

# A Class Experiment in Imagery

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## A CLASS EXPERIMENT IN IMAGERY.

Educational psychology is endeavoring to establish itself in its especial field through questionings, investigations, and experiments, -testing the old and the new alike, confirming wherever possible, rejecting where facts do not substantiate. Problems of great moment educationally are to be solved; old methods and old theories must undergo the same drilling test; if proven of benefit educationally, if helpful to the race in the largest sense, then and not otherwise can they remain; if faulty, or if founded on misconception of the subject itself, or upon a mistaken psychological principle of theory, then it must be brushed aside and the proven put in its place. Results involving whole systems of education and of untold importance to the race may reasonably be expected from this new critical attitude, this application of psychological criterion to everything connected with the education of the child. Systems will fall of their own weight when the sledge-hammer of experimental science knocks away the old props of belief, or, perchance will topple dangerously for a time while these old props are being strengthened or replaced sometimes even by those firmly set on the foundation of established scientific facts. France, for example, has proven that a dull course in morals cannot take the place of the early emotional and religious life of the child. True, she has arrived at this conclusion through sad experience rather than experiment, but how much

less costly had the experiment been upon a few individuals rather than upon a whole race of people; with the consequent result that the country is flooded with moral delinquents. The experimental science of education aims ever at conservation. Again, radical reformers have tried to throw Greek and Latin from the curriculum on the theory that there could be no transfer of power from such elements to ordinary life, i.e. - that formal discipline, so-called, was all a myth. Experimental psychology steps in and by a great number of experiments, carefully made, shows that in certain instances there seems to be a distinct transfer from field to field of learning and probably from these various fields to life itself. As a consequence, Greek and more especially Latin are with us still, after a stormy passage, and while neither study is now on the firm pedestal upon which it rested for so many centuries, nevertheless educators are more or less content to let them occupy their respective positions until positive evidence drives them out. Each study is now conceded to have, not alone great *intrinsic value* as a means of drill in accurate thinking, but an inspirational value as well. The experimentalist in education is a conservative as well as a factor in conservation.

Already educational psychology seems to be firmly entrenched through <sup>its</sup> ~~these~~ numerous helpful suggestions and successful experiments. Never again will the traditional curriculum go unchallenged, for the new science demands results, for the future of a nation or a race is at stake. Not progress through revolution but through evolution is the ideal set up, - progress in a social and a pragmatic sense. Is the ordinary curriculum

preparing the child for life in any sense or is it very nearly a failure and the ~~time~~<sup>time</sup> and effort of school a waste? Does the school reach the great mass of children who must go early into the fight or does it send them out on the battleline with an empty cartridge-bow? Has their short course given them the utmost of value in return for the time used, or do they go out as unskilled- to eke out existence but little above the horizon of human experience? Do those who have been longer in the molds go out wholly or partially crippled because of long contact with dead forms, or do they go as true men and women, strong to cope with life? Have their individual tendencies and weaknesses been discovered by the skilled teacher and cultivated, in the former case, and, in the latter, either turned into other channels or eliminated through a fuller knowledge? Have the school methods been such as to build up generalized habits which will be of use through life, or have they been such as to positively weaken the powers of the individual? Has the pupil's Love of the Beautiful lain dormant or atrophied or has it been siezed upon by the school as one of the most important factors in the development of life? e

Questions arise indefinitely of such vital importance that it is a marvel that they are still unsolved. They have been repeatedly asked but not until recently have psychologists deemed it sufficiently dignified for them to probe into such insignificant things as concern the mere education of the child. Not until psychology~~s~~ had passed this stage, and become the possession of the common people through the great work of

Professor James<sup>who</sup> had shown them the way, could, philosophers and psychologists endure the "dust and sweat" of earth, for he of all the great philosophers wished philosophy to be not secluded "from everyday interests, another world pure and apart", but rather "muddy with the currents of common life, thick with the dust of the common highway." With the introduction of this attitude, philosophical and investigative thought took on new life, and the formulating and answering of questions which touch the workaday world and life became a possibility and a fact. With the advent of the James' attitude ~~was~~ educational psychology became a possibility.

Notwithstanding the great importance of the work of educational psychology, only a few of the institutions of higher education have as yet introduced such courses in their School of Education, and these include only such as Chicago, Columbia, Harvard, and the foremost of the state Universities. Along with this lack of courses has gone the consequent lack of training of the public school teachers; and only within the present school year has such a course been offered in the State<sup>of Kansas</sup> for the better equipment of this all-important public servant. How great a crime has thus been committed, not only against the childhood of Kansas, but also against those of other parts of the United States, the teacher's subsequent work and costly errors and failures alone can tell. Lack of a definite scientific and professional training is to spell the failure of the teacher of the future. But how best secure for the

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teacher this special training for his work? How best interest him in the problems the solution of which means so much for the future State? Certainly a mere study of textbooks will not train the future investigators of the educational problems, upon whom the great part of the burden of experiment and investigation must rest, and from whom the hopeful educational specialists expect so much. Nor by classroom lectures, though these are always a very vital part of such work. Only by coming into real touch with real problems through individual investigations can an interest in them and in the field in general be aroused. Only by getting a glimpse into one's own mind can one comprehend something of the workings of it, and from this extend one's methods of investigations to other minds by means of the increased interest thus aroused.

We students of the School of Education of the University of Kansas think that here the methods used are such as best tend to secure the above results, which tend to so train the teacher that he "may contribute constructively toward the elevation of the teaching profession throughout the public school system." Such a course can bring the greatest results to the student following it only when sufficient preparation has gone before. Hence the prerequisite of such work is a junior classification and the previous work done must have included a year of general psychology. The class of the present year has included juniors, seniors, and graduate students. The present study in imagery has been selected for this present purpose, not because this was the only kind of data gathered, but because

it forms, as it were, an entering wedge into the consciousness of the individual student. Because of this fact and because of the great importance of imagery in education of the child mind, this subject forms a sort of backbone for the entire course of work. For, in the words of the Dean of the School, the object of the experiment is to give the students a first-hand view of the subject matter of psychology, that they may learn to depend not upon books so much as upon the content of their own mind; to have them get some insight into the complexity of the problems and show them the impossibility of arriving at any trustworthy pet theory to fit these problems, - in short, to give them a critical viewpoint in respect to books and theories. "As a basis for the work of the course, Munsterberg's 'Psychology and the Teacher' was used, the first ~~two~~ ten chapters being touched upon in a merely critical way in class work, the remaining chapters being taken up more in detail, and the author's psychological views discussed and criticised. The lectures by Dean Charles Hughes Johnston leading up to the work in imagery consisted of a brief general review of psychology, the history of the relation of psychology to education throughout its development, relation of mind and body, ~~and the~~ mental elements, mental unity, etc. From this a transition was made to the field of feeling, thence to Imagery. The discussion here dealt with the types of imagery of different individuals, use of imagery in learning, and applied problems for school experimentation. These lectures were supplemented by extensive collateral readings upon the various topics, <sup>including articles</sup> by all

the leading psychologists and educators of the day. (The latter part of the course consists of an examination of the various problems of formal discipline, habit formation and habit breaking, learning processes, and individual differences, together with the psychology of such mental processes as reading, expression, grammar, history, music, etc., - these last being individual topics assigned for special reports.)

As a preliminary to the experiment careful instructions were given the class, together with several trial experiments, this being necessary to acquaint them not alone with the work of the experiment itself but with the terminology used as well. The conditions were as follows; two words were to be given by the experimenter and each subject was to write immediately the words which came first to mind during a period of thirty seconds. The starting words were arranged in pairs, each pair representing a different mental content as follows:

1. Unrelated percepts- angel, logarithm.
2. Related percepts-pen, ink.
3. Unrelated jingle words-ping, ting.
4. Unrelated concepts-sweetness, endurance.
5. Related concepts-psychology, diploma.
6. Percept and unrelated emotion words  
pencil, anguish.
7. Emotion word and concept-eagerness, education;
8. Forced fusion-psychology, teacher.
9. " " - ambition, animal.

As will be seen the method used is somewhat similar to the association tests as used by Jastrow, Calkins, Binet, Flournoy, and others. Jastrow uses a onehundred word test for ascertaining the community of ideas of Wisconsin men and women, and Calkins uses the same test for the same purpose at Wellesley.

Binet uses a modification of this test in France for the study of individual differences, and Flournoy uses it to discover the effect of environment upon the mental content, the former requiring only twenty words for a test series, the latter ten words. Whipple seems to approach nearest to the test as used in the University of Kansas, for he says that the series may be made uniform at the beginning by using a single start-word. There is a wide difference, however, as to the use made of the data and the tabulation of it. In this test, two words are presented, to consciousness with the expectation that each will have its influence upon the stream of thought which follows, and as a matter of fact, this expectation is realized in many instances. One word seems to hold the field for a time, then the other 'pops up' and the remainder of the series will be upon the new base. The following will make the method clear.

Start words, a. sweetness.  
b. endurance.

		Signal	Symbol			Subconscious or		
				Cause.	Imagery	Feeling	Pure-thought.	Inarticulate.
1. hardship	b.		X					
2. trip	b+1	visual						
3. sisters	1+2	"	- -	X				
4. danger	2+3	- -	-X-	X				
5. horses	2+3+4	"	- -	X				- X
6. sickness	5	- -	X					
7. health	6	- -	X					

In the series here cited only "b" influences the thought-flow, while in an experiment some months previously when the same start-words were given to the same subject, the result was this: 1. molasses 2. hardship 3. labor 4. dinner 5. mine, etc. This clearly shows the easy flexibility of the mental flow.

In the first instance, a definite experience of a trip by wagon and various incidents connected therewith in the mind of the subject were called up. In the second case only a seeming verbal association of words is present. It would indicate that a different mental backing or thought experience had preceded. But it might as easily point to a difference in temperament or tone of body. The subject has a distinct tendency toward visualizing, some symbolic imagery is noted, while feeling is clearly present in the series also. In the transfer from <sup>3, ~ 4, ~</sup> "three" to "four" there seems to be a doubt as to the exact connection—that there is some subconscious element present which is hard to group or define. In <sup>^</sup>like manner each series was carefully studied and tabulated and the following list of questions answered in as full a manner as possible, together with such comments and explanations and queries as the individual student might be able to make.

	Yes.	No.	No ans.
1. Is there presence of verbal automatism?	28	1	3
2. Is there presence of notable change of orientation during the course of association, i. e. motor tendencies to turn the body or parts of the body in different directions?	14	14	4
3. Did you experience ideas which seemed to be free from motor tendencies?	22	4	6
4. If so, do these predominate at the stages of passing from one word to the next?	17	6	9
5. Do you find ideas in your series that seem to have natural attractions for other ideas, or are there relationships acquired ones?	14	7	9
	7	Both.	
	2	Vague. answers.	
	19	Acquired.	

- |  | Yes. | No. | No answ  |
|--|------|-----|--|
| 6. Does the mental image, or the meaning of the word seem to enter consciousness before the word, or, is the word a compromise label for what it does not exactly fit, - is language an inadequate symbol? |      |     | 10 Meaning before the word.<br>11 Image before the word.<br>7 Either word of meaning first.<br>3 Word a compromise label.<br>1 vague answer. |
| 7. When feeling is present in the series, does it seem to have a coloring influence, or a determining factor, or an unrelated element, or a retarding obstacle?  | 16   | 9   | 2<br>3<br>2  |
| 8. Do your words seem to come to represent part of a developing feeling or emotional content, or do they stand as an independent item of a logical experience?   | 11   |     | 6<br>13<br>2   |
| 9. Do you detect fewer feelings of relation when the series may be called emotional?   | 11   | 15  | 6  |
| 10. What is meant by incipient motor tendency?   |      |     | 17<br>9<br>6   |
| 11. Does the presence of this determine which ideas and words take the field?  | 12   | 8   | 2<br>10  |
| 12. What do you experience as inhibition? Do you experience a deadlock in any part of your body?   |      |     | (Answers quoted later)   |
| 13. Is the flow of words less obstructed when no inhibition is noted?  | 24   | 3   | 2<br>3   |
| 14. Would you say that one idea as such inhibits another?  | 15   | 14  | 2<br>3   |

15. Can you explain your series, or do you think they could be explained in terms of mental habit?

15 Yes      11 No.  
2 "Partly"  
4 Answers omitted

While it is clearly evident that the subjects are too little acquainted with the work and not sure enough of the meaning of the various terms to give even fair data for any satisfactory generalizations, and while we feel that much better results might be secured from a set of experiments after each one has become more thoroughly acquainted with the work required <sup>and</sup> with the meaning of terms, nevertheless, the main purpose of the experiment has been attained, viz. - "To give the students a first-hand view of the subject matter of psychology". Familiarity with a tool comes from persistent use, and since nearly all the subjects are novices in introspection and interpretation of data, a second experiment after each member of the class has once formulated his or her answers to the given questions would give much better results. Thus the series and the questions would come to have a more vital connection in experience and <sup>the</sup> more significant meaning, for it is very evident that different individuals have varied in their interpretation of the same terms. While this renders the data practically valueless as far as general conclusions are concerned, it does not destroy the net result of the experiment, for as was said above, the aim has been to give the student a working basis for psychology. To illustrate: In answering the first question, 28 of the 32 subjects, or 87 1/2 %, say they note

verbal automatism; one denies the presence of it, while three refuse to risk their reputation upon such (to them) obtuse questions. Even a closer analysis of the experience of those who affirmed might reveal the fact that some of the data which they classified as verbal might properly be called something else. For example, when "ting" follows "fing" in the jingle-word series one subject called it "verbal", but certainly there is something there beside that. The two words have a distinct auditory response or association as well. But the various subjects were enlarging their experience in respect to verbal automatism and the time used in interpretation was well spent no doubt. In the second question, 14 noted orientation, while 14 did not. But even in this perfectly lucid question, 4 do not feel themselves on safe enough territory to risk an answer, though it is probable that more felt sure that they knew what they were affirming or denying than in the previous question. For, no matter how well a term be defined, nobody of students will get identical ideas and the same feeling content from it. In the third question, 22 reported the presence of certain ideas which were free from motor tendencies, 4 reported negatively, i. e. these four report that all their ideas had a motor significance. As a matter of fact, when we attempted to discover if this were a fact with those four, none would reaffirm it, and perhaps the answers were due to a confusion of the question again. Six omitted the answer, this being still further evidence of this confusion. In the fourth question, 9 did not answer, or nearly one-third of the class. How many of the others were sure

of the question, it is difficult to say. But it seems to us that the question requires too close an analysis of this very uncertain and very fleeting psychological state for a mere novice to attempt to answer with any degree of certainty. That is, the question itself calls for introspection upon a point which is beyond the beginner in psychology. Besides this, it is difficult to determine the exact meaning as it is phrased here. As it stands, it manifestly means, - "Do the free-from-motor-tendency ideas predominate at the stages of passing from one word to the next?" But we fail to see just how a third idea can be discovered, or even imagined, between two words, one of which follows directly on the heels of its predecessor. The question certainly aims at discovering if the motor tendency predominates at the transition stage. And, it is with reference to this latter view that we made the statement above that the question requires an almost impossible analysis of the very fleeting psychological state which is supposed to exist here at the stage of leaping from one word to the next. The mere fact that nine attempted no answer is sufficient evidence of the obscurity which the question holds for them. In the fifth question 14 found natural attraction between ideas whereas, the point of the question is that no idea as such attracts another idea. This may be a mere phenomenon of the kind met with so often in the psychology of the crowd, - the greater number voting for the side of the question which is put first. On the other hand, 9 feel that the relations are required ones while seven think that both of these are possible.

Question No. 6. is one of considerable interest. Eleven feel that the mental image enters consciousness before the word, ten feel that the meaning enters before the word, while seven find a certain irregularity, words before the meaning and meanings before the word, <sup>at different times, or in different series.</sup> Three think the word is a compromise label, that language is not adequate to convey the thought, i.e. a word sometimes does not express the thought or feeling which is felt to be in consciousness. This differs in one important respect from Rowlands\* experimental test as to the effect of words <sup>in</sup> consciousness. She found that her subject felt three distinct stages in the word effect; a. Familiarity with the word, i.e. She felt that she would know what it meant. b. She felt then ~~that~~ she would know presently what to do with it. c. Then the images unrolled themselves in all their variety and richness. In her experiment, the word was pronounced and the effect of the one word noted. In our experiment, each word is called up by another word in consc(iousness, hence we could not expect to find a parallel effect. It seems even that we might expect a wide variance in a single individual's experience. We think it very probable that in pure verbal association the word comes into consciousness first. For instance, if "May" is spoken, "June" follows at once. Later, all the associations of the word crowd in, flowers, birds, commencement, etc. In the case of the literal imagery association, we might easily say when the word "bird" was <sup>spoken</sup> ~~open~~ that we seem to hear the song before the word "song" comes to us; and in the case of the word "game", the whole

\*"Psychological Experiments Connected with different Parts of Speech." Psy. Rev. - Mon. Series. 1907.

body will be in incipient activity, and even the whirr of the ball and the ring of the racket will be heard, before "tennis" floats into consciousness. But whether this is a general principle that the image precedes the word in literal imagery we are at present unable to say. An experience entirely distinct from either of these is found in the case of composition, when a distinct thought-feeling is present and we feel that there ought to be a better word with which to express it. But this feeling of inadequacy of language accurs only perhaps when there does exist a more fitting word. After sundry attempts to secure the exact word, and after a trial of various words suggested in thought, we may be compelled to leave the phrase unfinished, the feeling unsatisfied, only to return to it at a later time to find that the exact word is apparently waiting, a word which we apparently knew existed and for which we had been carrying on conscious search. The meaning certainly exists in consciousness here before the word. Aside from such situations, we feel that there can be no reality to the feeling that language is an inadequate symbol for our thoughts. When once the thought is cleared the word fits snugly enough.

In the seventh question, 16 thought that feeling had a coloring influence, 9 thought it a determining factor, while 2 thought it had both a coloring and a retarding effect. None of the entire 32 members of the class felt that it had no influence upon the stream of thought. But if Professor Titchener\* finds it impossible to study a feeling introspectively except

\*"Textbook of Psychology" page 22.

~~except~~ in a "post mortem examination" sort of way, it is quite probable that the subjects in this experiment had an even greater difficulty. According to his experiments, the moment we turn attention to an emotion to study it, the emotion vanishes,—has already vanished in fact. In the experiment here noted, only a trace of emotion at best would be aroused by such a word as 'anguish' in the percept-unrelated-emotion series. To study this fleeting thing under such adverse conditions is nearly impossible, for if a full grown emotion or passion is so easily dissipated, such a thin experience as we get here is almost a negligible quantity. Yet, according to the next question, for the majority of the class, the words came to represent ~~the~~ a part of an emotional content, and the majority also discover more "feelings of relation" when the series may be called emotional. No doubt the past experience of each one was called upon here to furnish supplementary data. Even so, we must not expect an exact retrospective analysis from our untrained subjects, and, as we intimated at the beginning, the aim of the experiment is not data but experience. The flow of words should be more 'fluid' under emotional stress for it proves to be the lubricant of the mental machinery in all composition, but it is not surprising if even a majority of the subjects are unable to so state their experience. For they are under practically experimental conditions here and those conditions not of the most favorable kind to give results for the study of emotion.

In the tenth question, 12 thought the presence of insipient tendencies had a distinct effect upon the direction of the

course of thought, while eight denied the truth of this. Approximately one-third of the class did not have a clear understanding of either (10) or (11) of the series, and their answers were either vague or omitted entirely. This is only a further instance of the lack of a clear understanding of the points to be brought out by the experiment, and of the lack of uniformity of opinion as to the meaning of the terms. It will be interesting no doubt, to note in this connection some of the varied answers given to number (12). "What do you experience as inhibition? Do you experience a deadlock in any part of your body?" The answers vary widely and in themselves form an interesting study. "Keeping words back"; "Just a sort of stampede resulting in a blank"; "The retarding action of one idea on another"; "The struggle between two ideas to see which shall take the field"; "A slight feeling of inward cringing"; "A kind of deadlock in the mind"; "Two ideas striving for recognition at the same time"; "The mind seems to be blank"; "A mental conflict"; "In inhibition the mind is full of a vague mass of ideas"; "Hazy ideas, but not clear enough to express in words"; "Inhibition is the stopping of the flow of ideas"; "Two conflicting ideas fight for the field at once, causing a blank period in which no ideas enter consciousness"; "The power of not permitting words to come into play which you are trying your best to get." Such data is interesting in the extreme, tending as it does to give some clue at least as to the workings of individual minds. Various causes produce inhibition. A quite common experience was for the subject to experience

complete inhibition for even the full thirty seconds in the first or second trial-series. The attempt at passivity apparently was a hindrance until a certain familiarity was had with it, then the series flowed smoothly enough. In a series of like nature given the class of the second semester, one student, a Phi Beta Kappa, gave her experience of inhibition as a state of mind- a perfect blank- which comes sometimes when called upon to recite, and could only be overcome by a strenuous effort of the mind. This is a rather common experience also, perhaps, probably being more common and more pronounced with people of a retiring or timid disposition. Nearly all the subjects felt some inhibition to affect the flow of consciousness more than ~~a~~ part of the body, <sup>it</sup> being a psychical rather than a physical phenomenon. The flow of words was less obstructed, more free, when no inhibition was present. They were nearly equally divided upon the point as to whether 'one idea as such inhibits another', few, evidently, <sup>seeing</sup> ~~saw~~ that it was a 'catch question', intended merely to check them up on a psychological point, and having little real connection with the experiment itself. But the answers show careful thought, which results in each side being well bolstered up.

In the fifteenth question, 15 held that the series were the result of mental habit. But in the later class, where the phrasing of the question had been <sup>1</sup> altered so that the negative side was given first, nearly all voted the thought-flow to be 'spontaneous'. This might again indicate the common tendency to vote

for the side of the question 'put' first, but it might indicate a different understanding of the question in the latter instance. At any rate, the second question is so put as to call attention to 'spontaneous', and this sharply differentiates it from 'automatic', that is, mental habit. But, with young people such as are giving the data, the inference may be made that, as yet, habits cannot be detected in the large majority of thought-connections, whereas, with the older individual, the thought-stream comes to have a more and more definite channel, until in the case of certain old men with a poverty of imagery, a certain thought or situation is bound to set off a whole series of past experience—there being no turning them aside till the thing's done. The initial stimulus being the spark set to the fuse which it follows slowly along with ominous sputterings but goes out at the end for lack of further material, and without any explosion because there is no powder at the end. The entire purpose has been accomplished, that purpose being simply to use up this feeble mental energy, and with no thought nor expectation of leading up to, and making, a definite point. Even our favorite Professors are sometimes guilty of giving the clue to the whole lecture at the beginning and it is then possible for the 'wearied' student to subside into his most comfortable position and either doze most luxuriously or daydream of the beautiful times to come when 'exams' will be over and school will be no more. Professor James, in his inimitable way, says of habit,—"To each sort of impression we have an automatic, ready made response. My very words to you now are an example of what I

mean.....I find my tongue inevitably falling into its old phrases and repeating almost literally what I said before." But this is habit as found in men of more mature years. 'Habits of thought' have scarcely been formed in this sense in the average college junior or senior. But there is to be found usually in their data something much akin to this habit—a definite connection with and a dependence upon the immediate past, whether of studies pursued or of experience itself. In this sense, the individual series can be "explained in terms of mental habit."

In this report the results collected from 32 sets of data have been used. While a total of 88 sets of data have been brought together, we have preferred (whether fortunately or not for the success of the report) to give a direct report upon the 32 <sup>the</sup> "primer class", and in connection therewith have given the important variations and additions as found in the later work. At this point certain criticisms and suggestions might not be entirely out of place—criticisms which have been in part expressed in the body of the report, but a clearer exposition of them will be made here; suggestions which might prove helpful in the further progress of this kind of work.

1. The questions are not all as clear as they could be made, perhaps. Aside from the confusion of the fourth question which was mentioned in the discussion of that point, there was a very noticeable lack of understanding of No. 9—"Do you detect fewer 'feelings of relation' when the series is emotional?" As a result of this lack of understanding of the real import of the

question, not one of the first class connected it in any way with "pure thought" or the "pure thought controversy", and, of the entire 88 subjects, only five so connected it. Thus not enough material was secured from which to draw a single conclusion. Were there a certain definite reference to 'pure thought' or definite reference to some author's treatment of this subject included in the question, the difficulty would be minimized. Even with 'feelings of relation' in quotation marks as in the latter question, many failed to connect it with the desired point.

2. Each should be a definite, distinct question, - unless the latter part be merely explanatory. For instance, in No. 6, only 10 of the 88 subjects answered the second part of the question - that "Is the word a compromise label for which it does not exactly fit, is language an inadequate symbol?" The same fact was observed in connection with No. 12. But here not a single one put himself on record as to his experiencing "a deadlock in any part of the body". By using a separate question, this obstacle could be removed.

3. A helpful addition to the experiment might be found in a requirement that each student work up a brief report from three or four sets of data. A scheme of rotation of individual papers could be used so that in a short time each member of the class could have access to the required number. This suggestion is made because of the fact noted in working up the data that the greater value by far accrues to the individuals who tabulate and report the material. By so doing, these individuals receive

a value which the majority do not get. By working into the problems in the more detailed and thorough way which is required in making the report, one of the chief values of the study is secured. By comparing one's own thought with the thought of other individuals, new impressions are received, stimulation to new thought is aroused, and the whole range of mental activity is quickened.

As an evidence of the utility of such a course founded upon some fundamental experiment as a basis, is to be noted the increased interest of the class in all psychological problems and data. In the advanced class in Educational Psychology, the experiment was again used with certain modifications but with greater interest than before. The students were more deeply <sup>interested,</sup> not only because of the familiarity with the ground covered, but also because of new problems to be met and solved. The method itself is an ever-expanding method, capable of admitting new situations which may be chanced upon in class discussion or in supplementary reading, capable likewise of gathering in as a net the material needed for the solution of these situations. For example, such questions as these evolved out of the course, - "What substitute for the 'association of ideas' would more fittingly describe what you experience as the associating activity?" "Do you note perseverative tendencies, rhythmic, wave-like returns of word streams?" That is, is there a tendency in certain instances for the word stream to return to the starting word or to some other word?" State differences between

kinesthetic imagery and kinesthetic sensation in your series. "

"Does your incipient motor tendencies depend upon past kinesthetic experience?" That is, what effect does your previous experience have upon your incipient motor tendencies? Can we experience a motor tendency to an action if we are unacquainted with that action previously, and with the process of its sensory-motor working-out? These points were incorporated in the latter experiments as Nos. 16, 17, 18, and 19, with the expectation that the drag<sup>net</sup> would bring up something <sup>of use</sup> in connection with each of them. The expectation was realized, the last two points proving of special interest to many. Several felt that kinesthetic sensation was more real to them than kinesthetic imagery, i. e. kinesthetic sensation was more stable and forceful than the other. Upon this point, Professor Titchener's discussion of the "Memory-Image and the Image of Imagination" has considerable bearing and is of great general interest. The discussion should be read entirely. One subject felt that the motor expression was more general throughout the body in kinesthetic sensation than in kinesthetic imagery. But this would seem to be a mistake for kinesthetic sensation seems to be definitely localized in most cases, for example, in the throat when a word has the effect of attempting to force itself out into sound. As the last two questions are closely connected, the second will be taken up as explanatory of the first. Of the 19 answers given upon this question, 15 maintained that their 'incipient motor tendencies' were dependent on their past

experience,<sup>3</sup> maintained the opposite, while the remaining one voted 'yes' and no'. Various arguments were introduced as evidence. This is a good example, - "Not all my motor tendencies depend upon past motor experiences. It is possible for me to imagine myself falling through space from an airship or any high point. I have never experienced this, neither have I seen anyone else, still this motor tendency is quite marked." This may be only an argument for the affirmative if we examine it closely. The subject here has a distinct feeling that falling is unpleasant, no doubt, but beyond that there is little to the feeling, perhaps. But, granted that the feeling is a bonafide feeling, it can easily be shown that it might depend almost entirely upon previous experience. That shrinking, cringing, sensation which is nearly always present to the novice when looking for the first time from a considerable height is, no doubt, the basis for his imagined feeling in connection with the thought of falling from an airship. But in this sensation, it is safe to say that the rush of air as one approaches the earth is not felt, nor is the shock of the body as it strikes the earth, nor the shooting pains from parts of the body toward the vital centers. And certainly the feeling of death is not there. Another subject said, "I can have incipient motor tendencies to do things I have never done. I had the motor tendency to swim before I learned to swim, and could have an incipient motor tendency to fly if I just thought about it hard enough." Another statement answers this very well. This subject says, -

"When I dream of falling, I have the same sensation that I experience when descending in an elevator. If I had never ridden in an elevator, this sensation, or image rather, would be much less intense, and might not occur at all. " We certainly must have a basis of experience in order to feel an incipient motor tendency to put the thought into action. We do not feel ourselves rising bodily from the earth, nor performing the act of flying, simply because no motor accompaniment to the thought has ever been experienced. There must <sup>first</sup> have been opened up to traffic that sensory-motor pathway or arc which is peculiar to each activity before the full sensation is possible. If the motor accompaniment is largely responsible for an emotion, as Professor James held, and all the leading psychologists since have admitted, then it must be true that the incipient motor tendency is a part of the experience of kinesthetic sensation or imagery, and how could it become a part of it except through a simultaneous functioning of all the parts called into play by the process itself, during previous experience. The 'muscle feel' could not be produced under any other conditions than by actual activity in that particular connection, or else a very closely related connection.

To sum up: The value or success of this experiment is not to be judged alone by the value of the data gathered, or of the conclusions drawn therefrom. On the contrary, it must be based upon the results upon the students themselves. It has been of value to them in that (1.) they have been brought to see that

their own mind must furnish the larger part of the psychological material which they are to study;(2). That even a simple process is a much more complex matter than it is generally thought to be- that there are many elements present which are usually entirely overlooked;(3),That a new and vital method of approaching the problems is here given them; and ,(4). that they actually caught a glimpse of their own mind at work, and as a result an introspective attitude has been gained. Thus the entire class has a more intense interest in psychological problems than at any previous period of their experience. This attitude will be retained in large part, and as the various members go out as teachers, they go with a keener insight into educational problems and a more thorough knowledge of the needs of the developing mind. The training resultant from the experiment can but have the greatest influence upon the character of their work, especially that which has to do with intensive experimental and investigative study. Granted even, that no point of interest has been cleared, that no conclusion of value has been drawn, and that upon the one point of its utility to the student must the usefulness of the experim<sup>at</sup> rest, we are willing still to trust the stability of it. That alone is sufficient base for its success.

*James Howard Hanger.*