Croonian Lectures

ON

THE OBJECTIVE STUDY OF NEUROSIS.

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LECTURE III.¹

IN the preceding lecture I dealt with some of the forms of response to noxious stimuli from a physiological point of view. We cannot, however, content ourselves with purely physiological observations. Our patients come to us complaining of certain definite subjective symptoms and our object is to detect the defects of bodily mechanism of which they are the signs. It therefore becomes a matter of urgent importance to determine so far as we can the relation between bodily responses to stimuli and affective states. It is true that we have learnt physiologically to observe only an infinitesimal part of the bodily changes that are associated with affective states; but that small part is, as we have seen, susceptible of quantitative as well as qualitative observation. As a first step we must consider briefly what we mean by an affective state and what relation it bears to sensation.

SENSATION AND AFFECTIVE STATES.

Sensation is defined as an elementary mental process which is possessed of the attributes of quality, intensity, clearness, and duration. Affection is similarly an elementary mental process, but though possessed of the attributes of quality, intensity, and duration it has been denied that it possesses the attribute of clearness. It is said to be impossible to attend to an affection. If we attempt to do so the quality of pleasantness or unpleasantness disappears and we find ourselves contemplating some obtrusive sensation that we have no desire to observe. If we want to get pleasure from a concert or a picture we must attend to what we hear and what we see. As soon as we try to attend to the pleasure itself the pleasure is gone. (Titchener.) Herein lies the pith of the argument for dissociating affection or feeling from sensation. The subsidiary argument that the opposition of the qualities of affective pleasantness and unpleasantness is not paralleled by any of the facts of sensation appears to me to be untrue, or at best unprovable, because we know no more about pure sensation than we do about pure feeling or affection.

It is at this point that objective psychology comes to the rescue. The reason for the apparent difference between affection and sensation has been made clear by neurological investigations, especially by the work of Head and Holmes. Two systems of afferent function exist—the one system reacts to stimuli of a noxious nature, and the effector organs which manifest its activity are either organs not under the power of conscious effort or else certain combinations of reflexes which cannot be voluntarily activated. The great terminal ganglions for this mechanism are in the thalamus. This system is phylogenetically older than the cortical system. It originates the defensive reflexes by which the body reacts as a whole to noxious stimuli, whether by glandular, visceral, vascular, or muscular pattern reflexes. There is another system of nervous mechanisms by which appropriately adjusted reflex patterns are combined in response to stimuli not in themselves possessing either noxious or benign characteristics, and the

terminal coördinating centre of this mechanism is in the cortex. Its function is, to borrow the language of Head and Holmes, discriminatory, and this discriminatory adjustment of certain reflex mechanisms to various stimuli is correlated with consciousness.

The two systems are not, however, independent. When the activity of the cortical processes is impeded, by inhibition arising from either external or internal stimuli, an activation of the thalamic system may occur; in other words, the resources of the body as a whole are mobilised to overcome the resistance. Conversely changes of the activity of the thalamic effector organs when they reach a certain degree of intensity stimulate the cortical receptors and we become aware of a change in the common sensation of the body. The consciousness of such a disturbance constitutes what we term an affective state. This reciprocity between the effector organs of the thalamic system and the cortical discriminatory system was already clearly appreciated by Hobbes—"adeo inter se motus cordis et cerebri sunt reciproci." The function of the cerebral cortex has been said to be discriminatory, a certain stimulus or group of stimuli being integrated with a specific reflex pattern activity, but when stimuli arising from the activity of the thalamic system reach the cortex they represent changes taking place in every part of the body. No one elementary group of sensations will be prepotent; we are only aware of a diffuse sensory disturbance. Such appears to be the objective explanation of the origin of the attempt made by psychologists to differentiate between feeling and sensation. When the thalamic activity is of great intensity in response to a maximal stimulus, such as intense fear, certain of its elements may be so intense that they dwarf the remainder and are attended to as an ordinary sensation when their afferent impulses reach the cortex. Thus an absolutely definite sensation of nausea is experienced by some men when under fire, others complain of a burning sensation in the throat, others of palpitation; and it is a peculiarity of the predominant sensations that they may so dwarf those arising from other forms of organic resonance that a man who is not conscious of any great degree of fear simply becomes aware of a sensation of nausea when under fire for the first time. It may not be till after he has gone through the experience on subsequent occasions that he recognises a connexion between his nausea and exposure to danger.

It is in the preponderance of some one such type of reaction, due either to innate or acquired anatomical abnormalities, that we find the explanation of so many of the visceral types of neuroses. In many cases the actual movement of the effector organ rather than its sensory concomitant holds the attention, as in the case of the well-known occurrence of vomiting, micturition, or defæcation as a response to noxious stimuli. In the last lecture we have seen that the organic response to noxious stimuli is manifested as activity, and the response to benign stimuli as quiescence, and we are therefore justified in associating activity of the thalamic system with unpleasantness and quiescence with pleasantness. So far as it has been necessary to speak of these sensory concomitants of the bodily reactions I have spoken of them as states of affection or of feeling. From the physiological standpoint I can see no difference between an affective state and an emotion, and I am perfectly willing to use either term indifferently. From what can be gathered from the writings of psychologists it would appear that when certain sensory elements of an affective state sufficiently predominate so as to direct the attention overwhelmingly to their presentation the state is said to be one of emotion; the difference is therefore one of quantity and not quality. I do not propose to enter into any attempt to differentiate the various types of emotions or affective states. Much of the psychological literature on this subject is characterised by that peculiar naivete with which the scientific specialist too frequently tends to regard life. Our preceding short review of some of the objective changes verifiable as bodily responses to affective

¹ Lectures I. and II. appeared in THE LANCET of July 16th and 30th respectively. The final lecture will appear in a coming issue.

stimuli is sufficient to substantiate the acceptance of the popular psychology of "mixed feelings." We have seen that movements common to other states of activity may occur as concomitants of different affective states.

PROBLEM OF ORIGIN OF AFFECTIVE STATES.

However much we may wish to confine our study of the neuroses to a purely objective basis we are unable to evade the question as to whether an affective state is to be regarded as conditioned by the physiological changes of bodily activity, or whether such changes occur as the organic resonance to a preceding affective state. Our whole system of the interpretation of the emotional aspects of the neuroses must be influenced by our answer to this problem. Ancient writers answered it in no uncertain fashion :

"Cor ardet, pulmo loquitur, fel commovet iras,
Splen ridere facit, cogit amare jecur."

Aristotle and his school of course recognised no other bodily mechanism for mental processes than that of the thoracic viscera. The Stoics, for the most part, rejected the brain as the seat of mind, and Zeno, Chrysippus, Diogenes, and Apollidorus were unanimous in proclaiming the heart to be the seat of the emotions. It would be too lengthy a task to follow

feeling, for the subject that feels, has always some objective ground. Emotion is never the reception of impressions, but is always the response to them. Let us see how far a purely objective inquiry as determined by observations of the bodily reactions will help us to settle the question. Fig. 1 is the record of a reaction to a nocuous stimulus, manifested by the galvanic reflex, of a motor voluntary reaction and of an involuntary motor reaction or start. About the last-named reaction—the start—I have little to say; its latent period is very short, about 0.08 of a second. It can be, as Sherrington has shown, elicited as a purely mesencephalic reaction to auditory stimuli in decerebrate animals, when its latent period is about 50 σ . In this case the stimulus was a fainter one, and the latent period is appreciably longer than that found by Sherrington in animals—and this is the rule for any type of start reflex as elicited in man; it is therefore by no means certain that it has the same bulbar origin as the reflex in decerebrate animals. It is not an invariable accompaniment of affective states determined by nocuous stimuli, and for our present purpose we may disregard it. The next event recorded on the photograph is the voluntary motor reaction: the subject was instructed to press a key as soon as he perceived a prick. The latent period

FIG. 1.

Galvanic reflex to prick stimulus. Record shows heart beats. Below is the record of the Deprez signal marked "key." Time above in fifths of a second.

the causal attribution of the affections to visceral changes throughout the Middle Ages. In recent times it has been revived in the James-Lange theory of emotion. I cannot do better than give the theory as propounded in James's original words: "Common sense says we lose our fortune, are sorry and weep; we meet a bear, are frightened and run; we are insulted by rivals, are angry and strike. The hypothesis here to be defended says that this order of sequence is incorrect: that the one mental state is not immediately induced by the other, that the bodily manifestations must first be interposed between, and that the more rational statement is that we feel sorry because we cry, angry because we strike, afraid because we tremble, and not that we cry, strike, or tremble because we are sorry, angry, or fearful, as the case may be." This view has apparently been held in different forms by Sergi, Richet, Ribot, Münsterberg, and others, and has provoked a storm of controversy.

I shall not attempt to follow the arguments based on introspective considerations, but will turn to those furnished by objective methods. Sherrington attempted a physiological solution of the problem by depriving a dog, so far as possible, of all afferent paths of somatic sensation. He transected the spinal cord in the cervical region and subsequently performed double vagotomy. In spite of the deprivation of organic sensation that was occasioned by these measures the animal showed unmistakable signs of emotion when angered or menaced. The experiment is, as Sherrington recognises, by no means conclusive; all that it entitles us to say is that for the dog in this condition emotional manifestations were confined to the head and neck area, and we have already adduced evidence that changes in muscle tonus are just as much one of the factors of the organic emotional response as visceral and vaso-motor changes. Ward has urged that James's theory is a flagrant *ὀστέρων πρότερον*—a putting of the cart before the horse. Emotion is always the expression of feeling; and

is here a normal one of 0.2 second. The third event is the movement of the galvanometer fibre at the beginning of the galvanic reflex. The latent period of this reflex is here 2 seconds. If the galvanic reflex be taken to indicate one of the many bodily responses that go to make up the general state of bodily activity whose sensory equivalent is an affective state then this affective or emotional state is arrived at quite 1.8 seconds after the initial stimulus has been perceived and acted upon.

It might be urged that the galvanic reflex is a response *sui generis* with a remarkably long latent period, and that the other responses take place more rapidly. The analogy between the galvanic reflex and the time relations of the "cat pad" phenomenon of Luchsinger might *prima facie* lead us to the same conclusion. The experiment of Luchsinger, it will be remembered, consisted in observing a secretory current from the pad of a cat's foot when the sciatic nerve was stimulated electrically and the latent time of this reaction, measured by Waller in the human subject, is about 2 seconds. The latent period of the plethysmographic response can be measured with a fair degree of accuracy, and in the previous lecture we have seen that its time relations are the same as those of the galvanic reflex. The latency of the alterations of pulse rhythm cannot obviously be determined accurately, but by collation of a large number of tracings I have never found it to be a shorter period than 2 seconds. We have seen reason to believe that the acceleration of the cardiac rhythm is due to removal of the inhibitory action of the vagus, and physiological experiments assign a latency of about 1 second to the vagal reflex.

The latent period of the respiratory changes is similarly incapable of accurate determination, but I have never found it to be less than 1 second. The muscular tonic response in the majority of my determinations had a latent period of about 2 seconds. I have no data as to the latent period of visceral and

glandular activity, but indirect evidence would point to their being at least equally long. Thus the objective evidence is unequivocal—the stimulus is perceived, differentiated, and acted upon a considerable time before the presentation of the sensory concomitants of the bodily reactions could be experienced as an affective state. In my own case introspection seems to confirm the objective data. Experiences in the line in France were perhaps a little too complex for analysis, but in the streets of London my absence of mind has frequently nearly involved me in a motor accident. In such cases after successfully avoiding the oncoming vehicle I have experienced some 2 seconds later the feeling that we used to call as children “going hot all over.” Had the stimulus been less transitory and the motor pursued me instead of avoiding me the continued organic response would on the sensory side have amounted to what we know as a state of fear.

POSSIBILITY OF EXISTENCE OF AN OBJECTLESS AFFECTIVE STATE.

It is of great importance for the understanding of the nature of neuroses that we should determine whether a reversal of this normal sequence of events can take place; that is, can a pre-existing state of bodily activity, which is the physical aspect of an affective state, determine the orientation of cortical activity so that the state of emotion arises first, and then an object is assigned to it? It may be disputed whether an objectless affective state can exist, but there is ample evidence that the existence of the bodily concomitants of an affective state will facilitate the representation of some situation which will then be assigned as its object. Marañon injected a small dose of adrenalin into a sensitive patient, and obtained various subjective sensations which as a rule constitute the syndrome of terror. At times this was noted by the patient himself, who declared: “I feel as if I were afraid, but I am calm.” When, however, he supplied an appropriate verbal stimulus by mentioning some source of anxiety to the patient, although such a stimulus would naturally have caused but little reaction under normal conditions, the patient would break down completely in a fit of emotion.

Hitherto I have not dealt with the influence that may be exercised on the response of the nervous system through the agency of the internal secretions.

DISTURBANCE OF ENDOCRINE SECRETIONS IN RESPONSE TO NOCIOUS STIMULI.

The classical experiments of Cannon seem to have demonstrated that states of excitement are accompanied by a hypersecretion of adrenalin, as evidenced both by direct serum tests for its presence and by the occurrence of glycosuria. His brilliant demonstration has been received with great enthusiasm and a far greater rôle has been assigned by the uncritical to the part played by the hormones in the activity of the nervous system than can be justified by observation. It is too readily forgotten that the effector organs of the vegetative nervous system respond to the internal secretions of the adrenals in precisely the same way as they would if acted upon by the vegetative system directly. It is therefore no proof that a reaction is due to the stimulation by an internal secretion, and not to the autogenous activity of the nervous system, to say that the reaction resembles that which is experimentally produced by the injection of the hormone. Swale Vincent has pointed out that there is no evidence whatsoever that adrenalin, for example, is a normal constituent of the blood; indeed, there is much cogent evidence against such an argument.

That under certain conditions of great excitement adrenalin may be present in the blood seems to be fairly well established from the work of Cannon, but were it secreted as a response to stimuli of a less intense and prolonged nature it could only be present in the blood in such minute amounts as to be incapable of initiating the bodily emotional responses. I have conducted a series of observations on my own blood

taken before and after the experience of ten minutes' faradisation. In no case was I able to detect any hyperglycæmia as a reaction to the pain stimulus. It is obvious that the painful stimulus was inadequate inasmuch as it neither increased the blood sugar nor produced glycosuria, but the pain was certainly more severe than is likely to occur in the normal experience of healthy life, and it seems legitimate to assume that the ordinary nocuous stimuli of daily life are unlikely to affect the secretion of adrenalin. This criticism applies even more strongly to the internal secretions of the other endocrine organs as a direct response to nocuous stimuli. When we turn to the evidence in support of the direct influence of the internal secretions on the threshold excitability of the thalamic system, we are on surer ground. There is ample clinical evidence of the state of hyperexcitability of patients suffering from hyperthyroidism to stimuli adequate to arouse an affective response. Experimental observations show that the hormone of the thyroid has a marked influence on bodily activity. This hormone has been isolated and identified by Kendall as an indoxyl

FIG. 2.
Above, curve of diurnal resistance as altered by ingestion of thyroid extract—compare Fig. 8, Lecture II. Below, responses $\times 2$ to maximal stimulus (pistol shot).

iodine compound and found by him to raise the rate of basal metabolism 2 per cent. in a man weighing 70 kilos. when administered in a dose of 5 mg.

I have in a previous lecture dealt with the diurnal variation of the bodily resistance described by Waller, and I showed that there was evidence of a rough correspondence between the magnitude of the galvanic response and the diurnal resistance variation. In order to test the action of ingested thyroid gland on the galvanic response I again made use of this diurnal variation. By taking large doses of thyroid in the early morning I was able both to diminish the mean value of the skin resistance and to mask its diurnal variation. At the same time the galvanic response to uniform sound stimuli of moderate intensity was markedly increased. Fig. 2 may be compared with the record of the diurnal variation of resistance and the magnitude of the galvanic response represented by Fig. 8, in the second lecture. Each diagram represents the mean observations of three successive days. Subjectively, whilst under the influence of thyroid in large doses, I was aware of a marked degree of irritability which lasted throughout the time of the thyroid ingestion experiments, but which appeared to be accompanied by a rather increased power of doing work. I give these subjective observations for what they are worth. That a diminished skin resistance occurs in cases of exophthalmic goitre was shown long ago by Vigouroux. The action of adrenalin in producing effective states has already been considered; but in the absence of any proof of its normal presence in the blood stream we have no right to consider that the normal activity of the affective thalamic mechanism is influenced thereby. There is some direct evidence that the internal secretions of the gonads facilitates the specific affective response to sexual stimuli as shown by the results obtained with implantation of testicular grafts in man and animals suffering from loss of sexual desire. Although there is every reason to believe that the internal secretions of other

glands have a direct influence on the affective responses it is difficult in the present state of our knowledge to bring forward any incontrovertible proofs of this hypothesis. It must never be forgotten that a glandular structure in the normal body is not inert so far as the furnishing of afferent impulses to the central nervous system is concerned.

It may well be that these afferent impulses and not the internal secretions evoked by their activity are the determining influences of the glands on any particular mechanism of response. I was able to obtain records of the secretion of saliva from my own parotid gland by applying a small catheter tube maintained in position by a suction ring over the orifice of the duct. This procedure has been adopted by other observers for the recording of conditioned reflexes produced by the sight of food; I found that noxious stimuli, if of sufficient intensity, tended to produce inhibition of the saliva flow. The fall of the drops was recorded by allowing them to tilt a tipover key that closed a Desprez signal circuit and thereby recorded on a smoked drum. There is not wanting evidence of the disturbances of the gastric, intestinal, and renal secretions as a response to noxious stimuli. We have so far seen that the mechanism of all forms of cerebral activity is capable of being recorded in terms of muscular and glandular activity; before attempting to transfer this knowledge to the investigation of neuroses we must consider the constitution of some of the more complicated nervous mechanisms in their barest outlines. In the last lecture I showed a slide (Fig. 7) illustrating a conditioned reflex; you may perhaps remember that the subject was taught by means of a painful stimulus to perform a certain movement and that we noted that when the stimulus was intermitted, whilst the audible sign that had hitherto accompanied it was made, the subject responded precisely as if he had perceived the stimulus. We also noted that the signs of an affective response, as evidenced by the galvanometer, were present when the click of the electric key occurred in the absence of the stimulus. In the language of popular psychology the subject had formed a habit, or in that of physiology a pattern reflex had been conditioned. Now supposing the stimulus had been repeated a requisite number of times, the subject would, at any rate for the first few occasions on which the click of the key was alone given, have found himself utterly unable to control the movement of pressing the signal key. But this movement was in the first instance one that had been acquired as a result of the activity of the discriminatory mechanism of the cortex. It has now ceased to be discriminatory and become independent of the first process of nice adjustment of a specific mechanism to a specific response by the inhibition and coördination of other forms of cortical activity. There is, however, no evidence that the response has ceased to be controlled by the same cortical mechanism which started it. I found in this particular instance that after the first few times the voluntary muscular reaction settled down to a constant latent period of 0.18 second and that later when the conditioned reflex was elicited by a click alone the latent period remained unchanged. Owing to the slow rate at which these particular records were taken the latent periods could not be read closer than to 0.02 second, but the accuracy is sufficient to justify our assumption that the reaction continued to be performed by the same cortical mechanism that had been responsible for its initial manifestation.

Now this statement embodies a very important fact of which the psychotherapist endeavours to make full use. It means that when the reaction had become part of a conditioned reflex and had ceased to be the centre of conflicts between various alternative reflex paths, which conflicts we generally associate with conscious perception, the conditioned reflex still made use of the same cortical mechanism. That is, it still had a direct nexus with all those processes with which it had been originally connected. Therefore by the use of appropriate methods of observation it should be possible to determine what the original associations

were when they are no longer objects for the subject's own consciousness.

CONDITIONED REFLEXES IN DAILY LIFE.

Now the greater part of our daily conduct is made up of such conditioned reflexes or habits, and the more effectively they have been established by constant repetition the more difficult it is to interrupt the reflex pattern by some fresh stimulus. We defined one of the attributes of a noxious stimulus as a tendency to interfere with and impede the normal tendencies of vital activity. There is no more fixed or powerful activity than that of a well-established habit mechanism. A verbal or physical stimulus that impedes the activity of a habit reflex pattern will therefore act as an intense noxious stimulus, and through the inevitable thalamic mobilisation of the bodily activities to resist such interruptions an intense affective state will be the sensory result. Not only stimuli from outside may tend to impede the activity of the habit mechanisms. Attempts on the part of the subject to interfere with them will equally evoke the generalised bodily response with the corresponding unpleasant feelings. Lastly, the constant occurrence of these reactions, whenever the habit mechanism is interfered with, may in itself condition a new reflex pattern—an active opposition to all attempts to cause the feeling of discomfort by interfering with the primary habit. Such, I believe, is a restatement in the language of objective psychology of the rather clumsy symbolism which the psycho-analyst makes use of; such terms as "the censor" would appear to be unnecessary in this connexion. There is another type of pattern reflex even more potent and more dissociated from the discriminatory mechanism of the cerebral cortex. Unlike the conditioned reflex it has never arisen in the life of the individual from a discriminatory response to a stimulus. This mechanism is an inherited one, and is unchained by some one specific type of stimulus and by no other. Such innate reflexes of a specific type are in greater or less degree common to all the individuals of the same species; these inherited reflex patterns are known as instincts.

INSTINCT REFLEXES.

Now by definition an instinct is an inherited pattern reflex. It is evoked by a specific stimulus and in response to this stimulus the pattern is unfolded. The end-result of the reflex is implicitly determined by the nature of its innate mechanism, and it is a mere matter of chance whether this end-result is ever presented to the subject who owns the reflex. Though by observation we may sometimes learn what the end-result really is, it by no means follows that we shall necessarily do so, and in the case of the lower animals—as when an insect, after laying its eggs, prepares food for larvæ that it will never live to see—it is quite certain that it can never know the end-result towards which the instinct reflex is orientated. Now it is of great importance to the understanding and treatment of the neuroses that we should know whether an instinct reflex has any such relation with other discriminatory mechanisms as may allow us by association methods to determine its true orientation. We may recognise that a certain line of conduct is not substantially in harmony with the environment, that attempts to impede it cause great emotional disturbance, that its origin is obscure and its end-result opposed to the interests of the patient. It is, however, only by tracing some affinity between its mechanism and the nervous system as a whole that we can hope to understand or influence it. In the case of a habit or conditioned reflex this is relatively easy. It arose as a discriminatory response to a certain stimulus—that is, it was once an object of experience and may again be recalled by appropriate methods. But if the instinct be an inherited mechanism, how can its origin be with any certainty deduced from its relation to other mechanisms accessible to consciousness? The problem is a fundamental one, and has presented itself in many forms.

To the Atomists, to Heraclitus, and to the Pythagoreans (who never drew a distinction between animal and human intelligence) the problem was never presented, nor do we see any trace of it in the anthropomorphic animal psychology of Plutarch. The conception of a divergence between abstract thought and animal life is implicit in Plato, and the distinction became more definite in the writings of Aristotle and the Stoics. In scholastic thought we find instinct formally recognised as comprehending the totality of animal behaviour and the baser part of human conduct, whilst in Neo-Platonism there is a reversion to the standpoint of the Epicureans. With the wane of scholastic thought the tendency to the anthropomorphic view of animal behaviour has persisted till the present day. Darwin formulated our present knowledge of instinctive behaviour and gave full recognition to its recurrence in man and its evolutionary significance.

The problem as to the relation of instinct and intelligence now becomes a biological one. Those who hold the Neo-Lamarckian doctrine as to the hereditary of acquired characters may consider that instinct is nothing else than a hereditary conditioned reflex—that somewhere in the past a discriminatory action became a conditioned reflex, and by the aid of natural selection such a conditioned reflex has been handed down as an innate part of the nervous mechanism. If an instinct in its earliest stages originated as an act of conscious discrimination its later hereditary form will still show some affinity to the conscious mechanism that first started it, and we might hope that by learning something of its cortical connexions we would arrive at its origin. On the other hand, if an instinct be regarded as a variation preserved by process of natural selection, it is clear that to seek its early cerebral connexion is futile, and if we disbelieve in the heredity of acquired characters the instinct reflex pattern must be unfolded *de novo* in each generation, and the associations that it may possess will only be such as may have been acquired during the life of the individual. Men of such different schools of thought as Ziegler, Haeckel, Spencer, Wundt, Semon, Ward, MacDougall, and Preyer, adopt the Lamarckian standpoint; Driesch and notably Bergson represent a return to the scholastic view of instinct. For Bergson instinctive behaviour represents a form of activity to which there can never be a psychical correlation in the terms of human practical intelligence. Human intelligence is so developed and so limited as to enable us to adopt mechanical aids to life, and therefore postulates at the beginning of any action a more or less clearly defined conception of what its end is to be. Instinctive behaviour knows nothing of ends; it can only reply to introspection in the words of Luther, "Ich kann nicht anders."

I venture to think that all speculations about the psychical aspects of instinctive behaviour founded on animal observation are of very doubtful value. The supreme act of faith is the attribution of consciousness to our fellow beings, for knowledge of consciousness is never immediately given; but to proceed to speculate about the psychical correlations of instinctive behaviour in insects can hardly be helpful to objective psychology. We must turn to human instincts, and we must obviously select for study of instinctive behaviour an act performed for the first time and from which mimicry and verbal suggestion are excluded.

EXPRESSION OF THE ANIMAL NEST-MAKING INSTINCT IN HUMAN BEINGS.

Some years ago I observed what has always seemed to me to be a singularly interesting and beautiful instance of instinctive behaviour that fulfils these postulates. If it has been already noted by others I must apologise for presenting it under the guise of a new observation. A primipara about two days before the birth of her child worked very hard at tidying not only all the drawers of her bedroom and boudoir but also her husband's desk. Asked why she

did this she said that as she was going to be ill for a long time she wished to have all her own and her husband's things in perfect order. The answer seemed to me to be somewhat inadequate, since as a rule the husband's desk was never interfered with. Some time later the father of several children remarked to me that he always knew when a birth was due, since for a couple of days before it his wife in an excess of energy would tidy every drawer she could find including all his private papers. When I asked him why she did so he said that she gave him the same explanation as I had received in the first case. Now I knew this lady sufficiently well to feel sure that on the occasion of her long absences at her country house, where she spent many months every year, the last thing that would occur to her would be to prepare for her absence by such a minute ransacking of drawers that are as a rule outside her province. I then asked a midwife if this procedure was a usual precursor of childbirth. She said that she had observed it in quite the majority of her cases, and inasmuch as her practice lay among some of the wealthiest people of the country in whose houses such duties as the arrangement of drawers and cupboards are seldom performed by the mistress the phenomenon was all the more striking. Later on when observing the behaviour of a doe rabbit in a breeding hutch I noted that for three or four days before delivery the doe spent her time in a state of frantic activity collecting bits of hay, tossing them up to unravel them, and finally carrying them to the dark compartment at the end of the cage. She was making a warm nest for the expected young. When we find that this nest-making behaviour is universal among the higher apes I think that we are entitled to assume that the drawer-cleaning, sorting, and tidying are the expressions of the animal nest-making instinct.

We have here an instinct untainted by any possibility of mimicry, and since its existence is apparently unknown, free from any complication due to suggestion. The purpose of the reflex instinct mechanism is unknown to the expectant mother, and when her attention is directed to it, and she is asked what she is doing, she casts about for an explanation and evolves one that is not only false but shows no associational nexus to the true purpose of her activity. The distinguishing feature of an instinctive reflex is its compelling urgency. The least delay or opposition to its accomplishment, once it has been aroused by the appropriate stimulus, evokes an intense bodily reaction, and it would appear to be of the imminence of such an explosion of feeling that we speak of as a feeling of compulsion. This feeling of compulsion is the real equivalent of what Bergson terms intuition in respect to instinctive activity. Like the Bergsonian intuition, it cannot be translated into the language of practical thought, nor has it association of a direct nature with aught other than the immediate instinct mechanism. These innate pattern reflexes that we term instincts undoubtedly play an enormous part in the mechanism of conduct. Their recognition in all but such simple cases as I have just now narrated is a matter of great difficulty. They can as a rule be only distinguished from the conditioned habit reflexes by a minute knowledge of the subject's past history such as neither he nor the observer can hope to possess. Much of the vast output of writings on the subject of the instincts that has been characteristic of the last few years loses considerably in value on this account. As I am concerned only with an attempt to show what fundamental knowledge concerning organic disturbances of mechanism can be gained from an objective study of bodily responses and of conduct, I will make no attempt to deal with any system of classification of the different forms of instinctive mechanism. There appears to be a tendency to over elaboration in this direction—*Essentia non sunt multiplicanda praeter necessitatem*—the "razor" the "doctor invincibilis" has its application in psychological medicine as well as in philosophy. One particularly deplorable move in this direction has been the invention of states or attitudes to take over the very attributes without

which an instinct cannot be recognised as such. Thus to account for the compelling power of the instinctive mechanism that will drive a man into courses of conduct that are directly at variance with his interests in society as at present constituted, we are invited to divest the instinct of its compelling power and to lay it at the feet of an entity termed the "self regarding sentiment" for whose satisfaction we yield to the unprofitable enterprise. There is a flavour of mid-Victorian self-righteousness about this sentiment; it may possibly have been of great usefulness in strengthening the resolutions of conscientious objectors, but the men who sacrificed their interests in the war because they felt that they could not do otherwise had little use for it. The modifications that will be imposed on a primary instinctive mechanism by the pressure of the environment will be incalculable. It is for this reason that in the elucidation of both instinctive reflexes and conditioned habit reflexes their affinities to the affective states are likely to afford a truer if less detailed insight into their nature than any attempt to range them in a tentative scheme of classification.

From what has been said of the relations of bodily response to nocuous and benign stimuli it is obvious that I must consistently range the processes of activity that are distinguished as appetites as being nothing other than responses to nocuous stimuli. From the objective point of view such activities are the response to the present situation of pain and not the pursuit of pleasure. The satisfied man can have no appetites. The nocuous stimulus that arouses our activities is not that conditioned by the desired object itself, but by the limitations imposed by the environment that impede the possibility of our satisfaction by its possession. What is true of appetite is true of desire. As Spinoza remarks, there is no difference between appetite and desire except in so far as the latter implies consciousness. Desire is self-conscious appetite.

SOME NOTES ON ORIENTAL SORES.

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MESOPOTAMIA may be described as a land rich in mosques, sand, and oriental sores; as regards oriental sores, a better ground for research could hardly be found than that opened up during the conquest of Irak. Few people left the country without having had an introduction to the sore; many regarded the condition as an unavoidable and trifling evil; some even went so far as to be inoculated on one or other limb in the popular belief that one sore confers immunity. Multiplicity of sores was, however, the rule in cases seen. The incubation period varied from three to six months; cases were more numerous during the cold period—i.e., September to April. The causative agent, the L.-D. bodies, could only be distinguished in the earlier sores—the macular and recent ulcerative type, while the veldt diplococcus could be found in most of the older sores. From the position of the majority of sores various biting insects have been cited as carriers—amongst them the ubiquitous sand-fly and the stomoxys—but definite proof on this point has yet to be established.

The type of sore seen varied from the small bluish-red macule, to the large, irregular, thick-margined ulcers, having scabs dotted with pus puncture holes. The sites, in order of frequency were: wrists, hands, forearms, knees, and feet.

Complications.

In most cases oriental sores run a straightforward course, but complications sometimes arise. One of these is of interest, and was observed in some five cases—i.e., about 0.7 per cent. This was a thrombosis of the vein draining the area in which the ulcer was situated.

A peculiarity of the thrombosis was its resistance to medicinal treatment. In one case where the sore was situated on the dorsum of the foot, near the outer two toes, the whole of the short saphenous was represented by a hard thickened cord, a section of which showed successive fibrous laminæ within a thickened vein wall. In two other cases the upper reach of the internal saphenous vein was affected, the sore being on the inner side of the knee; of the remaining cases, one was in the right upper abdomen and the other in the right wrist. In all cases the sore was of some months' duration, and in two cases had apparently healed. The thrombosis refused to clear up under prolonged palliative treatment, and surgical interference, which consisted of complete or partial removal of the affected vein, was required.

Treatment Employed.

The following modes of treatment were tried:—

For early sores—macular and early ulceration stage: (1) X ray applications, one Sabouraud's pastille, once weekly—one to four applications; (2) potassium permanganate crystals: the scab was removed, the base of the ulcer cleaned, and the edges packed with the crystals; (3) methylene-blue; (4) crystals of hyd. perchlor. applied as in 2; (5) injections of tartar emetic: intravenous, starting with $\frac{1}{2}$ gr. doses, and increasing by $\frac{1}{2}$ gr. at intervals of four days. A week's interval, when $\frac{1}{2}$ gr. had been given. Maximum dose 4 gr.; (6) ung. ant. tartrate.

Conclusions.

The results of the various modes of treatment led to the following conclusions: (1) For early sores X ray curative, especially of small sores, with slight, early ulceration; (2) for older sores: potassium permanganate, effective in about 50 per cent. of cases. Methylene-blue of doubtful value; hyd. perchlor. crystals fairly efficacious, but too painful; injections of tartar emetic effective in about 90 per cent. These were picked cases—fairly recent sores and situated usually on the face.

The old sore was the least amenable to treatment of the above type, and the large, thickened scab-forming purulent type of ulcerative sore seldom yielded to medicinal measures. In these cases thorough scraping under CHCl_3 and ol. ricini dressing, later replaced by a stimulative ointment dressing, gave the best results.

One's conclusions might, in fact, be tabulated as follows:—

(a) For the sore in the early stages: (1) X ray applications; (2) crystals of pot. permang.

(b) For the sore in the fairly advanced stage: (1) crystals of pot. permang.; (2) intravenous tartar emetic.

(c) For the sore in the more advanced stage: (1) thorough scraping under CHCl_3 , and application of ol. ricini dressing.

(d) For sores in the face, other than those in a very early stage: intravenous tartar emetic.

Under thorough treatment most sores healed within a month. A marked improvement was usually observed after the second injection of tartar emetic.

The scar left was of the tissue-paper variety, with radiating lines of pigment from the periphery. The scar tissue rapidly became darker, especially in the oriental.

London.

ST. ANDREWS INSTITUTE FOR CLINICAL RESEARCH.—

A three weeks' course of post-graduate study for general practitioners will be given at the St. Andrews Institute for Clinical Research, Fife, commencing Tuesday, Oct. 4th. The course will consist of lecture demonstrations dealing with methods for the investigation of disease in its early stages, and will be supplemented by demonstrations on matters of clinical interest in anatomy, physiology, chemistry, bacteriology, ophthalmology, and radiology. Graduates desirous of attending this course should communicate as early as possible with the Secretary of the Institute, who will send them full particulars, and will be glad to advise them with regard to securing rooms in St. Andrews.