, arguments as to selection of a calling, etc. This tendency is no doubt, to a certain extent, characteristic of age, but the blighting effect of the ordinary school upon the imaginative processes may have had something to do with it. At any rate those who wrote this type of composition were for the most part those who had been going to school thirteen or fourteen, or even fifteen years.

The fault shown in column (b) is typical of the boys. Column (f) also contains many stories betraying this fault. These stories resemble a series of beads on a string, the string corresponding to the general subject of the story, such as hunting or fishing. Perhaps a better comparison would be a series of snap-shots on the same film. The boys whose stories show this fault are usually the younger ones, who, while their images are very vivid, lack constructive power.

Columns (g), (h), (i), as well as (a), already mentioned, are filled by those lacking imaginative power. The total for the boys is somewhat larger than that of the girls, and is of course relatively still larger, since there were fewer boys than girls. There is then, as has been said, a greater number of boys than of girls deficient in imagination.

Columns (c), (d) and (f) indicate that redundancy of detail is the great destroyer of unity in the girls' stories. This is directly in line with other results of this study already noted.

F. Length of the Stories.

In this test about 125 words were reckoned to a page.

In the first series the stories of the boys averaged 1.38 pages; in the second, 1.10 pages. The stories of the girls in the first series averaged 1.60 pages; in the second, 1.27. Both sexes write shorter stories where the subjects are suggested to them from outside. In both cases the girls write on the average longer stories than the boys. The decided drop in the number of pages from one series to the other is no doubt the effect of a drop in interest. A scanning of the results in the group of stories suggested by pictures strengthens this explanation.

In the "Moose" and "Adrift" stories the boys average highest,—1.25 pages. Next comes the "Stag at Bay," and next the "Mouse-trap." These are the stories that former tests indicate as probably the most interesting to the boys.

With the girls, "Adrift" occupied the first place, with an average of 1.52 pages. The pathos of the picture appealed to them. Next came the "Indian on the Broncho" with its suggestions of massacre, women and children left alone on the frontier, etc. The stories on this subject averaged 1.51 pages.

The "Mouse-trap" also averaged 1.51 pages. It is to be noticed that the humorous picture appealed strongly to both sexes.

G. Explanation of the Pictures by the Various Stories.

In the power of explanation or fitting the stories to the pictures in snch a way as to explain the situation indicated by the picture, the sexes are fairly equal, although the boys seem to have a slight advantage.

The stories were arranged in three groups according as they (a) explained well, (b) explained poorly, or (c) failed to explain. The results are expressed below. The figures represent the number of stories.

	a	b	c	Total.
Boys	115	8	15	138
Girls	110	23	26	159

H. Religious, Moral, Social and Other Elements.

The boys' stories make no reference to religion. Two stories by girls are primarily religious. One tells how a box of useful articles was made up for the missionaries. Another describes a Christian Endeavor Convention and mentions the conversion of friends. Incidental references to religion occur throughout the girls' stories.

Both sexes betray interest in moral questions, but the boys much less than the girls. The girls show a decided tendency toward moralizing. Even the "Mouse-trap" story provokes much of this. In the first series at least eight stories by the girls turn on moral questions.

In many eases the boys show a decided preference for illegal activities. As many as seven stories are of spearing salmon, and one is of hunting moose with dogs, serious offences against the law in the district where these stories were written. No disapprobation is expressed, but rather the moral question involved is ignored. It is evidently not a case of immorality but of non-morality. With the boys, considerations of prudence appear frequently. One boy decides to play truant no more as the resulting thrashing more than counterbalances the pleasure obtained from temporary freedom. Another decides never again to steal cake in the dark when there are mouse or rat traps in the house.

Where the boys choose as subjects for stories activities in which but one or perhaps two or three can engage simultaneously, the girls choose such activities as excursions and picnics. This seems to be partly due to a difference in social instincts.

Long ages of training in different spheres may have led to a permanent sex difference now inherent in the individual. The predominance of the hunting-fishing psychosis in boys and of the food-preparation psychosis in girls may in part be due to this. The influence of the social environment of the individual must be a tremendous and perhaps the chief factor.

Food is mentioned often with both sexes. The boys think only of devouring it, and never mention its preparation or the manner of serving. The girls, on their picnics and excursions, usually relate with great detail the packing of the dishes and food, the spreading of the tables, etc.

The boys never mention clothes. Three of the girls' stories turn on this subject, while many incidental references are made throughout the stories.

Money is mentioned frequently. The boys usually refer to a definite amount, the girls to a "large sum."

Conclusion and Résumé.

The subjects of this investigation were studied from many standpoints and for a period of six months. The writer was intimately acquainted with each one, knew his or her social surroundings, and in most cases knew the parents personally. The youths who were the subjects of this study were normal individuals of at least average physical and mental health. It is hoped that similar investigations in other localities will be conducted, which may more fully establish or refute the results of this study. It is stated now to avoid unnecessary repetition, that no finality is claimed for the conclusions here set down except for the particular conditions under which the investigation was conducted, and save where these conclusions are supported by evidence culled from other sources. Wherever these conclusions may seem to be dogmatically expressed, it is to be understood that dogmatism is not intended.

One result of this study is to make apparent the fact that the imagination of youth between thirteen and twenty has a wide range and great fertility. It may be true, as Lindley says, that "every *child* may indeed be a 'genius,' but not of the inventive and creative sort (40 : 480); but of the *youths* of this study it is certainly true that all but two or three have some germ of the same imaginative processes that are found in more

perfect form in the inventive and creative genius, while many have imaginative power of no mean rank.

Hall and Wallin, in their study of youth's reactions to clouds, speak of the prolificness of the youthful shape fancying impulse. (35 : 376.) They state that clouds "can arouse impulses that run the entire gamut of feeling; that touch every chord of sentiment, from the smooth and gentle to the large and terrible." (35 : 475.)

What is here stated to be true of the clouds is true of the whole natural environment of the youth. Partridge, in his study of revery, writes of the profound effect of music, nature, twilight, upon the spontaneous activities of the mind. (47 : 455.)

Indeed, it would be strange if in youth the imagination did not reach a somewhat highly developed stage. The work of such authors as Miss Shinn and Paola Lombroso, shows that imagination begins early in the life of the child. A résumé of the results of such studies is to be found in Chamberlain's book on the child. (17 : 83-85, 324-327.) Whether during childhood imagination or imitation predominates, may be a question. Some, at least, have believed that the former predominates. Dr. G. Stanley Hall, writing on "Children's Lies," says that "we might almost say of children, somewhat as Frohschammer argues of mental activity, and even of the universe itself, that all their life is imagination." (31 : 215.) If this be true of the child whose plays largely consist of passive motion (swinging, sliding, etc.), is it not true of the youth with his superior physical activity and his greater power of constructiveness?

The interests of youth are various, but those of the boys are less multiform than those of the girls. The boys specialize on motor interests. The interests of the girls are more static and emotional. These differences are based partly, at least, on inherent anatomical and physiological differences. (*Cf.* 6 : 303, and above.)

In imagery the girls excel in visual and auditory; the boys in motor imagery.

In both visual and auditory memory the girls surpass the boys; but excellence in memory does not seem to have any necessary connection with imaginative power.

The use of names of persons and animals is quite common in both sexes; but far more so among the girls than among the boys. Where interest is keen, the girls tend to group their imaginative material about definite individuals with definite names. The girls have a stronger interest in names as names, apart from their use as symbols for individuals. Fanciful and striking names are used by them most frequently.

Both sexes tend to write in the first person where interest is

very strong. This tendency is far more apparent with the boys than the girls. Where interest is at a minimum, neither proper names nor the first person is used by either sex.

The boys use more details furnished by the pictures than the girls, and have more power to work them naturally into the woof of the story. The girls, however, write stories that are far more detailed. In the words of Alfred Austin, "they are interested in the individual joys, sorrows, sins, sufferings and emotions generally." The emotional material in the imaginative productions of the girls is very large. The great predominance of pity, sadness, fear of being left alone, etc., suggest almost a neurotic tendency, which may be due to the unnatural conditions of the social environment, which largely prohibits healthful activity.

In imaginative quality of the stories, the boys tend to specialize in both directions. Some boys are better and some worse than any of the girls.

In constructive unity of the stories the boys excel the girls. This may be due to greater richness of material in the case of the girls, but is probably due largely to greater constructive power possessed by the boys. This greater constructiveness seems to be connected with more rational modes of physical activity. No doubt the superiority is partly inherent, but the effect of environment must be great.

Where the boys offend against unity, their stories are panoramic. The girls are prone to write stories which are top-heavy. "Parturiunt montes, et gignitur ridiculus mus." They also spoil the unity of their stories by the insertion of irrelevant details.

Wherever the topic is interesting the subjects tend to write longer stories. That is, a certain heightening of the feeling tone tends to increase the amount of imaginative material ready to hand.

More religious, moral and social elements enter into the imaginative material of the girls. Clothes and the preparation of food appeal more to the girls, the consumption of food to the boys. Money appeals to the imagination of both sexes, but here the boys are more practical than the girls.

In general, the occurrence together of a certain type of physical activity, a certain type of emotional life, and a certain type of the imagination, seems to suggest some causal connection. At least the activity of the organism, as well as its inherent constitution, seems to determine the character of its interests, which in turn determine largely the form of the imagination. Perhaps these three aspects of the life of the individual are mutually interactive.

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