V.—CONSCIOUSNESS AND BIOLOGICAL EVOLUTION. (I.)

BY HENRY RUTGERS MARSHALL.

Sec. 1. THE increasing interest shown in these days by biologists concerning the psychological problems that bear relation to their studies of living matter, is certainly a reason for congratulation. Psychologists have for long years been turning their attention to biological studies and have in later times given especial consideration to neurological investigations: and they have done this with the hope that by the study of the morphology and development of the nervous system they might learn what would be of value to themselves in their investigations in relation to the nature of consciousness, which we all know to be intimately connected with neural functioning. Moreover no psychologist in these days will hesitate to acknowledge his indebtedness to the physical sciences, and especially to physiology and neurology. But it must surely be agreed that the psychologist is warranted in expecting the workers in biological and physiological fields to ask help in return from the science to which he devotes his energies: for it is not at all unlikely that light may be thrown upon some of those biological problems which are before us to-day by a study of the character and development of the conscious states which have relation to the forms and evolution of life.

In the course of the series of articles of which this is the first number I shall discuss a number of biological questions in connection with which the teachings of psychology appear to me to be likely to be of service. In this first number I shall touch upon a few such points, concerning which it will be well to have a clear understanding with my reader before I develope the argument of the succeeding articles.

I.

Sec. 2. I wish in the first place to make a brief study of the theory of "parallelism" between mental and physical phenomena as it seems to me to be valid, and to ask the reader to consider the bearing of this theory upon the notion that consciousness has functional significance in biological development.

Before entering upon this discussion I would beg my reader to note one point with reference to two opposed theories of the relation of mind to matter which are displaced by this theory of parallelism.

Long before the human mind had gained any knowledge of the existence of a nervous system, the forms of consciousness,—sensations, intellect, emotions, and will,—were thought of by men as acting upon and making use of the bodily organs. The mind was thought to influence the body.

Later investigation has shown that the farther we study, the more evidence do we gain that all conscious effects involve neural changes; but it has also shown, on the other hand, that there are many neural changes which do not appear to affect consciousness at all.

It is not unnatural that the old notions of the use of the body by the mind should have clung to us, and that we should find a school of thinkers who interpret the newly discovered facts in terms of the hypothesis that mind influences the body, and who are unwilling to renounce the claim that human consciousness is fuller and wider than neural reaction. In fact such theorists are able to support their position by pointing to the vast fields of conscious activity that cannot be positively shown to be determined by any known neural activity; and they are thus led to hold that investigation has shown no more than the fact that special mental states are in themselves efficient to produce nervous action; and to claim therefore that these mental states are the all important matter for consideration in discussing the relation between neural and psychic action.

My reader will say truly that no body of serious and learned psychologists in our days holds such an extreme view, but he will agree that this is practically the position taken by many unlearned in psychology who earnestly attack all opposed views as dangerous materialism.

I refer to this view however principally because I wish to note that equally unwarranted appears the position of an opposite school which includes amongst its numbers not a few of our eminent scientists, who are wont to look upon those who cling to that theory of ancient pedigree, of which we have just

spoken, as gullible fools. Those who hold the opposed theory of which I now speak are wont to call attention to the fact that action of nerve is explicable in very much the same terms in which we describe the mechanical forces of nature which surround us: and emphasizing the fact that a great deal of nervous action does not appreciably affect consciousness at all, they are wont to contend that therefore this action of nerve must be all important for our consideration in discussing the relation between mental and neural actions; and they ask us to look upon the accompanying conscious states as merely "epiphenomena," affecting the mechanical nervous action no more than the squeak of the cart wheel affects the progress of the cart; if we may borrow a descriptive phrase from Prof. Huxley.

But why, we are at once tempted to ask, is the claim of the extremists of one school better than that of the extremists of the other; when of these two sets of facts which we know to bear a very close relation to one another, each set in turn is held to be alone of significance? And this is the point which in introducing this discussion I wish to make clear; viz., that if the view first mentioned assumes too much in proclaiming the all importance of the conscious aspect in relation to neural change; equally may it be held that the opposing view assumes too much in proclaiming the all importance of the neural changes and the total unimportance of the coincidents in consciousness. If one view be rejected because of its dogmatism, then the other view must be rejected for exactly the same reason.

A more logical hypothesis than either of those above spoken of has presented itself to the minds of many of our best thinkers in these days, in what is known as the theory of "parallelism" of which I have already spoken. This hypothesis differs in detail as expressed by various writers; my own expression of it will probably differ in some respects from that of any of those who have written upon the subject: in order that my meaning in what follows may be clear I shall run the risk of wearying my reader by stating the theory as it seems to me to be valid, in its broad lines.

Sec. 3. It seems to me that if, in reference to the problem before us, we treat logically the phenomena of psychic life as we experience it we are compelled to hold that each and all of the elementary activities of life have psychic correspondents; or in other words that they are accompanied by some form of what we may call "mentality"; but that under certain conditions, and only under these conditions, does this mentality

take the form that we speak of as consciousness. Why I think we are led to this position I shall explain briefly.

In the first place we have become convinced, as we have already seen, as the result of physiological investigation that while consciousness is always attended by material changes in our organism, yet only some of these material changes appreciably affect that consciousness. Still we are unable to bring ourselves to believe that the connection between material change and consciousness is fortuitous, and of no moment.

But our attention is called at this juncture to the fact that the highest organization of life which is found in the cortex of the brain, is known to influence most markedly the most complex forms of consciousness, and the great body of neurologists will agree that the fact that the most effective mass of what we call consciousness is connected with the action of that elaborated part of our nervous system which we call the brain, shows that neural systematization is of fundamental importance in relation to consciousness, which we may look upon as due to coincident psychic systematization.

But if it be granted that neural systematization is thus of importance, then we are led in the first place to grant, as is generally done, that there are grades of consciousness in animals of different forms and types corresponding to grades of this neural systematization in them. Nor can we stop here: for we are surely forced to allow also that there are within our very selves various systems of consciousness corresponding to varieties of neural systematization within us. This is evidenced by the more or less morbid conditions known as states of "double consciousness," and by the normal shiftings of mental capacity.

We are thus led to go a step farther and to hold that as there are many neural systems within us of varying grades of complexity and integration, all of which have means of expression of more or less definiteness; that therefore there is a great probability that these lower neural systems are the coincidents of certain lower grades of consciousness.

The facts as we have discovered them are then explicable if we hold that activity in one of these psychic systems, viz., that which is coincident with the pulse of activity in the brain, is of preeminent importance; and that in man this importance is greatly increased because our brain system has connected with it the power of giving itself the elaborately differentiated, and yet relatively definite and fixed, expression in speech.

Furthermore we must hold that this preeminent system of consciousness is itself, within certain limits, capable of becoming split up into more or less separate parts, which at times may

find their expression correspondingly separated. We are forced to this conclusion by the facts above noted of what are acknowledged to be multiple consciousnesses within the same person, such as we note in cases of hypnotic or other trance states, and in morbidly neurotic patients, and, if we will but look for it, in our own perfectly normal lives.

Furthermore we may surmise that, under certain conditions, the minor systems of activity, which are normally entirely separated from the preeminent system, may join with and affect the constitution of this preeminent system,—this brain consciousness,—that alone has its mode of expression in speech.

The preeminent consciousness, this "brain consciousness," in man is indeed all that falls within the scope of introspective psychology, but logical considerations surely lead to a widening of the limits of consciousness in the manner suggested and, to the hypothesis that there is a psychic somewhat, a certain "mentality," connected with each neural action which gives us consciousness of varied grades, under certain conditions of neural systematization.

If this conception be correct then it seems probable that the "mentality" coincident with certain of our bodily actions may fail to become part of the preeminent consciousness, either because it has not gained the qualities which make consciousness out of mere "mentality," or because actual disconnection determines the absence of the mental correspondents of these activities from forming part of the preeminent consciousness. And this disconnection may be due to incommensurability of rhythm, if we may so speak, between the several sets of activities, an example of which we have in the insensibility of the soldier to the painful sensations caused by a wound, during the excessive excitements of mortal combat: or it may be due to actual disconnection between the physical parts that are active, such disconnection as we see almost completely realized in the independent action of the cerebro-spinal and sympathetic nervous systems, the latter serving to govern the functioning of the assimilative and other systems which do not need to react quickly to alterations of environmental condition.

But even where the connection of the physical elements in a physical system is complete we should expect to find certain marked distinctions within the psychic system coincident therewith. We must conceive of the physical action of the coordinated system, of which the brain forms the centre, as a pulse, as it were, of many correlated subordinate activities, most of which are unemphatic, but some of which are likely to stand out from the mass. Similarly on the psychic side we should expect to find at each moment a pulse of consciousness

correspondent with this pulse of physical action, this full consciousness being made up of many subordinate elements, most of which will be unemphatic and which will appear to form an unanalysable whole, but some of which on the other hand will be emphatic, and will therefore stand out as increments, so to speak, to this unanalysable whole.

This unanalysable whole is I think that which we designate as the empirical Ego, with which the psychologist has to deal; and the emphatic elements, which appear as increments to this Ego, are the elements which fall within the so-called field of attention; such elements for instance as make up our recognized sensations, emotions, thoughts and acts of volition.

It must be noted also that at times we include in this field of attention certain effects from systems of mentality that are ordinarily separated from the system that we call here our "speech consciousness," our "brain consciousness."

I would here call attention to the fact that this statement of parallelism avoids the difficulties inherent in those atomistic theories so carefully considered by Prof. James in his criticism of the "Mind Stuff" theory¹: for it assumes in a system no mental elements which act separately within the system; nor any quasi mechanical or chemical combination of such mental elements to produce new psychic phenomena. On the other hand it assumes that each more or less complex psychic system acts as a whole, its elements being variously emphasized and thus changing the quality of the whole psychic pulse: but so long as these elements remain part of a system in no sense are they conceived to act as elements as they would act if they were not part of the system.

I think it will appear in the sequel that the conception of the relation of mental to physical activities thus stated aids us materially in gaining a correct view of not a few matters which are of interest to both biologist and psychologist; and before passing on I shall ask the reader to consider with me, two ever recurrent problems upon which this hypothesis, if it be correct, appears to throw no little light.

Sec. 4. In the first place I wish to speak of the bearing this doctrine of parallelism has upon the question whether consciousness has or has not a function in relation to biological development.

Puzzled by the enormous complexity of animal life, failing in their endeavours to comprehend the basis of the manifold accommodations to varied conditions which are seen in living

¹ *Principles of Psychology*, Vol. I. Ch. vi.

beings of all grades, balked in their efforts to conceive the origin of variations from typical forms; many eminent biologists have turned to consciousness for aid.

Some lay hold of the notion that consciousness appears in the universe as the source of variation, is the active agent in changing the course of typical neural action in order to produce accommodation¹. Impressed by the difficulty of squaring this view with the generally accepted hypothesis of the conservation of energy, others lean to the notion that if consciousness cannot change the value of a neural force it at least may serve to guide such a force into new channels, and thus produce variation.

But the effort to explain these biological difficulties by recourse to the hypothesis of interference by consciousness must appear to my reader to be futile, if he once consider how little relatively we know of the nature of consciousness, how little of the nature of neural action; and how exceedingly difficult it is to conceive of the manner in which this supposititious active or directive interference can be made effective. The hypothesis of such interference is in truth a mere statement of our ignorance.

But if we think of consciousness in the light of the hypothesis of parallelism as above stated, it seems to me that the question before us is laid at rest.

We then see that the complication of animal life is co-ordinate with a like complication of psychic life. We see that the manifold accommodations by the living elements are coincident with equally manifold new relations of psychic elements. We see that variation from typical biological forms involves necessarily variation from typical psychological forms. We see furthermore that growth in organization in neural fields must correspond with growth in organization in mental fields.

It appears then that if we are satisfied, for the time being at least, to accept the fact of physical evolution in all its complexity, and are content as we must be at this moment to study its forms and progress with acknowledgment of the difficulties surrounding the question of its origin, and of our ignorance of its teleological significance so far as the universe is concerned; then we may be satisfied in a similar manner to accept the fact of psychical evolution in all of its complexity; may properly content ourselves as scientific psychologists with the study of mental forms and of the development of mental phenomena.

¹ Such a view was expressed by Prof. Cope in an address at Philadelphia, Dec. 1895, before the Amer. Psychological Association.

But beyond this we may hold that there is no reason to believe that consciousness, properly speaking, has or can have any function in relation to biologic evolution, rather does it appear as a correspondent of this biologic evolution. And on the obverse side we are led to hold that there is no reason to believe that biologic forces have or can have any function in relation to mental development: what we do hold is this; that the great forces which move in the universe bring about this mental development coincidently with the evolution of complex neural systematization.

The question as to the nature of the moving forces which have produced the genesis and continuance of this evolution, coordinately physical and mental, intensely interesting as it is, we may turn over with some relief to metaphysics, as a question with which biologists and psychologists, so long as they remain in their own fields, have, strictly speaking, nothing whatever to do; although we may surely hope that metaphysicians will some day make the solution of this problem clearer to us.

Sec. 5. The second problem which I would ask my reader to consider here is the view which we are led to hold in reference to the relation of intelligence to instinct, if we maintain the doctrine of parallelism.

If all the instincts observed in the animal world were diverse from our own, as diverse for instance as those which lead to flight in birds, I very much doubt whether we should ever have conceived of the relation of consciousness to instinct action as it presents itself to us to-day.

But noting, as we do, many actions in animals which seem to be clearly automatic, we find in ourselves very similar activities which appear to influence our consciousness; and then again we find others of the same type that do not appreciably affect consciousness at all.

Looking at the matter carefully, and considering the actions in ourselves which correspond to what we speak of as instinct actions in animals, we find that the appreciable effect of these actions upon consciousness can be represented in gradation from a minimum of zero, to a maximum in which instinct appears to have disappeared entirely, giving place to actions produced by will.

On the other hand our attention is attracted to the fact that in our own experience we are able to trace the formation of what we may call pseud-instincts. Actions which were performed years ago only under stress of will and with effort, we know to have come gradually to require less and less of effort; we know we learned gradually later on to perform them

altogether without attention, although they were still under control of our will; we realize that we have then gradually lost this control altogether; and finally that the actions take place with as little appreciable effect upon consciousness as appears in connection with the most characteristic of the instinct actions.

These observations have led some to hold the theory that all instincts have originally appeared as adaptations that have been intelligent; but that as adaptation has become unnecessary in connection with these activities intelligence has lapsed; and this notion has served to emphasize the above discussed hypothesis, that consciousness has a function in connection with biological adaptation.

But with our conception of parallelism before us it does not seem at all certain that such a theory is warranted. It is of course true that a large mass of our individual habits arise in connection with intelligence, and that as they gain their distinctive characteristics, intelligence in connection with them lapses: and it is equally true that if these habits help to give us success in life's struggle the race which is descended from us may by chance be able to gain these habits of action in form so thoroughly organized that they may appear finally as clear examples of instinct; and this is true whether traits acquired by an individual are transmitted by inheritance, or are not so transmitted.

But on the other hand it is not difficult to understand the lapse of intelligence referred to without recourse to the hypothesis of a functional relation, if our doctrine of parallelism be true. For we have merely to hold that as habit becomes more fixed, neural action becomes more thoroughly organized; and that correspondingly the psychic elements coincident with the neural activities become less and less emphatic in the pulse of the preeminent consciousness with which introspection acquaints us: and finally that these psychic elements either become absorbed into that unanalysable background which makes up our empirical Ego; or else perchance lose all influence upon this preeminent consciousness, and this either through practical physical disconnection of their neural coincidents from the brain, or by their lack of rhythmic relation with the brain activities.

But beyond this I see no reason why we should assume that instinctive actions could not be acquired without any consciousness at all. All that we have to assume in order to account for such acquisition is the occurrence of a "chance" favourable variation in some form of action which in itself may be quite inappreciable in its effect upon consciousness. If this favourable

variation should happen to become fixed in our race we should have an instinct of new type formed in our descendants without any intervention of consciousness at all.

II.

Sec. 6. I shall now ask my reader to consider with me a question of terminology which appears to me to be of moment in itself, and which will have its application in the articles which are to follow this. I wish to say a few words concerning the nature of Instinct and concerning the application of the term.

As far as we can go back in the history of organized life we find two fundamental influences at work, the influence which tends to restrict variation within certain typical lines, and the influence which would lead the organism to break free from these restrictions.

If we begin by considering a hypothetically simple living mass, assuming nothing more than the existence of the very simplest possible forms of living matter capable of growth, and placed in an environment that furnishes the nourishment upon the assimilation of which this growth depends: if such a mass can be assumed to exist, then I think it will be agreed that we must assume also a tendency to "fission" in the living mass, or in other words must postulate the breaking up of the living mass as it grows: for the reason, as Spencer has taught us, that volume tends to outrun surface; and as the nutrition is absorbed on the surface, while the reactive changes occur throughout the living mass, it is impossible for growth to continue unless the mass breaks up.

That such fission or cleavage does take place in low grades of living matter is well recognized by all those who use the microscope. But if we once assume that this fission or cleavage takes place, it is evident that the new masses will, after the fission, at first be placed contiguous to one another and as the process of division continues that they will, unless disturbed, tend to form a group which we may call an aggregate. Furthermore if the process continue indefinitely it seems to me to be apparent that, unless forces in the environment sweep the newly formed elements apart, we shall soon have an aggregate in which some of the living elements are prevented from absorbing nourishment by the mere fact that they are entirely surrounded by their fellow elements, and cut off from contact with the environment which contains this nourishment.

It would clearly be of advantage to these simple living forms if this difficulty could be overcome, and the simplest effective variation in this respect would be found if the new

elements, as they were formed, developed a tendency to separate themselves from the parent mass. As a matter of fact in very low forms of life we find what the biologist calls "cilia"; minute, and more or less active, prolongations of the cell substance which must tend to bring about separation between the cells. The microscope indeed shows us still more simple forms, so low in the scale of life that we often scarcely know whether to call them animal or vegetable, which have this power of separating themselves from their fellows, through the agency of no discoverable cilia, but through processes which we fail entirely to comprehend.

But we must not stop to consider these low forms of life too closely, fascinating as such study might be, for our interest in them here is merely in relation to their survival after they have come into existence through the division of the parent mass. What is of interest to us here is the recognition of the fact that in quite another way the newborn elements, tending to aggregate as we have seen they do, may accommodate themselves to their environment without the acquisition of mutually repulsive capacities. For this accommodation may be accomplished by the acquisition of certain differentiations in functioning so that the elements upon the surface of the aggregate and those that are shielded directly from contact with the nutritive environment will tend to react differently; provided that these differentiations result in a transfer of the nutriment from the environment to those elements that are placed distant from this surface.

If we assume even such simple aggregates as above described to exist, then we may suppose that any change in any one element of such an aggregate will tend to bring about some alteration in the elements adjacent to it, and on the other hand that these latter will react to modify the action in the first changed element; thus the action in the element first affected will not be the same as would have resulted had it not been contiguous to the other elements.

If then a disturbance of any kind whatever from the environment reach one of the outer elements of such an aggregate, this element would tend *primarily* to react upon the disturbing force from the environment as though it were an isolated element; and *secondarily* this action would be modified, or inhibited more or less fully by the influence of the other elements of the aggregate. Thus we see that in the very beginnings of the life of aggregation, we have two influences at work: *first, the elemental variant influence* which would lead any element to act for itself alone; to become accommodated more or less perfectly to a stimulus from without itself: and *second, the modifying influence from the aggregate*

of which it is an element. This influence from the whole aggregate upon a single element is in my opinion the very basis of what in complex organic life we know as instinct. Of this point I shall have a good deal to say in the sequel, but just here I would call attention to two facts. First, that as soon as we rise from mere aggregates to forms that are organized, the actions due to influences inherent in the organism are themselves organized. Secondly, that this organization is developed to the attainment of some biological end; for it is not easy to understand why nature should allow elements to aggregate unless they were aided in the struggle for existence by the fact that the organized actions occurring in this aggregate are of advantage to the aggregate directly, and indirectly to the elements. As a matter of fact this seems like stating a truism, for we recognize the biological end in connection with most of these coordinated actions which we call instinct actions, and I think we must hold that all series of actions which are thus determined by the constitution of the organism and which appear to subserve definite biological ends must be classed together as Instincts.

It is thus that I am accustomed to employ the word Instinct: but the reader will recall that I thus use the word with a wider significance than many authoritative writers attach to it; and at this point it will be well I think to explain and to defend my position in this regard. I think I shall be able to approach the subject best by referring to Prof. Lloyd Morgan's criticism of my usage of this word. He holds, in objection to my extension of the term, that biologists "have grown accustomed to the application of the term instinct to the manifestation of particular activities," and he says: "the term 'instinctive' should in my judgment be applied to those activities which are congenital and which are also relatively definite."

To the limitation of the term to congenital activities I am sure all will agree, if we accept Prof. Morgan's usage of the word congenital. For, as he explains, he intends by the application of the term merely to exclude acquisition during life, through experience, which is an important distinction; and he allows a subsidiary classification of instincts into connate and deferred, *i.e.*, those instincts that are perfectly formed at birth, and those which only appear some time after birth.

If we turn then to the question of the definiteness of the reaction, we note at once that while Prof. Morgan lays stress upon this fixedness of reaction in instincts he is nevertheless compelled to acknowledge, as he does in the use of the phrase "*relatively* definite," that this "fixedness" is variable: it seems

to me that this variableness is so wide, that definiteness of reaction cannot for a moment be used as a differentia in relation to instinct, and that any such usage as Prof. Morgan upholds narrows our conception of the bounds of instinct in a manner to be deplored.

It appears then that instinct actions as *objectively* viewed by the biologist are determined first by their organization, but especially by some biological end which this organization subserves. When we consider them *subjectively* we add the differentia that they are automatic, *i.e.* that the organized actions take place without our will; and whether we recognize the end to be subserved or whether we do not, and in most cases we do not.

If this be true then the definiteness, and the fixity, of the actions is of secondary moment: that which is important being the character of the biological end towards which these organized activities tend.

This is made the more clear, I think, if we study the instincts with the object of noting how variable are the actions involved in their expression.

It is true that we usually take as examples of the typical instincts those which express themselves in what seem to us to be practically invariable actions occurring in definitely co-ordinated relation to one another, so that the actions appear to be always the same, and to be aroused always by the same stimuli. As an instance of such an instinct we may take Prof. Morgan's happy example of the instinctive reactions in the chick in connection with drinking. Here as his experiments show there is no tendency to look for water; the thirsty little birds apparently have no conception of the basis of their discomfort; they will walk through water without any effort to drink unless they happen to perform the very definite act of pecking at the water, when at once the instinctive explosion takes place, they perform the seemingly definite actions resulting in the throwing up of their heads, and they drink.

But if we study this very case with care we see at once that of the chicks in a brood no two are likely to strike the water with the bill under conditions which will produce exactly the same relations of stimulation, and therefore with each of the chicks the coordination of complex actions which result in the drinking must be different, although in ways that are with difficulty observable.

It appears then that the fixity of reaction is an ideal to which instinct actions indeed tend, but which we may assume is seldom if ever quite reached; and which when reached give us what we usually speak of as reflex actions.

But if the instinct actions themselves are only relatively definite, the biological end to be attained is much more fixed; and this fact in connection with organization is in my view the *objective* mark of an instinct, to which as I say above must be added, on the *subjective* side, absence of any influence produced by conception of this end.

It seems to me that there are many of the lower types of instinct which show very clearly that their efficiency depends not upon any set of actions which can be spoken of as even relatively definite, but rather upon the trend of the activities they induce, even if the circumstances of stimulation vary; or even if the stimuli themselves, and consequently the reactions to the stimuli, differ to a certain degree. The young chick after being taught to peck may I think without question be held to show an instinctive tendency to search for food, but it expresses this instinct by turning this way and that, by jumping back or rushing forward, by grasping much that it cannot digest in the effort to gain what will serve as nourishment; the general end being reached, as the reader will perceive, through rather widely varying coordinations of actions.

And when we turn to a study of instincts of slightly more complex form our point is much more clearly seen. The actions connected with preparation for self-defence, those connected with protection of the young, with nest building, with migration, etc., these actions are surely to be classed as instinctive; and yet they are exceedingly variable and unpredictable in detail; all that we can predict is the general trend of the varying actions which result from varying stimuli under varying conditions; and which function to some determinate biological end.

Clearer still does this become when we study the higher instincts, those for instance which relate to the foundation of the family in the human animal; instincts which act indirectly through many efforts tending to the accumulation of food or property by the man, and to protective care of the young by the woman. But if definiteness or relative fixedness of the activities involved be the mark of an instinct, as those who object to my usage would hold, then these actions that we have just mentioned cannot be called instinctive. Yet who will agree to such a position; who will abandon the application of the term to the activities connected with fatherhood and motherhood; who will object to speaking of the paternal and the maternal instincts?

But the point that I especially wish to note is this; that if I am right in the contention thus made, then there are series

of activities of a most complex nature which we must also speak of as instinctive; namely, those series of actions that, through many complications, and without influence from any recognition of the biological ends they subserve, lead to the protection of the weak; to the prevention of tyranny and violence, through oppositions to murder, theft, lying, adultery; to the strengthening of social bonds; and to the emphasis of social consolidation. We are thus brought to see that we are warranted in speaking of the ethical instincts, of the patriotic instincts, of the benevolent instincts, and of the artistic instincts.

Prof. Morgan has suggested¹ that it would be proper to use the term "impulse" rather than "instinct" in description of these less definite and more complex activities which I hold to have all the essential characteristics of instinct actions.

But I think I may rightly protest against such usage: for "instinct" as I use it in this connection is surely employed (as I think it should always be employed) as an objective term, to describe certain series of activities which occur in organisms as we note their life actions; and the word "impulse" cannot, I think, be properly applied in Psychology with such objective significance.

For "impulse" should in my opinion always have subjective significance in Psychology: it is the word we use to describe those more or less painful states of consciousness which are determined by the presence in mind of persistent images of the realization of distinctly motor activities which are not in fact realized². "Impulses" I believe to be mental phases which in an objective view we always find to be determined by the inhibition³ of instinct actions that have been stimulated by the presence of the conditions that might normally call them out, but which instinct actions, for one reason or another, are not at once realized.

But whether or not this be accepted as true, it will be granted I think that the word "impulse" is widely employed in Psychology to describe psychic phenomena pure and simple, and that it has gained this significance through long usage in the study of introspective Psychology, and in the allied philo-

¹ *Nature*, 18, A. pl. 95.

² Cf. my *Pain, Pleasure, and Aesthetics*, p. 273 ff.

³ This inhibition may be caused by positive opposition, or by the fact that the "stimulus must generate a certain amount of organic instability before the organic mechanism will fall to the response," a condition to which Prof. Morgan refers in an address delivered in Boston in 1895, with part of which he has kindly furnished me a manuscript copy.

sophical studies; notably in Ethics, where it is constantly used with subjective reference.

It is true indeed that students of physics and of psychology have been accustomed to use the word "impulse" objectively to describe distinctly physical processes; one billiard ball is said to impart its impulse to another ball; the neurologist speaks of the "impulse" from the terminal nerve organ reaching the cortex of the brain.

But as this usage of objective science exists, it is especially to be desired that the greatest care should be used to discriminate between the subjective and objective use when we employ the term in a science in which the subjective significance is usual and proper, and important. It is, I am confident, because Prof. Morgan has not freed himself from his habit of speech as a physiologist, that in writing upon psychology he occasionally lapses into the objective use of the term; as for instance where he suggests¹ that "we apply the word impulse to the tendency of the organism to pass from the relative instability of a need or want, to the relative stability of a satisfaction." This *tendency* is surely an objective fact: but if we consider the matter subjectively, unless introspection deceives me, we are warranted in saying that we experience in this connection two mental states only: 1st the "instinct feelings," which are coincidents of the "instinct actions," which latter are the objective evidences of this "tendency"; and 2nd what Prof. Morgan, using rather popular language, calls the relative instability of a need or want in connection with these possible "instinct actions"; and this last state of mind I think is what writers in Philosophy, in Psychology, in Ethics and Sociology call "impulse."

III.

Sec. 7. I shall now ask the reader to consider for a moment one other point which is not without interest in itself and which will be found most important in relation to the arguments to follow this.

We are all familiar with the conception, brought into prominence by Mr Spencer, that social aggregations may be of organic nature similar to that which we note in the case of individual organisms: the organism in the case of social existence being however of a higher order; one in which the individuals are elements, even as in the individual itself the special organs or the cells are elements.

¹ Boston address referred to in previous note.

Mr Spencer calls attention to the fact that social aggregates correspond with organic forms in general, 1st, in that they grow, 2nd, in that they increase in structure as they grow, 3rd, in that the individuals which are supposed to be elements of these higher social organisms perform different functions, 4th, in that the so-called life of the social aggregate may be destroyed without destruction of the life of the units, and 5th, in that the units may die or be lost to the aggregate and be replaced by similarly functioning units, without necessary impairment of the integrity of the social aggregate itself.

1. It is clearly true that societies grow: but it is to be noted that they grow for the most part as do the very low forms of individual organic life, by the aggregation of like elements in which the mass of the functioning is the same for all: individual is added to individual in making up the social body, much as cell is added to cell in the formation of the lower organic aggregates, and of the elementary parts of the higher organic forms. In the organic life of the higher animals on the other hand growth is accomplished by the aggregation of parts which function very differently and which cannot, beyond certain limits, be made to function alike, as we shall see more fully below. Intestines, stomach, heart, lungs, liver, kidneys, each differs in form and functions. The form and functioning of individuals of social aggregates are clearly much less differentiated.

2. That social aggregates like organic aggregates increase in structure as they grow must be granted, but the increase corresponds with that found in the lower animal life, rather than in that of the higher grades, as is more fully explained in the next paragraph.

3. That differentiation of functioning is marked in social bodies is of course agreed, and it is clear that the complex division of labour which appears so prominently in the higher civilizations corresponds more or less accurately to the differential functioning of parts in the individual organism.

But here we must note that these differences of functioning of the individual elements of social aggregates are determined to a great extent by conditions external to the individual, just as in the lowest forms of individual life the cell elements are determined to differential functioning by differences in the stimuli which reach them from without; their varied performance being due not to inherent differences in the parts themselves but almost altogether to differentiation of these external stimuli.

The same influence of external circumstance is visible in the social aggregates even where they are of the highest type.

A man for example may be a common farmer under certain conditions, but given other conditions may find himself leading armies to victory: in other words, the elemental individual who under certain stimuli may be part of the apparatus which brings nourishment to the social body, under certain other stimuli may become part of the protective apparatus.

But in the higher organic individual life such transfer of function takes place with great difficulty, and where it is possible at all it occurs only within narrow limits. One kidney may indeed learn to do a large part of the work of two: the foot may learn to do some of the work of the hand; some part of the brain cortex even may learn to do the work of a part that has become extirpated by disease or by surgical operation, but the change must take place slowly, and the accommodation is recognizedly difficult, even where the functioning of the two parts involved is closely allied, as in the cases just mentioned: where the functioning is very diverse, as between heart and lungs, brain and stomach, transfer of function is known to be impossible.

In the very highest of the social aggregates such as we find in our most fixed civilizations there is, as already indicated, no corresponding difficulty in the transfer of function from individual element to individual element.

4. That social aggregates may be destroyed without death to the individuals of the aggregate is true, and the same is true of the cell units or simpler cell parts of the lower animals.

But as animals rise in the scale of organization the life of the parts becomes more and more necessarily dependent upon life in the whole organism. The heart of the frog will indeed beat on one's hand for a considerable time after it is removed from the body, but it cannot live long apart from the body even if it be artificially nourished: certain of the functions which are determined by the action of the spinal nervous system will be carried on also in the frog after its brain has been extirpated: but this cannot continue for any great length of time. And in man, and the higher animals in general, death of the organism involves much more speedy death of the elementary parts.

In the social aggregate on the other hand what is assumed to be death of the aggregate or destruction by disruption may occur without the production of any visible effect upon the duration of life in the individual elements of the aggregate. A tribe of troublesome savages may be broken up, as often happens, but this involves no death of individuals. In the higher social life, Poland and its social organization has disappeared without loss to the world of those who would but for

its disruption make a nation to-day. So you may disrupt mere cell aggregates without destroying cell life: you may cut certain of the lower animal forms in twain and you will speedily find that you have destroyed neither part, but that presently you have two smaller individuals.

5. It is true that in the lower animals, parts which have been lost may be replaced, the loss not producing death in the organism; if we cut off the claw of the lobster it is after no long time replaced and the animal is apparently unharmed: it is true also that in social aggregates, social forms may continue, although individual elements die; their work being taken up by other individuals.

But in the higher animals destruction of any important part involves speedy death in the organism as a whole; and in this respect there is no correspondence between the life of the higher animals and what is claimed to be the life of the social aggregate.

It becomes evident then from each of the points made above that if the social body be organic it can not be much more advanced in integration than those lower forms of individual organisms which in the beginning of this sketch we described as little more than aggregations.

Sec. 8. When all is considered it appears to me that we must come to the conclusion that we cannot lightly cast aside the notion that social life is organic in its nature; it seems on the whole most probable that some of the complex developments in our fully differentiated life may have relation to efficiency in a wide social organism; an organism however of very low type.

The fact that this hypothetical organism if it exist must be of low type is a point to which I shall refer with a special application in a later article of this series: I have treated it at length here from the biological point of view because I wish to point out an implication on the psychological side which seems to be appropriate in this place.

If it be true that the social organism so far as it exists at all must be supposed to correspond with the lower forms of animal life in which the complexes of cells are little more than aggregated; rather than with those forms which are so closely integrated that they may be spoken of as truly organic: then it is surely improper to speak of the opinions of aggregates of men, as we comprehend them, as a "social consciousness," as our extreme sociologists oftentimes do¹. For the conception of

¹ Confer the late French sociologists who speaks of imitation as social memory.

a social consciousness implies that the thoughts of men as they are related to the whole pulse of the social consciousness, must correspond, in the main, with particular psychic elements in us, as these are related to the whole pulse of our own conscious life.

Were the psychic elements which make the substance of our conscious life so loosely bound together, so fortuitously unrelated, as are the thoughts of men, we could certainly not believe that out of these more or less isolated psychic elements anything could arise correspondent to consciousness as we know it. Only where we perceive close community of impulse, and identity of thought, amongst large masses of men can we imagine any social consciousness to exist, and then only of a grade much lower than human consciousness as we know it.

Furthermore, even if we suppose, for argument's sake, that a social consciousness does exist, of which our thoughts are mere elements, and the possibility of such existence I agree to, what reason I would ask have we to believe that our elemental thought can in any way grasp the content of this hypothetical social consciousness? As well might we expect the elements of our psychic life, say our sensations, to grasp the complex resultant which we call our consciousness. He would be a bold psychologist who would suggest that a sensation could appreciate our higher life of reflection.

If there be perchance, correspondent to our individual consciousness, a social consciousness of sufficiently high grade, it may know our thoughts as elements much as we appreciate the existence of our own sensations and their elementary qualities, and it may have means of expression that are effective for other consciousness of its own order; but we as elements of this wider consciousness can surely not be able to grasp even dimly the nature of the higher consciousness which, if it exist, must be determined by the pulse of thought of many interrelated individual consciousnesses. What sociologists are often tempted to speak of as the "social consciousness" should therefore properly be spoken of merely as the related consciousnesses of the individuals composing social groups.

One more point. If it be true that social aggregates are organic and that this organic nature is of a low order, then it is clearly impossible that the hypothetical social body can be able to perform functions correspondent to those which in individual life are performed only in organic forms of a most complex order.

The hypothetical social body, if it exist, may be counted on to perform the differential actions that relate to the lower forms of assimilative life, and those which relate to simple forms of

self-protection. But just as soon as we assume that this hypothetical social organism can perform great complex work correspondent to the higher grades of effort in an individual with all his parts thoroughly integrated, we must expect to find our assumption unverified: we must expect the social functioning thus attempted to fail, because the aggregate in such direction fails to act as an integrated unit, because it loses its organic structure and becomes a mere cumbersome machine with parts working together in time indeed, but under no coordinated and integrated system. This is a thought which it seems to me our thoroughgoing socialists may well take into serious consideration in these times.