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Ladies and Gentlemen:--

I feel it a high honor to be called upon to address the Teachers of Ontario at their Annual Convention. The subject on which I have been asked to speak to you was selected for me by the Committee who invited me -- physiological psychology. When you read this big title I fancy that many of you said to yourselves -- physiology we know and psychology we know, but what is this physiological psychology?!

If we were thoroughly acquainted with all the departments and sub-departments of physiology, and with all the divisions and sub-divisions of psychology we should know more nearly whore to locate this disputed territory lying somewhere between physiology and psychology and claimed by both. We should know that there was even a difference. Between physiological psychology and psychological physiology.

Let us first look at physiology to discover in what region of its domain this territory lies when claimed by physiology. As you all know, physiology is a branch of the wide study of biology the study of life in all its various forms and manifestations.

Under biology we have morphology or a study and classifications of forms of living organisms, histology limited to the finer microscopic investigations, and physiology that deals with the action or function of organic structures.

Under physiology is included a study of vegetable, and of animal structures and functions.

Limiting our attention to the consideration of animals -- we may distinguish a nutritive structure and function that corresponds in character to the vegetative, a muscular system, and a nervous system. If we leave out of view the vegetative whether in plant or animal, and also

the muscular system we have remaining the nervous system of animals and it is in connection with the study of thin sub-department that we reach the field of psychological physiology. You see why it is called physiology. Now it is peculiar to the nervous system of animals that it is most intimately connected with what we may term psychical manifestations. The physiologist from his point of view regarding these psychical manifestations as distinctive of the nervous system, and he endeavors to use those psychical manifestations as signs or helps in studying the physiological organism, that is, he continues to study physiology, but he makes use of the psychical as a means to attain his end, viz., a more accurate knowledge of the nervous system. It is making [p. 87] use of the psychical differences in so far as they are helpful in distinguishing, defining and classifying the various parts of: the nervous organization. Such a study of physiology might be termed psychological physiology.

NOW LET US TURN TO PSYCHOLOGY.

I have already spoken of psychical manifestations without attempting to explain their characteristics. It is this that is the subject matter of psychology -- states of consciousness. In physiology we were dealing with a branch of the objective, with objects in space and movements of objects in space; in psychology we attempt to deal with the subjective, with inner conditions and changes, with states of consciousness as felt and known by a subject. What those states are and what they are like you can only know by a self-reference to your own individual experience. I attempt no further definition of them but simply state that Psychology attempts to observe and study these states of consciousness.

Such a study has often been termed introspective, that is, instead of fixing the attention without upon the objects in space and their movements, an attempt is made to take notice of the states of the conscious; experience in time within our own consciousness and so is called introspection or looking-within.

Dr. Maudsley in his work "The Physiology and Pathology of Mind," raised objections against such an attempt. He classified three objections against any attempt at a study of the states of the mind as follows:

(a) "There are but few individuals capable of attending to the sucession[*sic*] of phenomena in their own minds."

(b) "There is no agreement between those who have acquired the power of introspection.

(c) "In order to observe its own action it is necessary that the mind pause from activity; and yet it is the train of activity that is to be observed. As long as you cannot effect the pause necessary for self-contemplation, there can be no observation of the current of activity; if the pause is effected, then there can be nothing to observe."

This has been wittily summarized. (1) Few *can* observe their conscious state. (2) Those who can do so are not agreed. (3) No one can do it at all.

Now, it is not a sufficient answer to Maudsley's objection to point out the inner incoherency and contradictions of his statements. We must look at the subject for ourselves, and then I think a moment's reflection will allow us that it is simply untrue that we must absolutely pause to observe our states of consciousness, and when we do so there is nothing to observe.

Are we not aware that we have a toothache when we are having it? Must we pause from having the toothache to be aware that we have it? What a blessed relief if when we attempted to observe it there would be a pause and in the pause nothing to observe. This would be a great saving of laudanum and a loss to the dentists. Not only can I observe, [p. 88] the toothache I have, I can recognize it as my *toothache* and as different from other sensations I

have; still deeper I can recognize that it is *my* toothache that I have, that is, I may be self-conscious or capable of recognizing myself the possessor of the toothache, who can distinguish himself from the toothache that he desires to be rid of it.

Yet there is this amount of truth in Maudsley's objection, that introspection is not an easy task for the ordinary mind. It is something unusual for it to take this attitude.

It is perfectly true that at first our attention is outward, our minds occupied with and wrapped up in the observations of objects in space and their changes. It is a later stage when there arises a clear recognition of our states of consciousness, and still later before we clearly recognize that our states of consciousness are *ours*, that WE have states of consciousness as our states of consciousness, that we as persons are conscious beings -- self-conscious beings; so we may trace three stages in the growing clearness in our apprehension of our knowledge and its components.

1. The earliest and easiest whore the attention is almost entirely engrossed with objects and movements of objects in space.

2. A recognition of our states of consciousness as inner states in time having a peculiar character as states of consciousness. This is the position occupied in what is termed "introspection," that is, the attention is now directed to the subjective states.

3. A deeper consideration which is nearer akin to philosophy than psychology. A deeper reflection and a more mature kind of thinking is required to clearly distinguish the *self* that has its conscious states as something that may be distinguished from its states; that is to got a clear view of the nature and character of *self consciousness*, of the character and the meaning of the *self*. We may then admit some truth in Maudsley's statement, not of the impossibility, but of the difficulty of studying states of copiousness, that is the second stage that we have referred to, and we may say that to investigate the third stage, whose importance is scarcely seen by Maudsley, is still more difficult and requires greater care and longer training. But confining our attention to the second, the study of the states of consciousness, the subject matter of general psychology, we see that immediately and directly the individual is conscious of his *own* state; he alone is properly conscious of those states and of what is going on in the minds of others, he knows only by a reference to what goes on in his own mind. But the observation of the conduct of others, and the expression of their thoughts and opinions help us to understand ourselves.

So the study of the subjective conditions of the individual, although, the starting line and stopping point of psychology, can yet be supplemented by the study of other individuals; they are to the individual in a certain sense objective (though after all he is not studying them independently of his own view of them). Hence Spencer says subjective study must be complemented and completed by objective study. Learn [p. 89] to understand the character of consciousness by noting what it does; study its products or manifestations, for instance language as a product of thought and an expression of thought, monuments of literature science and art, institutions, forms of government, history of nations, customs of various nations, a comparative study of savages, their rites, ceremonies and mythologies, a study of infants, and the stages of their development, that is endeavor to trace the history of the individual and of the race from its earlier and simpler, to its more complex and developed forms. Nay, we shall not stop with infants and savages, we shall get hints from *animals*; and we have such works as those of Darwin, and Romanes, and Lubbock, with their careful observations of animals, and here again we run over to the border land of disputed territory. The study of animals has usually been carried on chiefly by the biologist, but the psychologist is also interested in the subject and lays claim.

Now in this debatable common ground which may be assigned to biology, or to psychology, we may note some of the methods and results.

1st. We may note the comparative study. It is now a common place that the brain is the

chief organ of intelligence, but. like the ordinary knowledge that the earth turns on its axis, investigation was required to gain this result.

A comparison was instituted by the biologists, and they reached a generalization that in a wide way the intelligence of an animal, as far as could be judged from its habits, was pretty directly proportional to its brain development, that animals might be arranged in classes according to their intelligence, and that the brains of these animals would be ranked in a corresponding gradation.

The general public have been most interested,, perhaps, in a special application of this general result. It was commonly stated that the brains of men were heavier on an average than the brains of women, hence the conclusion seemed more or less plausible that men possessed greater intelligence. But the biologists have lately discovered that they had not reasoned quite logically and consistently in this particular instance. Judging from the habits of men and women respectively there did not seem to be as great a disproportion in the intelligence, displayed by each as would have boon expected from the disparity in the weights of brain; but it turns out that the comparison was exceptional and incorrect. In the case of all other animals the scale had been arranged not according to absolute weight of brain, but according to relative or proportional weight;. In comparing, for example, an elephant, and a mouse, the absolute weight of the elephant's brain was not compared with the absolute weight of the mouse's brain, but the proportion of the elephant's entire weight which consisted of brain was compared with the proportion of the mouse's entire weight that was made up of brain; in comparing men and women, however, they had simply taken into account the absolute weight, while the true method, as elsewhere employed, was to enquire what proportion of the. whole weight of the [p. 90] man was brain weight and what proportion of the whole weight of the woman was brain weight, and then compare these to see which stood higher in the scale of brain development. As men on the average are much heavier than women, it turns out that in proportional brain weight the comparison is rather in favor of the woman! The lady- teachers in Toronto have my permission to take a careful note of this for future reference in urging their claims for higher remuneration upon the trustees, but in justice to the trustees I must tell you of another point that is now being advanced by certain biologists, most prominently perhaps by Professor Lambrose, of Italy, who ventures to call in question the current belief in the superiority of the nervous organization of women. While it was believed that men were vastly superior in brain development as indicated by a comparison of brain weight, so much superior in fact that some explanation was needed to account for the fact that women after all, judging from their habits, did not seem to be so inferior in intelligence as was to have been expected, the favorite theory to account for the high intelligence of women with such a low, weight of brain was to say that the brains of women were of a better texture, the nervous organization of a finer quality, and it was claimed that women showed great heroism and. patience, and deserved the highest credit and admiration for bearing pain and surgical operations so stoically. Lambrose now solemnly avers that the apparent stoicism and patience displayed by women in sickness and pain simply demonstrate that women do not feel the pain as keenly as men; that they can better endure halving their teeth pulled, simply because they do not suffer so acutely as the men, that in reality the nervous organization of men is much finer, much more delicate, much more sensitive than that of women. As sensitiveness in general is supposed to be connected with fineness of nervous organization, the lady teachers should be very careful not to wound the sensitive feelings of the delicately organized trustees.

We have spoken of comparative study. Let us now consider physiological study of the individual; experiments upon animals to gain more accurate knowledge of the nervous organism. One of the sources of information is vivisection. If the heart of a frog is removed it continues to beat for quite a while although altogether severed from the body; further if the heart is cut into pieces, every section that contains a ganglion cell will for some time continue to act thus showing that the ganglion cells are subordinate centres of reflex action, or automatic movement upon stimulation. The movement in the tail of a snake after the body is destroyed is a reflex action due to centres in the spinal cord. If the cerebrum or chief portion of the brain of a frog be removed -- the frog is the favorite victim of vivisection experiments -- the body will act in various ways upon stimulus being applied. If a drop of acid be placed upon one of the legs, the other foot will promptly, wipe it off. From various experiments it is determined that certain

movements such as breathing, etc., are regulated chiefly by the lower portion of the brain, the medulla oblongata, and that [p. 91] the cerebrum or fore-part of the brain is needed for the initiation of purposive movements, not arising from stimulus.

Another question that was discussed and experimented upon is what is called brain localization. The earlier work that is well remembered was done by Gall, and his results formed the basis of the science of phrenology. The crude application of these results led to the discredit of Gall's views. Then a later experimenter Flourens succeeded in casting such discredit upon the phrenological position that it was entirely neglected for a longtime, but in 1861 the study of Aphasia or loss of speech led Broca to conclude that the centre of the brain usually affected, where there was aphasia, was the portion of the frontal convolution of the left hemisphere (in right handed persons.)

With Fritz and Hitzig a new era of experiment began. The general result from their experiments seems to be that the fore part of the brain was chiefly connected with MOTOR reactions; the back portion with the sensory. Hermann Monk, another experimenter, tried to map out the whole surface of the brain into separate sections; so that he even had a little circle in which he located memory almost like the old phrenologists, so that in the case of a dog operated upon he claimed that it had soul-blindness, which he defined as incapability to remember the significance of signs. Goltz, however, claimed that there was simply general stupidity due to the nervous waste and debility. The consensus of opinion being somewhat intermediate between the early view of special localization and the contrary view that the whole brain was capable of acting as one organism without special differentiation of function. The method of experiment by which these conflicting results were reached are chiefly forms of. vivisection performed upon dogs, rabbits, guinea pigs, pigeons and monkeys.

I. Electrical stimulations of portions of the brain and watching the effect.

II. By extirpation or destruction of sections of the brain, that is cutting out small portions in various parts and noticing the effect.

III. By the observation of the effects of disease. The latter, I need not add, is the chief source of experimental information upon the human brain, post mortem examination, though some experiments have unwittingly been made by accidents, such as the celebrated crowbar case, where a crowbar was blown through a portion of the brain without killing the victim. So far the experiments spoken of are of a general descriptive character, and though in a sense scientific they do not meet the strict demands of science, that is, quantitative exactness such as we have in chemistry. An attempt to give quantitative or mathematical exactness is made by what is termed psycho-physics. A couple of examples will make it plain. We can measure objective changes because we can compare one objective state by another, our standard remaining the same, hence we can accurately measure and weigh objects, and changes of objects in space, but there is a difficulty of measuring the subjective states because you cannot take one and [p. 92] place it beside another, you have no abiding standard. An attempt is made, however, to measure the subjective states by some objective change that remains the same; the difficulty here being however that the subjective state of one moment, which is measured by the objective test is said to be equal to or different from a subjective state at another moment, so that though the standard is apparently the same, we are in difficulty in applying it, because what we have measured once has disappeared and can only be recalled by memory.

Our standard of measurement is extensive, but the differences to be measured are not extensive but intensive, or changes in degree such as we can distinguish in a pain growing more and more unbearable.

A unit must be got or minimal state. The way to do this may be illustrated by the sense of weight. Place a very slight weight upon some portion of the body and it cannot be perceived as heavy; go on increasing the weight and at length there is a recognition that a WEIGHT is being felt. This is called the threshold.

Now suppose it takes *one ounce* to reach the threshold, it may be that if we slightly increase the weight we cannot perceive the increase, slightly more we do perceive an increase, we will say 1/3 of an ounce has been added before a difference is noted. It is generally the case, that if it requires 1/3 of an ounce to be added to the ounce, before a difference can be perceived, that if we add another 1/3 of an ounce to the 1-1/3, this is not sufficient to be noticed, but we will need to add the 1/3 of 1-1/3 ounces.

A second class of experiments are to determine the duration of states of consciousness; an attempt to measure the physiological and psychical process. A delicate chronoscope is used, that registers 1000th part of a second.

The clock is started and stopped by an electric current. Now if I place one finger upon the key that starts the clock and the other upon a key that stops the clock, you will notice that if some one presses upon the finger first mentioned the clock begins. I have to press down with the other finger and stop the clock, the interval will be registered and is what is called simple reaction time, it is found to be about a tenth of a second. The experiment can be varied with different signals to start the clock.

For instance, a bell rings when the clock starts, and I attempt to stop the clock as soon as I hear the sound; sight signals can be easily arranged, and many variations made in these different kinds of signals, and the difference in time noted.

Various processes occur in the short interval thus measured. The stimulus from the signal is carried inward to the brain, is apprehended and a motor impulse is transmitted to the muscles. By varying the experiments and by the help of physiological experiments to measure the velocity of nerve transmission and muscle stimulation, an attempt is made to measure the various processes occurring in the short interval. Many interesting facts are noted. It is observed for instance that when a person attends to the receiving of, the signal, that is to the predominently [p. 93] sensory element in the whole process, the time occupied in the process is considerably longer than when the attention is concentrated upon the acting member, the finger that stops the clock. The usual explanation of this fact, when one is attempted is, I think, incorrect. I shall not, however, attempt to discuss the point here, except to say that I believe that the physiological facts and habit are sufficient to explain the difference in time. When we attend to the receiving of an impression, we naturally tend to assume a passive or receptive attitude with consequent relaxation of the muscles and suspended breathing. When we attend to the making of an intended movement we naturally craw in , a full breath and the muscles become tense and ready for action. In the first case the muscles are not prepared to act quickly, they are "standing at ease," and a certain time is required to make the requisite preparation for muscular action; while in the second case this work has already been done, the muscles are tense, wound up ready to go off, they are in a state of unstable equilibrium, ready to act quickly at the least stimulus. 'Note the starters in a hundred yards foot race, and you will observe how often they start off before the signal is given. This is not from an attempt to take an unfair advantage of the other competitors, but due to the readiness to start upon the least stimulus.

The physiological condition explains a great deal. Then we must take account of the habitual procedure in action. We are accustomed to fix our attention upon the thing to be done, and the action does not naturally go beyond the point on which attention is fixed without some re-adjustment. In the case where the attention is directed to the receiving of the signal there is a tendency to stop at the point of apprehending the signal. This tendency has to be overcome -- a new action beyond this has to be proceeded with -- the attention must shift over to this further act. If these various factors are taken into account there would not seem to be anything mysterious or wonderful about the fact that the time occupied in the process when the attention is fixed upon the re-acting finger, stopping the clock, is shorter than when the attention is fixed upon the finger receiving the impression -- the signal. You will readily see that many variations in the experiments can be simply made. It will be found that the time is lengthened when the subject is performing some mental operation, when his attention is distracted, or when he is fatigued while on the other hand it becomes shortened by practice, and concentration of

attention.

Though there are marked individual differences we attain an appearance of exactness by an average of many experiments, and though it is true that the facts were very generally recognized by experience before such experiments were carefully conducted still the experiments tend to give clearness and exactness to knowledge, and also to lead to more careful observation.

You will notice that the method in psychological physiology and physiological psychology are the same. In both cases an attempt is made to apply strict scientific treatment. In the case of psychological [p. 94] physiology the method seems to many to be justifiable and sufficient; for, the purpose. In the case of physiological psychology it has been called in question.

It may be granted that the states, of consciousness may be treated, to a certain extent, as we treat changes in objects and that a certain gain results from this narrower view that limits the attention to a part of the process of consciousness but it should never be forgotten -- as it frequently is -- that this is only a limited or partial view.

There are two aspects in consciousness. Consciousness is a process. Hence we have 1st. Changes occurring (2nd) in the same consciousness. There is 1st a difference (2nd) a unity.

We must carefully note that a change is one thing, a consciousness of change another, and although they can never be absolutely separated we should carefully note the difference between a state in consciousness, or a succession of states in consciousness, and the consciousness in which, and for which, the states exist as conscious states.

The scientific or mechanical view limits its attention to the changes, the differences. By the physiological method an attempt is made to deal with each state in the consciousness as with atoms or changes in space of a moving particle.

The second element to which we have called attention, the unity, is neglected.

We may then contrast the study of the objective changes, the movements in space, with the subjective or changes in consciousness, by examining the latter a little more closely.

There is a resemblance when we regard consciousness merely as changes occurring. But even looking at the character of the changes that occur there is a marked contrast when we consider the recurrence or reproduction of states of consciousness.

A previous state in consciousness may be reproduced in consciousness. This reproduction of a previous conscious state is much more than the mere recurrence of a previous movement. The hand of my watch now points to 40 minutes after . Yesterday the same hand on the same watch pointed to the same place, but does the watch remember having previously pointed to 3.40? In consciousness the reproduction of a previous state is more than the mere recurrence of a previous movement. It has been retained in some way by the consciousness, and is referred to the same consciousness that previously had the experience remembered.

It is sometimes said that what is peculiar to consciousness is memory, the recurrence of a past state with its recognition. But at the basis of memory and recognition is the peculiar activity of cognition, because if there were no cognition there would be no recognition. You cannot remember what you never knew hence memory cannot be brought in as an explanation of the possibility of knowing. In cognition there is something unique making a basis for memory and recognition.

The fact of recognition is something unique, there is no analogy in [p. 95] the changes of particles in space or movements in the organism and their recurrence. In recognition there is a reference to one consciousness of .the present and the past, and this shows that there is a unity that embraces the succeeding elements, and cognizes and recognizes them as a process in time; there is a unifying activity; and an identity or continuity throughout the activity, a reference of the various succeeding states to the one identical, uniting, including, conscious self. In its unifying, including activity we find no proper analogy in objective changes. The elements in the changes of objects may possess a certain identity, but there is no reason to suppose that there is in the objects a self-recognition of identity, and the various elements in an object form an aggregate rather than true unity. Even permanent contiguity and inseparable union must be distinguished from a true unity as found m consciousness.

To illustrate the difference between an aggregate and a unity we may take the cortex of the human brain.

It is estimated that there are on the cortex of the brain some 1000 million cells. If these were distributed that would give one cell to each human being living, on this earth.

If each cell were independent and independently conscious, then upon the cortex of one human brain there would be as many separate, distinct, and independent consciousnesses as there are individuals on the earth. The mere fact of their being contiguously situated would not in itself make them constitute a unity; if this were all they might be as separate as the different sticks in a box of Eddy's matches.

Now having tried to call your attention to the striking contrasts between the characteristics of consciousness as a unity and a unifying activity, and the characteristics of material objects aggregated in spatial relations let us attempt to trace apparent analogies or resemblances that may be made out when we limit attention to one aspect in consciousness viz., the occurrence of changes, and seek for similarities between the objective changes in the nervous organism and the subjective changes within consciousness.

First there is the fact of change. For consciousness there must be activity, there must be the occurrence of changes within the consciousness and the apprehension of these by the consciousness.

Over against this, as similar, there must be a nerve excitation and nervous, changes propagated along a nerve in order to have a sensation.

Again psychologists have noted in their study of what is termed "association of ideas," that those things which have been regarded as resembling or similar have a tendency to recall one another or come together in thought, also things that have been contrasted as different, and a more general statement may be made that whatever has been contiguously known has a tendency to be reinstate in thought as a whole if any part of the previous experience recurs.

As similar it is noted that in the nervous organism a movement once set up can be easily repeated, and movements antiguous to one [p. 96] another may influence and interact upon one another, the stimulus applied to one portion may be transmitted and affect another portion.

Again, even in the case of the unity that I have said is peculiar to consciousness, the reference of the various states to the one identical consciousness, an analogy seems to be found in the co-ordinating work of the nervous system. In fact/some psychologists think that the great lesson to be learnt from physiological psychology is the unify and continuity of the sentient life and the unity of consciousness. I do not think that this lesson was learnt from physiological psychology. Take another point, the subordination and direction of one class of ideas or states of consciousness by some governing or dominating idea, seems to have its analogy in the distribution of functions in the higher and lower nervous centres: cerebrum, medulla oblongata and spinal cord. And lastly even the great and striking distinction made by

consciousness of the ego and the non-ego, the subjective and the objective is supposed to have a certain counterpart in the afferent nerves, carrying inward the external excitation and the efferent nerves carrying outward from the cortex and setting in movement the muscles.

Without attempting further to estimate the significance of these general analogies and correspondences let us briefly consider some of the results gained, some of the advantages and some of the limitations of the method of physiological psychology.

We will observe first that an attempt is made to apply the scientific method, and the simplicity of mechanical explanation to the complex phenomena of consciousness. The gain from this are the general advantages to be derived from the limited scientific standpoint. In applying it there is training and practice in scientific methods, there is an attempt made to get greater exactness of detail in our knowledge of the interconnections between the states under consideration and to discover new facts and unnoticed inter-relations. The objections raised to the attempt to apply the mechanical theory throughout and keep to the scientific hyphothesis [*sic*] have been already partly indicated. It is complained that this point of view is partial "und inadequate. It is inclined to deal simply with the element of difference, the changes, neglecting the unifying activity. It occupies itself entirely with the states or changes in the states of consciousness, when it attempts to correlate these with states and changes of states in the nervous organism, altogether ignoring the unifying activity of consciousness in which and for which alone the states of consciousness have an existence, in fact neglecting and overlooking just what is distinctive of the conscious life. In defence of physiological psychology it may be said that it supplements and completes, what is called the "old psychology." It may be granted that just as psychological physiology has made a contribution to general physiology assisting in making it more complete, so in a similar way physiological psychology has given its contribution and assistance to general psychology. But such an admission would not satisfy many of the partizans[*sic*] of physiological psychology. [p. 97] They claim that it has entirely superseded the "old psychology" as they disrespectfully term the previous work. They are the representatives of the "new" psychology, which has entirely supplanted the "old" which has become obsolete. I think that careful and impartial consideration will pronounce this to be a great mistake though by no means an uncommon one. Not only is the old parent of the "new," but the parent has still to hold the child by the hand. It is the parent because all the chief classifications and distinctions that are appropriated and used by the "new" were made by the "old" psychology. In few studies has there been such a carefully considered classification ready to hand for present use. Still further, all the chief problems were started by the "older psychology," and more than that it must still assist in every attempt at solution. To show how indispensable is the work of the "old psychology" still, let us take for instance the observation, and study of animals, infants and savages.

The disciples of the "new psychology" often suppose that they directly observe the simpler manifestations of mind, and thus construct their science safely, while the foolish and benighted "introspective old fogies " kept deluding themselves with their own fancies. Now without questioning the value of such observations it must still never be forgotten that after all, when we suppose that we are erectly observing animals, children or savages avoiding all the illusions of introspection, we are in reality *noticing* certain manifestations, and *interpreting* them as indications of certain mental states.'

Do we get rid of our own mental constitution in *noticing* and in *interpreting*? How do we interpret? Obviously by reconstruction, by the aid of imagination and the memory of experiences of our own that had a similar expression or manifestation. Can you conceive of any possible way by which we can get rid of our own thinking, our own experiences, our own mental constitution while making these "objective observations"? It does not seem to me so very evident how all the subjective can be set aside. Consciousness and our own experience can not thus be set aside and altogether got rid of by the "new psychologist," any more than by the "old," who never claimed that he could perform the wonderful feat of swimming without going into the water. Of course we should be on our guard against self-deception, there should be eternal vigilance and this the "old psychologists" have almost always maintained as necessary, while the "new psychologists" are certainly exposed to the very same danger, only they tend to

disregard it, fancying they are quite safe.

It has been claimed that physiological psychology, first taught the importance of the formation of habits by its physical explanation, its theory of organic changes, residual effects, &c. I am inclined to seriously doubt this statement. On the contrary, the theory, of nerve tracts, brain changes, etc., is simply an attempt to explain in organic terms the very familiar facts of the effects of practice. I think, that in the case of the important matter of the formation of habits what is [p. 98] required is a more careful introspective, reflective and philosophical study of the facts of habit as known in our conscious experience to see their importance and ethical significance. The ordinary account given by the physiological psychologists is inadequate and misleading, because their familiarity with and constant use of the two modes of .expression, the psychical and physiological, seems to tend to make them arbitrarily divide everything into just two classes. Hence in considering habit they speak of the conscious and the unconscious. The learner is said to begin with consciousness, a state of painful awareness and his aim is to return to a condition of unconsciousness. This is not a true view of habit. We can easily distinguish between the first form of painful striving consciousness and the second where the result is acquired, possessed, controlled and used, but the second state is not. properly called unconscious. We certainly attempt, and should attempt, to form useful and proper habits that are our possession and under our directive control -- not to be interfered with when they tend in the right direction and lead to the desired result, but still capable of being modified if occasion arises. Take for instance piano or violin playing. Is it utterly and altogether unconscious? Is not the process as a whole under the directing eye of consciousness, and if anything unusual occurs, is there no way of adjusting the habitual action? If the acquired habit became absolutely unconscious, it would cease to be under control and could not be improved upon or modified when necessary. Hence it would often lead astray without knowledge of the error committed or possibility of correction.

The study of the organism may help; to emphasize the need of hygienic considerations, regard for health care of the body and so may assist in keeping before us the Greek ideal "Mens in corpore sano."

To many people the physical consequences of immoral conduct are more obvious and appalling than the deeper evils, the disintegration of the moral character. Take for instance the vice of intemperance. The strongest appeal is made to many people by showing the evil effects of liquor upon the general health. This is certainly a very grave matter. We are responsible for the care of our bodies and the preservation of our health, yet it seems to me that the deepest aspect of the wickedness of drunkenness is often almost entirely overlooked. This is not the physiological but the psychical aspect of the case, namely, that for a time the responsible moral agents give up his rationality, sinks for the time lower than the brute because the brute is incapable of moral or immoral conduct, hence it is not an exaggeration or figure of speech when it is said that human beings may sink for the time lower than the brutes. He allows himself to become temporarily insane and incapable of regulating and guiding his conduct. Is not a drunken man a temporary lunatic with this difference that we may pity the lunatic as suffering from some malady while the drunken man has knowingly chosen his form of lunacy, for the sake of gratifying a selfish appetite. During the period of his insanity for which he is responsible he may possibly [p. 99] commit some terrible crime. Now what I wish to call your attention to is this that it is no thanks to him if he miraculously escapes committing some dreadful crime. From a moral standpoint, as it will seem not from human legislation but in the-eyes of the eternal Judge, be la responsible for the crimes that he might have unwittingly committed, because he knowingly placed himself in a condition where they are quite liable to occur.

This is an appalling thought. I simply ask you, to reflect upon it and see if it is not an expression of the truth. If this sin were seen in its hideousness it would not be so lightly condoned, it would not be so recklessly committed; there would be a more earnest attempt to live up to the petition of the Lord's prayer "lead us not into temptation."

There is one point in practical education, to which I trust more attention will be directed.

I think the physiological experiments should give suggestion; and lead to more careful attempts to get the educational significance of brain localization, and individual peculiarities of memory to which the study of aphasia has helped to draw attention..

With the assistance of psychological observation, it can be discovered that students may be classed into those who are predominently visual or eye-memorizers, and those who are *ear*-memorizers.

This fact has been noticed, but not sufficiently attended to by educationists. The old method of teaching spelling was by sound memory; the eye memorizers learnt without the guidance of the teachers' by using their eyes. The newer methods of teaching spelling endeavor to direct and train the eye more, for the majority of people are *visual* memorizers. It is true that these assist one another and that is best learnt and most likely to be remembered that has exercised eye, ear, and muscle in its attainment. It is because the majority of people are eye memorizers that there is such an apathy or at times antipathy to attempts at phonetic spelling that so enlists the sympathy of the ear-spellers. To the eye-speller a change in the appearance of a word is a deformity, an abomination! In my opinion the only way to introduce a spelling reform, would be to take account of both classes of people, the eye-spellers and the ear-spellers. By a philological society settling upon a standard phonetic alphabet, and consistently using it in all the dictionaries to express the pronunciation instead of the present chaos of conflicting methods, a great step would be made towards the attainment of phonetic spelling. In the dictionary both forms-of representation would stand side by side, and we should not be annoyed by barbarous and capricious attempts at phonetic representation, but would have a standard phonetic spelling of as good authority, and soon as great familiarity as the ordinary representation. I have no doubt which would ultimately triumph in a fair field, because the eye can learn the form of the phonetic spelling just as well as any other kind of spelling while the ear cannot learn the multitudinous exceptions of our lack of system without great loss of time and effort. I am an eye-speller myself, even in writing shorthand [p. 100] I spell by eye, but I have much sympathy for the ear speller whose claims have been so persistently ignored, in what is sarcastically called English *orthography*.

Lastly, in considering the contributions made by physiological psychology, I have even heard it said that the great lesion taught by physiological psychology was the organic or united character of man's various faculties that ordinary psychology was in the habit of treating as separate faculties.

This however, is not the case. It is quite true that a psychology that speaks of the distinguished states in consciousness as absolutely separate is incorrect, but this tendency of separation is due to the employment in part of the method used by physiological psychology which lays the emphasis on the elements, upon the differences, and tends ignore the unity. Take the phrenological charts inspired by their physiological bias. What general psychology ever approached this in the absoluteness of its separations? In fact it is just the peculiar danger of physiological psychology to make absolute separations, and there is need of a reference to another standpoint that will call attention to the unity in consciousness, the unity that is abstracted from, and ignored in the attempted method of physiological psychology.

The conviction that the nervous system, is *one*, that it is a real *organism* is obtained not from observation of the changes occurring in the nervous system, but from consciousness of the reference of all the changes in experience to the one feeling consciousness so that if one member suffer all the members suffer with it. It is in the consciousness of the pain as belonging to the self, the consciousness of all its various experiences of all the members as belonging to the one identical consciousness that is the basis for the recognition of the unity of the organism. Instead of physiological psychology emphasizing the unity of the conscious life its emphasis and tendency has all been in the opposite direction. It is only, because it could not get free from the convictions and teachings of introspective psychology that it learned to speak of unity in the conscious experience and unity in the nervous organism. Instead of a conviction then of the unity of the conscious life being learnt from a conviction of the unity of the organism the truth is that the basis for the belief in the unity of the organism is the unity of the conscious life, not vice

versa as some physiological psychologists would try to represent.

This is in fact just the peculiar danger that besets the student of of [*sic*] physiological psychology. The limited point of view is apt to lead the young and unwary student to look upon the states of consciousness as having each a kind of separate existence apart from the uniting consciousness. He is attempting to apply to them the formula applied to the changes of material objects in space, and in consequence he is tempted to look upon the states in consciousness as the effects of organic changes. This is the simplest view for him to take, and its inadequacy does not become apparent at first. Many of the less reflective never proceed far enough to discover the insufficiency of this view. [p. 101]

If we reflect upon some of the consequences of the logical carrying out of this view we shall see some of its imperfections. It is apt to lead to the conclusion that with the destruction of the organism the soul must necessarily cease to exist. Furthermore even in the life of the individual the purely mechanical and materialistic conception of the nature of consciousness issues in the result that moral distinctions lose their validity, wrong doing is merely disease and an unavoidable disease, for in consistency a necessarily evolving fatalism -- such as the scientific view becomes when it is made all, and when its only unity is constant reference to the all-absorbing iron rule of the unbroken causal connection -- cannot leave any place for taking steps to choose the higher and avoid lower courses of conduct. With the reduction of the conscious states to the effects of material changes governed by a fatalistic view of the law of causation, freedom is denied, and with the abolition freedom moral distinctions and moral responsibility vanish out of existence. This consideration may lead us to doubt the sufficiency of the view or standpoint of physiological; psychology when it is extended and made all-embracing. I do not believe in studying a question from a theological basis, a determination to make the facts fit a certain pre-supposed conclusion. I do not believe that this is a correct method. If we were sure that the theory under consideration was true, then I say we should choose the truth let the consequences be what they may. I am willing to follow the truth of any consequences to which it properly leads. There is no deeper infidelity than a distrust of truth, to say, by word or deed that it cannot stand being investigated. Many of these sceptics of truth will talk unctuously about faith and while hugging their own delusions will lecture patient investigators upon the fallibility of the human reason. But if I deprecate a theological bias, so too in perfect fairness I may claim that it is just as incorrect to start with a materialistic bias declaring that; everything that does not fit this pre-supposition and theory is absurd. I object to the materialistic pre-supposition because it fails to explain the facts, and yet like a dog in a manger will not allow any other attempt at explanation. It is because when pressed beyond its partial truth it is discovered to be inadequate, untrue and unphilosophical that I object to it. The study of physiological psychology that makes use of the narrower view alone, though not misleading to one who can see beyond it, and has learnt its limited character, is very misleading to a beginner.

The "old psychology" scarcely ever lost sight of the unity of consciousness, the deeper truth, the philosophical aspect of the facts. Hence the older psychology when studied with a view to be an introduction to the deeper problems of philosophy, attempted to lead the pupil up gradually to a position from which he could detect the limited character of the mechanical hypothesis. .But, it is the boast of the "new psychology," that it is strictly scientific and avoids all such reflection.

The physiological psychology, keeps to the one aspect, namely, the changes neglecting the deeper aspect. It selects the partial view of [p. 102] consciousness, the one that will fit in most neatly with the mechanical interaction of material particles. By excluding any other consideration, it seems to give the decision in advance to a purely materialistic interpretation of mental action. The mind already accustomed to this view in dealing with objects, becomes familiarized with its use in dealing with the facts of consciousness and is precluded from discovering and noting the distinguishing characteristics of consciousness.

The "new psychology" prides itself upon being "strictly scientific," but this is just the danger of our times -- a superstitious idolatry of the hypotheses made use of in science without

enquiring into their meaning and limitations, their need of being supplemented by a wider view. In Mr. Bryant's thoughtful paper[*] a reference was made to the proper method of studying as inductive. There is one element in this method that was doubtless intended by Mr. Bryant though usually neglected in the common mode of scientific induction. In the scientific view there is a simple observation of cases, and a generalization made of the results. In education it is important that the student should observe, collect and generalize for himself, but something more than this is needed, namely the training of the critical and reflective faculties, a training of the capability of estimating opinions, and of forming valid proper and independent opinions.

Only thus will we study history aright, discover its meaning and learn its lessons for our guidance, only thus can we make a proper selection amid the various courses proposed for the future. This reflective, critical study is deeper than scientific observation and classification. It wishes to see and understand the meaning of the principles and presuppositions of science and scientific methods.

It wishes to learn the true significance, of what is taken for granted by the scientist. It wishes to understand the law of causation itself and see its relation to the free action of the moral agent. Many scientists say that all is absolutely ruled by the law of causation even the character and choices of the individual, yet those same people usually go on to say that we should, therefore learn the laws of nature, and conform to them.

They see no inconsistency in giving such advice; but if we too are merely changes or sums of changes ruled by the laws of nature and not rulers of the rules nor capable of making a rational application of them, then it is useless to give advice to conform to the laws of nature. As well advise the falling stone to conform to the law of gravitation.

So you will see that the law of causation in its connection with human character and responsibility must be re-considered. If we are to be able to *use* our knowledge, rule nature by obeying her laws, *we* must be more than the changes ruled by and used by the organic changes occurring in accordance with a determined fatalism.

I object to the materialistic hypothesis on many grounds, a few I may merely indicate. In thus going beyond to critically estimate the meaning of the law of causation we pass beyond the limited view of the ordinary scientific procedure. [p. 103]

I claim that scientific study should be supplemented by the critical reflective wider philosophical consideration, and that any psychology that fails to use its opportunities to fit a student -to grapple with these deeper problems, but arbitrarily fits all the appearances into the straightjacket of the scientific hypothesis is not true to the best interests of the pupil, and its teaching may become positively injurious by preventing a wider view.

The materialistic explanation it must not be forgotten is a theory or hypothesis, and must be tested as such. We, do not immediately observe that the "brain secretes thought as the liver secretes bile." It is sometimes represented as though it were an observed *fact*. But whoever directly observed the *brain* thinking? It is an hypothesis, and it is not sufficient to explain the facts under consideration. Let us represent the hypothesis thus: Two substances, matter and: mind interact, and the result is feeling, consciousness, knowledge. By the hypothesis our *knowledge* is the effect of two causes that do not come into knowledge but by their interaction produce knowledge. Knowing and knowledge is the effect. All that we know is phenomenal -- we never know the realities the unknown causes of the known effect.

But let us look more closely. The nervous organism to which the materialists refer knowledge is *known*, it is therefore merely phenomenal and not the reality. Yet it is used to explain knowing and the knower, is regarded as their basis and cause. Is it not evident that this known phenomenal object, instead of being an explanation of consciousness, requires consciousness, knowing, in order that it should be known and in order that it should exist as it exists for us and known by us, therefore for the known nervous system, the conscious knowing principle is required. The thing to be explained is necessary as the basis of that which is used

to explain it. Materialism says we do not know reality, we mean the substance behind the appearances, that is the cause of the appearances, and of the mind as one of its appearance. When carried out fully it is seen that this materialistic hypothesis when applied to the explanation of consciousness ends in an agnosticism, a doctrine of dogmatic ignorance.

Then having landed in this unfortunate position, it enviously tries to reduce everything else to its own plight. .It sneers at the mind as a "mysterious abstract entity," while it reality the mind is "a mysterious abstract entity" only to the materialist himself, who places it upon the same level as that other "mysterious abstract entity that he calls substance, and for which he has such great respect. ...

I cannot grant that the mind is a "mysterious abstract entity.'[*sic*] It is only from the inadequate view of the materialist, that it seems to be such. If I know anything more fundamentally, more immediately and surely than anything else it is myself the knower. I am capable of recognizing myself as the knower and doer ; capable of distinguishing myself as knower and doer from the things I know, the actions I do; which are *mine*.

The materialistic view is an hypothesis. It is doubly insufficient. [p. 104]

Take our moral experiences. If they are cramped into the materialistic formula, they cease to be moral experiences.

Moral distinctions disappear when made to appear at the necessary result of substances and forces interacting according to .the determined law of causation. How do the holders of the materialistic hypothesis treat moral experiences! Moral experiences are *facts*, but because such facts do not fit into their theory, they say "So much the worse for the facts." Anything that will not fit our theory, must not be admitted to be a fact at all. Therefore moral experience must be explained away as a species of inevitable illusion. Is not this arbitrary and unfair?

But further, you will notice that the realities interacting, and producing experiences of any kind are utterly unknown. So that even if we leave the moral aspect out of consideration the theory is insufficient as an attempted explanation of knowledge. Knowledge is limited to appearances of something that itself does not appear, hence we never know and never can know reality. Omniscience itself could never know reality according to this method, for it would cease to be reality if it were vitiated by being known. The result then of the theory is absolute agnosticism, and the attempt to explain knowledge ends by saying knowledge is impossible. Is not this the reduction ad absurdum of the theory? It was posited to make knowledge comprehensible as a possibility -- it explains it by saying it is an incomprehensible impossibility. Surely this is a confession of utter failure. What we begin with are the facts in our experience. An explanation should be an attempt to comprehend their meaning and possibility. An explanation that makes them unmeaning stands condemned.

It is not an explication to say that something is inexplicable, but an abandonment of the problem or rather an attempt to stand like a dog in the manger refusing to allow any other attempt at explication and explanation. A deeper view that will not be frightened away by the snarls of the dog in the manger, will see that not only must we take notice of the separate states and their changes and successions, but we must also recognize that our experiences are in consciousness and for consciousness.

We must turn our attention to the uniting consciousness that renders experience possible. This is not a retreat to the unknown and unknowable, because in self-consciousness we can recognize the character of the principle that is implied in all knowledge that we either know or can form any intelligent conception of. Further reflection may lead to the conviction that if we speak of the universe as a system, as in any intelligible[*sic*] sense *one* and not as a disconnected and unknown chaos, it must be held together by some principle similar in kind to the one we are aware of in knowing the character of our unifying consciousness. This deeper view recognizes that the self is more fundamental and permanent than its experiences of

change; that the self may be self-directive, may regulate its experiences and thus have a moral character and responsibility.

Such a view prepares for and points the way towards a justification of our belief in the existence of a Spirit that is Perfect. [p. 105]

Hence I claim that scientific studies and most especially physiological psychology should be carried up into a philosophy.

Many students of physiological psychology think that in seeking details under the guidance of their formula, they are dealing with and establishing the interconnections of mind and, matter; but as I have attempted to point out they limit their attention to merely one aspect of mind, the one that is most capable of being twisted into the appearance of a refined matter, and then suppose they have settled the problem of the relation of mind and matter, and all the time they have excluded, ignored and even at times ridiculed the characteristic that is most distinctive of mind; all because they have started with a materialistic bias, a dogmatic, uncritical presupposition.

Our University courses should include a more general study of ethics and philosophy to free men from the thraldom of narrow views.

It is a matter for regret that the tendency of our own University is so strongly towards early specialization. The influence of the curriculum even extends back into the High Schools and Collegiate Institutes and specialization is encouraged almost from the time of leaving the Public Schools. The teacher, at any rate, requires more general training than is required by the ordinary specialist. Yet those who purpose becoming teachers, are just the ones who are most tempted to specialize. The best course for the training, the education of one who intends to make teaching his profession and life work is a philosophical course.

The philosophical course demands a basis of wide reading; it demands a considerable language study, and its aim is to encourage reflection, thoughtfulness, thoroughness -- education rather than information.

Yet the philosophical course is avoided by many who intend becoming teachers because "there is no position in our schools to teach philosophy." As well avoid the study of educational systems, history of education, because there is no position to teach these in the schools. The object of these courses is to train the teacher himself so that he may go forth a clear thinker, an observant and thoughtful student, who is aware that his education has not been completed when he gains his B.A. degree, but who has learnt to become a life-long learner.

I am glad that the teachers in training require to take some psychological work in the school of pedagogy, but instead of beginning this work in the training-school, the teacher in training should be ready to enter at once upon a critical survey of systems of education. To do this he requires a preliminary training not only in psychology, but also in the philosophical work, ethics and history of philosophy. A little psychology alone is utterly inadequate, and as matters now stand he is simply acquiring even this at the training school in many instance, whereas he requires this and more than this to enter with profit upon his professional studies. Psychology is simply the a.b.c; he should go on to learn to read, should be capable of grappling with problems for himself, to be an independent thinker. It is to fit him for this that philosophical studies [p. 106] are so useful. In the training school many subjects have to be token up, leaving very little time for psychology; the study of the latter requires time, if crammed up hurriedly it becomes about as barren and useless as the old method of studying grammar by the learning of rules. The student must re-think, reconstruct, think for himself or nothing is learnt.

I am glad that Dr. McLennan has succeeded in preparing a very useful work, showing the practical bearings of psychology upon education. With the many other subjects to be attended to in the short session, he has not the time, nor should he be expected to train men in

psychology. The student's time should not be thus occupied. He should come to the school of pedagogy with a considerable acquaintance with psychology, ethics and philosophy, and should spend his time in the training school in discovering the most effective ways of making practical application of these principles.

There must be a foundation laid broad and deep, and the proper way to raise the status of the noble profession of teaching, is for those who purpose making this their life work to devote themselves to earnest preparation. Be ready to make self-sacrifices and you will not lose your exceeding great reward in the consciousness of duty faithfully and conscientiously done; in the knowledge that you are developing, moulding and ennobling the generation that will soon take our places, and carry on our work.

Footnote

[*] *Classics Editor's note: The paper referred to here is "Education in the Twentieth Century" by J. E. Bryant M.A., and appeared in the same volume as the present paper, pp. 50-78.*

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