SOME OBSERVATIONS ON THE THEORY OF PERCEPTION.

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In 1927 Parsons published his *Introduction to the Theory of Perception* with a view to formulating a working hypothesis. This book has played a large part in moulding my outlook upon psychological matters, and I should like to take this opportunity of making a few observations, even although they may not be wholly in accord with Parsons's opinions. But before going on to consider his view-point, perhaps it would be best if we started off by considering what is stated in a standard psychiatry text-book upon the subject of perception.

In Stoddart's *Mind and Its Disorders* we find the following : " It is only by our psychological analysis, by introspection, that we discover that the perception consists of sensations of various sense-modalities ".

Our first reaction to this statement is that surely a perception consists of more than these mere sensations. Our second reaction is—What and why are these sensations ; what and why is the percept ; and why should sensations lead to percepts ?

" Not all combinations of sensation will form a percept. For example, the sense-qualities cold, red, sweet, high-pitched and painful refuse to combine to form an idea or percept ". Again our first reaction is—Why ?—and the answer seems to be—Because it is not biologically useful.

In evolution, the ability to perceive is developed on a teleological basis, and if there is no such thing in Nature which combines in itself, as a unity, the ability to arouse a combination of these sense qualities, then they cannot be aroused as a unity.

The next statement Stoddart makes is that our perceptions are abstractions just as much as sensations are ; and one's reaction to this statement is—an abstraction does not seem to be a useful fundamental on which to build psychology of practical use to medical men.

When he goes on to consider spatial ideas, he maintains that the theory that they are innate is an unnecessary hypothesis ; that the newborn child has but to experience movement of its own limbs, and of objects in its environment, for the foundation of the extense-idea to be already laid, and then development of the spatial idea depends mainly upon our experience in the domains of vision, touch, etc. ; and one wants to know—how does the child, in the first place, experience movement ; how is the perception of movement obtained ; and how does it experience the difference between itself and environment ?

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The difficulty, it seems to me, is in treating of sensations as though they were things; and, secondly, of treating perception as though it were a thing formed by combinations of these other things.

McDougall puts the matter this way: "Experiencing is an activity of some being or subject who experiences something or somewhat. The word 'thing' in common speech is a material thing continually existing and separable as a coherent whole from its environment. The simplest kind of thinking, as in animals and young children, is thinking of present objects as of things which affect our sense-organs appreciably. Our sense-organs are instruments of selection among the streams of energy playing upon us".

Somehow, the various qualities of our sensory experiences are correlated in fairly constant fashion with the specific modes of stimulation of our sense-organs, so that these qualities of experience serve us as the signs of the presence of the things from which stimulation comes. It is these qualities of experience that are called sensations, and there is no harm in the term so long as we do not make entities or things of these sensations.

The higher forms of life have not developed in evolutionary history by the joining together of the more efficient sense-organs which were evolved from lower forms, the resultant of this combination producing a higher form. For example, man was not formed by the joining together of highly evolved visual, auditory and other neuronic structures, but in the course of development from, shall we say, the amœba to man; increasingly complex receptor apparatuses developed in order to increase the fundamental perceptual ability of living matter. Perception is the more basic unit, biologically speaking, and I see no reason why we should not have as a unit something which can be analysed into parts.

As Eddington remarks, "It seems a natural procedure to explain the complex in terms of the simple, but it carries with it the necessity of explaining the familiar in terms of the unfamiliar". And thence we branch off into philosophical and metaphysical problems and find ourselves arguing in a circle.

"If we accept the continuity of human and animal life from primitive forms of life," says McDougall, "it seems necessary to suppose that the various qualities have become gradually differentiated from some primordial sensory experience." This primordial sensory experience is primordial perception.

As Parsons says, "It is the bridge which spans the gap—if, indeed, it be more than an illusory gap—between nerve-processes and consciousness."

"From the phylogenetic standpoint, lack of differentiation of the receptor mechanisms in lower species points to the inevitable conclusion that such conscious responses as these animals are capable of are equally undifferentiated. Yet it is certain that these relatively undifferentiated recepts give rise to responses which are of vital importance for the preservation of the individual and the species."

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There is infinite scope for discrimination between kinds of things and between individual things of the same kind, and the creature which discriminates most nicely between things will, in the main, be the most successful.

The development of the power of perceptual discrimination between things and between classes of things is the basis of all the higher forms of mental life.

A large part of Parsons's thesis is taken up with a study of this growth of perceptual ability along the lines of the development of the various sense-organs and their neuronic connections. He maintains that the problem of their synthesis in the higher forms of life is a physiological one, in which at present there are many gaps. He himself closes many of these gaps by correlating the work of many workers in the fields of comparative anatomy, physiology, clinical medicine and so on. His general outlook is based, as he himself states, upon the doctrine of emergent evolution of Lloyd Morgan, stripped of its metaphysical implications. A great deal of the work of Sherrington is fitted in very well, and the protopathic and epicritic work of Head is correlated also.

A few extracts may well be quoted here: "There is evidence that the activities of Protozoa do exhibit traces of choice which fundamentally differs in type from the selective properties shown by a photographic plate or other inorganic material."

As McDougall in *Social Psychology* observes: "It seems probable that the actions of even the lowest animals imply a vague awareness of something, together with some vague forward reference, some vague anticipations of a change in this something. There is the germ of variation in striving, even at low stages, in order the better to cope with some obstacle."

"The serial metamerism of the higher metazoa results in the development of a head which takes the lead in active movements. The extero-receptors of the head (as Sherrington points out) not only receive more stimuli, meet more objects demanding pursuit or avoidance, but it is they which usually first encounter the agents. It is upon the distance receptor-organs that the brain is constructed and evolved. They initiate anticipatory, i.e., precurrent, reactions."

"It is from the integration and correlation of physiological impulses that the higher levels emerge and each of these, when it has proved itself biologically serviceable to the species, becomes part and parcel of the make-up of the individual of the species."

"The lowest of these integrative levels is concerned with fundamental processes which are little differentiated and are plastic in their potentialities. This Parsons calls the 'dyscritic' level. Upon this there has been evolved a more delicate epicritic mechanism less charged with affective tone and of greater cognative import. At a still higher level is the 'syncritic' mechanism of consciousness."

With the advance of differentiation, certain modalities assume a preponderant role in certain species. "Much confusion would be avoided," states

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McDougall, "if all philosophers were born blind, or forbidden to refer to visual perception." And here is Parsons's reply, which is a justification for concentrating upon visual perception :

"The intellectual supremacy of man is directly dependent upon the complexity and refinement of the visual patterns he is capable of appreciating and disseminating, and to which he is capable of reacting."

"The immense importance of vision for equilibration and orientation is liable to be lost sight of, or at least under-estimated, when dealing with the visual function of man ; for there the static functions are overshadowed by the more patent dynamic functions, and both are overwhelmed by the highly developed sensory and cognitive functions.

"Posture is the solid foundation upon which visual perception is built, and it is of such pre-eminently vital importance to the animal that it is subserved almost entirely, even in man, by a dyscritic mechanism. The chief functions of vision, biologically considered, are the control of the individual's movements, and the perception of movements in objects in the outer world. Visual organs are found almost solely in actively moving animals.

"In the primitive or dyscritic stage, the constellation of recepts from the presentation gives rise to changes in the primitive stream of consciousness arousing an awareness charged with affective tone, which is either pleasant or unpleasant. The effector mechanism is thereby stimulated to bring about a mass reaction ; the conscious response, and, therefore, also the motor response, being dominated by biological requirements, and accordingly in so far teleologically determined.

"The crude dyscritic sensibility is to be regarded in its primitive form as essentially utilitarian in the most fundamental sense ; upon it depended the survival of the individual and the species. So important is it that it cannot be wholly replaced by the more delicate epicritic mechanism. Hence it is found to persist alongside the epicritic in most of the senses even in the highest animals, though generally modified from its primitive character.

"In the epicritic stage, differentiation of the receptor mechanism permits of differentiation of the recepts. The constellation of recepts gives rise to a perceptual pattern in which the cognitive elements are so differentiated that the diverse sensations are discriminated. Awareness is focused upon those features of the pattern which are of greatest biological significance, and becomes attention. The perceptual pattern fills the field of attention, but attention leads to the selection and segregation of the most important features in this pattern, so that part of it occupies the focus of attention and becomes a more highly discriminative pattern in which qualitative and quantitative details of the constituent sensations spring into consciousness. At higher levels within the epicritic stage—but most of all within the syncritic stage, when biological significance has undergone sublimation, attention becomes interest. In both —attention and interest—there is a growth of the forward-looking tendency

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which is germinal in awareness, and which now becomes a definite conative tendency."

The quality and variety of these impressions are of three kinds—qualitative, temporal, and spatial. To understand why this is so, we must return again to primitive perceptual ability.

Fundamentally, for practical purposes we must take it that there are two classes of things in the world—the non-living and the living. It is part and parcel of the properties of living matter that it is able to perceive, and this perceiving is an activity, not a thing.

According to Lloyd Morgan's *Doctrine of Creative Evolution*, there was a time in evolutionary history when the living developed from the inert, but this unprovable hypothesis—with its metaphysical implications—is immaterial. "The line of demarcation," says Devine, "is not between physiological and psychological, but between living and non-living."

Myers states: "When we come to consider the difference between mind and living matter, the distinction is reduced almost to vanishing point."

And Haeberlin says: "The alternative mental and physical, where living activity is concerned, is a chimera."

Rignano says: "Mnemonic property is the peculiarity which ultimately distinguishes living from inert matter." And whether we accept this as the sole distinguishing property or not, for practical purposes we have to consider these two classes, non-living and living, and we must accept them.

With regard to the former, the following abstract from Eddington's *Space, Time and Gravitation* is both interesting, and not inappropriate:

"The ultimate elements in a theory of the world must be of a nature impossible to define in terms recognizable to the mind. In the relativity theory of nature the most elementary concept is the point-event. In ordinary language, a point-event is an instant of time at a point of space. The aggregate of all the point-events is called the world. It is postulated that the world is four-dimensional, which means that a particular point-event has to be specified by the values of four variables or coordinates. The statement that the world is four-dimensional contains an implicit reference to some ordering relation. It is unlikely that the individual interval-relations of point-events follow any definite rule or law which can be formulated by man. This is the starting-point of the infinite variety of nature."

With regard to the latter, i.e., the living matter, we must conceive of it in primitive form having to re-act fundamentally to such a world. Living matter has, as well as the mnemonic property, the property of perceiving, which is the physio-psychological expression of the ability to react.

It seems to follow upon the foregoing remarks that even primitive perception must include as part of itself the time, space and relationship factor. And as perceptual ability grew through the development, for that purpose, of the more highly-evolved sense-organs, the ability to perceive relationship grew

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inevitably with it. "Give me matter and motion, and I will construct the universe," said Descartes. "Give me a world, in which there are relations," adds Eddington, "and I will construct matter and motion."

Before going on to consider perception of a higher order, I should like briefly to make one or two observations upon Bergson's account of perception, since William Brown in *Mind and Personality* states that the eminent French savant's *Matter and Memory* will exercise a considerable influence upon the nature of future text-books upon psychological subjects. The only difference between matter as we observe it, and matter in itself, is that we see only a small part of it—it is a difference of part and whole. The nervous system is built up with a view to reaction; we see just those characteristics to which we can react. Perception is a form of action rather than a form of cognition. It is, in fact, the reflection of the body's virtual or possible action upon these objects, or of the object's possible action upon the body. Mechanical reflex action is necessarily determined action, and is therefore unconscious. Perception is likewise action, a reaction to a present stimulus, but it is not necessarily determined; its consciousness is a measure of its indetermination.

In ordinary perception we have something more than this pure perception (which is theory rather than fact); ordinary perception contains affection and the contributions of memory. So far, so good. But then he says, "Memory is of the spirit, perception in itself is physical". And our mind is brought into direct relationship with the object through a physical system.

Bergson starts his inquiry by an investigation into the nature of perception before passing on to the theory of psycho-physical relations, and brings in memory and mind to bear upon it, about which he has apparently already decided not only his psycho-physical views, but his whole metaphysical theory of the universe, which we cannot discuss now. It is, indeed, as illuminating an example of autistic thinking as any in Bleuler's book on that subject.

To come now to the question of more highly developed perceptual capacity.

Development through activity is the development of any organ resulting from the specific activity of functioning of that organ.

"Maturation," as Woodworth distinguishes it, "is the development of an organ towards its mature size and condition resulting from causes other than the specific activity or functioning of that organ. Maturation is a response to stimulation received by any part of the embryo from other parts of the organism itself; and this intra-organic stimulation, differing in different regions, is the decisive factor in the differentiation of parts and so in the development of the complex system which the individual becomes during his prenatal existence.

"Maturation provides structures which are capable of functioning but which require exercise, activity, to bring them into prime working condition. Maturation prepares the way for learning. When maturation has advanced to a certain stage, activity and learning on the corresponding level become possible.

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Learning takes place to an enormous extent in the postnatal period of continued maturation, and on to the end of life after maturation has done its work.

"There is abundance evidence of maturation in the development of the nervous system. Though no new neurones are formed after birth, growth of the nerve-cells and branches continues rapidly in early childhood, and more slowly into adult life."

The higher orders of perception, as McDougall terms them, are found in those animals which have a more highly-developed nervous system, and the relationship between these may well be elucidated on biological principles. For example, it seems not unreasonable to conjecture that for usefulness, anticipation is a great step forward from mere contemporaneous adaptation to stimuli. If motor responses are delayed, while bigger groupings of perceptions are made by the sensory mechanisms, better responses will be made, and in this we have the germ of planning and of contemplative thought.

It seems to me in harmony with this view that in such organisms as are capable of this, we have the great development of the cortex, with its inhibitory powers upon the more primitive and older established motor parts of the nervous system.

The tendency to bigger and clearer percepts, which is provided for by the increasing complexity of the neural mechanism, seems to accord with the Gestalt School of Psychology, who describe not only the tendency to see groupings and shapes and configurations, but talk of a tension which appears to exist, and which is only relaxed when, as they describe it, the perceptive organism closes the gap which may exist in configurations.

With increasing perceptual ability comes increasing Gestalt formation.

"The stress of Gestalt psychology," says Woodworth, "is on the perceptual factor in learning. Learning means doing something new, and the newness consists in a reorganization of the situation as it is, and the goal. The gap is bridged by perceiving the situation as a pattern including and leading to the goal.

"Organized wholes occur in nature and have the properties of wholes as distinct from a grouping of the properties of their parts. And it is biologically determined that living matter in the upward course of evolution has to meet and to react to organized wholes, and so the higher the creature in the evolutionary scale, the greater is that creature's acquired ability to perceive organized wholes.

"In arithmetic we have pure sums, in nature we have the formations of Gestalts. The human or animal organism is certainly a Gestalt. It is an organized whole, and not a mere sum of parts and organs.

"Any stimulation reaching the brain is taken up into a dynamic interacting system, and its effect there depends on the total activity going on in the brain.

"Though the Gestalt psychologists devote much of their energies to the

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investigation of sense perception, this is not because they regard motor activities as falling outside the fields of psychology."

If we attempt to build up a hypothesis of reaction to environment on the basis of Pavlov's conditioned reflexes alone we must remember—firstly, that, as Sherrington has stated, a simple reflex is merely a convenient abstraction ; and secondly, as William Brown has pointed out, Pavlov's dogs were animals with a prospective attitude already.

The Gestalt school believe that behaviour can never be understood in the least degree without taking account of perceptual processes. They hold that it is absurd to study the motor responses of the organism to the environment without considering what the environment is, as the organism gets it. They hold that motor activity is determined by perceptual activity, or, rather, that either taken alone is an artificial fragment, since the organism acts as a whole. Sense perception is embedded in the total activity of the organism ; and motor response is embedded in that same total activity.

The Gestaltists make much of the closed figure and its advantages over others competing for notice. On the whole the natural tendency seems to be to close up gaps, and this represents the inner brain dynamics in receiving a mass of stimuli. When an individual undertakes a task, e.g., to perceive something, tensions are generated in him which are not relieved till the perception is completed. These tensions amount to a quasi-need analogous to its organic needs, and are the expression of the striving for equilibrium in the psychical plane.

Although McDougall states that, speaking broadly, there is very little difference in the perceptual ability of different races, this can only be in comparison with the difference between man's perceptual power and that of other animals.

Köhler's intelligent chimpanzee perceived the relationships necessary for him to obtain the banana after several hours. Any average child would perceive this relationship in a much shorter space of time ; any infant would not. The growth of the perceptual capacity in humans is outstanding, but the latent perceptual capacity must have been inherited in the primitive neural mechanism of the infant, and perhaps a lack of sufficient thyroid extract in that child would prevent his ever attaining that degree of perceptual capacity,—in other words, interfere with the complicated biological process of maturation. It is because of the long period of infancy and childhood that the perceptual capacity grows to such great heights in man, but among human beings, I take it that the perceptual capacity varies a great deal.

" Genius, in truth," according to James. " means little more than the faculty of perceiving in an unhabitual way." I presume, rather, that genius means a heightened power of perceptual capacity and an ability, hereditarily determined, to increase the ratio of what is perceived to the whole. This is further developed in the early formative years when the neuro-psychic

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plasticity is at its maximum. For various reasons, which may be biological, such as the meningococcus infection; or social factors, acting upon the biological mechanism of the plastic developing nervous system, the capacity may not be developed, and in that case we know that "Full many a flower is born to blush unseen".

The "one per cent. inspiration" of Edison is this capacity for what might be termed "bigger and better Gestalt perception".

"It is common form among psychologists to discuss perception and conception as though they were entirely different functions, conception being a loftier form of thinking which only the cultivated adult attains to. Yet to know, to recognize, to be aware of or conscious of any object is to conceive it, even when our knowing is a perceptual knowing."

As Stout says: "In perception the universal and particular are indistinguishably blended; the universal element lies entirely in the bare fact that the particular is recognized. In conception, the universal is thought of as such in contradistinction to the particular; implicit in the percept, it is explicit in the concept."

Lack of time prevents me from going into this and associated matters, in any detail now, but I consider that I have already said enough to indicate my opinion that medical men should approach psychological problems along a biological pathway. Attempting every possible approach, as in other spheres, may merely result in leaving a lot of stones turned over, without knowing where or how to replace them. The practical applications are many; for example, biological psychology should play a large part in the general problem of education. Perception is the basis of higher mental processes, and proper education should be designed to develop to a maximum the capacity of all the sense-organs, the handmaidens of the perceptual ability. That development should inevitably be more from the Book of Nature, in all its manifestations, than from printed books. These should be used later, when the perceptual ability has developed sufficiently to benefit from them.

Again, biological psychology will consider memory as a property of living matter, and, for example, use its influence to emphasize the truth of Ribot's dictum, "Nutrition is the basis of memory", and, emphasizing the importance of the mnemonic and perceptual capacities of the developing post-natal nervous system, it will consider that the influence of the psycho-pathologists such as Freud and Adler in child welfare, guidance, and development—however important—is of no greater importance than the teachings of an ex-superintendent of a mental hospital—the late Sir Frederick Truby-King.

Again, it has been my experience of recent years, as a general practitioner mixing with his colleagues, that perhaps as a result of the swing of the pendulum, there has been a tendency among many doctors to consider disorders of the personality as though they were disturbances of our persona, or mask (detachable from the individual), by the abnormal activities of certain abstractions.

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And again, I believe that it is on the basis of a biological approach to the subject that we can hope to make progress in the study of the different aspects of pathological perception.

I am afraid I have strayed from the actual physiological discussions of Parsons's book in making these observations, which are an attempt to explain a view-point influenced, to a great extent, by the book. And all this is very far away from the philosophical speculations which usually surround the study of such things as perception. But as Woodworth remarks :

" Psychology has achieved the right to be unphilosophical. Any individual psychologist has, of course, his individual freedom to apply his psychology to philosophical problems ; and conversely, his philosophy to psychological problems. But we should keep our speculation apart from our regular business as psychologists and certainly not make any claim on our fellow psychologists to join our outside ventures."

Lest I be accused of too great a dogmatism, I should here like to associate myself with the remark of James :

" When we talk of psychology as a natural science, we must not assume that that means a sort of psychology that stands on solid ground. It means just the reverse ; it means a psychology particularly fragile and into which the waters of metaphysical criticism leak at every joint, a psychology all of whose elementary assumptions and data must be reconsidered in wider connections and translated into other terms. It is, in short, a phase of diffidence, and not of arrogance. A string of raw facts, a little gossip and wrangle about opinions, a little classification and generalization on the mere descriptive level, and some strong prejudices. This is no science, it is only the hope of a science. At present psychology is in the condition of physics before Galileo and of chemistry before Lavoisier. When the Galileos and Lavoisiers of the future do come, the necessities of the case will make them metaphysical." That is as may be, but in the meantime, in the words of Duke-Elder, for practical purposes we should follow the nature of perception and " other higher problems which have been too long the sole and isolated study of the physicist and modern psychologist, Their treatment thus divorced from their evolutionary environment recalls Plato's parable of the men in a cave who sat with their backs to the daylight and saw, not real things, nor even models of them, but shadows of models cast by the light on the blank walls they faced. One of the most significant happenings in recent years has been the attempt to include all the phenomena of life in an all-embracing biology."

Parsons's book is, in my opinion, one of the most important spear-heads of this movement.

" But," continues Duke-Elder, " if in the lower vegetative levels of vital activity we are bewildered by a legion of parallel and inter-related reactions, in the higher integrations of these processes we appear completely submerged by the multiplicity and uncontrollability of the variables with which we are

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confronted. Nevertheless, although we can reason by analogy and in approximation only; and although our hypotheses have a large margin of inexactitude which is constantly being added to and subtracted from; the method is undoubtedly the most scientific whereby to seek the pragmatic conclusion which appears so far away."

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